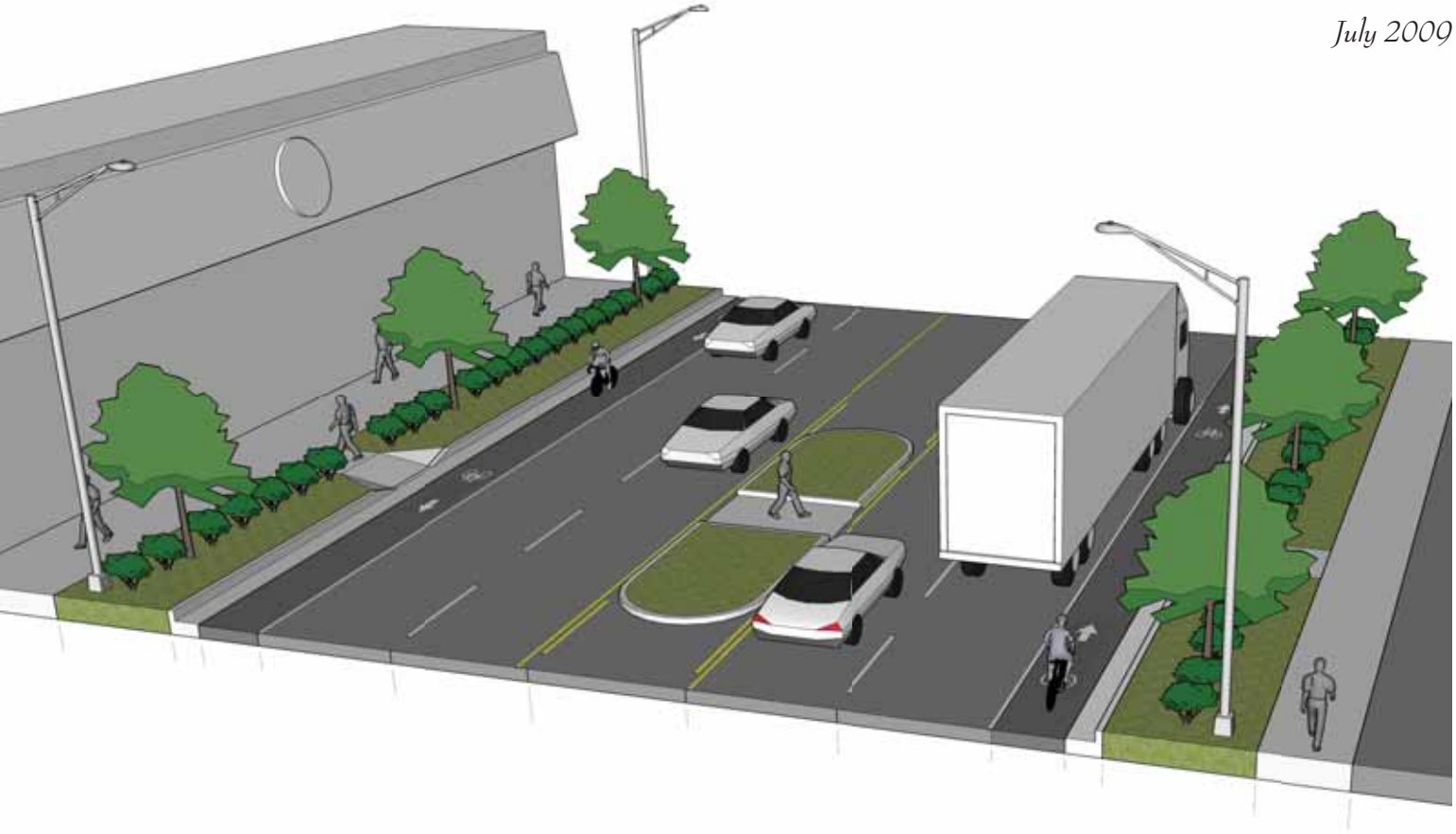
Complete Streets Study

Hall Road/Washington Street Corridor

Maryville & Alcoa, Tennessee

July 2009



Prepared for:

KNOXVILLE REGIONAL TPO

by:

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EXECUTIVE SUMMARY

This report documents a Complete Streets Study completed by Gresham, Smith and Partners in the Fall of 2008 and Winter of 2009. The purpose of the study is to make recommendations for transforming the Hall Road/Washington Street corridor in Maryville and Alcoa into a complete street with accommodations for all users. The study process was highlighted by a weeklong planning studio and workshop series in November 2008.

Hall Road in Alcoa.

What is a Complete Street?

According to the National Complete Streets Coalition, complete streets:

…are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to move safely along and across a complete street.

Complete streets are a new way of thinking about how streets are designed, and may be put together a number of different ways, so long as they are intentionally designed around all potential users.

Washington Street in Maryville

The Hall Road/Washington Street Corridor

The section of Hall Road and Washington Street that is the focus of this study is located where the Cities of Alcoa and Maryville meet, beginning at Lincoln Road near the historic Bassell community and ending at US 321/Lamar Alexander Parkway near Maryville College. This approximately one-mile-long corridor was chosen because of its mix of complementary land uses, such as the Maryville/Alcoa Greenway, downtown Maryville, Maryville College and surrounding commercial and residential uses, coupled with the lack of accommodations for pedestrians and bicyclists.

Issues and Opportunities

An analysis of existing conditions on Hall Road and Washington Street revealed several issues to be addressed by this study:

- Building pedestrian comfort zones that enhance the existing sidewalk coverage;
- Limited ROW on Washington Street;
- Mitigating high vehicle speeds on Hall Road;
- Create a safe, continuous bicycle facility/route;
- Making intersections safe and accommodating for bicycles and pedestrians;
- Identifying more opportunities for crossing;
- Integrating with existing and future development; and
- Balancing multi-modal needs with motor vehicle mobility.

Workshop participants examine an aerial of the corridor.

These issues were confirmed during an interactive public workshop in November involving residents, business owners, users and other stakeholders. Workshop participants identified four priority goals for the corridor:

1. Safe, comfortable environment for walking.

2a. Safe bicycle and pedestrian access to parks and schools.

2b. Visually pleasing and a gateway to the community.

3. Safe, comfortable environment for bicycling.

Corridor Vision Plan

The consulting team took into consideration the results of the existing conditions analysis plus feedback received at the opening workshop to make specific recommendations. The ultimate vision for Hall Road and Washington Street results in the creation of a safe place for bicycles and pedestrians, while maintaining the corridor's motor vehicle mobility function. It includes a raised refuge island, bicycle lanes, sidewalks, a planting strip with street trees and reorientation of buildings to make the corridor more pedestrian-friendly.

The recommended vision for the corridor, if implemented as a single project, would be very costly and potentially disruptive. Rather than try to implement the vision at once, the study recommends a toolkit of strategies that will show immediate results and incrementally achieve the ultimate vision over time. The strategies begin with lower-cost options that can be implemented relatively quickly and progress toward more costly strategies that will require more time. Public workshop participants were able to view the strategies and indicate their preference.

Long-term vision for the corridor.

Implementation

In sum, the total cost of the projects included in the toolkit of strategies is likely several million dollars. There is no specific pool of money set aside for funding the recommendations of this Plan. However, the important thing is that there be a plan and specific, tangible projects in place, so that funding vehicles can be actively pursued. This Hall Road/Washington Street Complete Streets Plan meets that objective. A more practical and creative way to get some of the projects implemented is by tagging along with an already programmed project.

A long-term, continual approach to implement the vision and strategies is through policy changes. Policies, which are typically implemented through ordinances, make an impact as land use changes or as buildings are rebuilt or renovated (i.e. redevelopment). Policies could take the form of:

- Sidewalk ordinance;
- Adequate public facility ordinance;
- Urban design overlay;
- Form-based code; or
- Private-sector incentives.

I. Background and Introduction

In the Fall of 2008, Gresham, Smith and Partners (GS&P) was contracted by the Knoxville Regional Transportation Planning Organization (TPO) to perform a Complete Streets Study. As part of the study process, the consulting team developed a plan for transforming the Hall Road/Washington Street corridor in Maryville and Alcoa into a complete street.

This report documents the Hall Road/Washington Street Complete Streets Plan, including the study process and recommendations, which is highlighted by a weeklong planning studio and workshop series held during the second week of November in 2008. The recommendations consist of a long-term vision plan for the corridor as well as a toolkit of strategies that can be implemented gradually over time.

Complete streets are intentionally designed . . .

. . . around all potential users.

What is a Complete Street?

The National Complete Streets Coalition states that complete streets are ". . . designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities are able to safely move along and across a complete street."

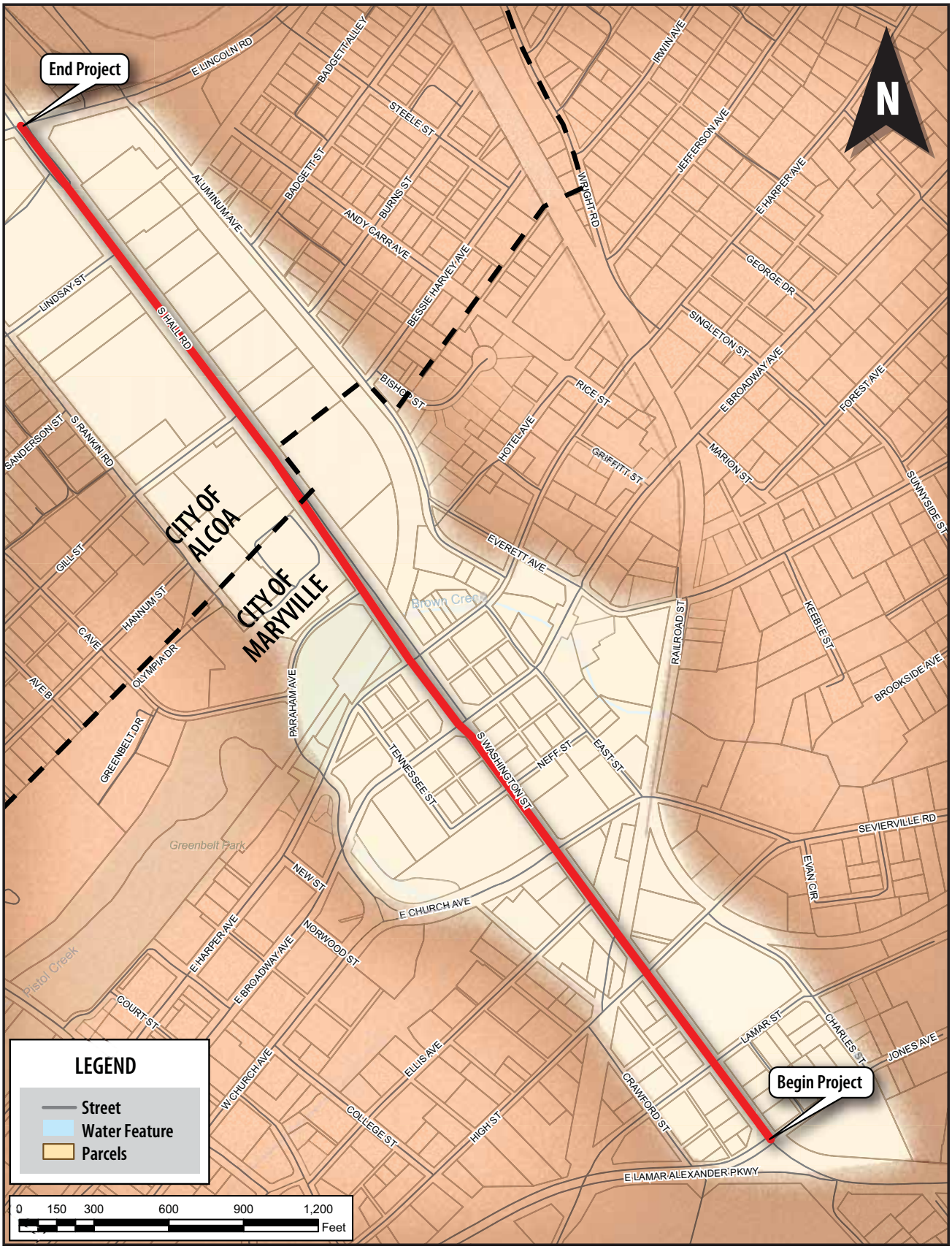
Simply stated, a complete street reflects a new way of thinking about how streets are designed. A complete street may be put together a number of different ways, so long as it is intentionally designed around all potential users.

Complete the Streets is a national movement that includes the Federal Highway Administration (FHWA), state departments of transportation, metropolitan planning organizations (MPOs), cities, counties, nonprofits and others. The movement is gathering momentum as more communities see complete streets as a valuable approach to providing alternatives to traffic congestion, making places more livable, reducing environmental impacts and providing a host of other benefits.

The Hall Road/Washington Street Corridor

The section of Hall Road and Washington Street that is the focus of this study is located where the Cities of Alcoa and Maryville meet, beginning at Lincoln Road near the historic Bassel community and ending at US 321/Lamar Alexander Parkway near Maryville College. (Figure 1). This approximately one-mile-long corridor was chosen because of its mix of complementary land uses, such as the Maryville/Alcoa Greenway, downtown Maryville, Maryville College and surrounding commercial and residential uses, coupled with the lack of accommodations for pedestrians and bicyclists.

Figure 1. Study Area



II. Corridor Context

In order to make recommendations on how to make the Hall Road/ Washington Street corridor a more complete street, it is first necessary to have an understanding of the current context. This includes an understanding of the corridor's role in the transportation system (mobility context), the people and places that surround it (land use and demographic context) and how the corridor is put together (design context).

Mobility Context

Hall Road/Washington Street, also known as SR 35, serves as a significant mobility corridor for the region. It is a key connector between regional facilities, including Interstate 140 (Pellissippi Parkway), US 129 (Aloca Highway) and US 321 (Lamar Alexander Parkway). This connection gives the corridor its status as a gateway to the Great Smoky Mountains National Park.

Daily Traffic Volumes

Traffic volumes on Hall Road/Washington Street (Figure 2) range from approximately 20,000 to 24,000 cars per day. This is considered a reasonable range of traffic volume for what a five-lane road in an urbanized area would typically carry.

Daily traffic volumes in the corridor are reasonable for a five-lane road.

Cross streets along the study corridor do not carry a significant amount of traffic. All cross streets carry fewer than 10,000 motor vehicles per day, most fewer than 5,000 motor vehicles per day. This is a function of the relatively balanced street network that serves the study corridor. The one exception is Lamar Alexander Parkway, which is a regional east-west road that carries almost 24,000 motor vehicles per day.

These data suggest that most trips on Hall Road/Washington Street originate from outside of the study corridor, indicative of the road's regional significance. However, relatively modest mainline traffic volumes, coupled with low cross-street traffic volumes, provide for a good degree of flexibility in design.

Functional Classification

Hall Road/Washington Street is classified a major arterial, further underscoring its regional significance (Figure 3). Additionally, three cross streets – Broadway, Sevierville Road (both are designated as US 441) and Lamar Alexander Parkway/US 321 – are classified as arterials, signifying that they too are intended to serve a regional purpose.

