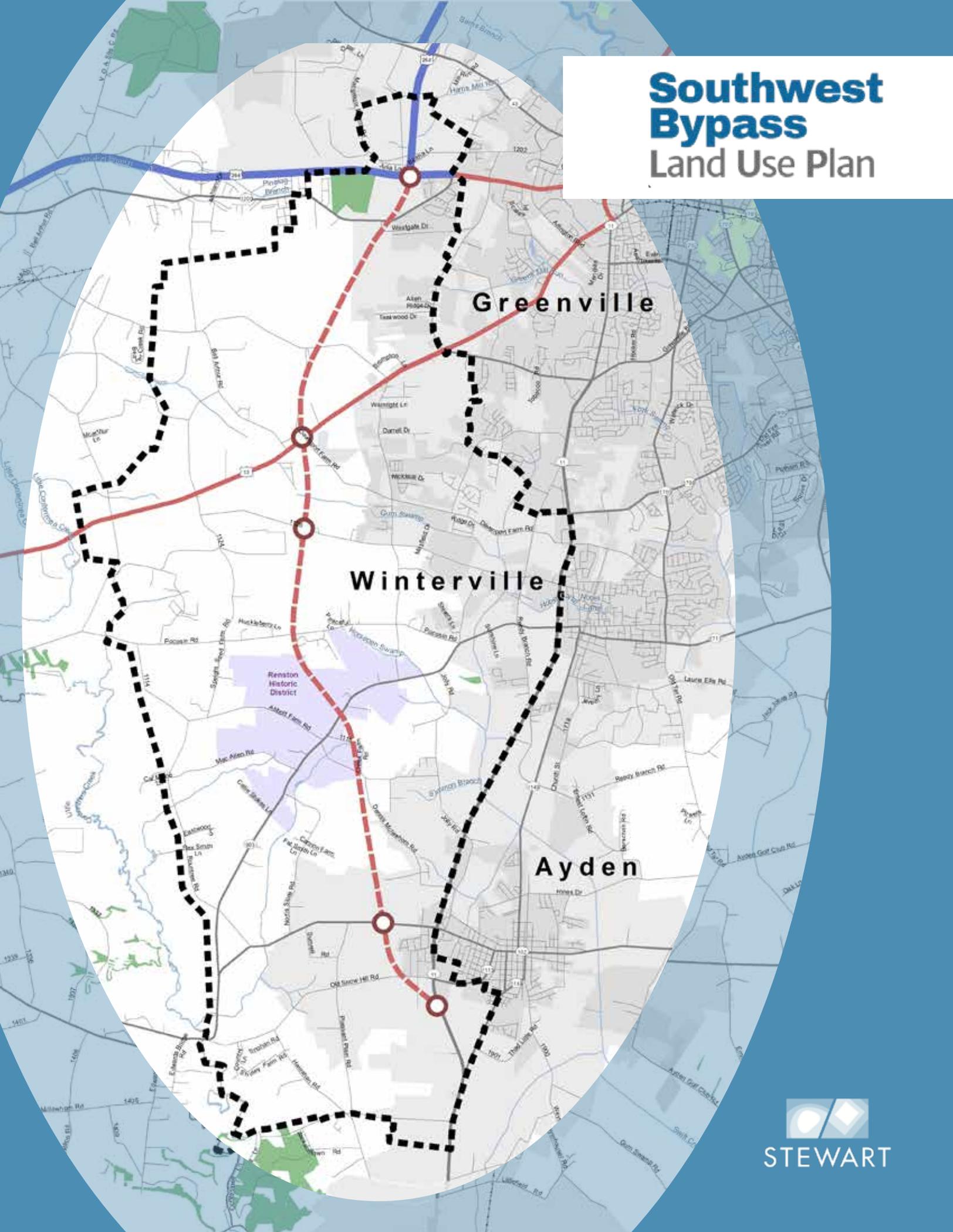


Southwest Bypass

Land Use Plan



STEWART

SECTION 5 APPENDIX



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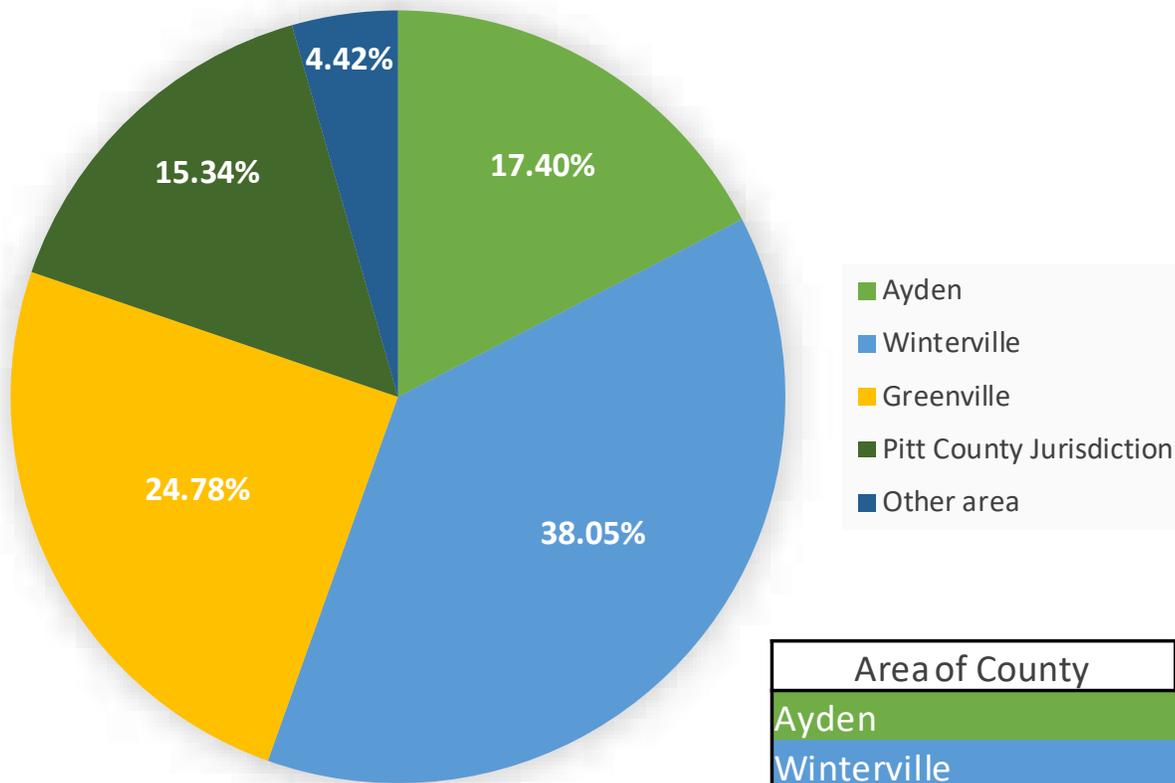
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Survey Results

