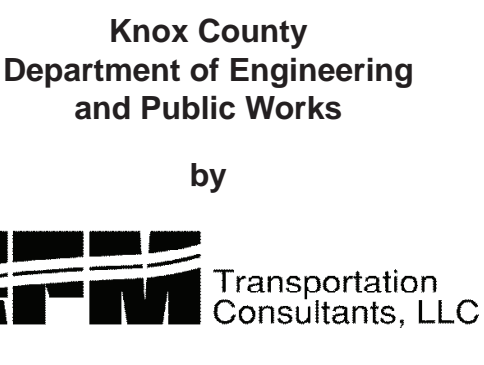
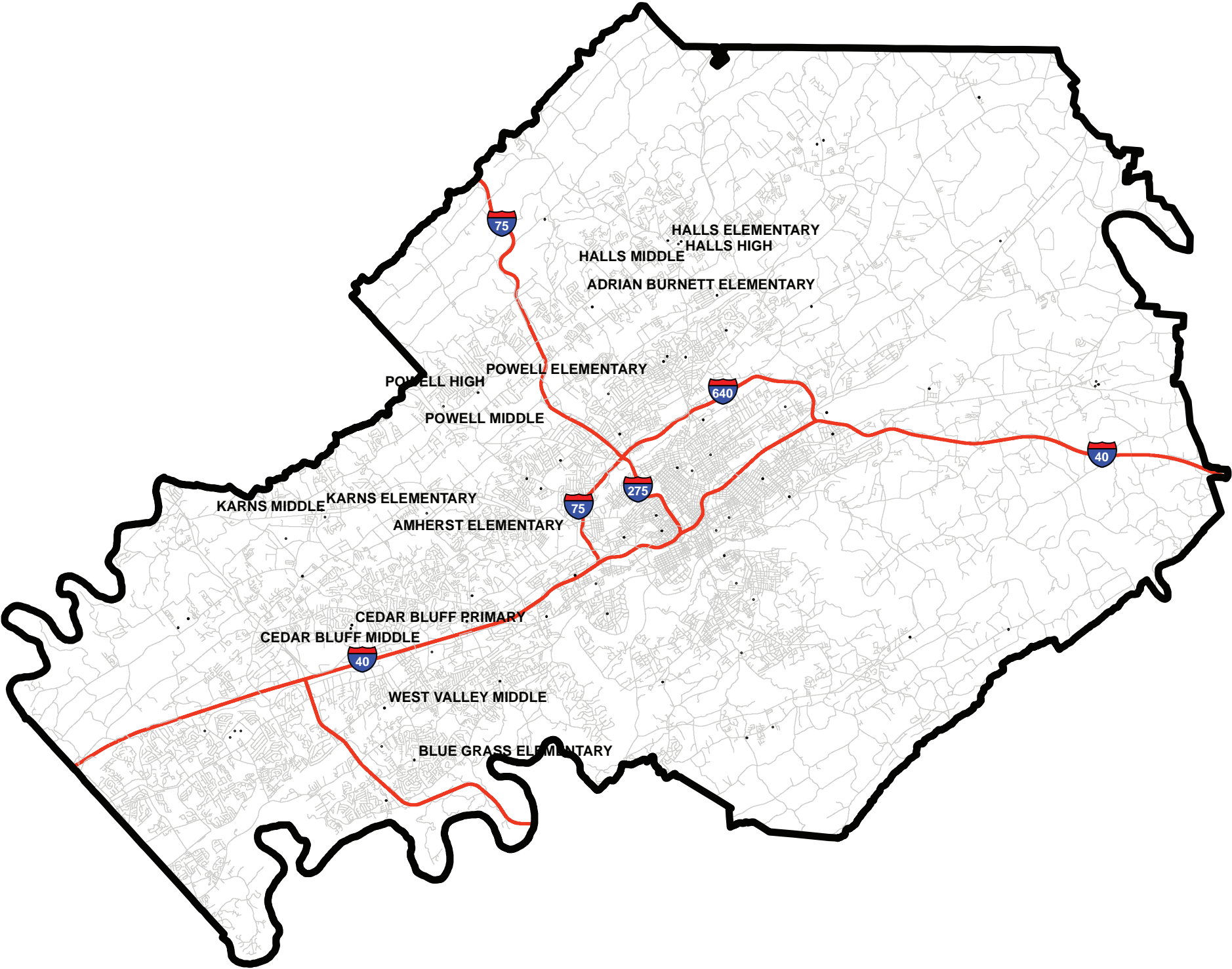



Walk-to-School Prioritization Analysis and Improvement Concept Plans (Phase 2)

Knox County, Tennessee




Developed for



Knox County
Department of Engineering
and Public Works

by

 Transportation
Consultants, LLC

October 2014

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
633	18%	-7%	71%	112	41



There are 35 schools located in unincorporated Knox County. Adrian Burnette Elementary ranks **12th** in pedestrian improvement priority based on composite data.

Assessment:

The school is sited in a valley between two ridges and is accessed by Brown Gap Road (2 @ 10' lanes, no shoulder, no sidewalks, 40' apparent ROW). A rear entrance to the school (including basic pedestrian facilities) is located on Felty Drive and serves the neighborhood immediately adjacent to (west of) the school. Topography and Maynardville Pike limit feasible walking access to neighborhoods east and west of the school along Brown Gap Road.

Recommendations:

- Promote existing pedestrian accommodations by signing the existing sidewalk connection to ABES on Felty Drive.
- Develop a specific route and encouragement plan for the Felty Drive neighborhood. This might include signing and striping walking routes, plans for establishing a walking school bus, etc. Larger-scale improvements within the neighborhood (e.g. new sidewalks) are not recommended due to the adequacy of these low-volume, low-speed streets for walking.
- Improved east-west connectivity to the school is required to facilitate walking trips beyond the Felty Drive neighborhood. Two alternatives are proposed:

Alt A - Construct an off-road multi-use path within the power line easement running through the valley north of the school. This easement crosses many neighborhood streets, making access from all neighborhoods possible. The path crosses Felty Drive adjacent to the existing sidewalk leading to the school. This is the preferred alternative.

Alt B - If construction within the easement is not possible, a sidewalk on the north side of Brown Gap Road should be constructed. Construction may be limited to Brown Gap Road east of the school since students west of the school can use the Felty Drive connection. A connecting sidewalk should also be constructed on school property along the school driveway.



Sidewalk connection to ABES from Felty Drive



Power easement connecting neighborhoods in walking distance to school



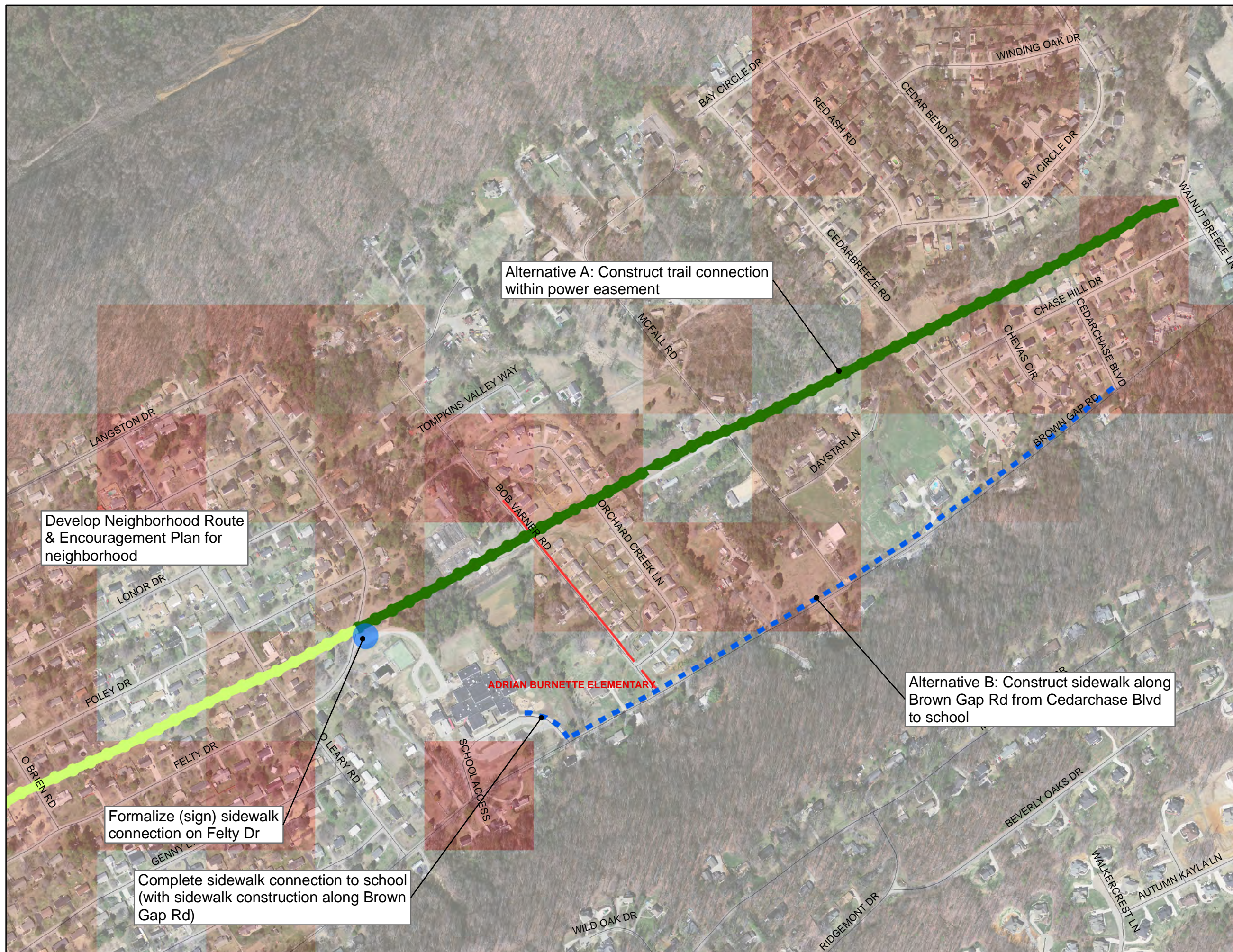
Sidewalk construction on south side of Brown Gap Rd limited by side slopes





Pedestrian Improvements Concept Plan

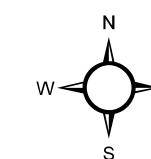
Adrian Burnette Elementary School



- Spot Recommendations
- New sidewalk
- New sidewalk (secondary)
- New trail connection
- New trail (secondary)
- Existing Sidewalks

Production of Walk Trips

- Fewer Trips Produced
- More Trips Produced



0 395 790 Feet

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
799	6%	100%	42%	125	16

There are 35 schools located in unincorporated Knox County. Amherst Elementary ranks **4th** in pedestrian improvement priority based on composite data.