Intersection Function

There are a total of 12 intersections in the corridor, five of which are controlled by a traffic signal, for an average signal density of five signals per mile. The reality, however, is that most of the signals are clustered on Washington Street at the south end of the corridor (approximately 880 feet apart). This is a relatively high signal density for a street

Figure 2. Daily Traffic Volumes

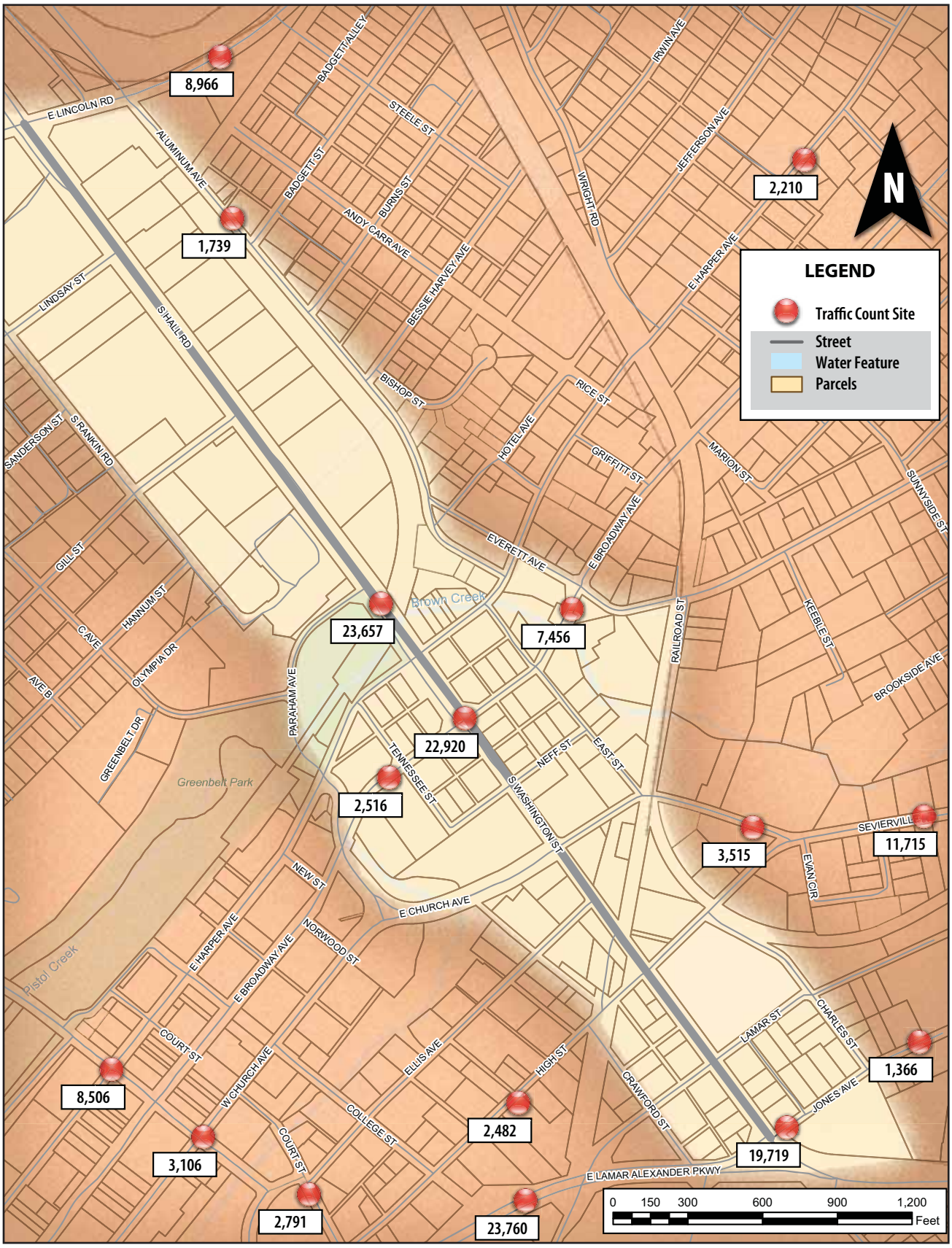
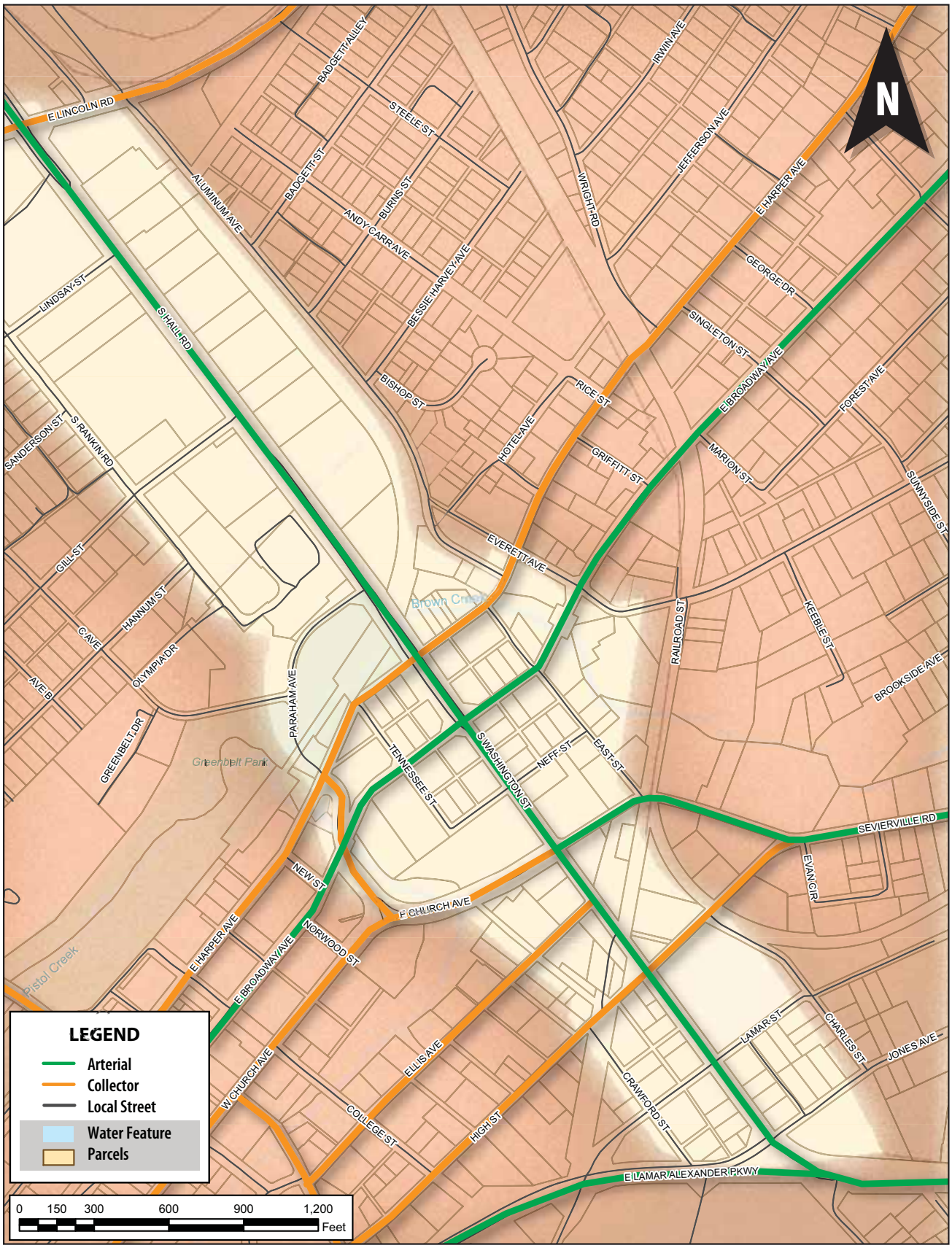


Figure 3. Functional Classification



Travel time delay occurs at intersections in the corridor.

Long gaps between traffic signals present the potential for safety and operational issues.

Truck turn movements are observed at High Street.

There are continuous sidewalks throughout the corridor.

outside of a downtown/central business district. Alternatively, there is a roughly half-mile stretch on the Hall Road portion of the corridor (from Lincoln Road to Broadway) that does not have a signal. Generally speaking, the more signalized intersections on a street, the greater the amount of delay (i.e. congestion).

Average Speed and Levels of Service

Relatively close signal spacing and signal delay contribute to slower travel speeds along the corridor. The posted speed within the study area is 35 miles per hour, yet the highest average speed for vehicles traveling through the corridor during peak periods is less than 22 mph, and average speeds are not much higher during the midday. The difference between the posted speed and the actual speed is attributed to delay at traffic signals.

Table 1. Average Motor Vehicle Speed on Hall Road/Washington Street (Miles per Hour)

Time of Day	Northbound	Southbound
AM peak*	21.8	NA
PM peak*	NA	21.0
Mid-day**	22.3	21.7

* *Maryville/Alcoa Traffic Signal Study*
** *Field measurement*

As noted, on the Washington Street segment of the corridor, signals are clustered closely together, leaving a large half-mile gap on the Hall Road segment. The net effect is that motor vehicles reach high speeds at long signal gaps and than stop abruptly at intersections. This creates safety and operational issues for motor vehicles as well as for bicycles and pedestrians (Figure 4).

Truck Traffic

Hall Road/Washington Street is not designated by the TPO as an official freight route, and no significant truck traffic is observed in the corridor. According to the 2030 Long Range Transportation Plan, fewer than 500 trucks use the corridor on a daily basis. However, truck turn movements are observed at High Street, associated with adjacent industrial uses.

Sidewalks

The corridor has good sidewalk coverage. Both sides of the street have continuous sidewalks throughout the corridor (Figure 5).

Crossing Treatments

Of the five signalized intersections in the corridor, three include pedestrian indications – Lincoln Road, Broadway and Lamar Alexander Parkway; all of these are missing one or more pedestrian indications. The remaining signalized intersections – Sevierville Road and High Street – include marked crosswalks (but no pedestrian indications). High Street has a marked crosswalk at only the north

Figure 4. Signalized Intersections and Travel Time

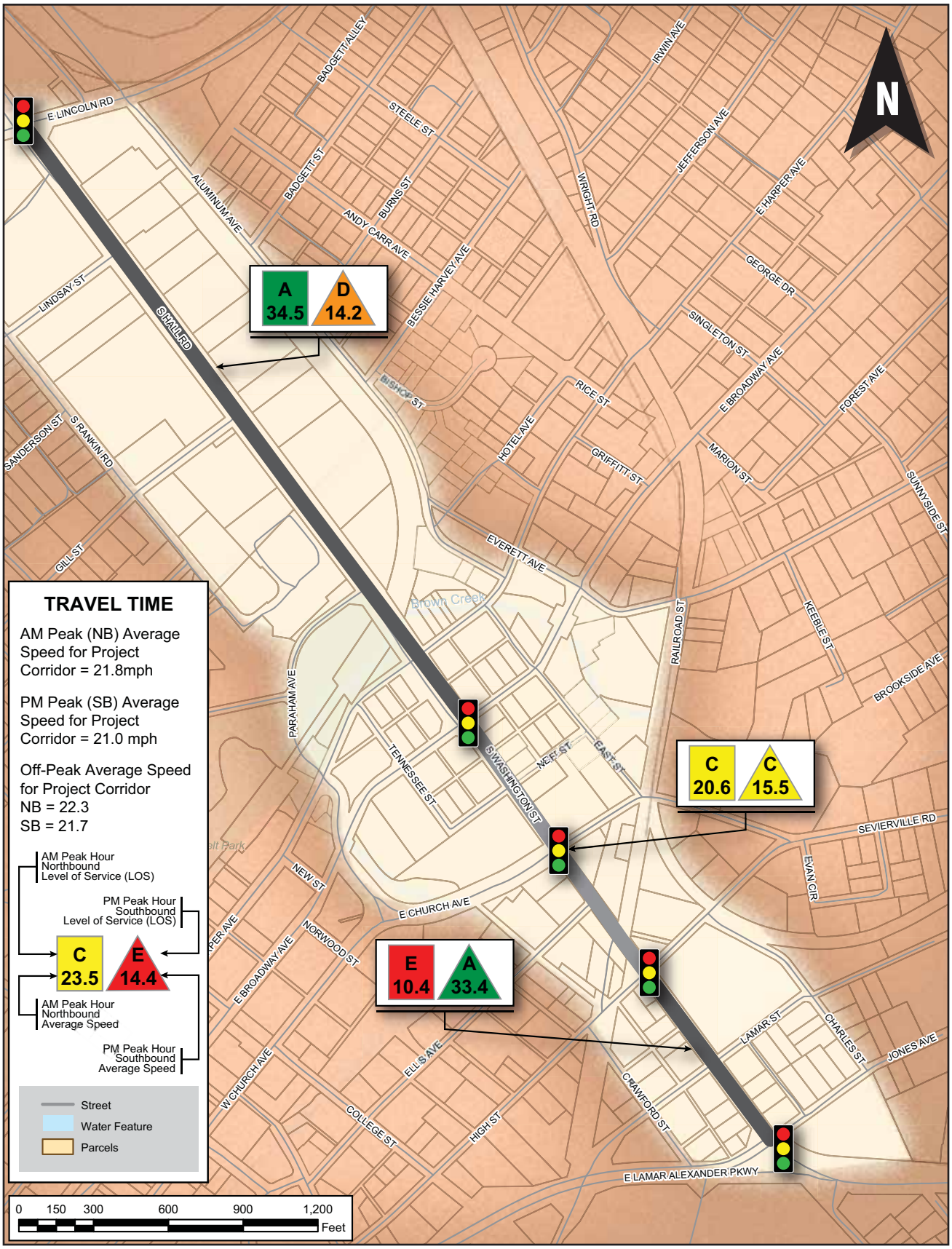
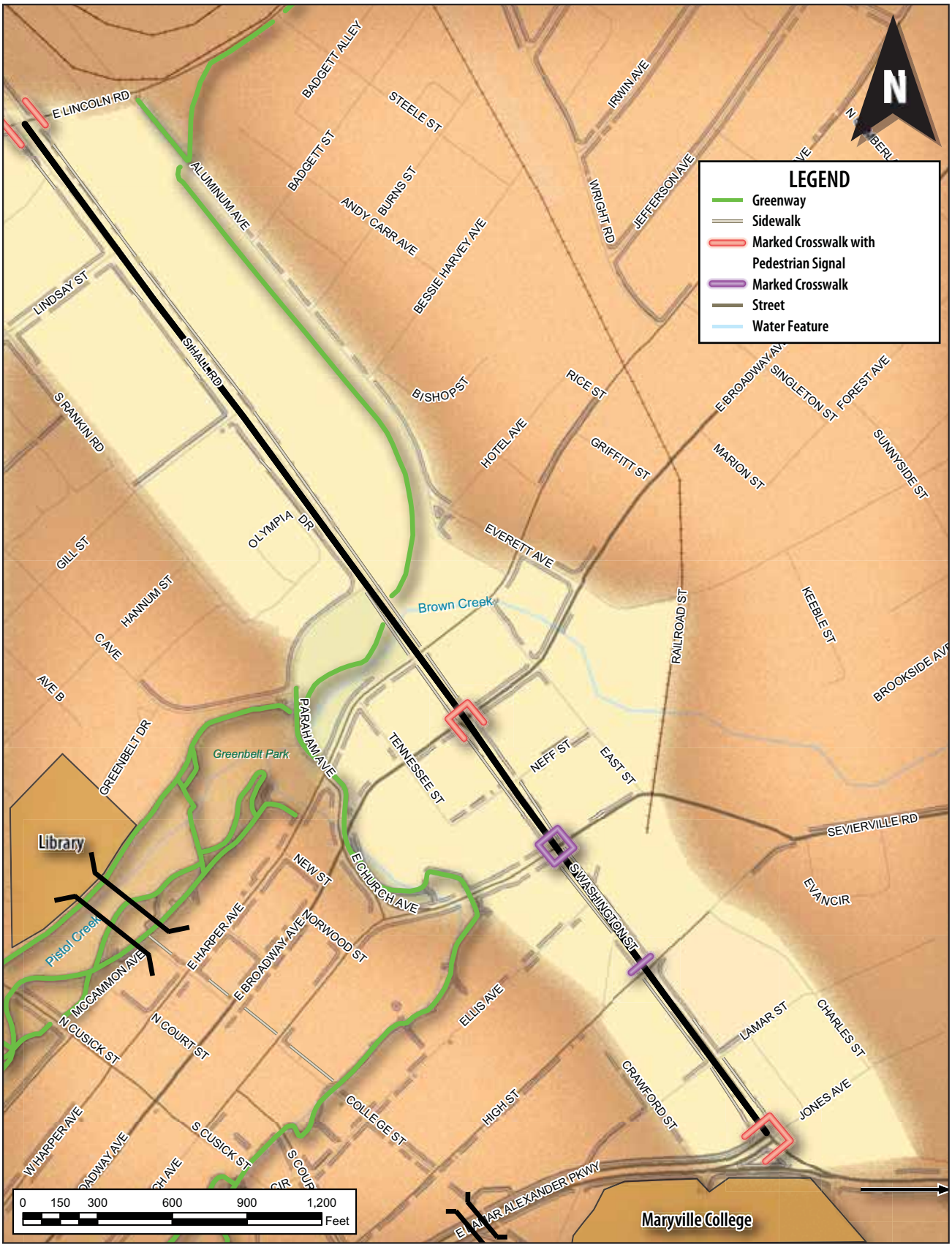


Figure 5. Bicycle and Pedestrian Facilities



leg of the intersection. There are no crossing treatments elsewhere on the corridor.

Bicycle Facilities

There are no designated bicycle facilities in the corridor. There is a striped, paved shoulder on Hall Road (north of Parham Avenue); however, it is not a designated facility for bicycles, and is often used by motor vehicles as an acceleration/deceleration lane for turning movements.

Maryville/Alcoa Greenway

The Maryville/Alcoa Greenway runs parallel to Hall Road on the east side, just behind the parcels that front Hall Road. The greenway passes under the corridor just south of Parham Avenue and continues west into downtown Maryville. There are no designated connections to the greenway from the corridor.

Transit

There is no fixed-route transit service in Blount County. While fixed-route transit service is a long-term goal for the region, there are no near-term plans for transit. The East Tennessee Human Resources Agency (ETHRA) provides demand response transit service for residents of Blount County.

Hall Road has a wide paved shoulder, but is not designated to accommodate bicycles.