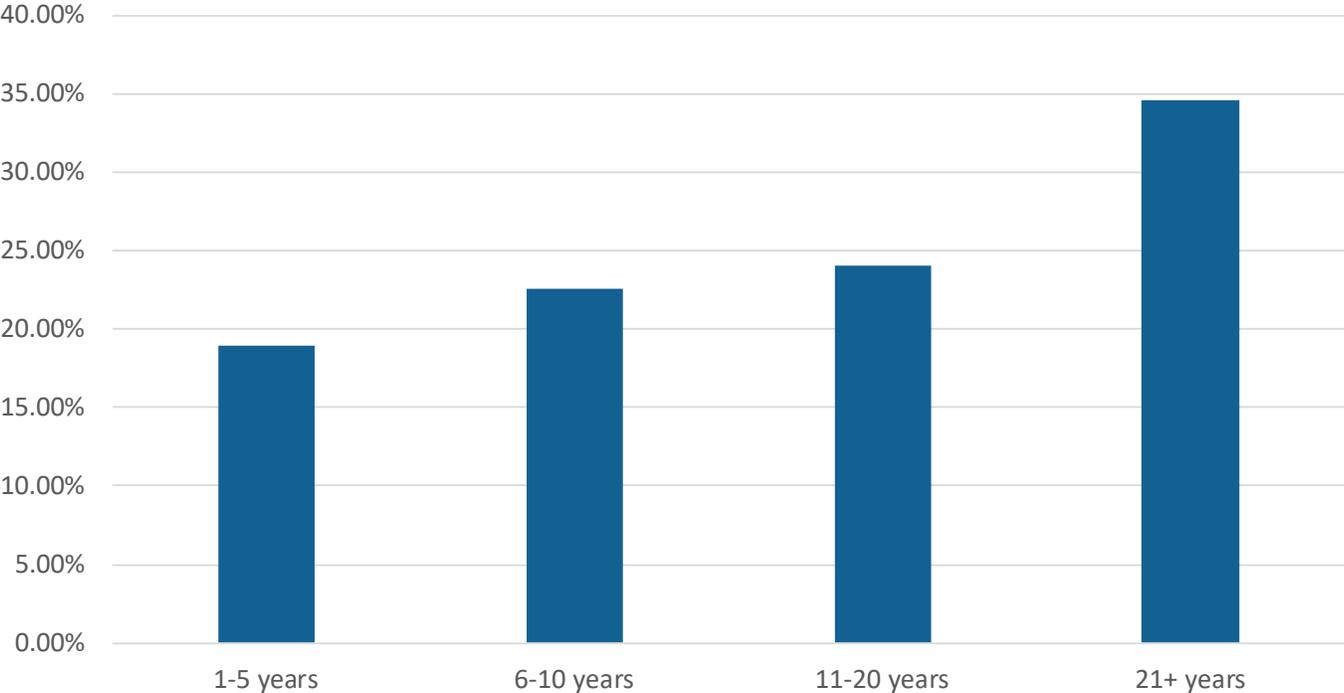
An online survey was conducted from February 26 - April 30, 2018. Over half of the survey respondents have lived in the area more than 10 years. Below are responses from the nearly 350 people who participated in the survey.

In what part of the County do you live?

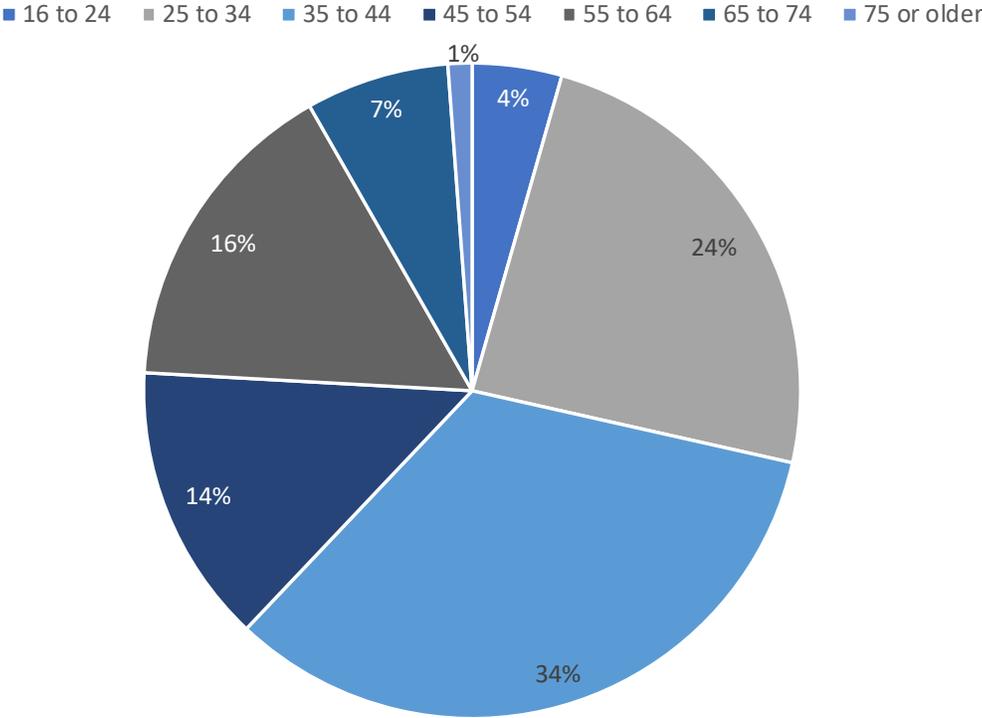


Area of County	Percent
Ayden	17.40%
Winterville	38.05%
Greenville	24.78%
Pitt County Jurisdiction	15.34%
Other area	4.42%

If you are a resident, how long have you lived in this part of the County?



What is your age?