Assessment:

Pedestrian access to the school is limited by a mountain ridge immediately north of the campus. Travel around the ridge is by means of Johnson Road, a 16' wide road with no shoulder or sidewalk. Schaad Road has recently been extended as a four-lane divided roadway, but traffic volumes will remain light until the road is extended further west. Construction on new residential development is ongoing and future development in proximity to the school is likely.

Recommendations:

- Connect neighborhoods on the south side of Ball Road to Schaad Road with a new trail connection.
- Connect Stars Cove Lane to Schaad Road sidewalks with a new trail connection.
- Construct a sidewalk along the school access drive connecting Schaad Road to the school building.
- Other improvements should be implemented as part of new development:
 - Improve Schaad Road crossings once the road is extended (pedestrian warning signs, flashers, and markings) to improve safety.
 - Construct connections to Schaad Road sidewalks or directly to the school as adjacent properties develop.
 - Construct sidewalk along Johnson Road if this road is improved in the future.



Sidewalks on Schaad Road should be extended along the driveway to connect to the school building.



Intersections on Schaad Road, though large, are currently adequate for pedestrian use, especially if patrolled during arrival and dismissal periods. As traffic grows on Schaad Road, however, additional safety countermeasures may be needed.

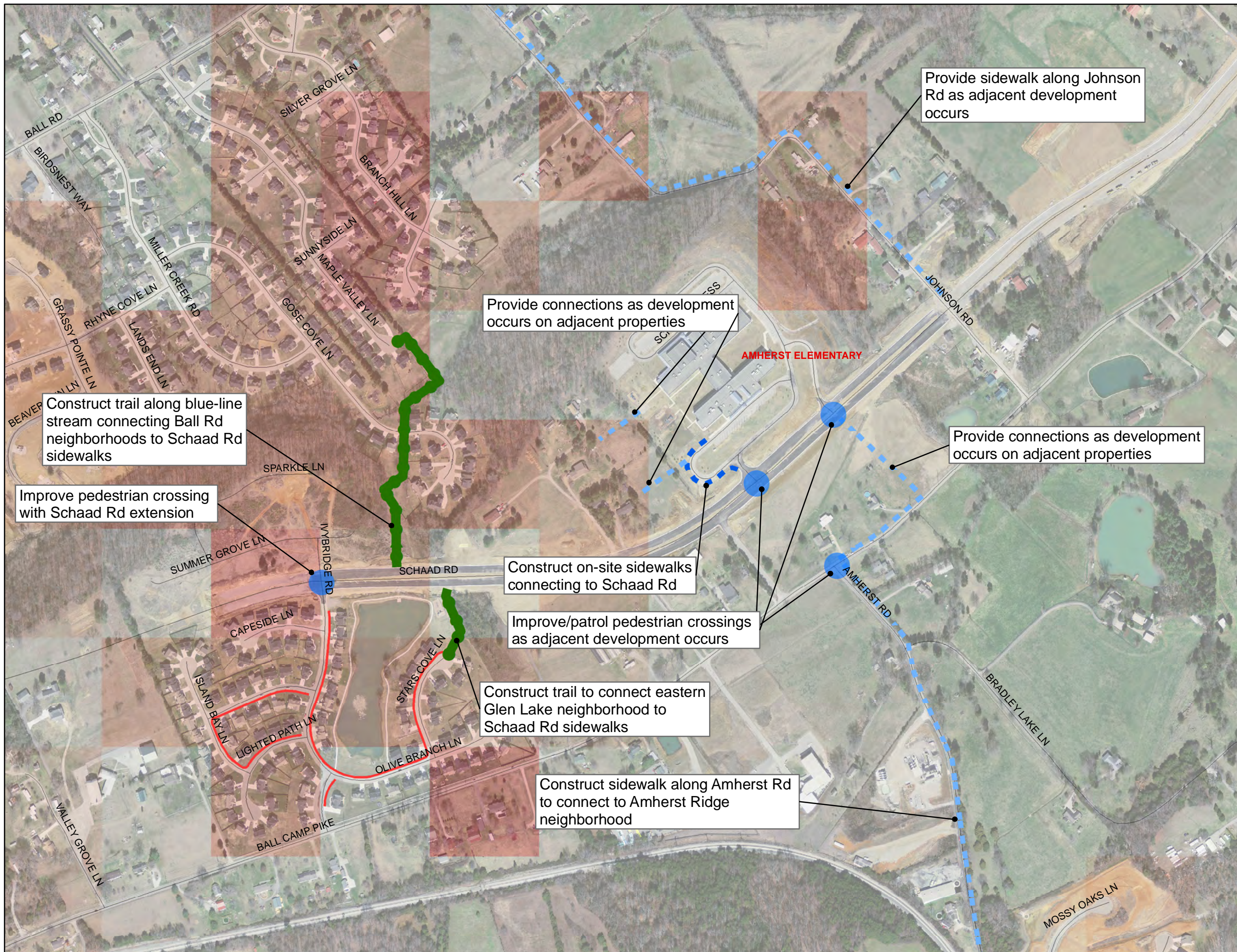
New development in proximity to the school should include pedestrian accommodations to facilitate walking trips.





Pedestrian Improvements Concept Plan

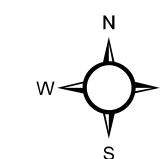
Amherst Elementary School



- Spot Recommendations
- New sidewalk
- New sidewalk (secondary)
- New trail connection
- New trail (secondary)
- Existing Sidewalks

Production of Walk Trips

- Fewer Trips Produced
- More Trips Produced



0 400 800 Feet

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
707	41%	-4%	18%	174	106



There are 35 schools located in unincorporated Knox County. Blue Grass Elementary ranks **2nd** in pedestrian improvement priority based on composite data.

Assessment:

The area around Blue Grass Elementary is largely developed with little new home or other infrastructure expected to be constructed near the school. Primary pedestrian access is along Ebenezer Road, a five-lane road with sidewalks connecting several neighborhoods north of the school. These accommodations are adequate, but the size and speed of traffic along this route might discourage potential walk to school trips from becoming realized.

Recommendations:

- Facilitate more walking trips on Ebenezer Road by the following:
 - Construct crossing islands in the center of the road at the intersections of Nubbin Ridge Road, High-bridge Road, Gatwick Road, and Grenada Boulevard.
 - Develop an encouragement plan for neighborhoods north of the school. A key component of the plan should be organization of a walking school bus.
- Upgrade pedestrian facilities at the signalized intersection of Ebenezer Road and Bluegrass Road. This should include new pushbuttons, signal heads, and landings with curb ramps.
- Connect the Roefield neighborhood by reserving a future pedestrian connection between Vale View Road and Bluegrass Road as a part of future development in this area. This connection would be completed by additional sidewalk construction along Bluegrass Road.



Recommended intersection improvements, Bluegrass Road and Ebenezer Road

At key intersections, the existing center turn lane can be reconstructed as a median crosswalk island to provide safer crossings.