Maryville/Alcoa Greenway

Land Use and Demographic Context

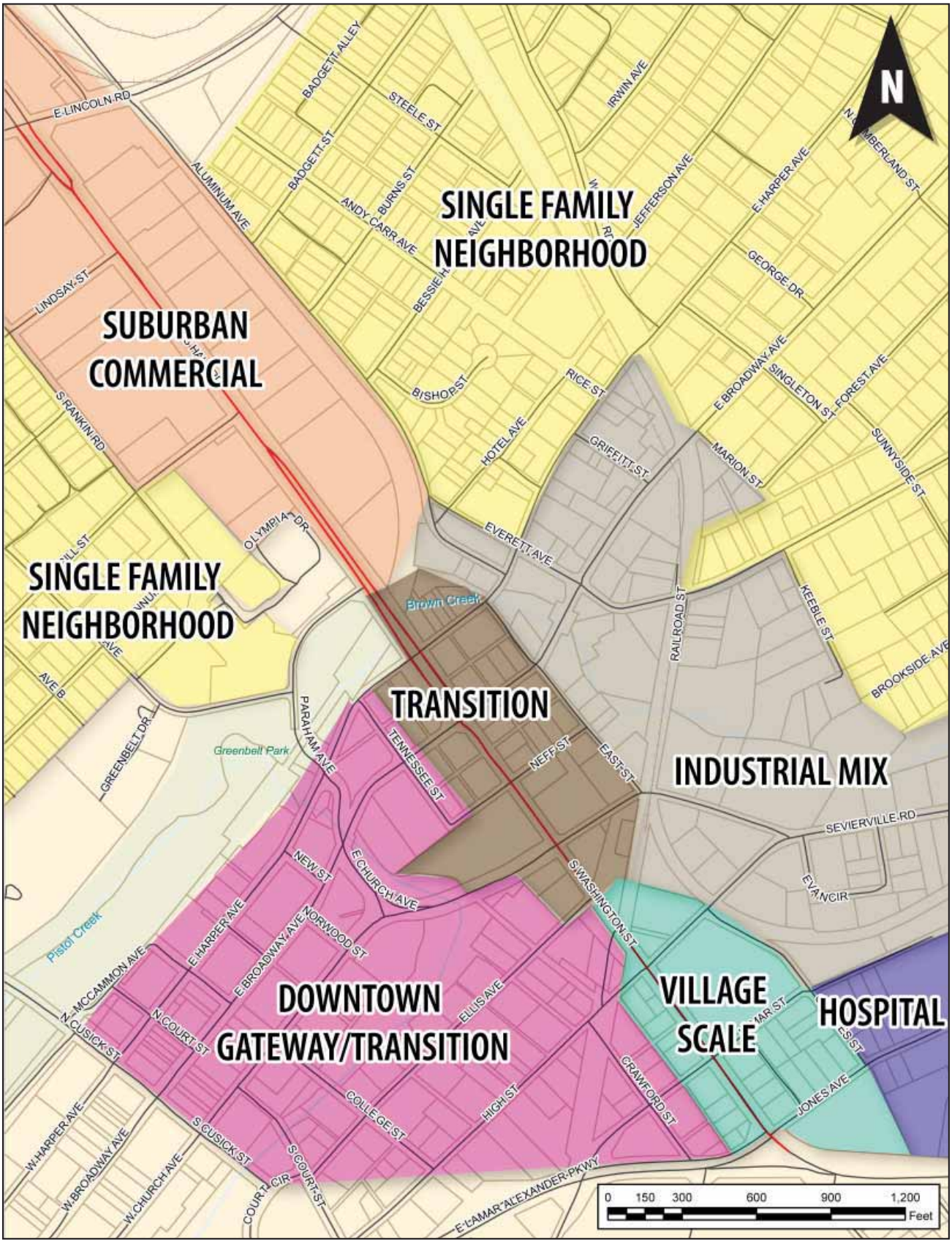
Land Use and Character

Existing land uses in the corridor can be described in terms of several distinct character zones (Figure 6):

- **Suburban commercial** – This is the section of Hall Road north of Parham Avenue. It includes single-use retail, restaurants, "big box" strip commercial centers and some service/professional establishments that are primarily automobile-oriented. Many of the parcels in this area appear to be candidates for redevelopment.
- **Transitional** – These are the blocks of parcels immediately south of the bridge. Here, the parcels and buildings become smaller and are closer to the street. Buildings are generally newer and are mainly small office/service uses.
- **Village** – This is the small scale, historic portion of the corridor. It begins south of Sevierville Road. Buildings are spaced close to each other and to the street, putting activities in easy walking distance of each other. There is a mix of uses, including an elementary school, small offices and new retail development.
- **Gateway** – West of Washington Street are several parallel east-west streets leading into downtown Maryville. These streets are fronted with various commercial uses
- **Industrial/hospital** – East of Washington Street are various light industrial uses as well as Blount Memorial Hospital.

Village-scale uses at the south end of the corridor.

Figure 6. Character Zones



- **Maryville College** – Just south of where Washington Street meets Lamar Alexander Parkway is Maryville College.
- **Residential** – Neighborhoods surround the commercial parcels on the north end of the corridor (Hall Road). The stable, established neighborhoods are composed of single-family homes on smaller lots (i.e. one-quarter acre or less).

Combined, all of the character zones contain compatible land uses and are located in close proximity to each other (i.e. within one-quarter mile). This results in an environment that is more naturally conducive to walking and bicycling than contemporary suburban development, which is made up of "megablocks" and is characterized by very large, single-use parcels and buildings that are separated by large surface parking lots and very long distances.

Community Facilities

Community facilities are places that exist for the good of the surrounding community; special emphasis is placed on access at these locations. There are several community facilities at the south end of the corridor, beginning with the Maryville/Alcoa Greenway and Greenbelt Park. Other community facilities include the Blount County Chamber of Commerce and Welcome Center, Fort Craig Elementary School, Maryville College and Blount Memorial Hospital (Figure 7).

Fort Craig Elementary

Zoning

Current zoning designations in the corridor essentially reinforce existing land use patterns. Washington Street is subject to Maryville's Downtown Development Guidelines, which provide direction on architectural treatments and other design elements.

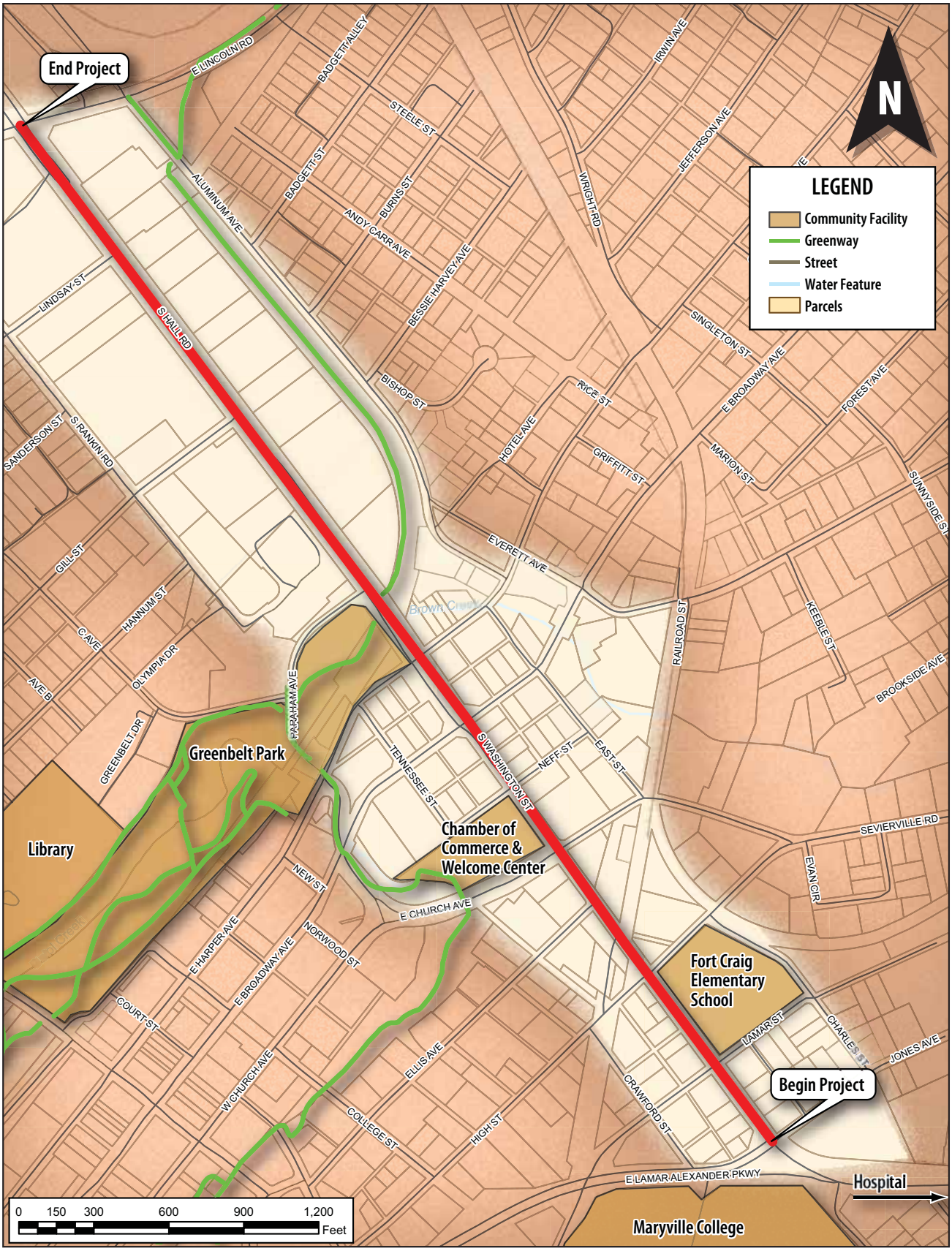
Demographic

Data collected during the most recent US Census (2000) was analyzed to determine demographic factors that bear a strong relationship to mobility needs among households located in census tracts in the corridor. Key findings include:

- 22% of residents are under the age of 18;
- 17% are over the age of 65;
- 52% of households have one or no car, and
- 4 out of 5 tracts are at or below the County median income.

These findings suggest that there is significant demand for alternatives to driving, either because of age, income or otherwise lack of access to an automobile. It is likely that providing more and better access to driving alternatives will enhance mobility in the corridor.

Figure 7. Community Facilities



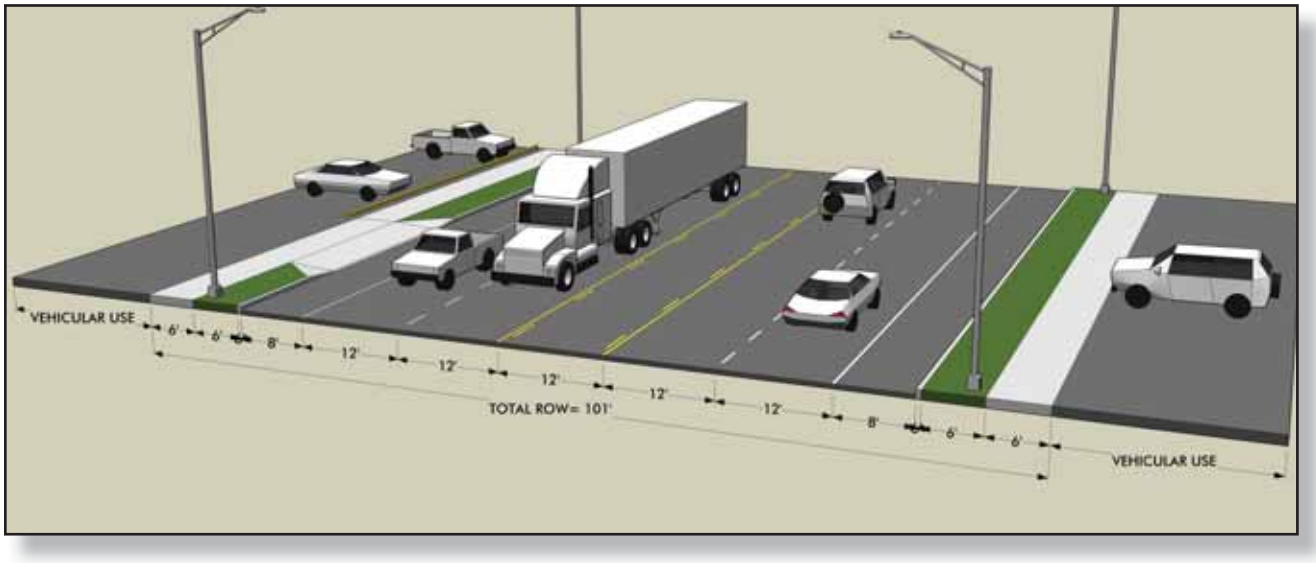
Design Context

Typical Sections

Hall Road/Washington Street within the study area is configured as a five-lane roadway – two motor vehicle travel lanes in each direction and a two-way center turn lane. The elements that make up this cross section, however, vary. The corridor can generally be described in terms of four unique sections:

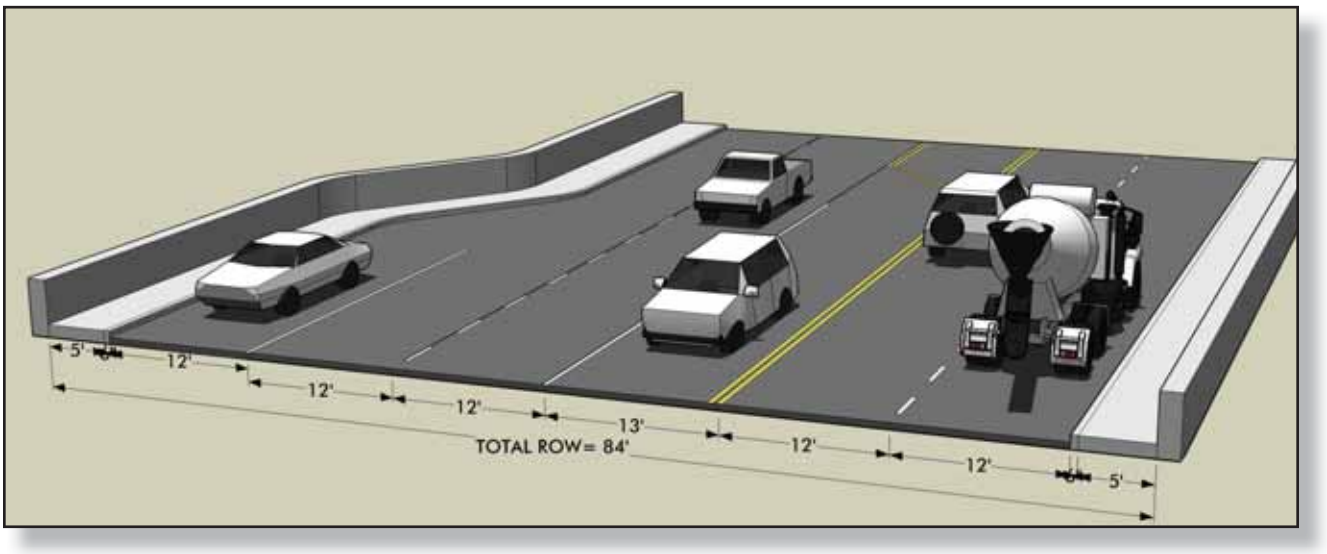
1. **Lincoln Road to Parham Avenue** – This section includes 12-foot travel lanes, a 12-foot two-way center turn lane, eight-foot paved shoulders, and a six-inch curb with no gutter pan. Roadside elements at the edge of the curb consist of a six-foot-wide planting strip and six-foot-wide sidewalk on both side of the street. The total width of ROW is approximately 100 feet. Parking is generally located adjacent to the edge of the ROW, and buildings setbacks generally range from 75 to 150 feet on the east side and from 100 to 200 feet on the west side (Figure 8a).

Figure 8a. Typical Section from Lincoln Road to Parham Avenue



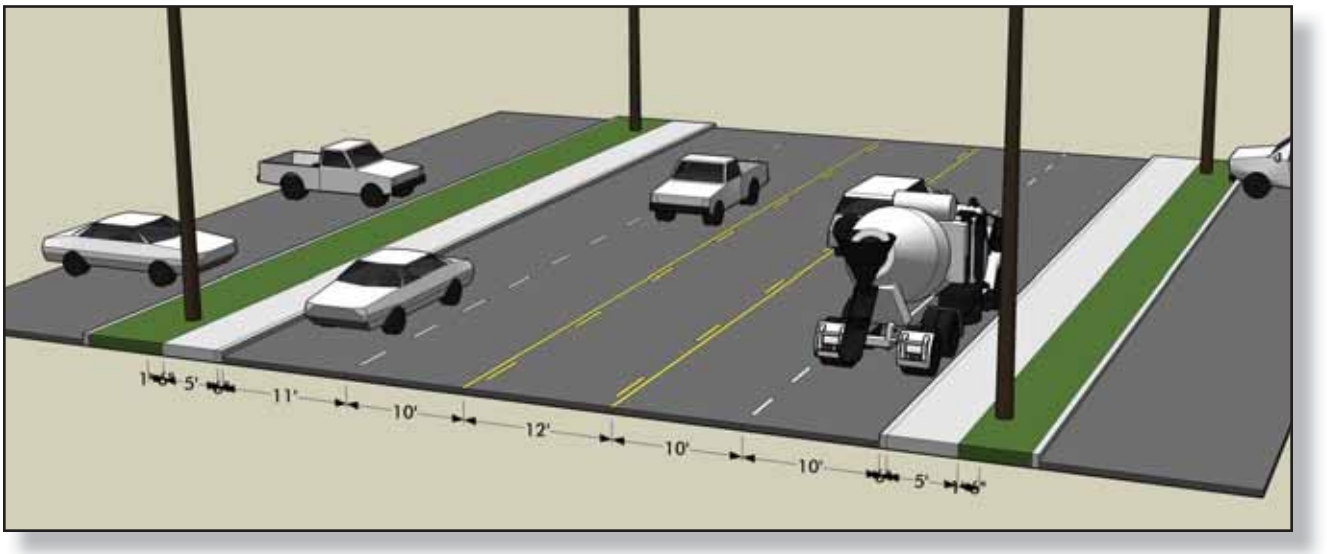
2. **Parham Avenue to Broadway** – This is the bridge section of the corridor. It includes 12-foot travel lanes, a 13-foot two-way center turn lane and a six-inch curb. There is a five-foot sidewalk and concrete barrier/rail on both sides of the street. There is no shoulder or planting strip. The total width of ROW is 72 feet. At the south end of the bridge, the ROW expands to 84 feet to include a 12-foot right turn lane at Broadway (Figure 8b).