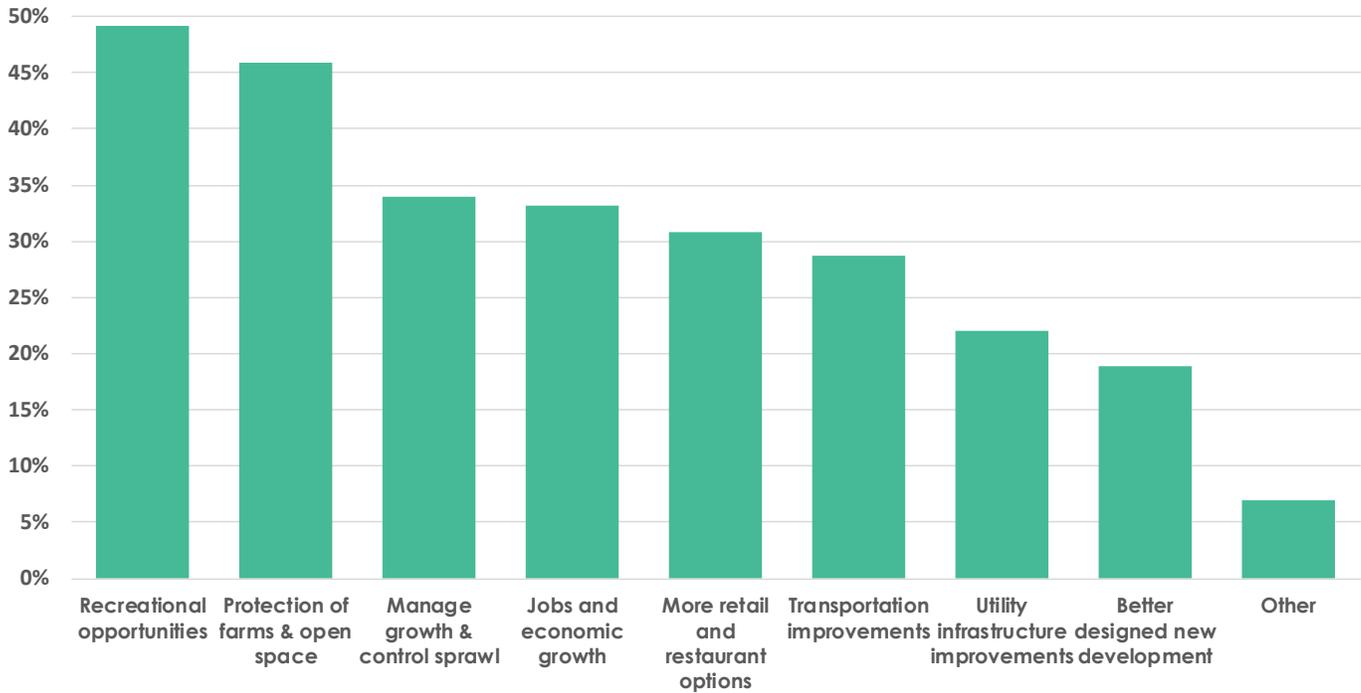


What do you value most about Southwestern Pitt County?

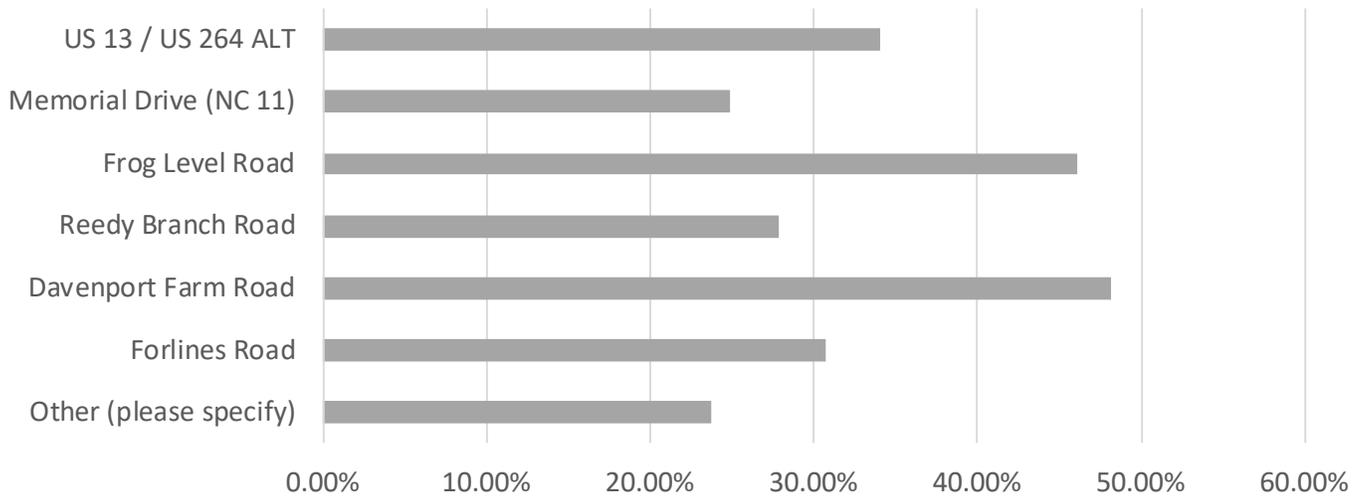
A word cloud of values for Southwestern Pitt County. The words are arranged in a roughly circular pattern, with 'Rural' and 'Greenville' being the largest. Other prominent words include 'Easy Access', 'Growth', 'Convenience', 'Shopping', 'Family', 'Farm Land', 'Quiet', 'Opportunity', 'Development', 'Small', 'Town', 'Nice', 'Neighborhoods', 'Community', 'Country', 'Space', and 'Low Crime'. Smaller words like 'Southwest Bypass', 'Pace', 'Quality of Life', 'Privacy', 'Location', 'Safety', 'Residential Area', 'Unsure', 'Close Proximity', and 'Major Traffic' are also present.

Easy Access Southwest Bypass Growth Pace
Convenience Quality of Life Shopping Privacy
Family Location Farm Land Safety Quiet
Opportunity Rural Development Greenville
Small
Residential Area Town Nice
Neighborhoods Unsure Community Close Proximity
Country Major Traffic Space Low Crime

What would you like to see in SW Pitt County area? Below are the top 3 answers



In your opinion which roadways need to be widened or improved?

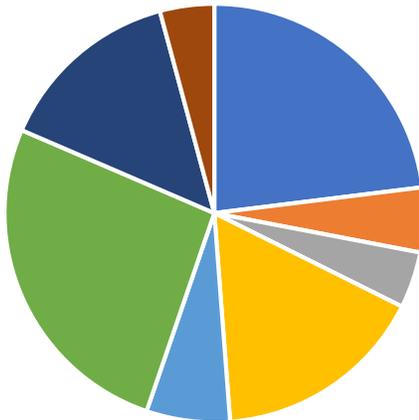


Other responses:

- Memorial/Thomas Langston
- Hwy 11/Old Snowhill
- Hwy 11/Reedy Branch
- Hwy 13/Ballards Crossroads
- Firetower/Evans

What type of development would you like to see along the Southwest Bypass Corridor?