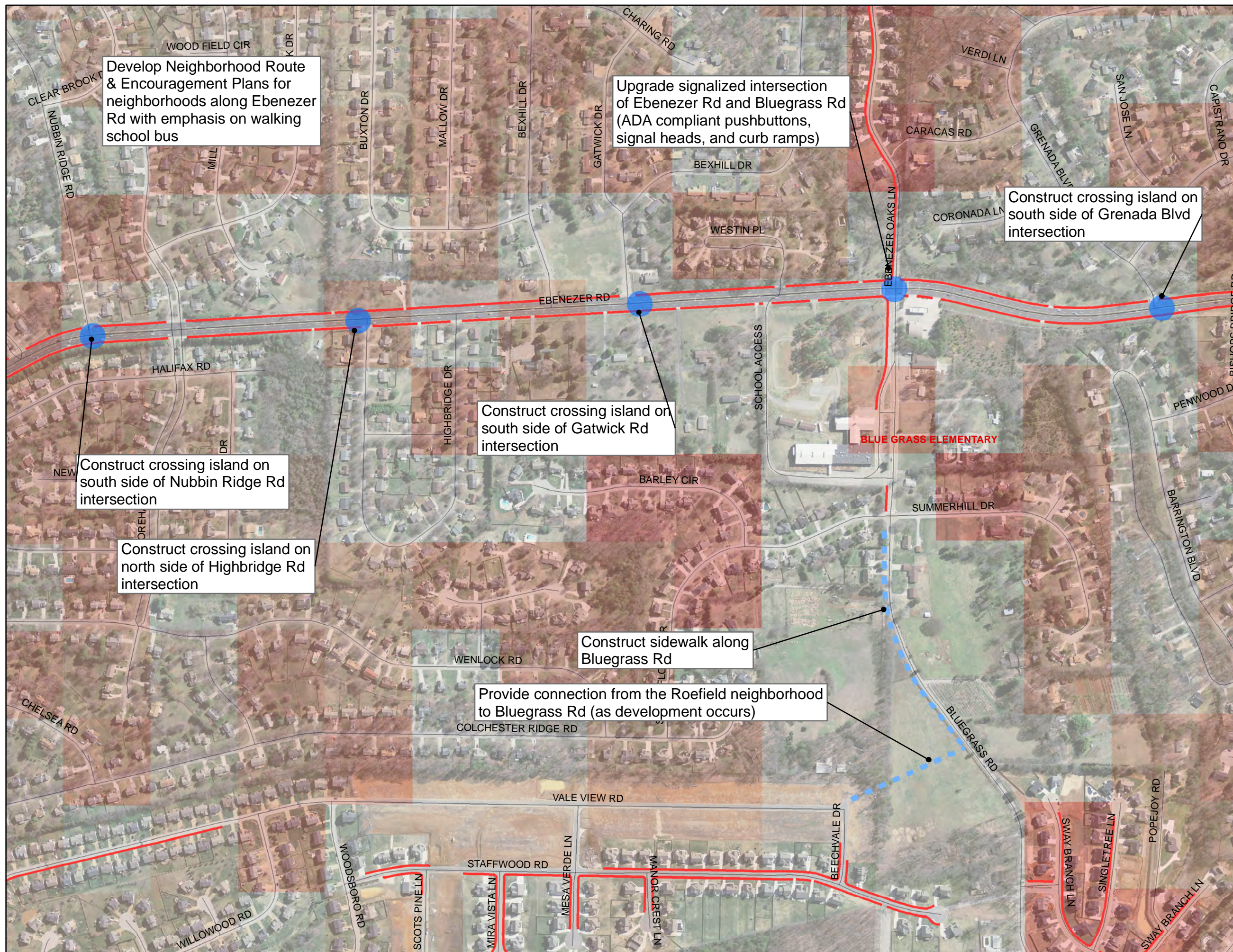


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Pedestrian Improvements Concept Plan

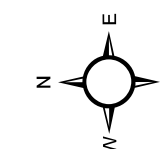
Blue Grass Elementary School



- Spot Recommendations
- New sidewalk
- New sidewalk (secondary)
- New trail connection
- New trail (secondary)
- Existing Sidewalks

Production of Walk Trips

- Light pink box: Fewer Trips Produced
- Medium pink box: Fewer Trips Produced
- Dark pink box: Fewer Trips Produced
- Dark pink box: More Trips Produced



0 400 800 Feet

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
1,293	12%	46%	48%	213	51



There are 35 schools located in unincorporated Knox County. Cedar Bluff Elementary ranks **1st** in pedestrian improvement priority based on composite data.

Assessment:

Located directly on Cedar Bluff Road, this five-lane road presents a substantial barrier to walk trips from residences on the east side of the road. Facilities along Cedar Bluff Road are adequate, though a relatively narrow sidewalk width and the speed and volume of traffic make walking along the road less than desirable. Aside from the neighborhoods immediately adjacent to Cedar Bluff Elementary, a significant source of walk to school trips is expected from the multifamily residential neighborhoods along Park Village Drive. These walk distances are further, but the number of potential walk trips and a good start to pedestrian accommodations make improvements in this area worth the effort.

Recommendations:

- Relocate current Cedar Bluff crosswalk 250' south to north side of school driveway. This will allow construction of a crossing median island to be constructed in the center of Cedar Bluff Road (construct 25' sidewalk into apartments parking lot on east side of Cedar Bluff Road).
- See Cedar Bluff Middle School for other related improvements.



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Providing a more protected crossing of Cedar Bluff Road will help where protected (signalized) crossings are infrequent. A pedestrian hybrid beacon could be used if more traffic control is desired.

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
609	29%	-38%	43%	100	44

There are 35 schools located in unincorporated Knox County. Cedar Bluff Middle ranks **8th** in pedestrian improvement priority based on composite data.

Assessment:

Situated alongside Cedar Bluff Elementary, Cedar Bluff Middle faces a similar walk to school outlook. Cedar Bluff Road presents a crossing challenge, but pedestrian trips from the Park Village neighborhood may be more likely to the middle school because older children can make the longer trip more easily. More sidewalks exist around the Cedar Bluff campus than at most other schools in the county. It is also true, however, that the areas closest to the campus are more completely built-out, meaning that new sidewalk connections as part of development are not likely. Large-acreage lots along Dutchtown Road might be an exception.



Connecting trails exist from Ponder Road (shown) and Whirlaway Circle. A direct trail connection to the Cedar Bluff schools campus from Chateaugay Road is recommended.

Recommendations:

- Construct trail connection from Chateaugay Road to CBES.
- Improve internal pedestrian connections between CBES and CBMS. This should include sidewalk construction along the rear access road between the two schools.
- Develop a Neighborhood Route and Encouragement Plan for the Park Village neighborhood.
- Improve the existing signal at the intersection of Cedar Bluff Road and Fox Lonas Road with ADA-compliant curb ramps, signal heads, and push buttons.
- See Cedar Bluff Elementary School for other related improvements.



Walkers crossing the Cedar Bluff campus would benefit from pedestrian facilities along the rear service drive which connects the two schools.



ADA-compliant signal upgrades at the intersection of Cedar Bluff Road and Fox Lonas Drive would include countdown signal heads and accessible pushbuttons.





Pedestrian Improvements Concept Plan

Cedar Bluff Elementary and Middle Schools

Develop Neighborhood Route
& Encouragement Plan for
adjacent neighborhoods

Construct sidewalk along service
drive connecting two schools

Construct trail connection from
Chateaugay Rd to elementary
school

Construct trail connection from
elementary to middle school

Improve existing signal with
ADA-compliant pedestrian
accommodations (curb ramps,
signal heads, and push buttons)

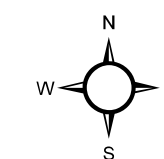
Relocate crosswalk 250' south
and construct crossing island with
rectangular rapid-flash beacons.
Construct short sidewalk extension.

Develop Neighborhood Route
& Encouragement Plan for
Park Village neighborhoods

- Spot Recommendations
- New sidewalk
- New sidewalk (secondary)
- New trail connection
- New trail (secondary)
- Existing Sidewalks

Production of Walk Trips

- Fewer Trips Produced
- More Trips Produced



0 400 800 Feet

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
785	14%	5%	37%	116	35



There are 35 schools located in unincorporated Knox County. Halls Elementary ranks **11th** in pedestrian improvement priority based on composite data.

Assessment:

Although not on the same campus as Halls Middle and High Schools, Halls Elementary shares most of the same challenges and opportunities for more walk to school trips as the other Halls schools. Most new trips will be most feasibly produced from the Larue, Midview, and Bonna Vista neighborhoods adjacent to the school. Relatively small improvements can better facilitate these trips. Accommodating new trips from other areas will mean larger-scale sidewalk construction. This construction, however, could also serve new development that is occurring along Hill Road and McCloud Road.

Recommendations:

- Construct sidewalk from Northgate Dr to E Emory Road.
- Construct sidewalk on McCloud Road from Greenscape Drive to Larue Lane.
- Sign the trail connection from Larue Lane and open a pedestrian connection between Larue Lane and Ventura Drive.
- Ultimately, sidewalk extension northward on Andersonville Pike and Hill Road can connect to neighborhoods further away from the school.
- See Halls Middle and High School for other related improvements.



The trail connection from Larue Lane is an ideal neighborhood walk to school facility. Signing it can make it a focal point of a broader Encouragement and Routing Plan for adjacent neighborhoods.



A break in the guardrail and short paved path between the Larue Lane and Ventura Drive cul-de-sacs will create a better connection for walkers to the schools in the Halls community.



Extending this sidewalk on Andersonville Pike to E Emory Road (to other sidewalk recommended there) will create a more complete sidewalk network for the Halls community.



Extending pedestrian facilities northward on Andersonville Pike and Hill Road can attract more walk trips, though distances are further to existing neighborhoods.



School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
1,146	14%	-2%	38%	120	43



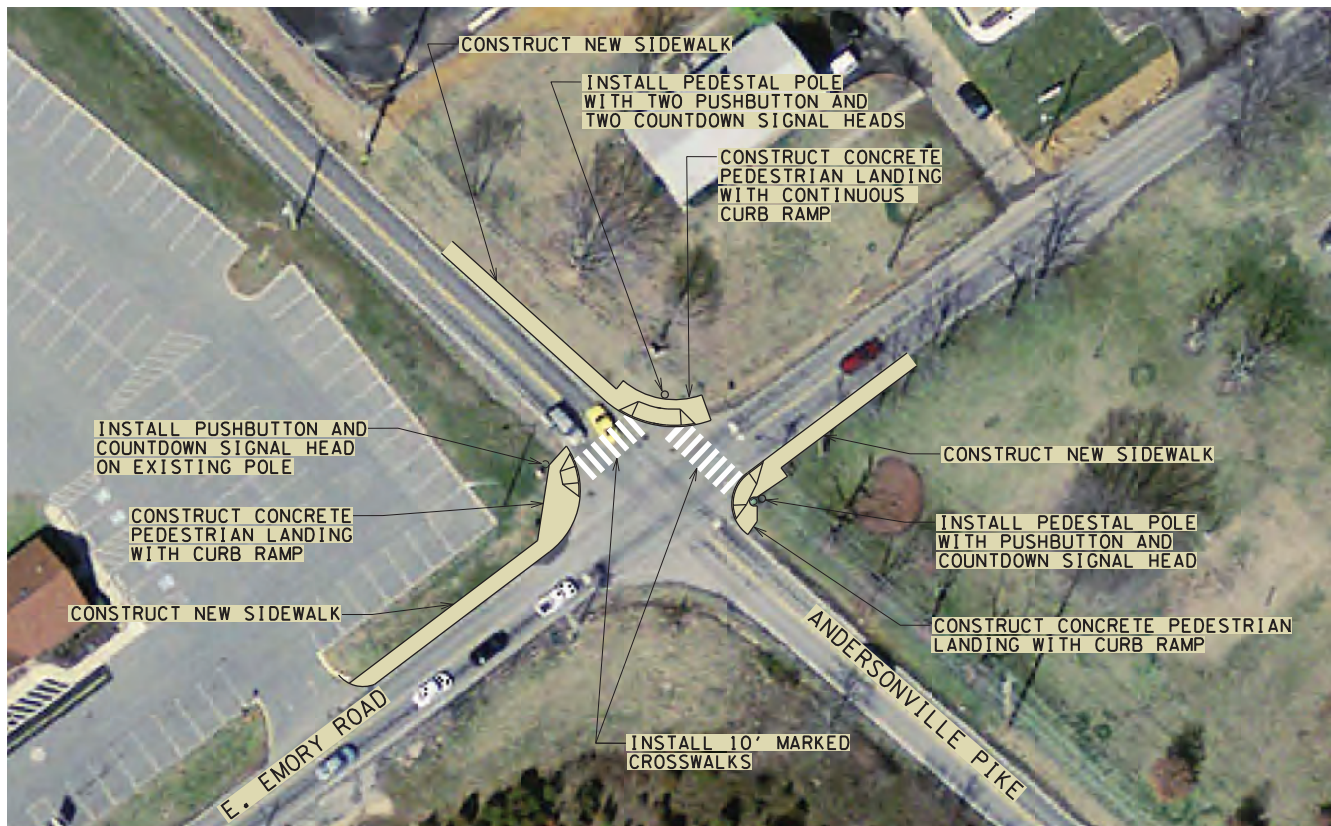
There are 35 schools located in unincorporated Knox County. Halls Middle ranks **5th** in pedestrian improvement priority based on composite data.