Figure 8b. Typical Section from Parham Avenue to Broadway



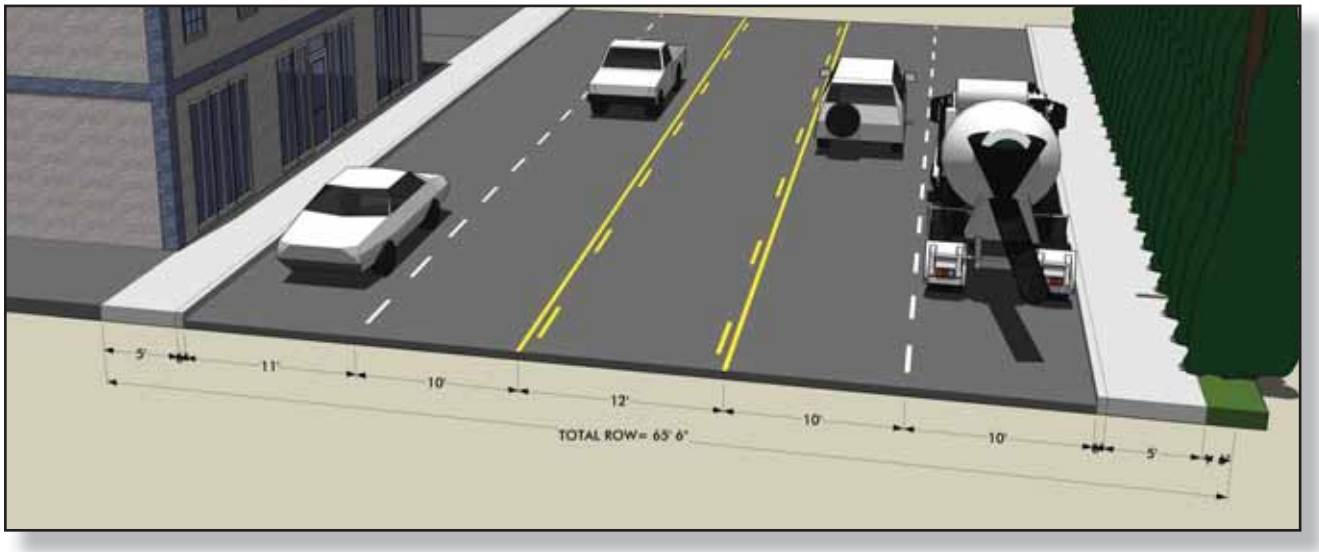
3. **Broadway to Sevierville Road** – While the roadway geometry stays the same, the ROW begins to significantly narrow on this section. The travel lanes are reduced to approximately 10 feet with a 12-foot center turn lane and six-inch curb. There are five-foot sidewalks on both sides of the street with no shoulder or planting strip. The total width of ROW is 64 feet. A single or double row of parking is generally located adjacent to the edge of the ROW, and buildings setbacks generally range from 25 to 75 feet (Figure 8c).

Figure 8c. Typical Section from Broadway to Sevierville Road



4. **Sevierville Road to Lamar Alexander Parkway** – The ROW width and typical section elements are generally the same here as the previous section. However, many of the buildings move to the edge of the ROW or within 25 to 50 feet. Most parking is shifted to the side or rear of buildings (Figure 8d).

Figure 8d. Typical Section from Sevierville Road to Lamar Alexander Parkway



Building Orientation

As described in the previous section, there is a distinct difference in building orientation at both ends of the corridor. At the north end of the corridor (Hall Road), building orientation takes on a decidedly suburban, automobile-oriented feel. The lots are larger and buildings are set back at longer distances (greater than 100 feet) from the street and each other. Buildings are oriented toward associated parking lots and there are few connections to the street. This style of building configuration is not likely to attract a significant number of individuals who walk by choice, but is still manageable for those for whom walking is the primary or only option.

South of the bridge (Washington Street), building orientation and character changes. Lots become smaller, buildings begin to move closer to the street and parking is shifted to the side and rear. At the south end of the of the corridor, many of the buildings directly front Washington Street and/or have direct connections to the street. This style of building orientation puts virtually all uses within easy walking distance of each other.

At the north end of the corridor, buildings are set back at longer distances from the street and each other.

At the south end, buildings are spaced more closely and oriented toward each other.

Curb cuts for direct access create a greater potential for conflict.

Large curb radii result in longer pedestrian crossing distances . . .

. . . and higher vehicular turning speeds.

Pedestrians cross in the flush median at mid-block locations.

Access

At the north end of the corridor on the east side of the street, virtually all parcels in the corridor have direct driveway access to Hall Road, and in many cases more than one driveway, with little or no cross access between adjacent parcels. This results in numerous curb cuts and vehicular turn movements in the corridor, which creates a much greater potential for conflict with other motor vehicles and bicycles and pedestrians. However, many of the land uses are not very active, so the current level of conflict is lower.

On the west side of the street, there is still direct driveway access, but larger parcel sizes mean there are fewer curb cuts.

South of the bridge parcels become smaller and more numerous. However, site access is a balance between side/rear and front driveways, meaning that the total number of driveways on Washington Street relative to the number of parcels is much lower.

Network Quality

On the east side of Hall Road, topography (a stream and the greenway) prohibits street network connections altogether. On the west side, larger parcels reduce the detail of the local street network, although several cross streets do exist.

On Washington Street, there are several intersecting cross streets. However, topography limits the number of local streets running parallel to the corridor.

There are no off-street (i.e. multi-use path) network connections to the corridor.

Intersections and Pedestrian Crossing

Intersections at the north end of the corridor are designed with relatively large (30 to 50 feet) turn radii intended for high-speed turn movements. The presence of a paved shoulder effectively increases the turn radius and vehicular turning speeds. The result of this design is that drivers look at oncoming traffic and quickly enter the stream and do not see pedestrians crossing. The large turn radii create long stretches of pavement for pedestrians to cross, sometimes approaching 100 feet.

South of the Broadway intersection, turn radii get smaller and intersections become more manageable. However, they generally lack adequate crossing treatments (markings, pedestrian indications, etc.). The intersection at Lamar Alexander Parkway contains heavy traffic with complex turning movements and long crossing distances, making it difficult to navigate for a pedestrian.

Intersection spacing and an overall lack of pedestrian treatments at intersections result in a long stretch on Hall Road (approximately half a mile) where there are no adequate pedestrian crossing opportunities. This is evident in the numerous observations of pedestrians crossing in the flush median at mid-block locations.

Summary and Assessment

Based on a review of the existing context on Hall Road/Washington Street, several observations can be made for the quality of the environment for pedestrians and bicyclists.

Pedestrians

Good sidewalk coverage, but:

- **Higher vehicle speeds** – the lack of roadway buffers (i.e. street trees, etc.) and large building setbacks leave pedestrians feeling exposed on the north end of the corridor.
- **Narrow lane widths** – relatively narrow sidewalks and a lack of roadway buffers make pedestrians feel squeezed and uncomfortable on the south end of the corridor.
- **No safe crossing opportunities** – pedestrians must cross at their own risk at untreated intersections or use the flush median at mid-block locations.
- **Intersections are barriers** – the long crossing distances, high-speed vehicular turn movements and absence of pedestrian treatments make many intersections barriers to walking in the corridor.
- **Walkable potential** – the placement of buildings and activities along the corridor gives it a potential for walking, but there are few intentional pedestrian connections.

Bicycles

- **There is a shoulder on Hall Road** – however, it is not a designated space for bicycles, and motor vehicles use it as a deceleration/acceleration lane; high mid-block motor vehicle speeds make it uncomfortable for inexperienced users.
- **Intersections** – the shoulder disappears at some intersections and driveways, turn radii result in high-speed motor vehicle turn movements, and bicyclists get cut off.
- **Mid-block** – curb cuts create many conflict points; motor vehicles obtain higher speeds.
- **There is no shoulder on Washington Street** – narrow travel lanes make bicycling a non-option for all but the most skilled cyclists.
- **No continuous parallel corridor** – all bicyclists must use Hall/Washington. The greenway does run parallel to Hall Road, but there are no good bicycle connections.

Lack of adequate crossing treatments.

Narrow lane widths and lack of buffer leave pedestrians feeling squeezed.

Many intersections in the corridor represent barriers.

There are no adequate facilities for bicycles in the corridor.

Balancing multi-modal needs with motor vehicle mobility poses challenges.

Challenges to be Addressed by this Study

The existing context analysis and assessment yields several challenges to be addressed by this study:

- Building pedestrian comfort zones that enhance the existing sidewalk coverage;
- Limited ROW on Washington Street;
- Mitigating high vehicle speeds on Hall Road;
- Create a safe, continuous bicycle facility/route;
- Making intersections safe and accommodating for bicycles and pedestrians;
- Identifying more opportunities for crossing;
- Integrating with existing and future development; and
- Balancing multi-modal needs with motor vehicle mobility.

III. Issues and Opportunities

At the core of the Complete Streets Study for the Hall Road/ Washington Street corridor is a weeklong corridor studio held November 10th and 13th that focused on engaging the community and stakeholders on issues, opportunities and solutions. The studio process began with a public workshop on the evening of November 10. The purpose of the meeting was to give participants a chance to sound off on issues and opportunities for making Hall Road/Washington Street a complete street and to identify their top goals for the corridor.

Attendees listen as information is presented during a public workshop.

Issues and Opportunities

Workshop participants were given an opportunity to work over detailed aerial maps of the corridor and surrounding neighborhoods. Hundreds of useful written and verbal comments were received during the course of the exercise. The study team was able to summarize those comments into a concise set of issues and opportunities for the corridor (Table 2).

Workshop participants examine an aerial of the corridor.

Table 2. Summary of Issues & Opportunities

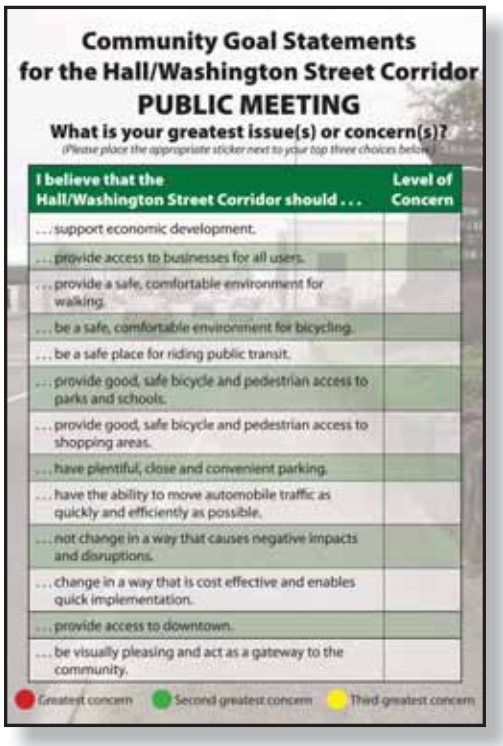
Issues	Opportunities
• Vehicular speeds (H) • Crossing opportunities (H) • Bicycle facilities • Pedestrian buffer • Access management (H) • Right-of-way squeeze (W) • Friendlier intersections • Lack of network, sidewalk links	• Gateways into downtown • Links to Greenway • Aesthetics

(H) Issue/opportunity unique to Hall Road
(W) Issue/opportunity unique to Washington Street

Community Goals

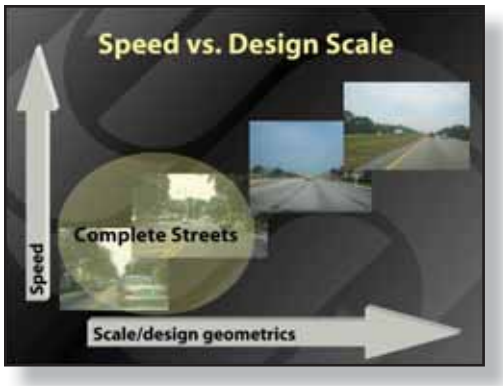
Workshop participants also had the opportunity to indicate their most important goals for the corridor. Not surprising, the top ranked goal centered on making the corridor in general a more safe, comfortable place for walking. Additional priority goals for the corridor focused on improving bicycle and pedestrian access to parks and schools and on making it a visually pleasing gateway to the community (tied for second highest priority) and creating a safe environment for bicycling.

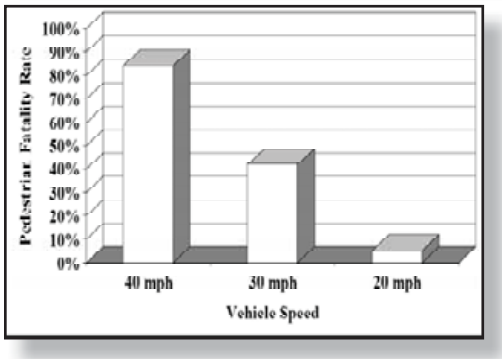
1. Safe, comfortable environment for walking.
2a. Safe bicycle and pedestrian access to parks and schools.
2b. Visually pleasing and a gateway to the community.
3. Safe, comfortable environment for bicycling.



IV. Corridor Vision Plan

After the opening workshop on November 10, the remainder of the corridor studio week was spent developing solutions to help transform Hall Road/Washington Street into a complete street. The consulting team took into consideration the results of the existing context analysis plus feedback received at the opening workshop to make specific recommendations.





Speed vs. Pedestrian Safety (Source: New Jersey DOT)

Design Parameters

Prior to making design recommendations for the corridor, it was first necessary to come to an agreement on key design parameters. While there are several different types of parameters to be considered in roadway design, this effort focused on two of the most relevant and critical: target speed and design vehicle.

Target and Design Speed

Research demonstrates a clear relationship between motor vehicle speeds and pedestrian safety. Further, lower design speeds enable more bicycle- and pedestrian-friendly design – narrower lanes, tighter curb radii, etc. The objective in setting the target speed for Hall Road and Washington Street is to enable the creation of a safe, walkable, pedestrian-friendly place while not significantly compromising motor vehicle safety or mobility.

- Target speed is the speed at which motor vehicles should operate, consistent with the level of mobility activity generated by adjacent land uses and a safe environment for pedestrians and bicyclists.
- Design speed is the speed that governs certain geometric features of the road.
- Target speed should be equal to design speed.

Table 3. Existing Posted Speed and Recommended Target/Design Speed

Street Name	Existing Posted Speed	Recommended Target and Design Speed
Hall Road	35 mph	35 mph
Washington Street	35mph	30 mph

This study recommends a proposed target speed of 30 to 35 mph for the corridor. This is consistent with observed motor vehicle operating speeds and will permit a design commensurate with the anticipated level of pedestrian activity in the corridor. Design recommendations for this study are based on the 30-35 mph design speed parameter.

Design Vehicle

The design vehicle influences the design of roadway components such as lane width and curb radii. While no significant truck traffic

exists in the corridor, the tractor trailer (WB-40) is recommended as the design vehicle for through movements in the corridor; it is a regionally significant facility that may one day carry more truck traffic. For intersections and other turn movements a smaller design vehicle was assumed: passenger car (P) and single unit truck (SUT).