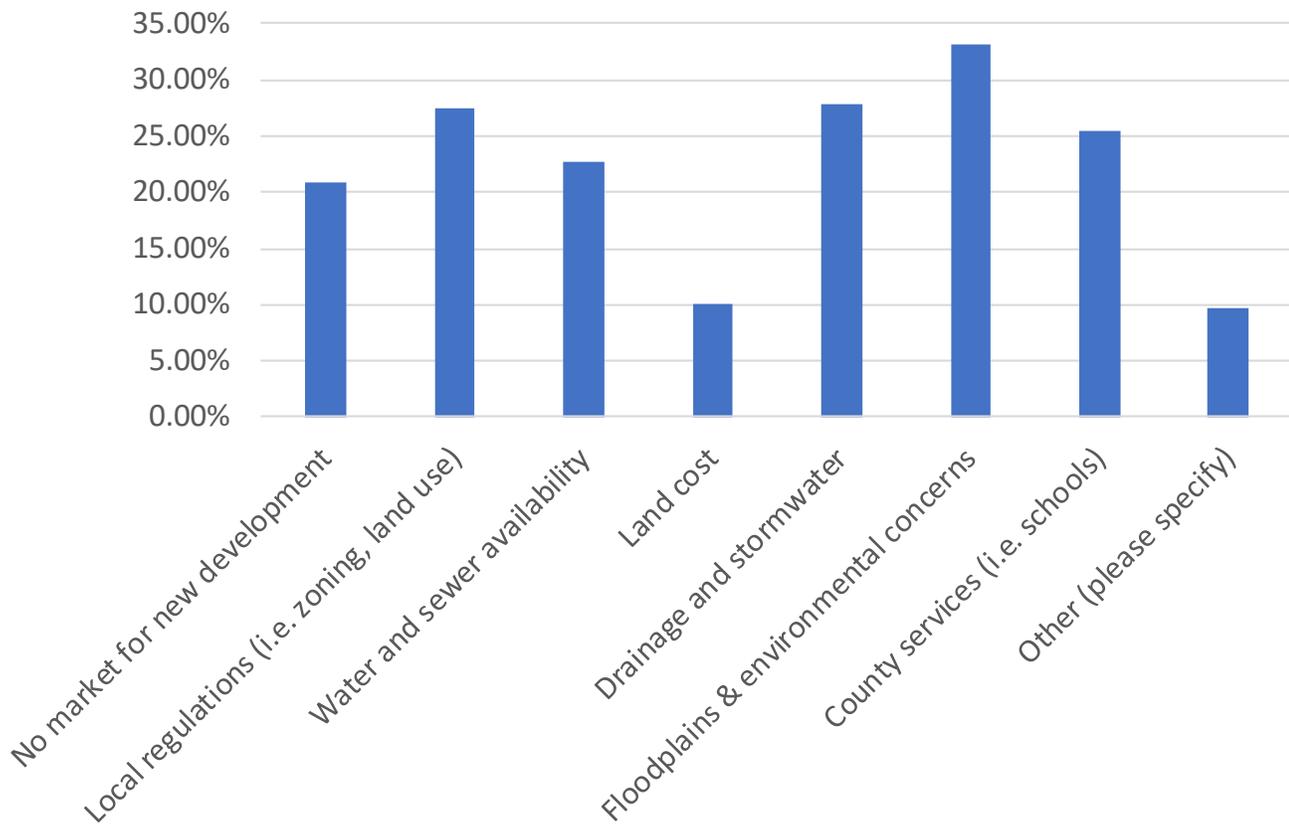
Type of Development	Percent
Retail and restaurants	41.94%
Office uses	9.09%
Multifamily residential	7.92%
Single family residential	29.91%
Industrial uses	11.73%
Mixed-use (walkable areas with a variety of uses including residential, retail, office)	47.80%
No new development	26.10%
Other (please specify)	7.62%



- Retail and restaurants
- Office uses
- Multifamily residential
- Single family residential
- Industrial uses
- Mixed-use (walkable areas with a variety of uses)

- Other responses:
- Greenways
 - Parks
 - Fitness
 - Farming Industry
 - Mall

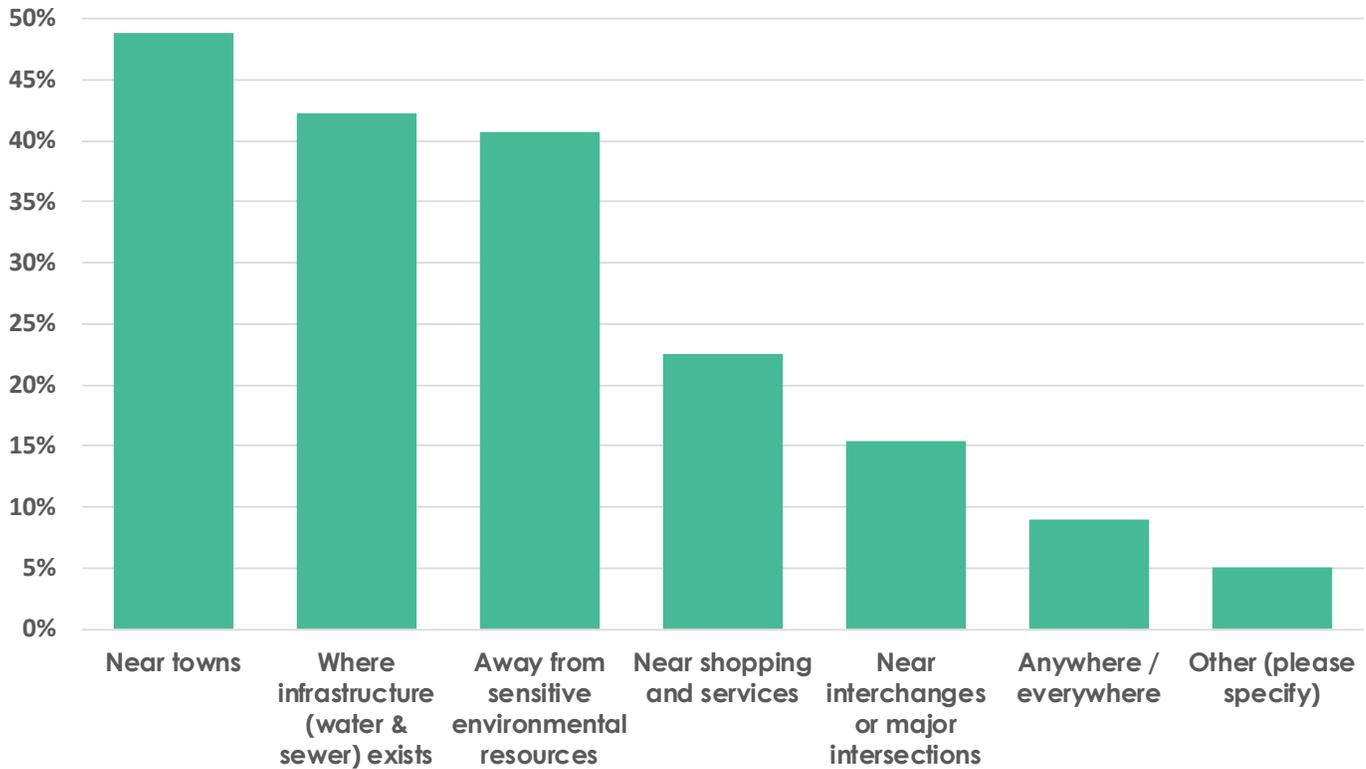
What do you feel is the biggest challenge for new development?