Assessment:

The Halls Middle and High School campus is hemmed in by several large roadways that present a challenge to more walking trips. Namely, Maynardville Pike and Norris Freeway and, to a lesser degree, Andersonville Pike and Emory Road. The Halls Greenway comes to within 1/4 mile of the campus, but its connection is very difficult given the prospect of crossing Maynardville Pike. An ideal trail connection from Oaken Drive does exist, however, and an outdoor classroom and small-scale trails have been developed along the North Fork of Beaver Creek. This connection serves the Bonna Vista and Mid-view Estates neighborhoods, found to be the most likely walk trip generators to Halls Middle School.

Recommendations:

- Construct sidewalk on Emory Road from the school access to Norris Freeway.
- As part of the sidewalk construction, improve the signalized intersection of Emory Road and Andersonville Pike by adding ADA-compliant curb ramps, pushbuttons, and countdown signals.
- Upgrade the marked crosswalk on Emory Road at the school access by replacing flashing beacons with rectangular rapid flash beacons.
- See Halls High and Elementary School for other related improvements.



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Expansion of the sidewalk network in the Halls Community will help facilitate walk to school trips. The intersection of E. Emory Road and Andersonville Pike is a part of this strategy. See Halls Elementary and High Schools for other related improvements.

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
1,276	16%	-18%	32%	130	52

There are 35 schools located in unincorporated Knox County. Halls High ranks **13th** in pedestrian improvement priority based on composite data.

Assessment:

Efforts to improve walk to school trips for the Halls Middle and High School campus should focus on the neighborhoods immediately north of the campus. A few recent developments along Ledgerwood Road (Ledgerwood Square and Matthew Place Condos) have increased density in the area, but significant new growth in proximity to the school is not anticipated. The existing trail connection from Oaken Drive should be the focus of encouraging new walk trips from the nearest neighborhoods.

Recommendations:

- Develop a Neighborhood Route and Encouragement Plan for neighborhoods north of Halls High (Bonna Vista, Midview Estates, etc.).
- Investigate the possibility of extending a trail along the North Fork of Beaver Creek. With added possible connections to streets like Mace Lane and/or Stillbrook Lane, this trail could ultimately serve as a viable spur to the Halls Greenway system.
- See Halls Middle and Elementary School for other related improvements.



Connecting the Halls school campuses with sidewalk along E. Emory Road and Andersonville Pike will benefit this community beyond the strict walk-to-school needs by connecting churches and businesses as well as the schools and residences.



With construction of sidewalk along E. Emory Rd, this crosswalk will get more usage and upgrades should include rectangular rapid-flash beacons.



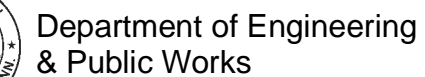
The trailhead from Oaken Drive allows pedestrian access from the adjacent neighborhoods. Increased trips from these neighborhoods are the most likely and require limited new infrastructure to encourage trip realization.



Extending and paving a trail along the North Fork of Beaver Creek, along with some local street accesses would bring new walk to school trips and could ultimately serve as a Halls Greenway spur trail.

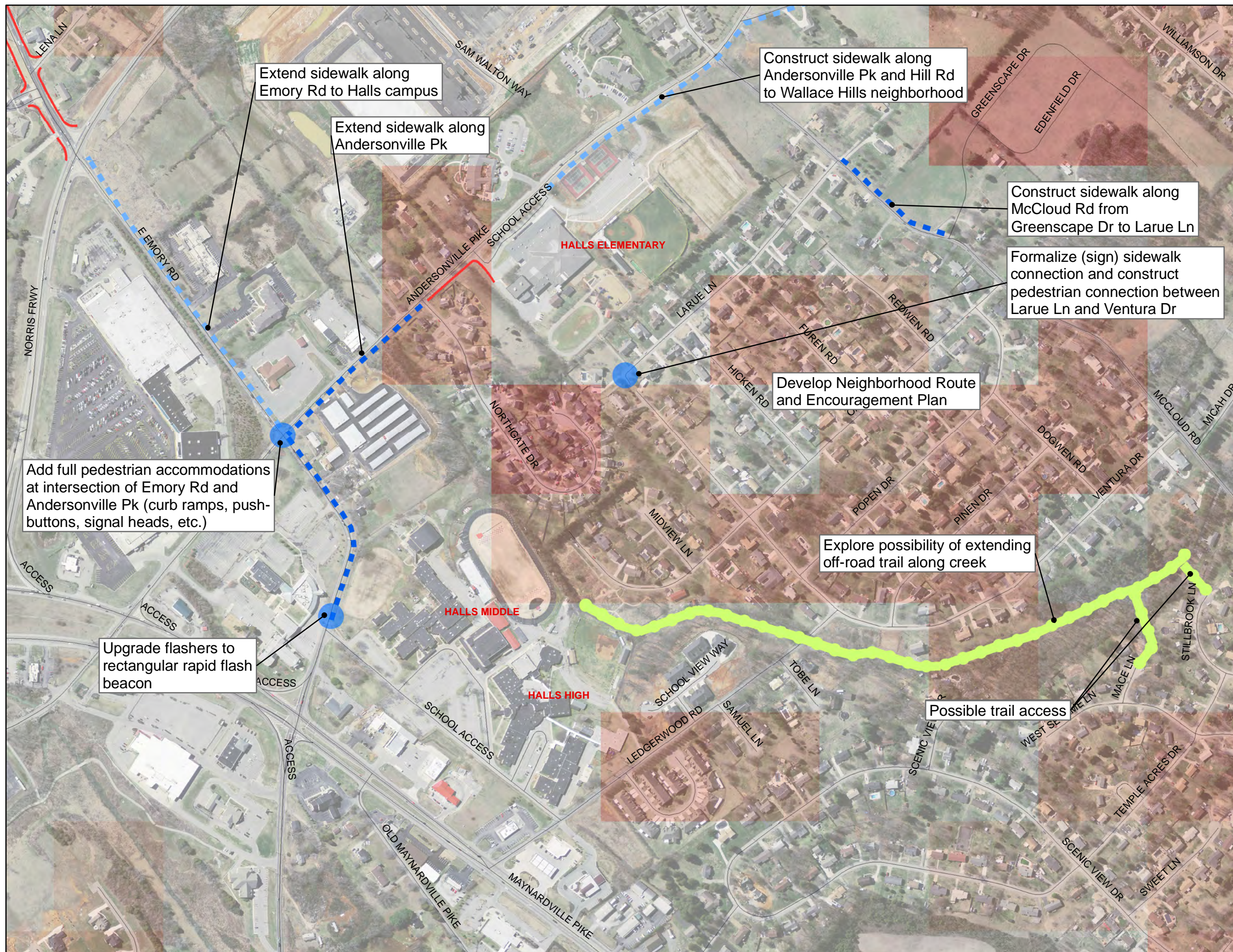


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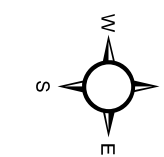
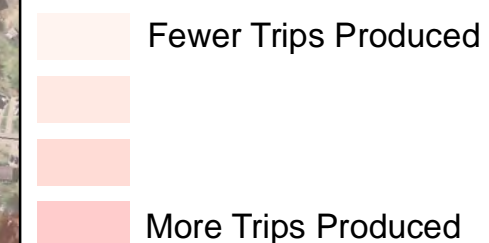