Table 4. Design Vehicle Assumptions

Through Movement	Intersection Design
• Tractor Trailer (WB-40)	• Passenger car (P) • Single Unit Truck (SUT)

Ultimate Vision

The ultimate vision for the corridor results in the creation of a safe place for bicycles and pedestrians of various skill levels, while maintaining the corridor's motor vehicle mobility function. Generally speaking, the vision includes the following elements:

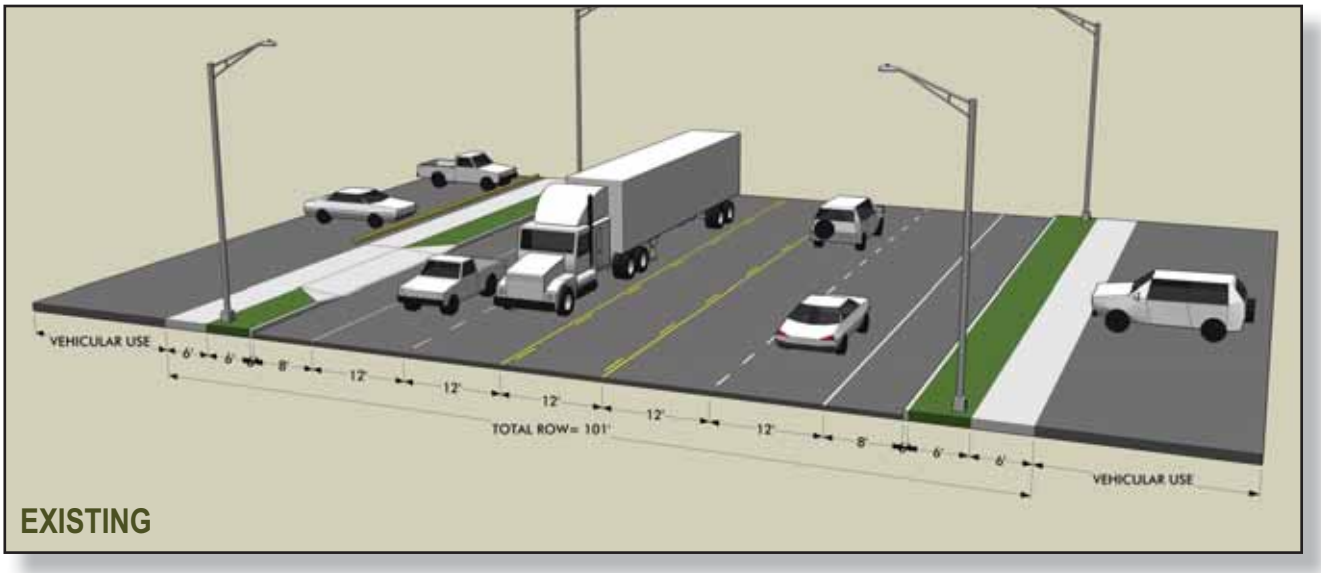
- Reduced travel lane widths (Hall Road only)
- Reduced number of travel lanes (Washington Street only)
- Raised landscaped median island
- Striped bicycle lanes
- Wider sidewalks
- Planting strip with street trees
- Buildings moved closer to the street through maximum 40-foot setbacks.

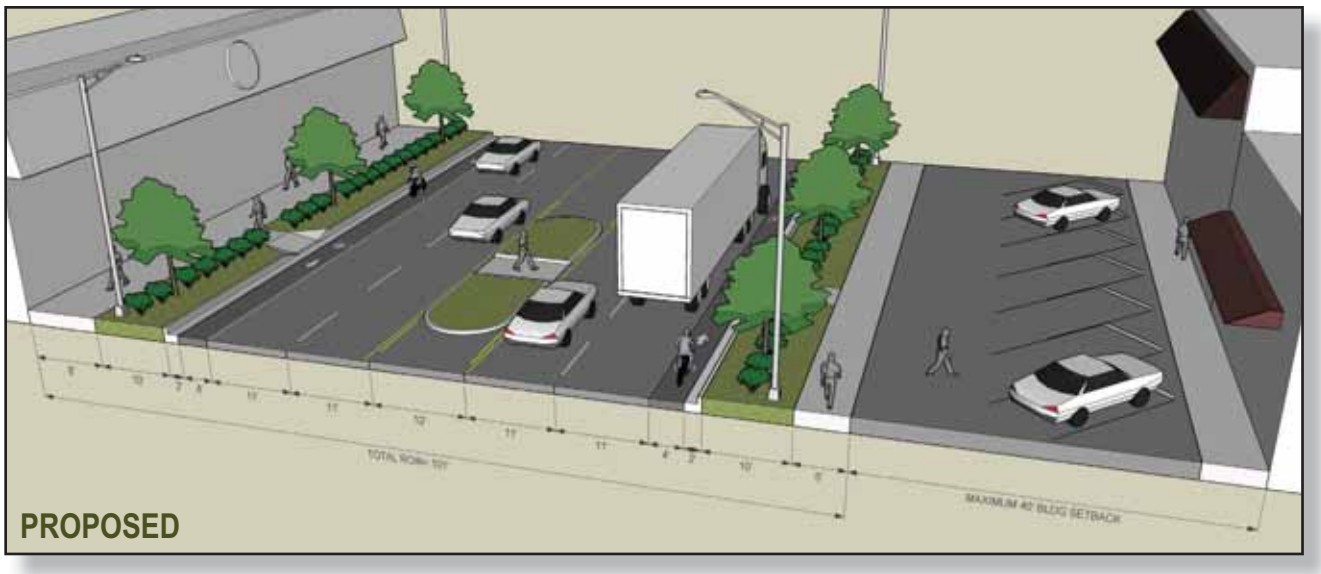
The existing context analysis noted distinctly different conditions on the Hall Road and Washington Street sections of the corridor. For instance, Hall Road has significantly more right of way, while Washington Street operates under more constrained conditions. As a result, two distinctly different visions have been developed for the different sections of the corridor.

Hall Road Vision

The long-term vision for making Hall Road a complete street includes bicycle lanes, reduced motor vehicle lane widths, raised median islands, wider sidewalks and a wide planting strip with street trees between in the sidewalk and the road. This vision was recommended because it can be built within the existing ROW and because it does not fundamentally change the travel lane configuration, meaning that it can be built incrementally over time.

Figure 9. Long-term Vision for Hall Road





Washington Street Vision (Road Diet)

Unlike the Hall Road segment of the corridor, Washington Street does not have a large shoulder or other additional right-of-way (ROW) for building streetscape enhancements. As a result, a "road diet" is proposed for Washington Street. The classic road diet eliminates part of the travel lanes and uses the additional ROW for wider sidewalks, street trees and furniture, on-street parking and/or bicycle lanes.

Several variations of the road are proposed, including the elimination of a travel lane in each direction and the elimination of the center turn lane at mid-block locations. Because the road diet is a major reconfiguration of the road, it can not be implemented incrementally; it must be programmed as a single project.

Given current and projected traffic conditions on Washington Street, lane reductions resulting from a road diet will most likely create adverse impacts to motor vehicle operations and capacity on Washington Street. One possible solution for mitigation of adverse traffic impacts is the proposed extension of the Pellissippi Parkway. That project will effectively create a parallel corridor, shifting traffic away from Washington Street. Further analysis is needed to determine potential impacts and possible solutions.

Figure 10. Long-term Vision for Washington Street

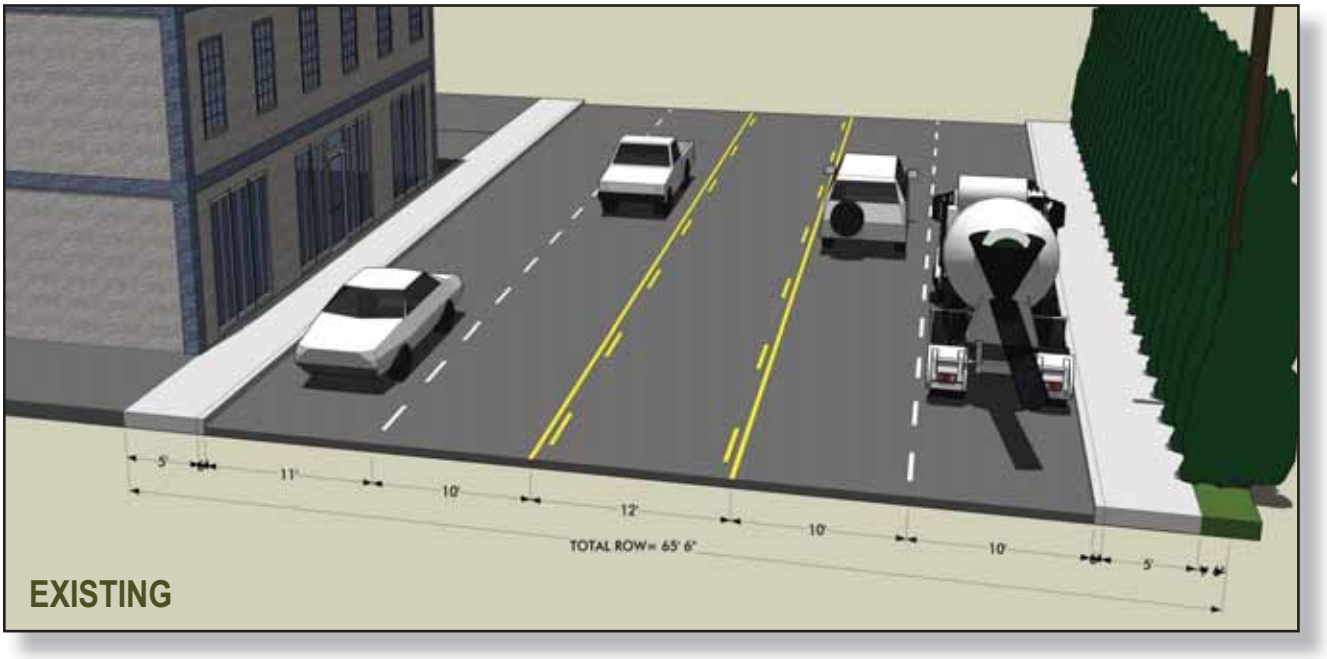
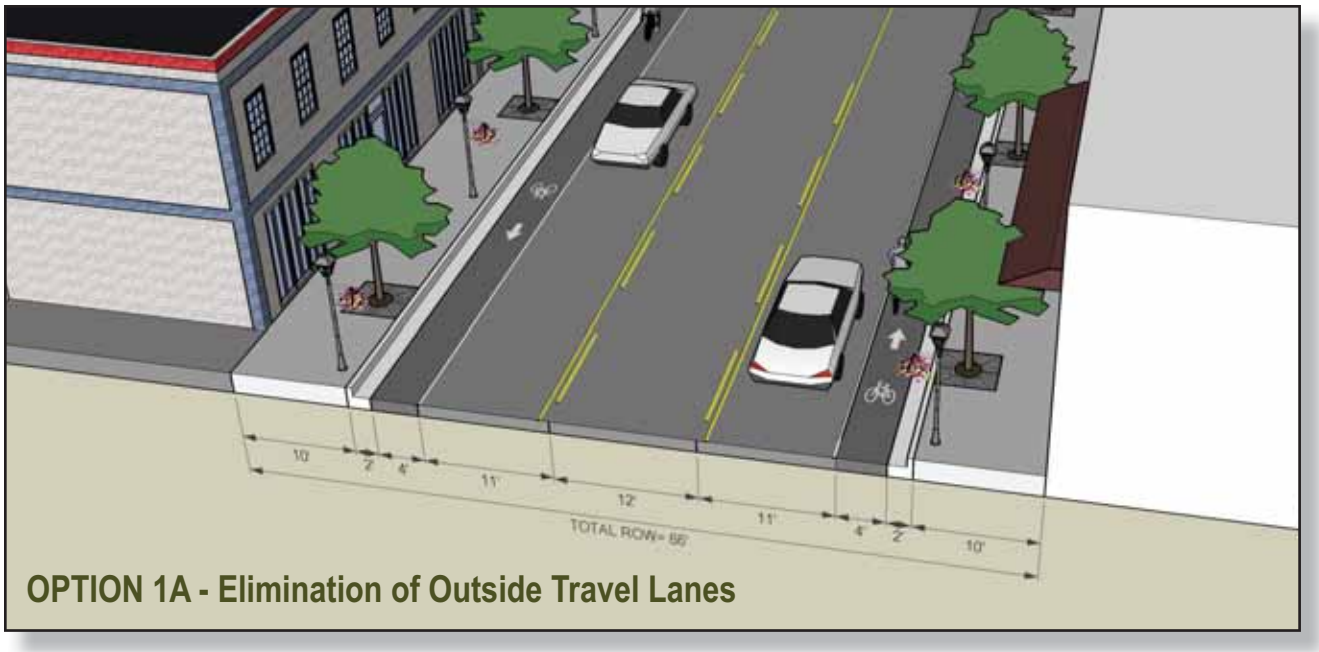
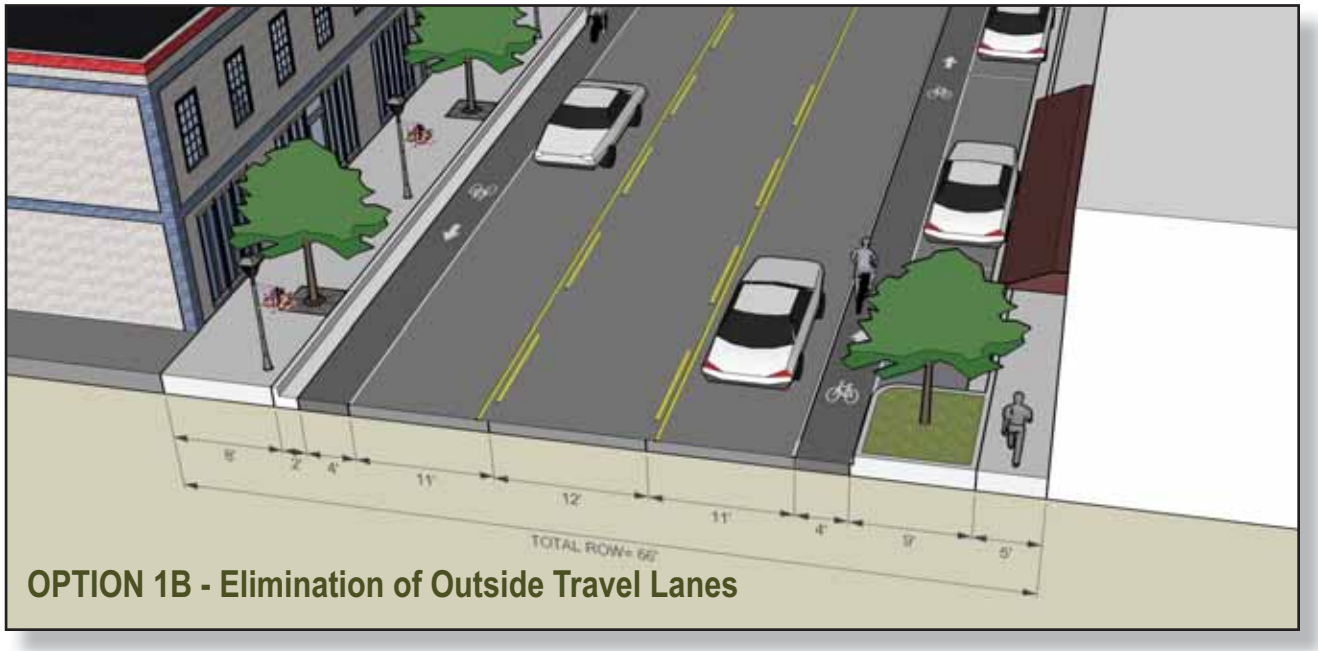