Other responses:

- Poor traffic planning
- Regulations
- Fire rescue
- Forced annexation for utilities
- Mall
- Poor road infrastructure
- Lack of sidewalks
- Farms

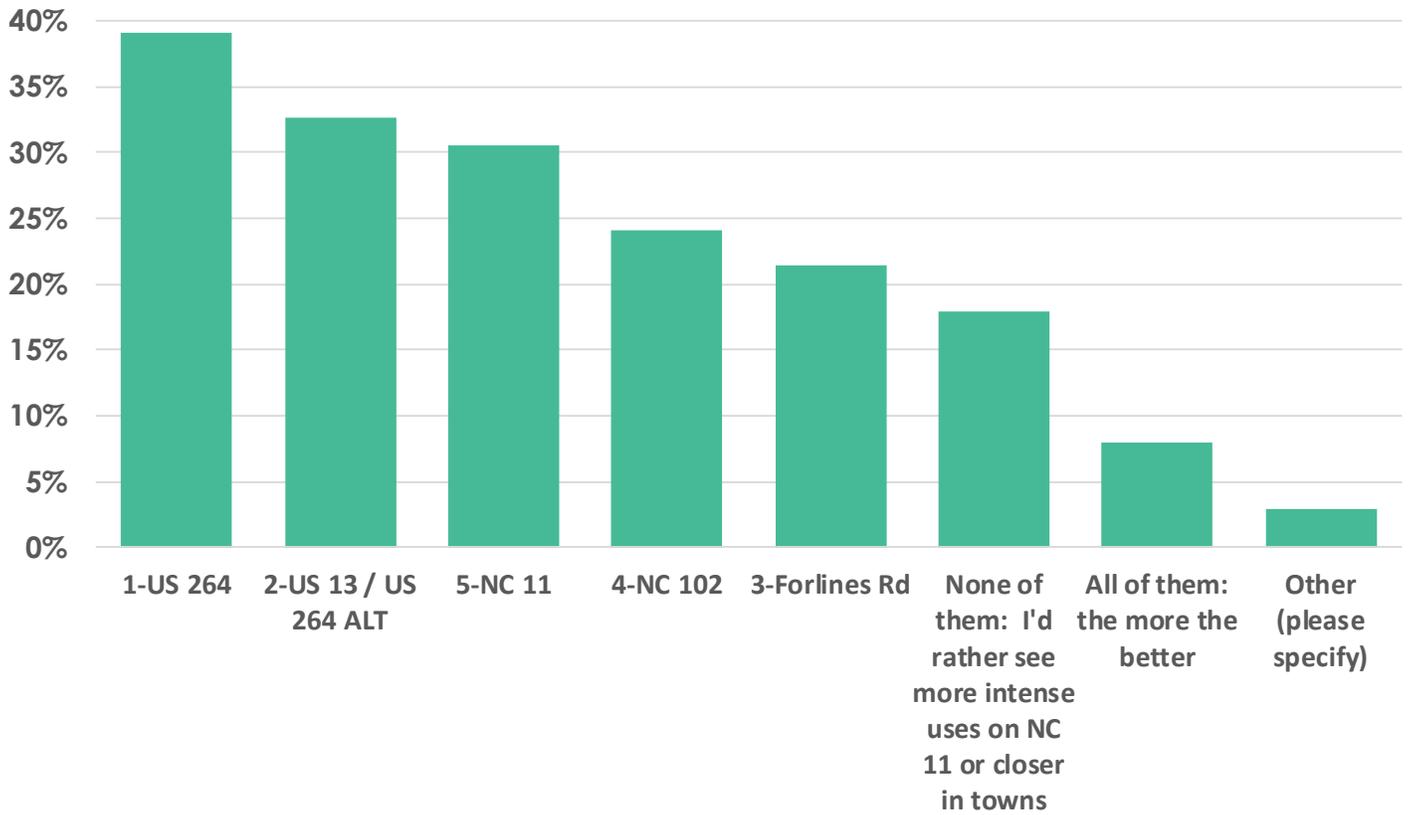
Where should residential growth be focused/encouraged (check all that apply):



Other responses:

- Open areas
- Uptown Greenville
- Connected to greenways
- Infill Development
- Away from cropland
- Adjacent to existing residential
- Where people want to live