Pedestrian Improvements Concept Plan

Halls Elementary, Middle, and High Schools



Production of Walk Trips



0 250 500 Feet

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
1,251	9%	75%	40%	131	41



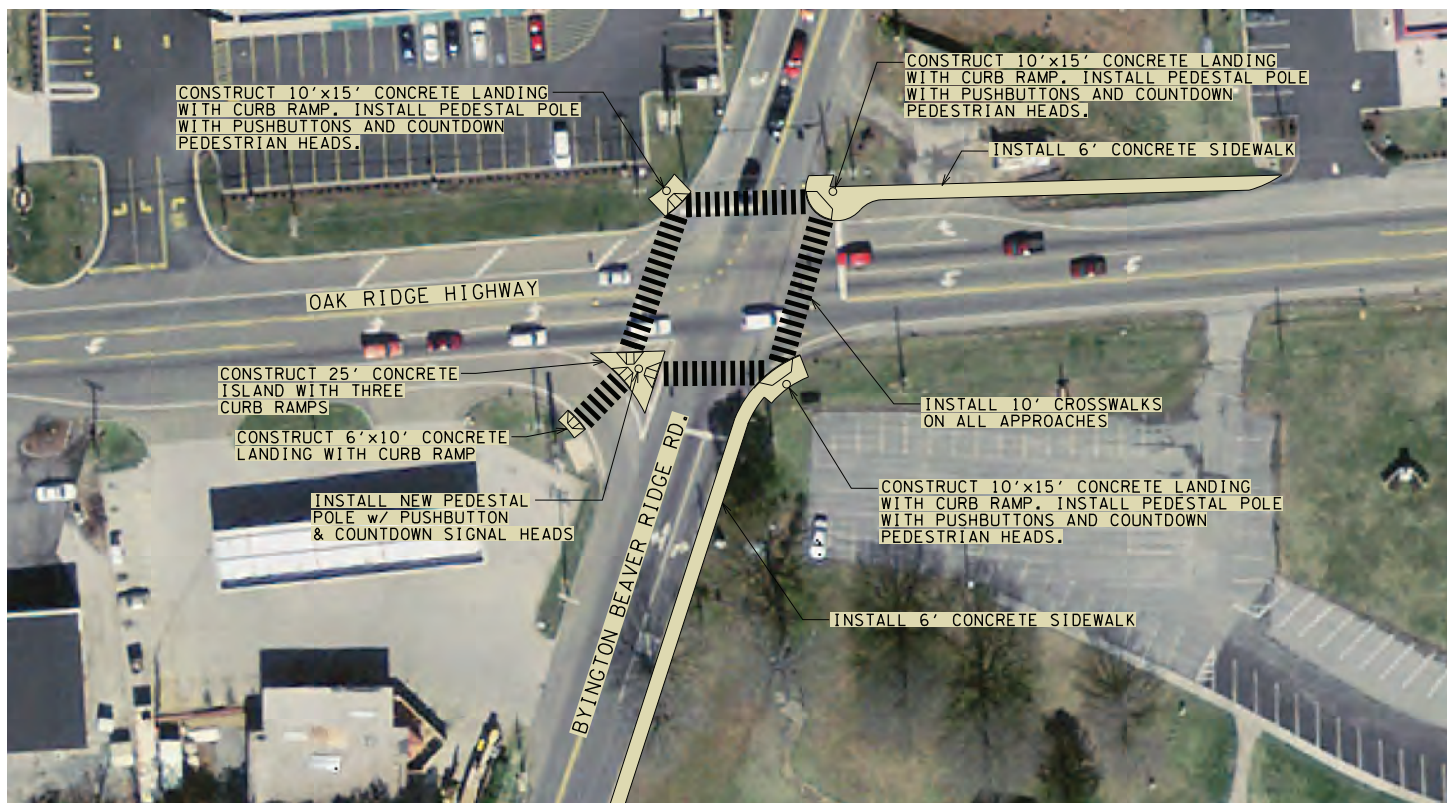
There are 35 schools located in unincorporated Knox County. Karns Elementary ranks **3rd** in pedestrian improvement priority based on composite data.

Assessment:

One of the few dedicated pedestrian overpasses in Knox County is at KES over Oak Ridge Highway. A newer and significant step in pedestrian improvement to Karns Elementary was made recently with the construction of sidewalk along Beaver Ridge Road. This project made it possible for almost 80 KES students (and 40 more KMS students) to walk to school. Future improvement should focus on a complete sidewalk network along Gray Hendrix Road, Byington Beaver Ridge Road, and Oak Ridge Highway that would facilitate more trips to Karns Elementary and Middle Schools.

Recommendations:

- Look for opportunities to further pedestrian connections between Emory Rd and Beaver Ridge Rd as part of new development.
- As development continues, construct a more complete pedestrian network with sidewalks along Garrison Drive, Byington Beaver Ridge Road, and Oak Ridge Highway.
- Make pedestrian improvements at the intersection of Byington Beaver Ridge Road and Oak Ridge Highway.
- See Karns Middle School for other related improvements.



"Destination" land uses in the Karns community make pedestrian accommodations at the signalized intersection of Oak Ridge Highway and Byington Beaver Ridge Road important.



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Pedestrian Improvements Concept Plan Supplemental Information

Karns Middle School
2925 Gray Hendrix Road

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
1,385	6%	0%	36%	75	26

There are 35 schools located in unincorporated Knox County. Karns Middle ranks **14th** in pedestrian improvement priority based on composite data.

Assessment:

Development immediately adjacent to Karns Middle is spotty, resulting in lower density and fewer walking trips to school. New sidewalk along Beaver Ridge Road connecting to the pedestrian overpass allows walk trips from the Beaver Ridge neighborhoods. Sidewalk is needed along Gray Hendrix Road and connections to this sidewalk should be required of future development along the road. In the longer term, a complete sidewalk network along Gray Hendrix Road, Byington Beaver Ridge Road, and Oak Ridge Highway can facilitate more trips to Karns Middle and Elementary Schools.



Sidewalks should be constructed along Gray Hendrix Road, beginning with the frontage of Karns Middle.

Recommendations:

- Construct sidewalk along Gray Hendrix Road.
- Require pedestrian connections as part of new development along Gray Hendrix Road. A connection from Sherwin Road to Gray Hendrix Road is especially important.
- Pave and sign the existing unimproved trail connection from Meadowrun Lane to Karns Middle School.
- As development continues, construct a more complete pedestrian network with sidewalks along Garrison Drive, Byington Beaver Ridge Road, and Oak Ridge Highway. This would include improvements at the intersection of Byington Beaver Ridge Road and Oak Ridge Highway (see Karns Elementary School).
- See Karns Elementary School for other related improvements.



Development of the pedestrian network by incorporating pedestrian connections through new developments (like this one on Gray Hendrix Road) are good opportunities to improve conditions without public expenditure while adding value to the development.



The trail from Meadowrun Lane to Karns Middle School should be signed and paved.



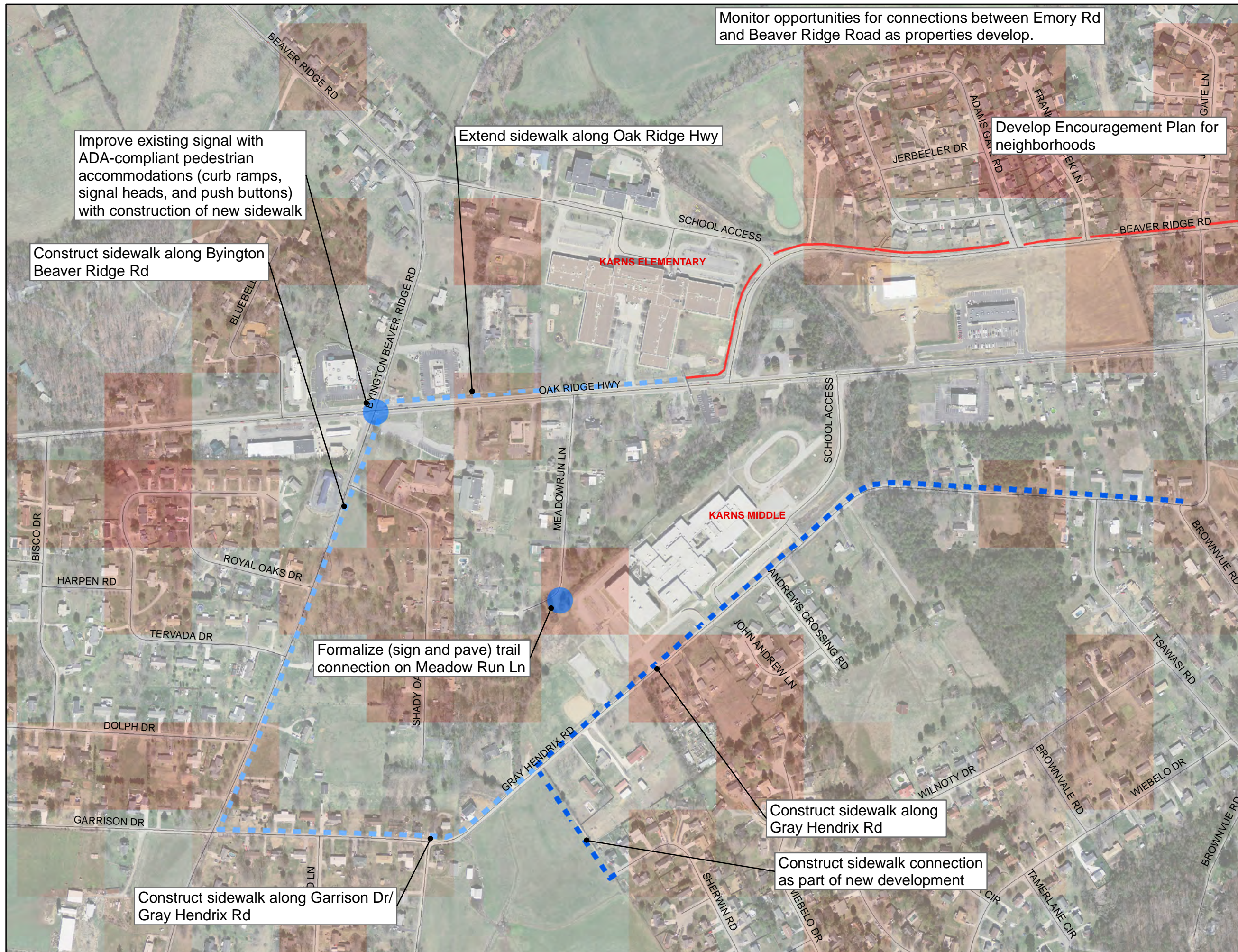
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Pedestrian Improvements Concept Plan

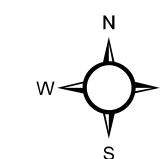
Karns Elementary and Middle Schools



- Spot Recommendations
- New sidewalk
- New sidewalk (secondary)
- New trail connection
- New trail (secondary)
- Existing Sidewalks

Production of Walk Trips

- Fewer Trips Produced
- More Trips Produced



0 400 800 Feet

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
913	17%	2%	50%	143	53

There are 35 schools located in unincorporated Knox County. Powell Elementary ranks **6th** in pedestrian improvement priority based on composite data.