Figure 10. Long-term Vision for Washington Street *(continued)*

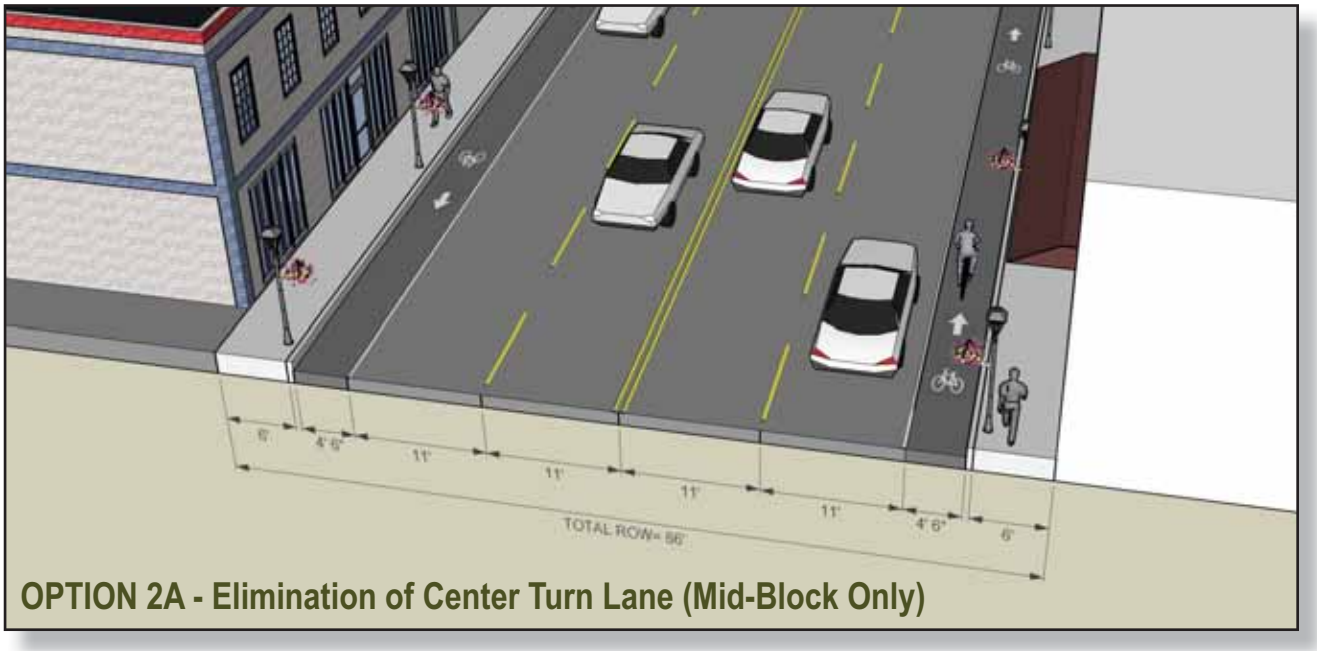


OPTION 1A - Elimination of Outside Travel Lanes

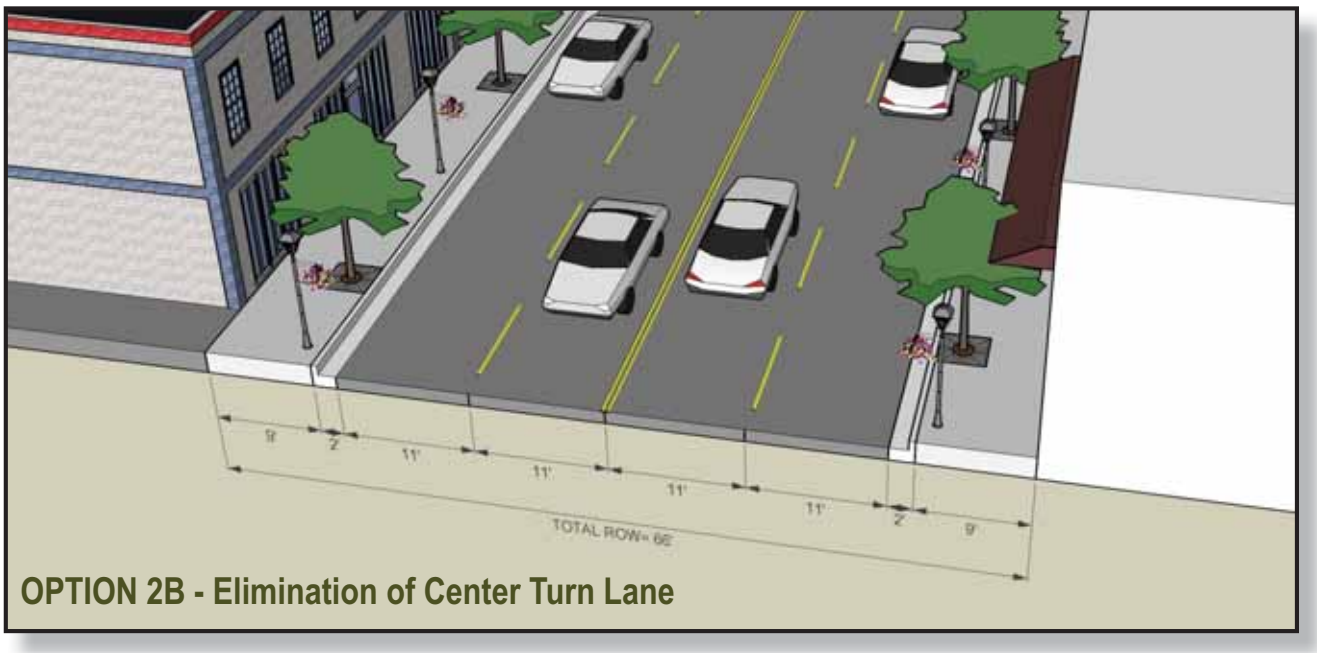


OPTION 1B - Elimination of Outside Travel Lanes

Figure 10. Long-term Vision for Washington Street *(continued)*

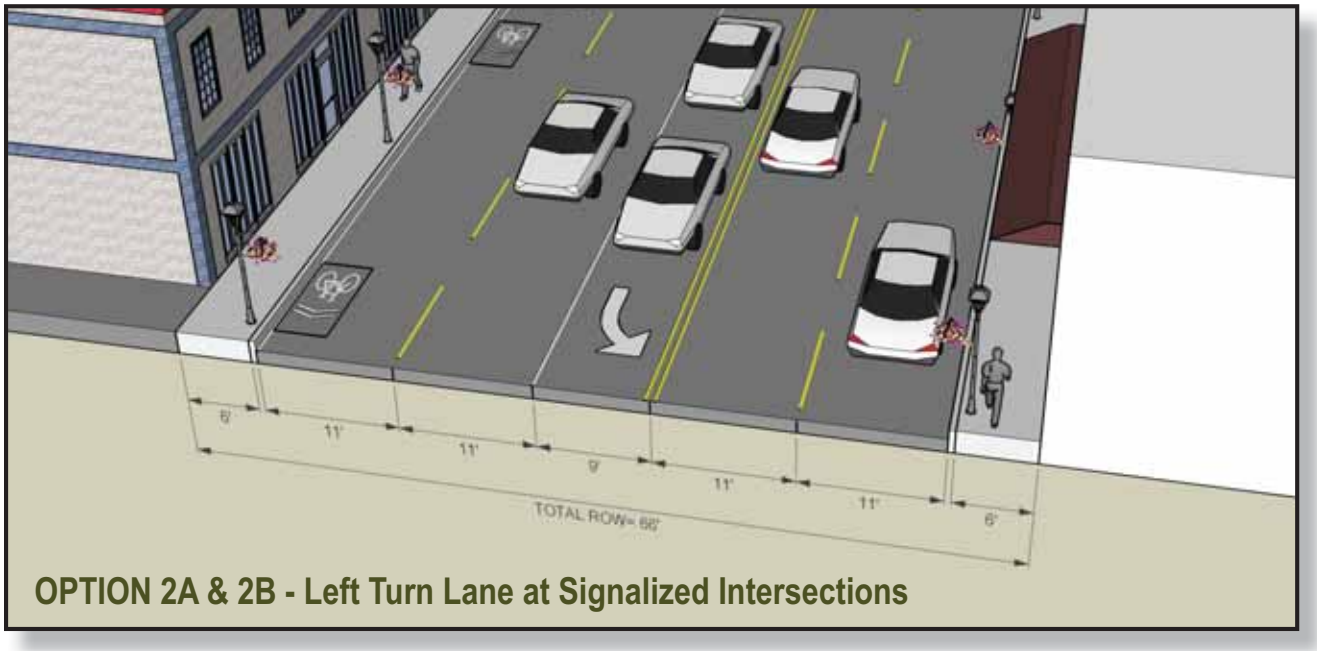


OPTION 2A - Elimination of Center Turn Lane (Mid-Block Only)



OPTION 2B - Elimination of Center Turn Lane

Figure 10. Long-term Vision for Washington Street *(continued)*



A potential intersection crossing enhancement for . . .

. . . the intersection of Washington Street and Broadway.

Toolkit of Strategies

The recommended vision for the corridor, if implemented as a single project, would entail reconstruction of the road to accommodate the raised median and extended curb, sidewalks and trees. This is very costly and potentially disruptive proposition.

Rather than try to implement the vision at once, the study recommends a toolkit of strategies that will show immediate results and incrementally achieve the vision over time. The strategies begin with lower-cost options that can be implemented relatively quickly and progress toward more costly strategies that will require more time.

Network-based Approach

The study team has taken a network-based approach to meeting the needs of various users in the corridor. That is to say, rather than look exclusively at Hall Road/Washington Street itself for accommodating user needs, the team took advantage of the relatively robust network of local streets and trails for making the street complete. This network-based approach is evident in many of the strategies described below.

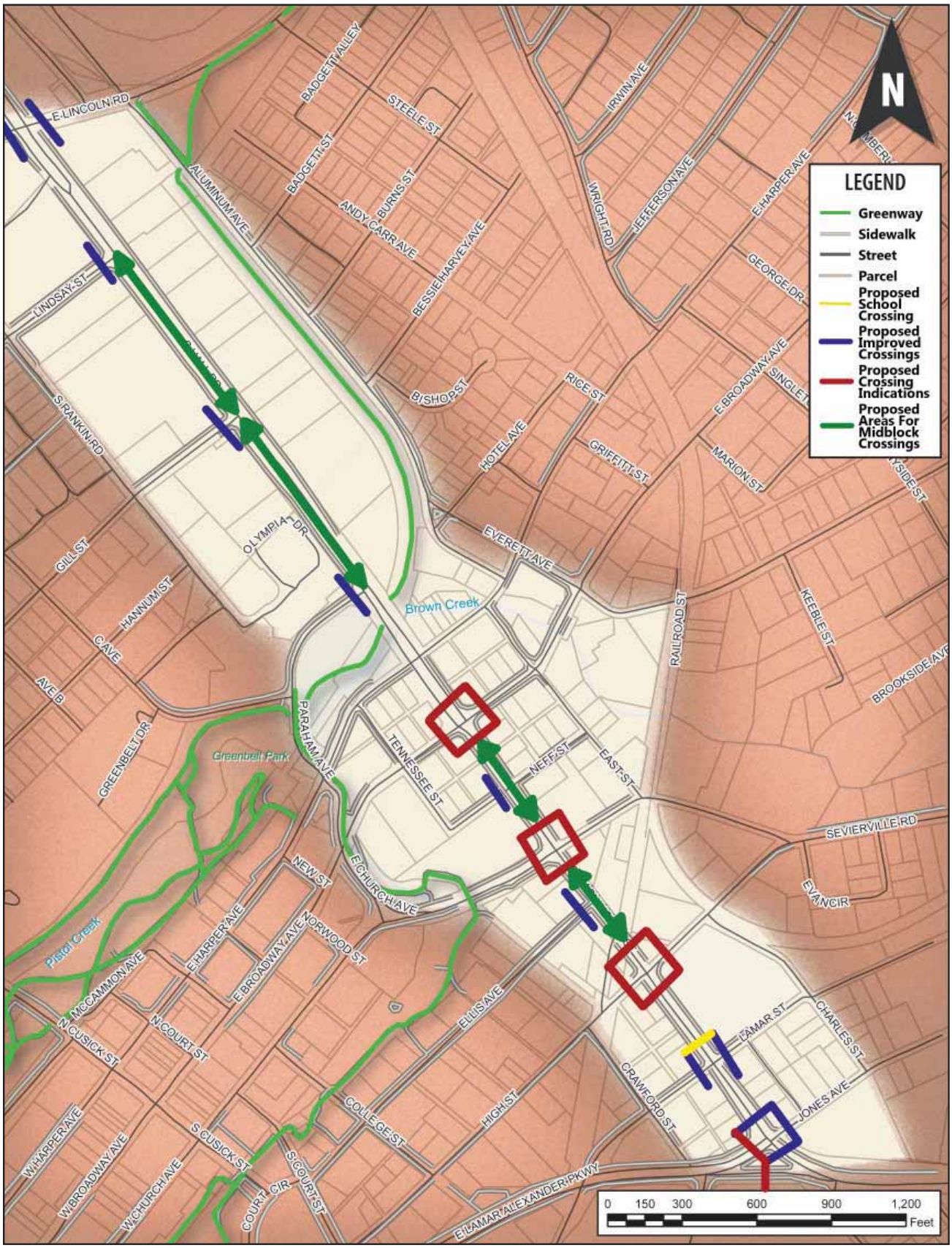
Intersection Crossing Enhancements

The existing context analysis noted the lack of pedestrian treatments at signalized intersections in the corridor. A basic, lower-cost strategy for making Hall Road/Washington Street more pedestrian-friendly is adding marking for pedestrians at crosswalks and adding pedestrian indications to existing signalized intersections where they do not currently exist. Marking may include white paint stripes or more decorative and elaborate materials, such as stamped asphalt or tinted concrete, and may include just the crosswalk or the entire intersection (Figure 11).

Marked crosswalks and pedestrian indications provide safe, designated locations for crossing intersections. More elaborate designs (such as those that include stamped asphalt or tinted concrete) can also serve as gateway features that are highly visible to motor vehicles.

Adding pedestrian indications could potentially have an impact on traffic signal timing at intersections on Hall/Washington. Any potential impact of signal timing on vehicle delay should be carefully weighed against the benefits provided to pedestrians.

Figure 11. Proposed Crossing Enhancements



Types of signage and pavement marking for a bicycle route system.

Bicycle Network

As part of the network-based approach for making the Hall Road/ Washington Street corridor a complete street, a system of bicycle routes has been proposed to accommodate bicycle users of various ages and skill levels (Figure 12). The network of connecting streets permits the creation of alternative routes to bicycling on Hall Road/ Washington Street itself, which may not be safe or comfortable for all users under all circumstances.

The route system consists of various facility types including a striped on-street bike lane, an off-road path or a shared motor vehicle lane. The proposed system also includes signage and a published route map. Emphasis is placed on connections to other complementary places, including the Greenway, downtown Maryville and Maryville College. Creating this route system will in some cases simply require placement of a sign on an existing street, and in others will require striping a new lane or building a new off-street connection.

Pedestrian Network

A pedestrian network is proposed that provides connections to places in the corridor and represents alternatives to walking directly along Hall Road/Washington Street street itself (Figure 14). Creating this network requires the construction of several small sidewalk links. The links are essentially short projects – ranging in length from approximately 50 to 300 feet – that fix critical gaps in the pedestrian network. The pedestrian network links can be adjacent to a street (i.e. a sidewalk) or an off-road path (Figure 14).

Mid-block Islands and Curb Extensions

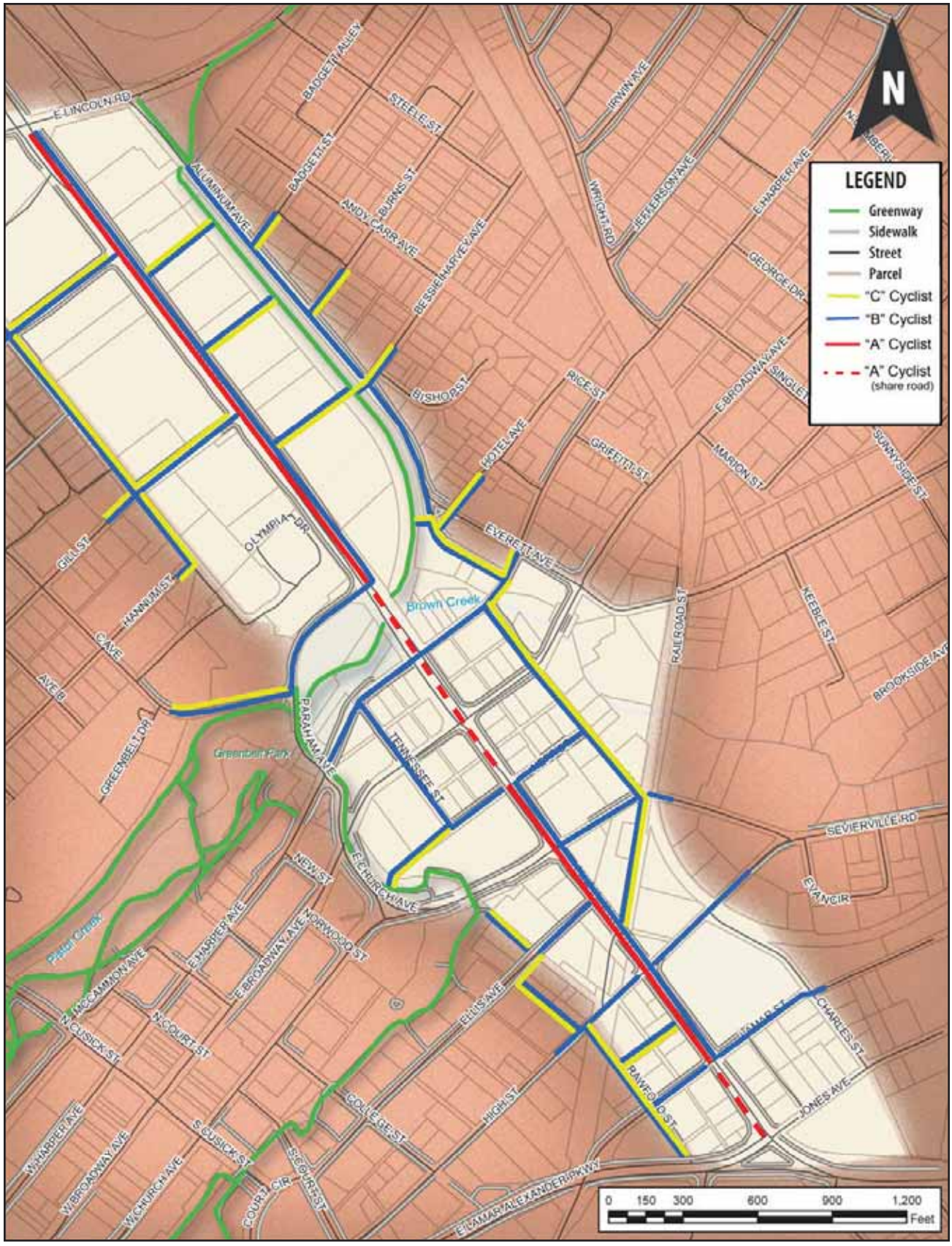
The Hall/Washington corridor contains long stretches of roadway without adequate opportunities to cross the street, leaving pedestrians to take the somewhat risky measure of crossing in the flush median. Raised islands placed in the center turn lane at strategic mid-block locations create a safer location (compared to a flush median) for crossing the street by breaking one long, complex crossing into two shorter ones. If done in combination with a curb extension, they reduce the crossing distance even more.