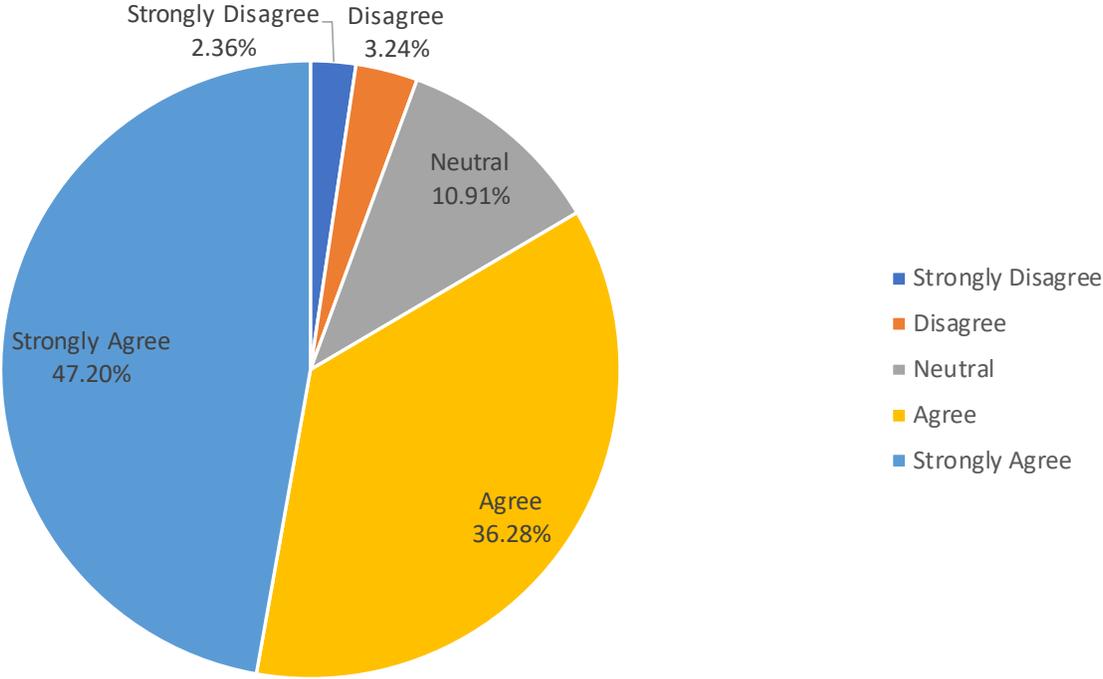
Which interchange(s) are most appropriate for more intense development?



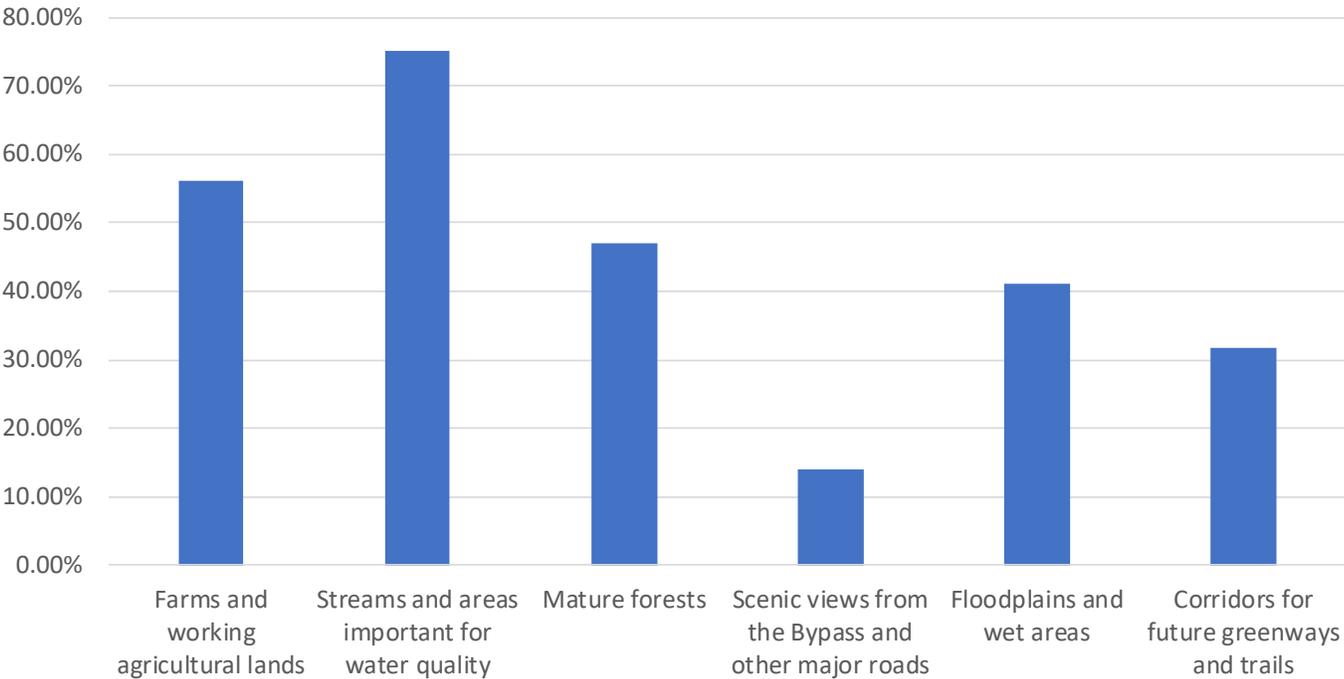
Other responses:

- Market driven
- 903/NC 11
- Grifton
- South to County line
- Infill & redevelopment

Do you agree or disagree with the following statement: Sensitive natural areas should be protected from development?



Which areas should the County prioritize for open space preservation? (Select your top 3 answers)



Residential Design Preference Results

MOST PREFERRED

 <p>1</p>	 <p>2</p>
 <p>3</p>	 <p>4</p>

LEAST PREFERRED



Neighborhood Design Preference Results

MOST PREFERRED



LEAST PREFERRED



Commercial Design Preference Results

MOST PREFERRED

1



2



LEAST PREFERRED



Additional Survey Feedback

Living Upscale Rural Areas Lots Family Dollar Raleigh
Parks Consider Frog Level Public Safety
Growth Stop Lights County Uptown
Development Eminent Domain Roads
Bypass is Complete Residential Areas Pay
Greenways Department Survey Nope Answer Corridor
Southwest Bypass Look

Public Meeting #1 Summary

Station 1: Trends & Demographics

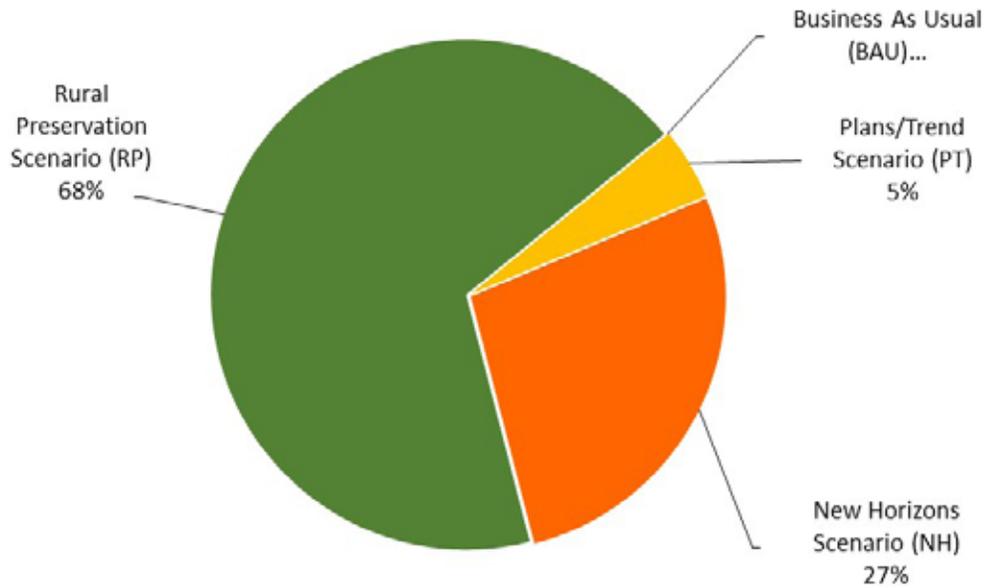
Question 1: What is your biggest concern about the future in the area around the Southwest Bypass?