Assessment:

A neighborhood school, Powell Elementary is closely surrounded by residences of the Powell community, though few sidewalks exist. Streets around the school are walkable (low speed, low traffic) and widespread sidewalk construction is not required. Pockets of new development, most notably the Brickyard Hill neighborhood have added relatively dense housing close to and just west of the school.

Recommendations:

- Construct approximately 150' of sidewalk on the west side of Brickyard Road between Ambergate Road and Wells Drive.
- Construct approximately 850' of sidewalk on one side of Wells Drive between the school and Brickyard Road.
- Install a marked crosswalk and pedestrian warning signage at the intersection of Brickyard Road and Wells Drive once sidewalks are constructed.
- Construct sidewalk along Ewing Road from the end of the existing sidewalk at First Baptist Church to Driftwood Drive.
- Construct sidewalk along Wells Drive from the school to Ewing Road.
- Install a marked crosswalk and pedestrian warning signage at the intersection of Ewing Road and Wells Drive once the Wells Drive sidewalk is constructed.
- Construct a pedestrian route to the Emerald Forest neighborhood via an extension of sidewalk along Ewing Road, paved trail construction along the northern edge of the church ballfield property, and a short sidewalk segment on Sharp Road.
- Construct a trail connection from the end of Powell Heights Road to the school property at the playground. This connection may be designed to be secured outside of arrival and dismissal periods.



Sidewalk construction along Brickyard Road and Wells Drive is needed to facilitate walk trips for students in the Brickyard Hills neighborhood.



Existing sidewalk on Ewing Road should be extended at least to Driftwood Drive.



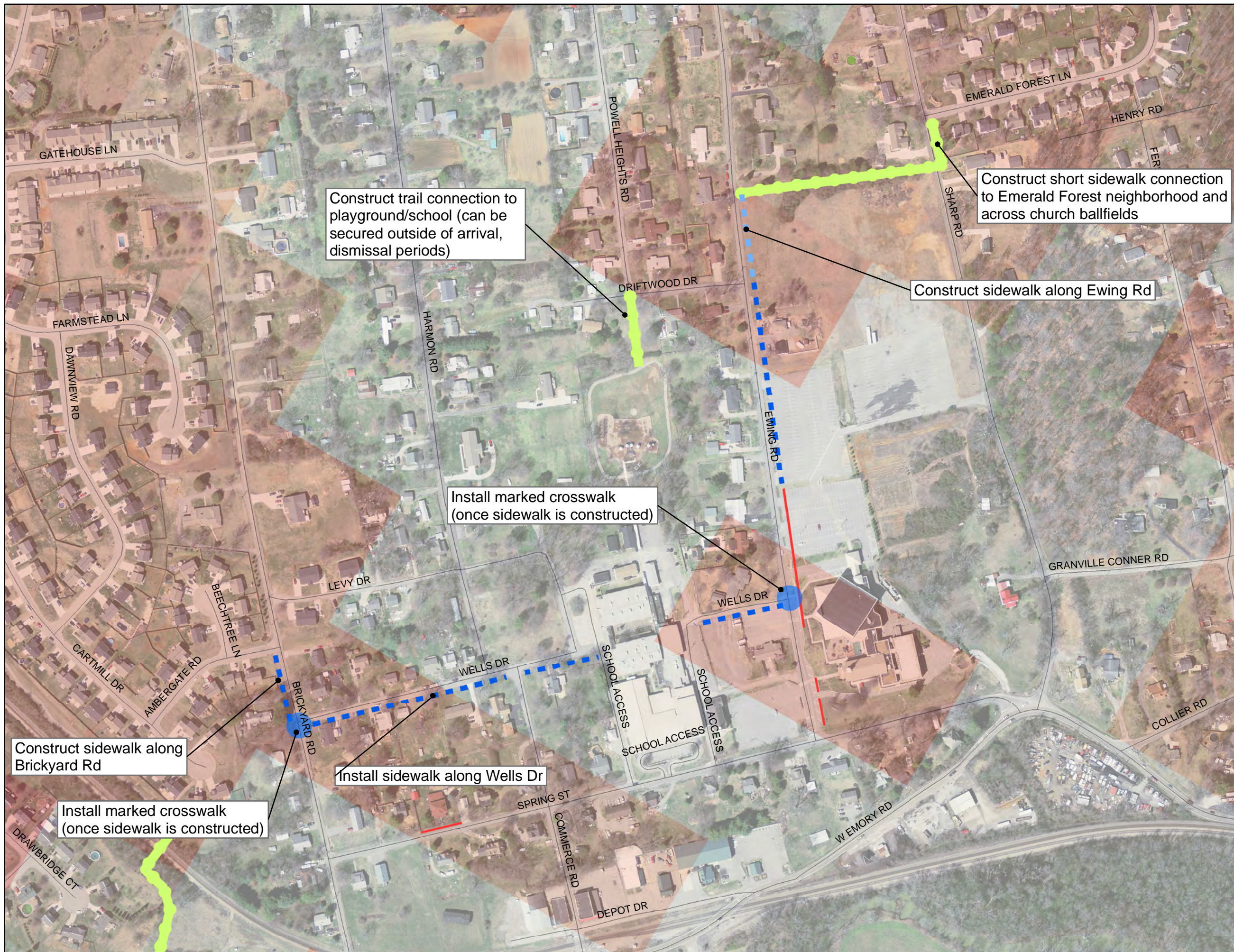
On-site accommodations are fairly complete. The layout of campus means that more children will arrive from the sides and rear of the building than the front entrance drive.





Pedestrian Improvements Concept Plan

Powell Elementary School



- Spot Recommendations
- New sidewalk
- New sidewalk (secondary)
- New trail connection
- New trail (secondary)
- Existing Sidewalks

Production of Walk Trips

- Fewer Trips Produced
- More Trips Produced



0 250 500 Feet

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
957	22%	-7%	44%	85	46

There are 35 schools located in unincorporated Knox County. Powell Middle ranks **10th** in pedestrian improvement priority based on composite data.

Assessment:

Though not on the same campus, Powell Middle and Powell High could benefit from much of the same infrastructure. Both schools could facilitate more trips from the large Broadacres neighborhood located on the north side of the school. Topography and a creek have limited development on the south side of Emory Road and, therefore, almost all walk trips come from the north side of Emory Road. The greenway along Emory Road serves as an excellent route for pedestrian trips to the two schools, but many walkers to Powell Middle have a shorter trip by routing through the Broadacres neighborhood. These neighborhood streets are suitable for walking without major sidewalk construction.

Recommendations:

- Construct sidewalk along Shropshire Boulevard from the Emory greenway to Harrow Gate Lane.
- Install a marked crosswalk and pedestrian warning signage at the intersection of Harrow Gate Lane and Shropshire Boulevard once the Shropshire sidewalk is constructed.
- Pave and sign the existing unimproved trail connection from Shropshire Boulevard to Powell Middle School.
- Construct sidewalk along Staffordshire Boulevard from the greenway to the Weigel's parking lot at the entrance to the Broadacres neighborhood.
- Develop a Neighborhood Route and Encouragement Plan for the Broadacres neighborhood.



The Emory Road greenway connects Powell Middle and High Schools and facilitates pedestrian trips along Emory Road.



Both students and residents of the western side of the Broadacres neighborhood would benefit from sidewalks along Shropshire Boulevard providing a connection to the greenway.



The trail from Shropshire Boulevard to Powell Middle School should be paved. A neighborhood routing plan will likely designate this as the primary school pedestrian access.



School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
1,373	18%	12%	42%	135	75

There are 35 schools located in unincorporated Knox County. Powell High ranks **7th** in pedestrian improvement priority based on composite data.

Assessment:

Though not on the same campus, Powell Middle and Powell High could benefit from much of the same infrastructure. Both schools could facilitate more trips from the large Broadacres neighborhood located on the north side of the school. Topography and a creek have limited development on the south side of Emory Road and, therefore, almost all walk trips come from the north side of Emory Road. The greenway along Emory Road serves as an excellent route for pedestrian trips to the two schools. With key trail connections, Powell High could also facilitate new walk trips from neighborhoods along Brickyard Road.

Recommendations:

- Construct sidewalk along Staffordshire Boulevard from the greenway to the Weigel's parking lot at the entrance to the Broadacres neighborhood.
- Develop a Neighborhood Route and Encouragement Plan for the Broadacres neighborhood.
- Install rectangular rapid flash beacons with pushbuttons and pedestrian warning signage at the existing crosswalks at the intersection of Emory Road and Camden Road and at Emory Road and the high school driveway.
- Investigate the possibility of a trail connection between the Brickyard Hill neighborhood to the Broadacres neighborhood street network and/or Emory Road. Tunnel(s) under the railroad would be required.
- Extend the existing Brickyard Hills neighborhood trail north to connect to the Tuscany Gardens neighborhood street network.
- Extend the sidewalk along Emory Road from PHS to Brickyard Road. This will likely require new curb and gutter drainage and possible parking reconfiguration for existing businesses.
- Improve the signalized intersection of Emory Road and Brickyard Road by adding ADA-compliant curb ramps, pushbuttons, and countdown signals.



Located in the Powell commercial area, Powell High has better pedestrian accommodations than most schools in unincorporated Knox County.



Extending this private trail by approximately 400' north would connect the Tuscany Gardens and Brickyard Hills neighborhoods, potentially connecting both to Emory Road.



A railroad underpass like this one could accomplish a connection from Powell High School to neighborhoods along Brickyard Road. Pedestrians already use an informal trail across the tracks in this area.