Mid-block islands consist of the construction of raised medians in the center turn lane. Curb extensions are the extension of the curb into the shoulder along Hall Road. Both mid-block islands and curb extensions help change the character and aesthetics of the road through street trees, pavement narrowing and other elements that make drivers more perceptive of the surrounding environment and their own travel speeds.

Median islands provide the added benefit of reducing turn-movement conflicts and improving traffic flow. However, special care must be taken to ensure that adjacent property access is not adversely affected.

Current research suggests that it is safer on high-volume, multilane roads (such as Hall/Washington) to leave the crossing at the mid-block median island unmarked. The placement of islands depends on consideration of several factors, including vehicular approach

Figure 12. Proposed Bicycle Network



A route system has been proposed to accommodate bicycle users of various ages and skill levels.

speeds and visibility. Further research and analysis are needed prior to installation.

Intersection Improvements

Intersections serve as major barriers to walking in the corridor. Long crossing distances, high vehicle turning speeds and a lack of pedestrian space are some of the contributing factors.

Proposed intersection improvements include curb extensions and corner expansions that will reduce the curb radii, causing vehicles to turn at appropriate rates of speed and minimizing pedestrian cross distance (Figure 15). The improved intersections can serve as "pedestrian pockets" and as gateways to places in Maryville and Alcoa (Figures 16-18). They may contain pedestrian lighting, landscaping, street furniture and wayfinding signage.

In locations where intersection skews necessitate very large turn radii, raised pedestrian refuge areas are recommended. Reducing pedestrian cross time will have a positive impact on signal timing. Curb extensions have the potential for creating additional delay at high-traffic intersections on Hall/Washington. Any potential impact of curb extensions on motor vehicle operations should be carefully weighed against the benefits provided to pedestrians and bicyclists.