- Too much congestion in areas around Forlines Interchange
- Not enough commercial development
- Too much traffic on 102
- Protecting Farmland (2)
- Light pollution and how future growth will impact the nocturnal environment and energy efficiency. I hope that the issue of outdoor lighting will play a role in how growth is managed
- Traffic and noise
- Getting from Firetower Rd and NC11 to the Bypass – what routes?
- Heavy congestion. Traffic lights. Signs saying new traffic lights.
- Too much development
- Impact of road on flooding
- Having other homes and shopping center next to my farmland
- The loss of farmland, water issues
- Congestion of residential and business
- Not enough traffic lights
- Keep agricultural areas intact
- Maintain the agricultural heritage of the area
- The area growing rapidly with cheap housing that ends up being low income housing within ten years.
- The area needs to stay in farming. The new road is a “bypass” not a development road
- Developers, businesses
- Environmental impacts
- Can this push sprawl much further?
- Too much development
- Growth in area - accommodating the shifts in population

Station 2: Land Use

Question 2a: Which scenario best represents your vision for the future of the Southwest Bypass area?

Scenario Preference



1

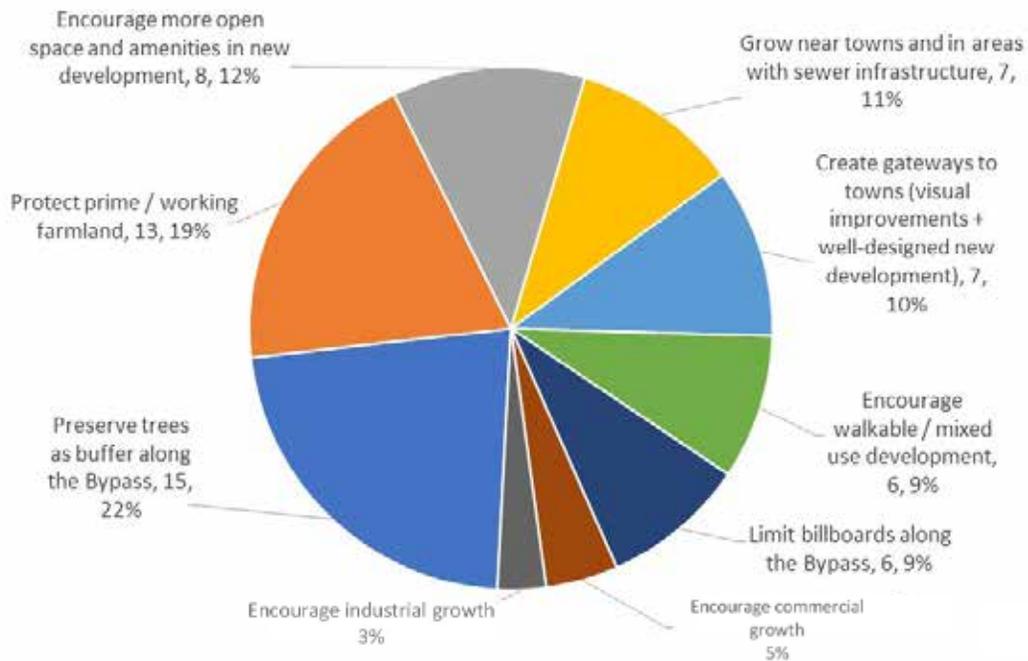
Attendees preferred the Rural Preservation Scenario and the New Horizons Scenario (See A-30 for descriptions of scenarios)

Question 2b: What change would you make to your favorite scenario to be more in line with your vision?

- Would really like Conservation Design used in new subdivisions
- Larger retail development
- Hog farms, turkey houses, meat processing plant
- I would like to see a lighting ordinance added to any scenarios
- Farmland
- Walkable areas with some housing for seniors and market/commercial access – especially at Forlines Rd.
- Safety. Street lights
- To respect farmland and livestock
- To never have started this mess in the first place
- More safety measures for traffic increase instead of 4-way stop signs.
- Traffic lights and street lights
- Keep or install buffers to minimize negative aesthetic and noise impacts
- Enhance roadways with landscape features – trees and perennials
- Zone Forlines interchange industrial
- The area just west of the Forlines intersection be zoned for commercial/industrial (RP)
- Small, unique retail
- Character
- Use rural preservation exclusively
- Less land devoted to open spaces – increase possibilities for use of land in these areas – maintain some areas as open spaces especially low areas

Question 2c: Choose 5 components/outcomes that should be in the Preferred Scenario for the SW Bypass Area.

Priority Outcomes

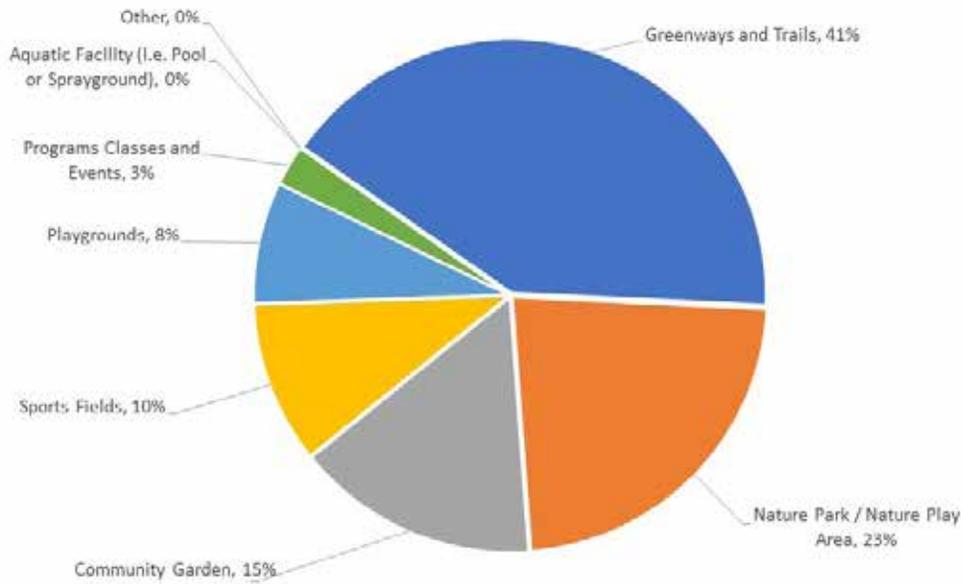


Attendees voted for preservation of trees along the bypass, protection of farmland and more open space and amenities in new development when asked about priorities.