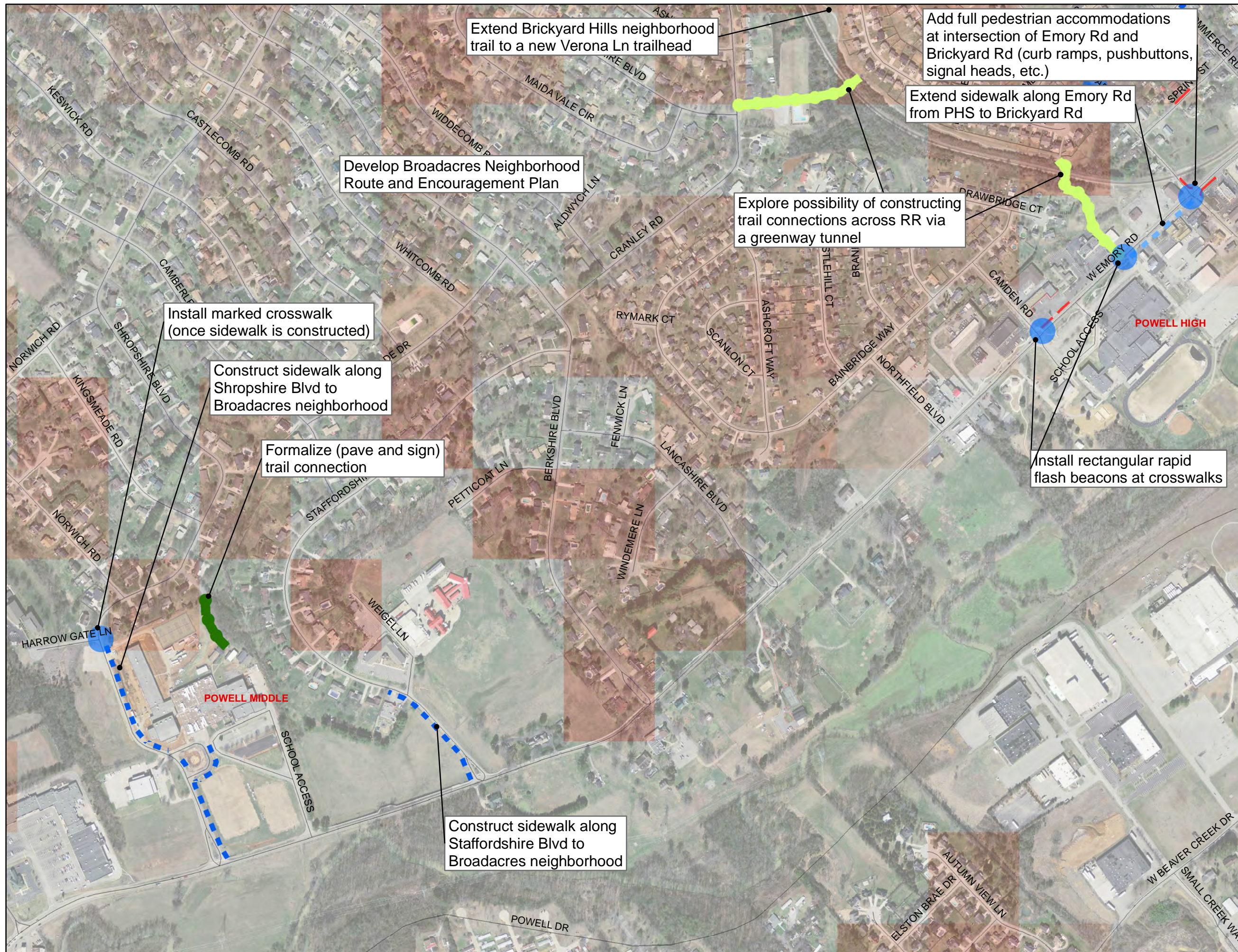


Department of Engineering
and Public Works



Pedestrian Improvements Concept Plan

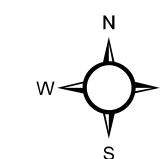
Powell Middle and High Schools



- Spot Recommendations
- New sidewalk
- New sidewalk (secondary)
- New trail connection
- New trail (secondary)
- Existing Sidewalks

Production of Walk Trips

- Fewer Trips Produced
- More Trips Produced



0 305 610 Feet

School Information:

2013-14 Enrollment	% in PRZ	15-yr student population growth in PRZ	Economically disadvantaged	Total walk trips	Walk trips in PRZ
1,153	11%	18%	15%	94	40

There are 35 schools located in unincorporated Knox County. West Valley Middle ranks **9th** in pedestrian improvement priority based on composite data.

Assessment:

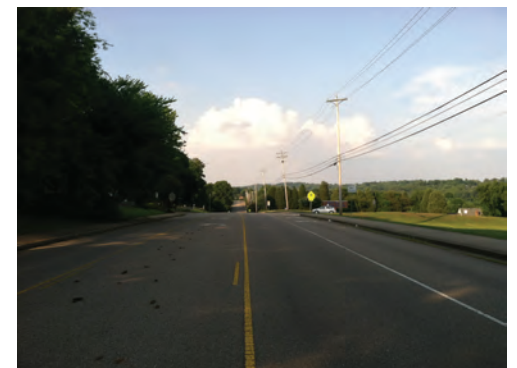
Access to West Valley Middle School is limited from the south by topography and is provided solely by George Williams Road (3 @ 12' traffic lanes with sidewalks). Sidewalk is present along the western school driveway connecting the building entrance to George Williams Road. Relatively high density housing is immediately north of the school and the lower density South Cedar Bluff neighborhood is located north of this, but does not have good pedestrian connectivity to West Valley Middle School. Few new connections are possible due to the low likelihood of new development near to the school.

Recommendations:

- Install rectangular rapid flash beacons with pushbuttons and warning signs at the existing crosswalk at the intersection of Shady Bend Lane and George Williams Road.
- Upgrade existing pedestrian facilities at the intersection of George Williams Road and Millstone Lane including ADA-compliant pedestrian signal heads, pushbuttons, and curb ramps.
- Construct a crossing island in the two-way left turn lane of George Williams Road at Bramblewood Lane. Install rectangular rapid flash beacons with pushbuttons and pedestrian warning signage at the island.
- Install rectangular rapid flash beacons with pushbuttons and pedestrian warning signage at the intersection of George Williams Road and Engert Road.
- Investigate the possibility of constructing a trail connection between the South Cedar Bluff neighborhood (Elkmont Road) and Bramblewood Lane.
- Develop a Neighborhood Route and Encouragement Plan for the South Cedar Bluff neighborhood.



Crossing facilities on George Williams Road are adequate, but safety upgrades can elevate the awareness of pedestrian activity.



A median island would help facilitate the crossing of George Williams Road.



A new pedestrian route across this field directly to the school is possible, but challenging grades make utilization of the existing sidewalk along the western school driveway preferred.





Pedestrian Improvements Concept Plan

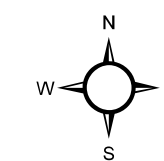
West Valley Middle School



- Spot Recommendations
- New sidewalk
- New sidewalk (secondary)
- New trail connection
- New trail (secondary)
- Existing Sidewalks

Production of Walk Trips

- Fewer Trips Produced
- More Trips Produced



0 250 500 Feet

Appendix

How Recommendations Were Developed:

The walk-to-school pedestrian improvement concepts were developed through a combination of GIS data analysis and site investigations. GIS data were used to determine the most likely walk trip origins and the field work focused on the determination of what improvements were needed to facilitate trips from these areas. The analysis focused on residential walk-to-school trips and improvements, therefore, may not connect to other important pedestrian destinations nearby the schools (libraries, greenways, retail, etc). Ideally, all of these destinations can be connected with pedestrian infrastructure, though it may not be recommended as part of this analysis. Other aspects of the recommendations are as follow:

- Most recommendations are stand-alone improvements, though some are designed to work as a system. If phasing of a recommended improvement is required, early phases should provide improved, safe access to school without depending on later phases.
- Many improvements are low cost and easy to implement. Implementation of these might provide quick momentum, but should not preclude the construction of larger-scale pedestrian enhancements. Other improvements are notable because of the complexity of coordination and construction. More detailed study and/or areawide comprehensive pedestrian planning is advised to determine more closely the feasibility of these large projects.
- These recommendations are not comprehensive and should not preclude the development of other connections, alternative alignments, etc.

General Notes

Neighborhood Routing and Encouragement Plans

Many neighborhoods adjacent to schools are high pedestrian generators. Streets in these neighborhoods are often low traffic and slow speeds, making them ideal for walking trips with little need for improvement. The recommendation for a routing and encouragement plan is to identify neighborhood-specific strategies which are developed with input from local families. In larger neighborhoods, the plan could identify and sign actual pedestrian routes. Or, a plan could identify parent “drivers” and “stops” for a neighborhood walking school bus. Some neighborhoods are not yet ready for these coordination plans because infrastructure is not yet in place.

Intersection Improvements

In relatively rural areas, signalized intersections commonly do not have pedestrian accommodations. These intersections, though busy, need not be a barrier to walking activity. The introduction of pedestrian accommodations must be in compliance with ADA design regulations.

Coordination with Other Plans

Non-motorized travel systems are often implemented most effectively through comprehensive planning and development of other nearby improvements. A review of Knox County’s subdivision requirements may be desirable to ensure that new development will include pedestrian infrastructure as appropriate, particularly around school areas. Other improvement efforts such as roadway, park, utility, and greenway improvements may be expanded to include these or other pedestrian improvement recommendations.



School	Improvements								Total Cost
	New Sidewalk Construction		Off-Road Trail Construction		Intersection Improvements	Crossing Island Construction		Misc. Spot Signing/ Marking Improvements	
	Length	Unit Cost	Length	Unit Cost	Cost	Number	Unit Cost	Cost	
Adrian Burnette Elementary	3,300	\$75 / l.f.	4,300	\$33 / l.f.			\$12,000 / island	\$500	\$389,900
Amherst Elementary	600		1,400						\$91,200
Blue Grass Elementary					\$40,000	4			\$88,000
Cedar Bluff Elementary and Middle	1,100		300		\$40,000	1		\$18,000	\$162,400
Halls Elementary, Middle, and High	2,500				\$40,000			\$18,000	\$245,500
Karns Elementary and Middle	3,500		100		\$40,000				\$305,800
Powell Elementary	2,200							\$1,000	\$166,000
Powell Middle and High	2,500		350		\$40,000			\$38,000	\$277,050
West Valley Middle					\$40,000	1		\$56,000	\$108,000
All Locations	15,700	\$1,177,500	6,450	\$212,850	\$240,000	6	\$72,000	\$131,500	\$1,833,850

These cost estimates are based on average prices for similar construction and reflect generalized construction assumptions with no inclusion of site-specific conditions. Estimates do not include engineering, right-of-way acquisition, or utility relocation costs. Sidewalk costs are based on recent sidewalk construction on Beaver Ridge Road.