Figure 13. Proposed Bicycle Lanes on Hall Road

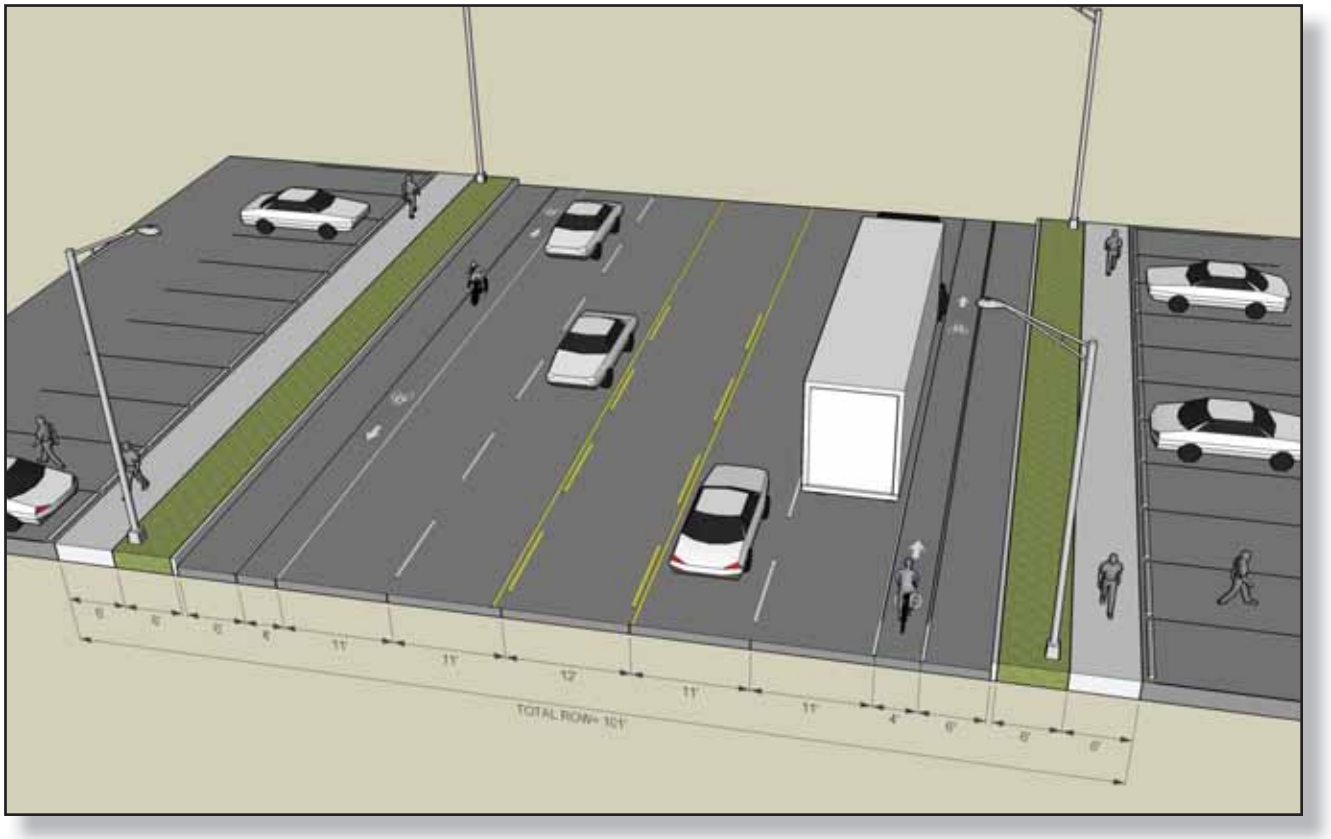


Figure 14. Proposed Bicycle and Pedestrian Network Links

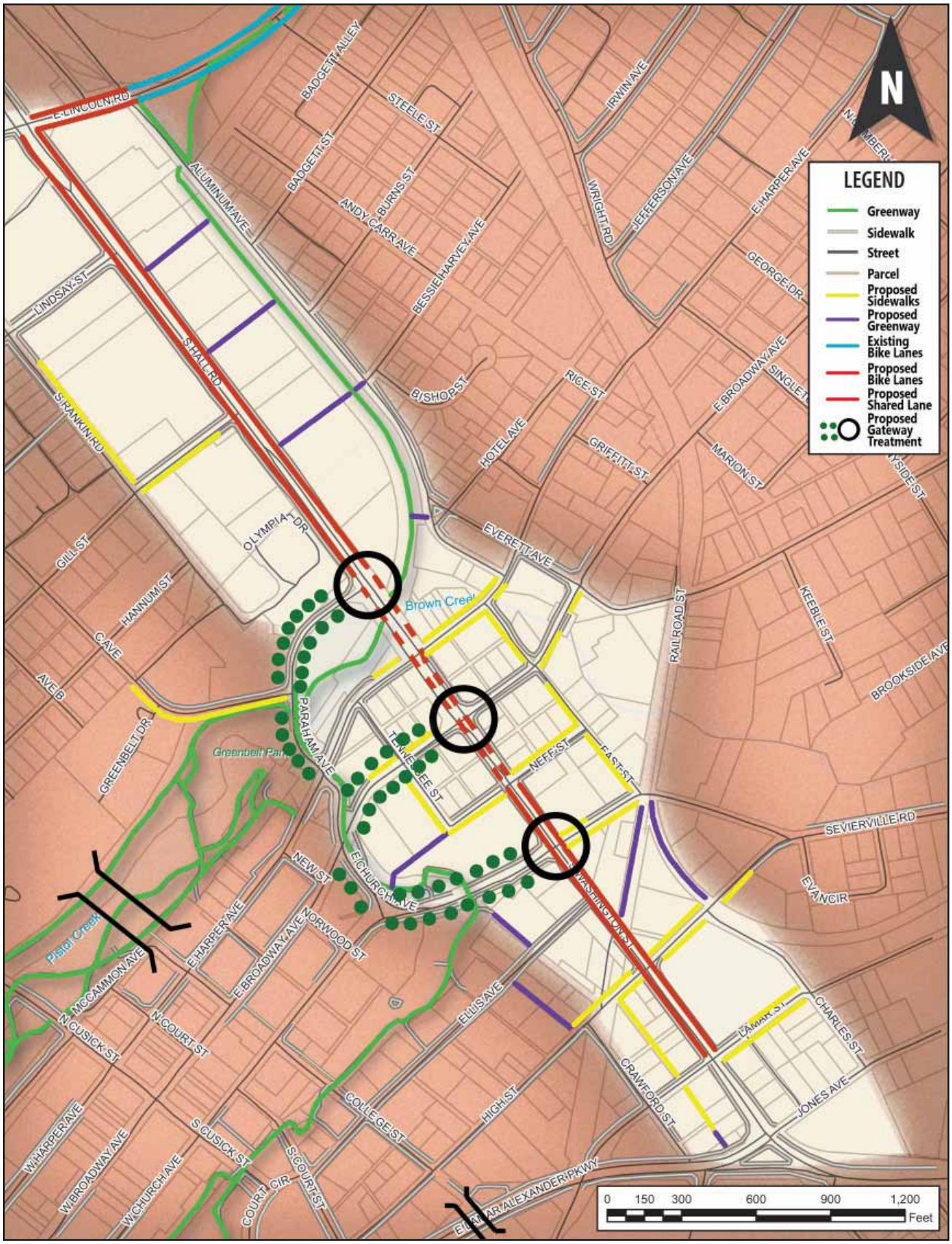


Figure 15. Proposed Intersections for Improvement

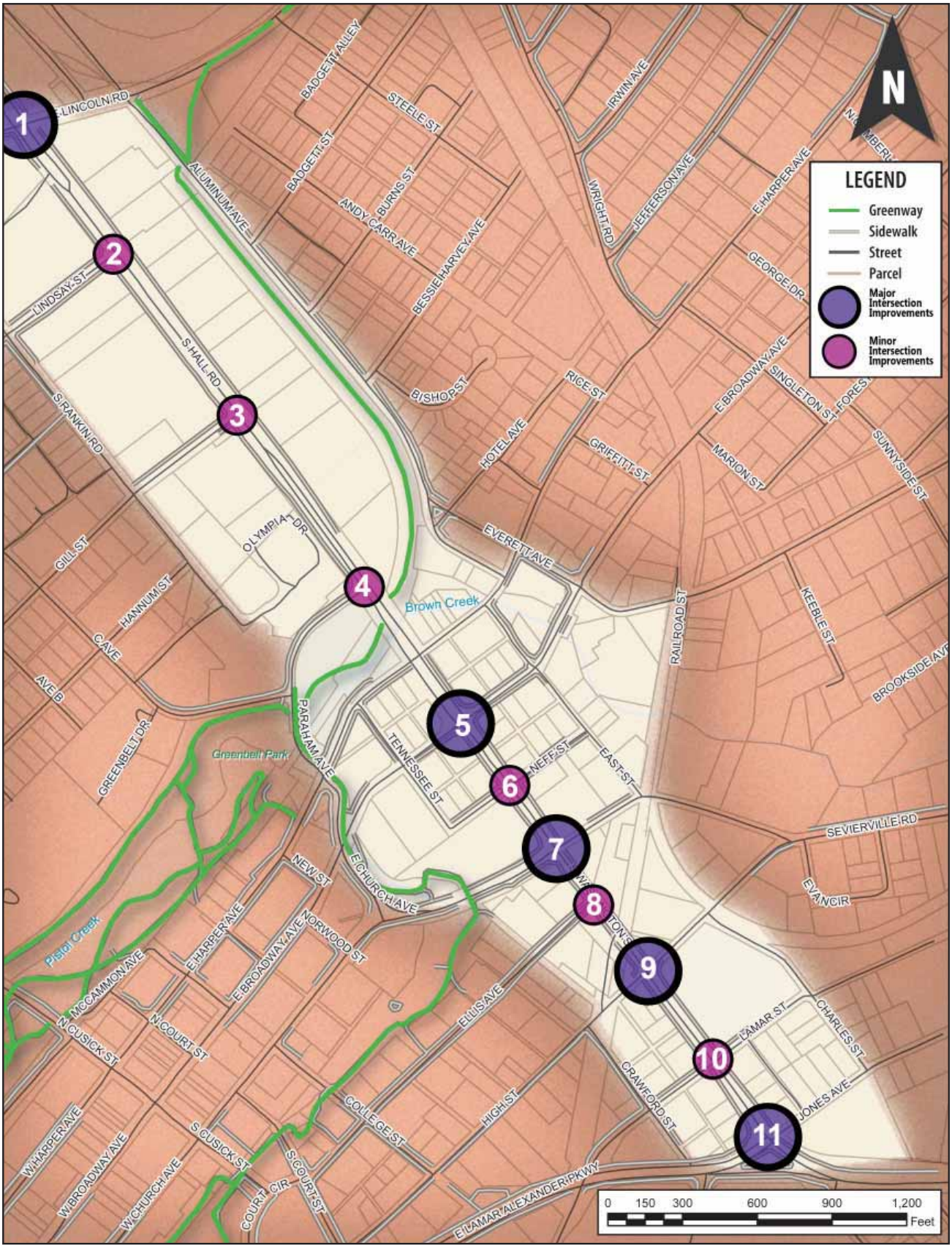


Figure 16. Intersection Recommendations

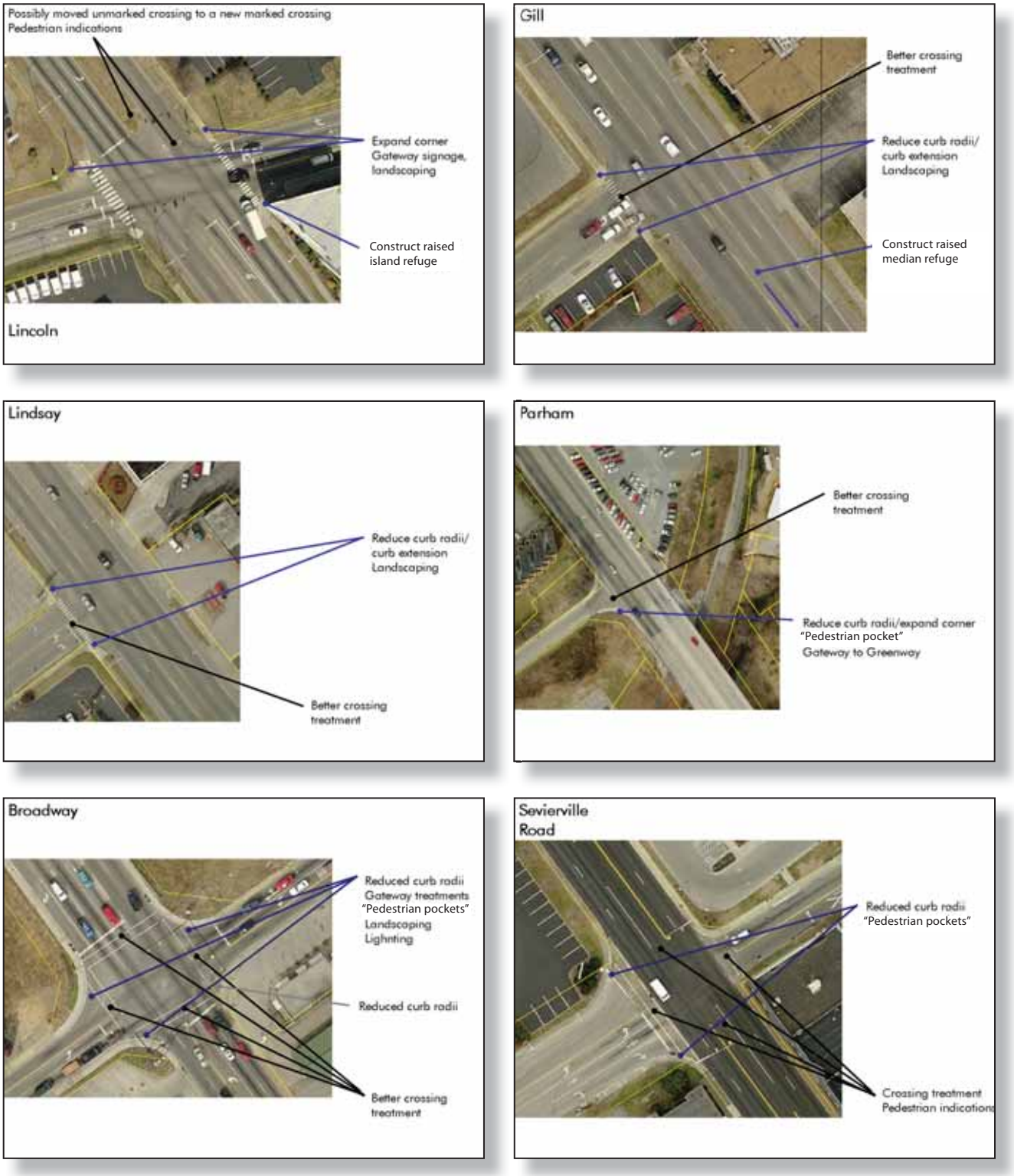


Figure 16. Intersection Recommendations *(continued)*

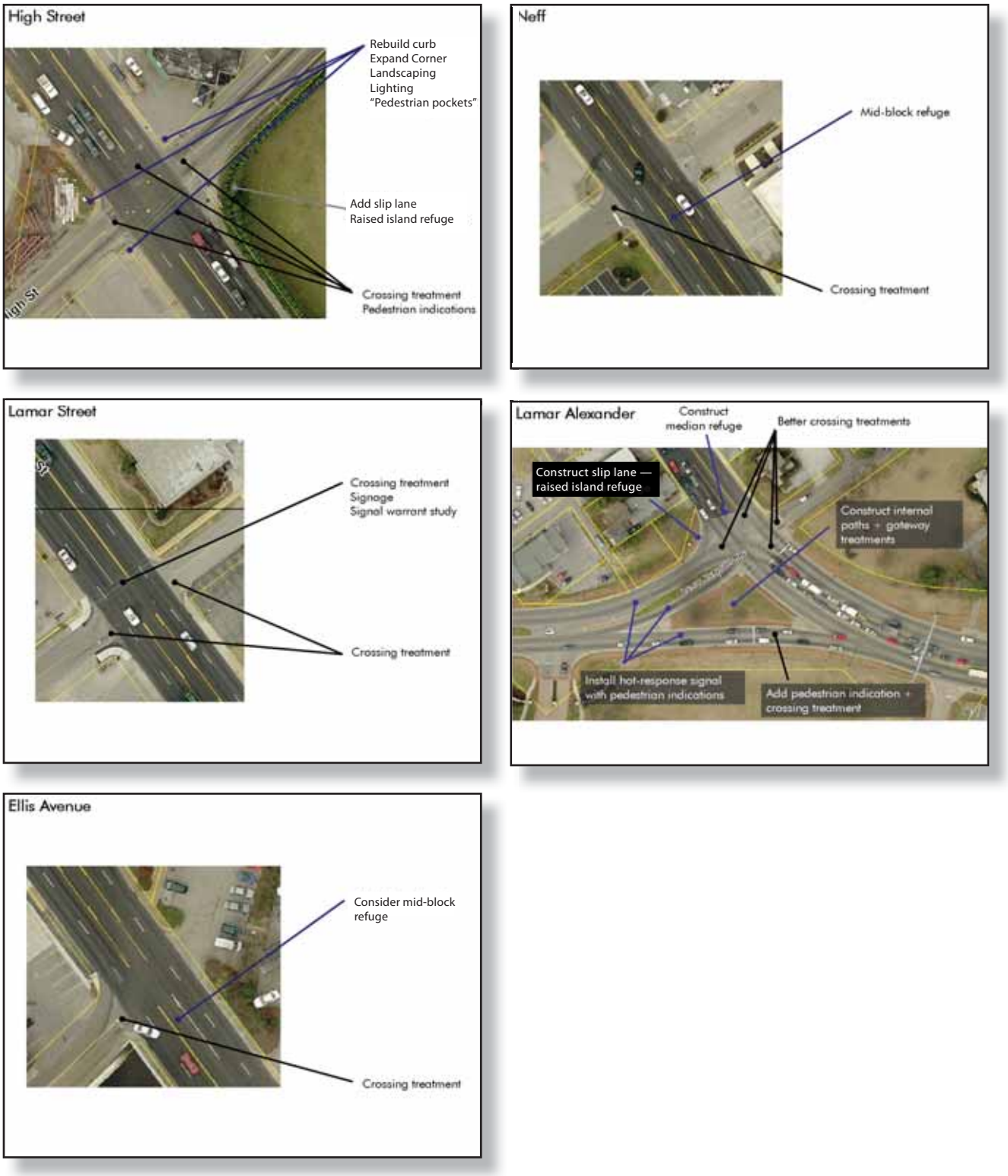


Figure 17. Intersection of Hall Road and Lincoln Road

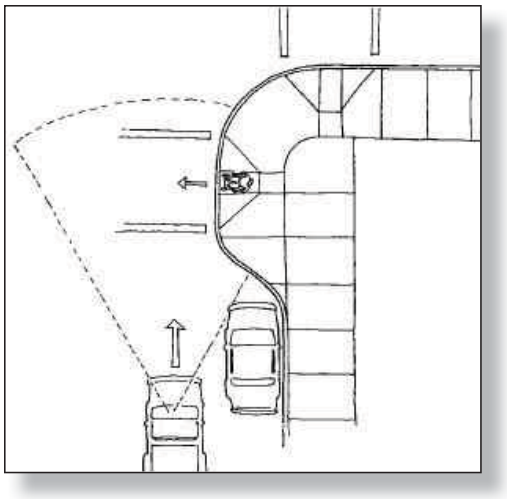
Figure 18. Intersection of Washington Street and Sevierville Road

Streetscape in Spot Locations (Hall Road only)

While it's not feasible to build the recommended vision all at one time, constructing streetscape improvements at spot, strategic locations along the corridor could help implement the vision incrementally. This could include curb extensions to accommodate sidewalks, planting strips/street trees and street furniture and could be done in combination with access management (Figure 19). The recommended vision for Hall Road has been specifically configured to permit incremental implementation through gradual streetscape improvements.

Streetscape improvements will create a safe, comfortable and attractive place for pedestrians, provide a buffer from corridor traffic, support an active street life and create a more aesthetically pleasing corridor. The striping of bicycle lanes should be done concurrently with streetscape improvements.

Streetscape improvements could be programmed and funded as public projects, or be incentivized through private development as part of an overlay.



Partial curb extensions improve visibility between pedestrians and motorists. (Source: www.fhwa.dot.gov)

Access Management

Multiple curb cuts on Hall Road not only create an unpredictable environment for bicycles and pedestrians, but they create operational issues for motor vehicles as well. Eliminating redundant access points along Hall Road will reduce motor vehicle conflicts with pedestrians and bicyclists along the street. Additionally, reducing curb cuts can eliminate turn movement conflicts and improve traffic flow. Special care must be taken to ensure that adjacent property access is not adversely affected. Driveway consolidation should be considered concurrent with all streetscape projects.

Figure 19. Intersection of Gill Road

V. IMPLEMENTATION

Prioritization

The long-term vision and toolkit of strategies were presented at a second workshop on November 13. The overall response was very positive. Through a weighted selection process, workshop participants were given the opportunity to indicate their preference for each type of strategy. An online survey, attached to the TPO's web site, provided additional opportunities for individuals to learn about the strategies and indicate their preference.

The combined results of the selection process are presented below. The results are not scientific.

Table 5. Preferences of November 13, 2008, Workshop Participants

Strategy	Rank
Mid-block Island and Curb Extensions	1
Intersection Improvements	2
Intersection Crossing Enhancements	3
Sidewalk Links	4
Streetscape in Spot Locations	5
Bicycle Lanes	6
Access Management in Spot Locations	7
Total Responses: 23	

The survey results presented above are one factor to be taken into consideration when the TPO and its agency partners begin to implement the recommended toolkit of strategies. In addition to preference, it is proposed that the TPO and its partners consider a number of factors for implementation, including cost (particularly those projects that require public money), impacts to mobility for all modes, whether positive or negative, and disruptions/impacts to business in the corridor.

Hall Road/Washington Street Complete Streets Toolkit of Strategies
Proposed Framework for Implementation
• Preference • Cost • Impacts to mobility • Disruption/impacts to business

Funding

In sum, the total cost of the projects included in the toolkit of strategies is likely several million dollars. Clearly, it will be a challenge to publicly fund the projects.

Table 6. What does it cost?

Project	Estimated Cost
Crosswalks and pedestrian indications	$6,000 to $40,000
Sidewalk Links	$15,000 to $25,000 per 100 linear feet
Bicycle Lanes	$25,000 to $50,000 per mile
Mid-block Island and Curb Extensions	$10,000 to $25,000
Intersection Improvements	$75,000 to $250,000
Streetscape in Spot Locations	$20,000 to $40,000 per 100 linear feet
Access Management in Spot Locations	Varies

There is no specific pool of money set aside for funding the recommendations of this Plan. However, the important thing is that there be a plan and specific, tangible projects in place, so that funding can be actively pursued. This Hall Road/Washington Street Complete Streets Plan meets that objective.

"Tag along" Projects

Perhaps a more practical and creative way to get some of the projects implemented is by tagging along with an already programmed project. For example, if there is a drainage or sewer project in the corridor that requires digging, the cost to extend the curb and/or construct sidewalks becomes minimal. Other types of tag along projects could include resurfacing, intersection safety projects, signal projects and site development/redevelopment.

Policies

A long-term, continual approach to implement the vision and strategies is through policy changes. Policies, which are typically implemented through ordinances, make an impact as land use changes or as buildings are rebuilt or renovated (i.e. redevelopment). Policies could take the form of:

- **Sidewalk ordinance** – This is a basic requirement for construction of sidewalks concurrent with new development, commonly used by municipalities. The design standards presented in the recommended vision could be used as a guideline for the ordinance. The City of Alcoa currently has a sidewalk ordinance in place.
- **Adequate public facility ordinances** – An expanded version of a sidewalk ordinance, this would require new development of certain thresholds to install new facilities commensurate with their demand. Facilities could include sidewalks, bicycle racks, etc.

Sidewalk ordinances ensure that walkways are safe.

- **Urban design overlay** – A special overlay district is created under a theme or premise. Design standards could govern a number of aspects, including signage, architectural, lighting, building placement and streetscape. Washington Street is subject to Maryville's Downtown Development Guidelines, which govern architectural elements and other design components.
- **Form-based code** – Similar to an urban design overlay, this is a new approach to land development regulations that uses urban form guidance rather than policies to regulate development to achieve a specific urban form. Form-based code is already under development in other areas of the region.
- **Incentives** – One way to achieve the policy recommendations is through incentives. For example, a new development could optionally build the streetscape recommendations of this plan, and as a result, be exempt from other development requirements – parking, maximum floor area ratio, etc.
- **Business Improvement District** – This is a voluntary entity where constituent businesses help fund a common improvement that will benefit all (i.e. streetscape, lighting, etc.)

APPENDIX A

Hall Road/Washington Street Complete Streets Study
Project List

Hall Road/Washington Street Complete Streets Study
Project List

Segment	Improvement Type	Cost	Location	From	To	Notes
I	Crossing enhancement	$	Lincoln Rd.			Improved crosswalks at E and W legs.
I	Crossing enhancement	$	Lindsay St.			Crosswalk at W leg.
I	Crossing enhancement	$	Gill St.			Crosswalk at W leg.
I	Crossing enhancement	$	Parham Ave.			Crosswalk at W leg.
II	Crossing enhancement	$$	Broadway			Improved crosswalks and indications at E, W & N legs; crosswalk and indication at S leg.
III	Crossing enhancement	$	Neff St.			Crosswalk at W leg.
III	Crossing enhancement	$$	Saviaville Rd.			Improved crosswalks and indications at all four legs.
IV	Crossing enhancement	$	Ellis Ave.			Crosswalk at W leg.
IV	Crossing enhancement	$$	High St.			Crosswalks and indications at all four legs.
IV	Crossing enhancement	$	Lamar St.			Crosswalks at E & W legs; school crossing at N leg.
IV	Crossing enhancement	$$	Alexander Pkwy			Improved crosswalks at N, S & E legs; crosswalks and indications at W leg.
I	Mid-block island/curb extension	$$		Lindsay St.	Gill St.	Specific location(s) subject to further study.
I	Mid-block island/curb extension	$$		Gill St.	Parham Ave.	Specific location(s) subject to further study.
III	Mid-block island/curb extension	$$		Broadway	Saviaville Rd.	Specific location(s) subject to further study.
VI	Mid-block island/curb extension	$$		Saviaville Rd.	High St.	Specific location(s) subject to further study.
I	New sidewalk	$$	S. Rankin Rd.	Existing sidewalk	Gill St.	Install new sidewalk on the E side.
I	New sidewalk	$$	Gill St.	S. Rankin Rd.	Existing sidewalk	Install new sidewalk on the S side.
I	New sidewalk	$$	C Ave.	Olympia Dr.	Parham Ave.	Install new sidewalk on the S side.
II	New sidewalk	$	E. Harper Ave.	Existing sidewalk	Washington St.	Complete gap in sidewalk on the N side.
II	New sidewalk	$$	E. Harper Ave.	Existing sidewalk	Washington St.	Install sidewalks on both sides of the street
II	New sidewalk	$	East St.	E. Harper Ave.	Broadway	Install sidewalk on E side.
II	New sidewalk	$	Broadway (W of Washington St.)	Existing sidewalk	Washington St.	Install sidewalk on N side.
II	New sidewalk	$	Broadway (E of Washington St.)	Everett Ave.	East St.	Complete gaps in sidewalk on S side.
III	New sidewalk	$	Tennessee St.	Broadway	Neff St.	Install sidewalk on the W side.
III	New sidewalk	$$	East St.	Broadway	Saviaville Rd.	Install sidewalk on W side.
III	New sidewalk	$	Neff St.	Tennessee St.	Washington St.	Install sidewalk on S side.
III	New sidewalk	$	Neff St.	Washington St.	East St.	Install sidewalk on N side.
III	New sidewalk	$	Saviaville Rd.	Washington St.	East St.	Install sidewalks on both sides of the street.
IV	New sidewalk	$$	High St.	Crawford St.	Saviaville Rd.	Complete gaps in the sidewalk on both sides.
IV	New sidewalk	$$	Crawford St.	Jones Ave.	Saviaville Rd.	Complete gaps in the sidewalk on both sides.
IV	New sidewalk	$	Lamar St.	Washington St.	Charles St.	Complete gaps in the sidewalk on both sides.
II	Sidewalk priority 1	$	E side of Broadway	High St.	Alexander Pkwy	Install sidewalks on E side (includes off-road path from end of Crawford St. to Alexander Pkwy)
I	Off-road path/greenway	$$	Approximately 700' S of Lincoln Rd.	Washington St.	Maryville-Alcoa Greenway	Off-road trail connection
I	Off-road path/greenway	$$	Approximately 1,100' S of Lincoln Rd.	Washington St.	Maryville-Alcoa Greenway	Off-road trail connection
I	Off-road path/greenway	$$	Approximately 1,600' S of Lincoln Rd.	Washington St.	Maryville-Alcoa Greenway	Off-road trail connection

Segment	Improvement Type	Cost	Location	From	To	Notes
I	Off-road path/greenway	$	Almuminum Ave. and Hotel Ave.	Aluminum Ave.	Maryville-Alcoa Greenway	Off-road trail connection
II	Off-road path/greenway	$$		Maryville-Alcoa Greenway	Tennessee St.	Off-road trail connection
IV	Off-road path/greenway	$$		Maryville-Alcoa Greenway	Ellis Ave.	Off-road trail connection
IV	Off-road path/greenway	$$		Ellis Ave.	High St.	Off-road trail connection
IV	Off-road path/greenway	$$		Sevierville Rd.	Washington St.	Trail conversion at abandoned rail bed.
IV	Off-road path/greenway	$$		Sevierville Rd.	High St.	Trail conversion at abandoned rail bed.
I	Gateway treatment	$$	At Parham Ave.			Signage, kiosks, benches and other amenities creating a 'gateway' between Washington St. and the Greenway and downtown Maryville
II	Gateway treatment	$$	At Broadway			Signage, kiosks, benches and other amenities creating a 'gateway' between Washington St. and the Greenway and downtown Maryville
III	Gateway treatment	$$	At Sevierville Rd.			Signage, kiosks, benches and other amenities creating a 'gateway' between Washington St. and the Greenway and downtown Maryville
I	Intersection improvement	$$$	At Lincoln Rd.			Curb extensions/ramps; construct right turn rauge island, gateway treatments and pedestrian amenities
II	Intersection improvement	$$$	At Broadway			Curb extensions and crossing enhancements, pedestrian amenities
III	Intersection improvement	$$$	At Sevierville Rd.			Curb extensions and crossing enhancements, pedestrian amenities
IV	Intersection improvement	$$$	At High St.			Curb extensions/ramps, rebuild curb, construct slip lane and island refuge, pedestrian amenities.
IV	Intersection improvement	$$$	At Alexander Pkwy			Construct slip lane and island refuge, internal paths and gateway treatments at existing island, hot-response signals.

Segment Key

ID	Segment
I	Lincoln Rd. to Parham Ave.
II	Parham Ave. to Broadway
III	Broadway to Sevierville Rd.
IV	Sevierville Rd. to Alexander Pkwy