Standard excavation is included, but substantive earthwork and grading (as was found to exist in some locations) is not included. Sidewalk costs are based on standard 6' concrete sidewalks with curb and gutter, though additional drainage modifications are not included. Trail construction assumes a 12' asphalt path on gravel sub-base. Signal costs include construction of 4 curb ramps, 8 pushbuttons, 8 countdown signal heads, crosswalk markings, 4 pedestal poles, and re-wiring to add additional conductors for pedestrian signals.

Updated cost estimates should be developed as needed based on full design plans.





KNOX CO SCHOOLS PEDESTRIAN IMPROVEMENTS PILOT PROJECT – FIELD REVIEW CHECKLIST

School Zone: _____

Date & Time of Field Review: _____

Weather & Lighting Conditions: _____

Auditor(s): _____

Area Type: rural / urban / suburban Traffic Control: all-way stop / side street stop / signals

Posted Speeds: Major Street(s)____ Minor Street(s)____ State Route(s): _____

Number of Travel Lanes: Major Street(s)____ Minor Street(s)____

AADT: Major Street(s)____ Minor Street(s)____

Sketch(es) of Critical Location(s):

North

(Attach photos as needed)



KNOX CO SCHOOLS PEDESTRIAN IMPROVEMENTS PILOT PROJECT – FIELD REVIEW CHECKLIST

Check all that apply and provide details, as necessary:

Is the visibility of critical intersections or any approaches limited by:

<input type="checkbox"/> Parked or queued traffic? _____	<input type="checkbox"/> Vegetation? _____
<input type="checkbox"/> Signs, utility poles, fences? _____	<input type="checkbox"/> Approach angle? _____
<input type="checkbox"/> Embankments? _____	<input type="checkbox"/> Vertical or horizontal curves? _____
<input type="checkbox"/> Buildings? _____	<input type="checkbox"/> Other sight obstructions? _____

Are signs in good condition (vandalized / reflectivity, etc...)? <input type="checkbox"/> Yes <input type="checkbox"/> No	Is there too much signage (visual clutter or confusing messages)? <input type="checkbox"/> Yes (please describe signs to remove) <input type="checkbox"/> No
Is pavement marking clearly visible (daylight and dark) and appropriate for the conditions? <input type="checkbox"/> Yes <input type="checkbox"/> No (please describe) _____ ○ Restripe? _____ ○ New Install? _____	Are traffic control devices clearly visible in advance of the intersection (daylight & dark)? <input type="checkbox"/> Yes <input type="checkbox"/> No
Is there sufficient street lighting/pedestrian scale lighting: (Describe) <input type="checkbox"/> Yes <input type="checkbox"/> No	Describe the bus facilities (location, etc.):

Describe Pedestrian/Bicycle Facilities or Lack of facilities:

Describe Surrounding Land Uses & Pedestrian/Bicycle Patterns:

Describe any other observed obstructions, concerns, or hazards:



KNOX CO SCHOOLS PEDESTRIAN IMPROVEMENTS PILOT PROJECT – FIELD REVIEW CHECKLIST

RECOMMENDATIONS

Intersections needing pedestrian infrastructure (provide location and circle control type and needs):

_____	Sig/AWSC/TWSC	Ramps / Pushbuttons / Heads / X-Walks
_____	Sig/AWSC/TWSC	Ramps / Pushbuttons / Heads / X-Walks
_____	Sig/AWSC/TWSC	Ramps / Pushbuttons / Heads / X-Walks

Sidewalks needed along streets:

New connections needed (list neighborhood name(s) and most probable street(s) for connection):

Midblock or non-controlled ped crossings needed (provide location and circle improvements as applicable):

_____	Static signage and marking / Flashers / Island / Signal
_____	Static signage and marking / Flashers / Island / Signal

Describe other details and/or other considered recommendations:

Sketches (as needed):

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MEMORANDUM

To: Cindy Pionke
Knox County Dept. of Engineering & Public Works

From: Jeff Hammond

Date: June 3, 2014

Re: Selection of school study sites

Task 1 of this study phase required the continued refinement of study site prioritization based on the analysis performed by RPM in the first phase of the study. The first phase predicted the total number of walk trips to each school based on student proximity to school and assuming that adequate facilities exist at all locations.

In addition to the total number of walk-to-school trips, the number of walk trips from within the Parental Responsibility Zone (PRZ), and the number of walk trips from outside of the PRZ as determined in Phase 1, other factors could be considered in prioritizing sites for further study. Some of these include:

- Documented pedestrian crashes at each location
- Enrollment (inside and outside of the PRZ, actual and percentage-based)
- Enrollment growth (inside and outside of the PRZ, actual and percentage-based)
- Supporting land uses (aside from residential and school activity)
- Type of school (elementary, middle, or high school)
- Geographic distribution of schools, political districts, etc.
- Demographic “stressors” as analyzed by Knoxville TPO

The most effective prioritization criteria as determined in Task 1 have been used to rank the schools located in unincorporated Knox County for further study. These criteria, and their relative importance in the ranking process are as follow:

1. Total number of walk trips originating from inside the PRZ (Weight 5). This factor considers the total enrollment, the amount of enrollment residing closest to the school, and the fact that school transportation is not provided.
2. Total number of walk trips originating outside of the PRZ (Weight 3). This factor gives prioritization credit where students are close enough to walk, even if transportation is provided.



3. School type (Weight 3). This factor assigns its highest score to middle schools (the age group most likely to walk per Safe Routes to School data), then elementary, then high school.
4. Percent change in PRZ enrollment (Weight 2). This score uses enrollment growth trends to give preference to schools which have growing numbers of students living closest to school.

Study limitations require that not every school be selected for additional study in this phase. As such, the top 14 schools based on these criteria are being carried forward into concept planning. These schools (in alphabetical order) are:

Adrian Burnett Elementary
Amherst Elementary
Blue Grass Elementary
Cedar Bluff Elementary and Middle
Halls Elementary, Middle, and High
Karns Elementary and Middle
Powell Elementary, Middle, and High
West Valley Middle

Schools having a composite score of 45 or higher were chosen for further study. This represents the top 14 schools (40%) of schools based on the chosen prioritization methods. The complete listing of schools and prioritization data are attached.

We are commencing with the development of detailed zone maps for each of these 14 schools to assist in our site visits. We will be in touch regarding the timeframe of our site work.

Schools in Knox County Ranked for Further Pedestrian Study

School	Trips inside PRZ (Actual)	Trips inside PRZ (Score x 5)	Trips outside PRZ (Actual)	Trips outside PRZ (Score x 3)	School type (Score x 3)	% Change in PRZ (Actual)	% Change in PRZ (Score x 2)	TOTAL SCORE
CEDAR BLUFF ELEMENTARY	51	25	162	27	18	46%	10	80
BLUE GRASS ELEMENTARY	106	45	68	12	18	-4%	0	75
KARNS ELEMENTARY SCHOOL	41	20	90	15	18	75%	16	69
AMHERST ELEMENTARY	16	5	109	21	18	100%	18	62
HALLS MIDDLE SCHOOL	43	20	77	15	27	-2%	0	62
POWELL ELEMENTARY	53	25	90	15	18	2%	2	60
POWELL HIGH SCHOOL	75	35	60	9	9	12%	4	57
CEDAR BLUFF MIDDLE SCHOOL	44	20	56	9	27	-38%	0	56
WEST VALLEY MIDDLE SCHOOL	40	15	54	9	27	18%	4	55
POWELL MIDDLE SCHOOL	46	20	39	6	27	-7%	0	53
HALLS ELEMENTARY	35	15	81	15	18	5%	2	50
ADRIAN BURNETT ELEM	41	20	71	12	18	-7%	0	50
HALLS HIGH SCHOOL	52	25	78	15	9	-18%	0	49
KARNS MIDDLE SCHOOL	26	10	49	9	27	0%	0	46
BRICKEY-MCCLOUD ELEMENTARY	17	5	115	21	18	-113%	0	44
HARDIN VALLEY ELEMENTARY	12	5	48	9	18	56%	12	44
A.L. LOTTS ELEMENTARY	22	10	89	15	18	-104%	0	43
HARDIN VALLEY ACADEMY	23	10	17	3	9	100%	18	40
BALL CAMP ELEMENTARY	28	10	47	9	18	-31%	0	37
CARTER MIDDLE SCHOOL	14	5	18	3	27	-7%	0	35
GIBBS ELEMENTARY	3	0	88	15	18	-278%	0	33
BONNY KATE ELEMENTARY	24	10	19	3	18	1%	2	33
SOUTH DOYLE HIGH SCHOOL	24	10	12	0	9	59%	12	31
CARTER ELEMENTARY	5	0	54	9	18	-31%	0	27
RITTA ELEMENTARY	4	0	53	9	18	0%	0	27
GIBBS HIGH SCHOOL	17	5	40	6	9	21%	6	26
NEW HOPEWELL ELEMENTARY	14	5	22	3	18	-16%	0	26
EAST KNOX COUNTY ELEMENTARY	7	0	42	6	18	-100%	0	24
MOUNT OLIVE ELEMENTARY	10	0	32	6	18	-123%	0	24
GAP CREEK ELEMENTARY	11	5	12	0	18	-56%	0	23
CARTER HIGH SCHOOL	19	5	22	3	9	15%	4	21
COPPER RIDGE ELEMENTARY	8	0	22	3	18	-23%	0	21
SUNNYVIEW PRIMARY	7	0	13	0	18	-107%	0	18
CORRYTON ELEMENTARY	7	0	12	0	18	0%	0	18
KARNS HIGH SCHOOL	9	0	27	3	9	-41%	0	12

Blue indicates schools to receive additional study.