Station 3: Parks and Environment

Question 3: What are your park and recreation facility preferences:

Parks and Recreation Preferences



Station 4: Transportation

- Largest area of concern is on Frog Level Rd, specifically at the Davenport Farm Rd and Forlines Rd intersections.
- Several people mentioned that the US 13 and Bell Arthur Rd/Davenport Farm Rd intersection is dangerous.
- Received comments on how NC 102 experiences large backups on both sides of NC 11 due to school traffic in the mornings. To avoid this traffic, people are redirecting to Old Snow Hill Rd, which cannot handle this increase in volume.
- Interchange Area Exercise: Which interchanges are most appropriate for more intense types of development
 - Public Meeting: US 264 and NC 11
 - Steering Committee: US 13 and NC 102
 - Public Survey: US 264 and US 13

Additional Comments:

- It is very important to me that growth is managed in a very intentional and responsible way. I enjoy the opportunity to include my input. Thank you.
- Mixed use – Forlines Rd
- Whats your Vision for the Bypass Area?
- Grass and trees – that's it – grass and trees +++++
- Leave it all for FARMING!!!!!!! +++++
- "ditto"
- Farming
- Farming
- Cows – lots of cows – and Shetland ponies
- Farming +++++
- Low density-development
- Responsible and intentional growth ++
- Lighting ordinance
- Farming Only +
- Neighborhood schools

****Each + above represents the opinion was seconded by another individual***

Steering Committee Scenario Planning Exercise



Steering Committee Meeting #3

Tuesday, March 27, 2018

SCENARIO PLANNING EXERCISE RESULTS

Land Use Scenarios Preference



NH
New Horizons

4

What do you like about scenario?

- Includes mixed use and traditional development
- Maximizes industrial in well defined areas
- Some construction where most appropriate
- Best mix of land uses based upon development potential
- Mixed use development at major interchanges at 13 & 102
- Developing vacant and underutilized land
- More medium density areas (sewer)
- Increased industrial and no estate residential

What don't you like? What would change?

- Add Renston Historic District guidelines
- Slightly less industrial at northern end
- Different designations at Ballards Crossroads And Frog Level/ Davenport Farm - possibly neighborhood commercial
- Would like to blend with PT and RP
- Remove emphasis on mixed use



BAU
Business As Usual

0



PT
Plans/Trend

3

What do you like about scenario?

- Increase in commercial and industrial land use
- Develops vacant and underutilized lands
- Would like to see blended with NH
- Like for commercial aspect for Ballards/Frog Level areas

What don't you like? What would change?

- Lacks mixed use and promotes suburban sprawl
- Northern section should be industrial
- Dickinson Ave Ext Corridor should be non-residential along frontage and transition to residential in the interior areas.
- Keep density on the eastern side of the Bypass & lower density on the western side.



RP
Rural Preservation

0

What do you like about scenario?

- Like aspects for Renston Historic District and commercial development along Swift Creek
- Conservation design and open space options

Public Meeting #2 Results

Question 1: Where do you live or own property?

- Greenville or Greenville Area- **9**
- Winterville or Winterville Area- **6**
- Ayden or Ayden Area- **6**
- West of the Bypass- **2**
- Renston Area- **3**
- Somewhere not listed above- **2**

Question 2: In general, what are your impressions of the amount and intensity of the proposed land uses in the study area?

	Too little	Too much	Just right	No opinion
Agricultural land uses	7	1	17	0
Residential land uses	1	6	17	1
Commercial land uses	5	9	7	5
Industrial land uses	5	8	8	6
Mixed use areas	7	5	13	1

Question 3: In the area that concerns you most, what are your impressions of the amount and intensity of proposed land uses?

Area (please specify): _____

- Renston (ag just right)
- Renston (too little ag, too much res/com/ind)
- Residential (just right)
- Agricultural land use- good farms shouldn't be covered with cement and houses
- South of Ayden- want industrial
- What is mixed use? Why hasn't it been used before?
- Winterville area (too little com/ind/mu, too much ag)
- 1137 Davenport Farm Rd and Frog Level Rd (too littler commercial and mixed use, too much ag, just right residential)
- Greenville Blvd& Dickinson Ave (too little commercial land uses)
- Frog Level (too little ag, too much res/com/ind)
- Traffic and Schools (too little ag/ind, too much res)
- Too much industrial. Can we not make sure existing industrial site is at capacity first?

	Too little	Too much	Just right	No opinion
Agricultural land uses	8	2	8	1
Residential land uses	1	5	11	1
Commercial land uses	5	7	5	1
Industrial land uses	5	7	4	3
Mixed use areas	7	4	6	1

Question 4: What is the one idea or recommendation that you would like to see more of in the draft land use plan?

- Need 3 or more parks west of 4 lane
- Require trees planted along bypass
- Preservation of existing historic resources to be assured by setbacks and other planning tools
- More industrial or commercial-mixed use area
- Clarify what is meant by cutoff lights. What is needed is called shielded lights which direct light down not up!
- More industrial by Pepsi Plant. Commercial restaurants. Strip malls. Mixed use center
- Consider potential urban designation
- More commercial mixed use and higher density needed for Davenport Farm Rd and US 13 & SW Bypass specifically 1137 Davenport Farm Road
- Show more connectivity between towns. How do we attract millennials to small towns using this plan?
- Firetower/Forelines Rd plan to address traffic added by interchange
- Connecting of existing roads- Firetower Rd, Forlines, Davenport Farm Rd to traffic flows from bypass and outgrowths of development at interchanges
- Need to see how public transportation/public housing will be addressed
- Historic preservation in Renston
- Walkability-interconnectedness of residential/commercial areas- greenway may help a lot
- Strong recommendation for reduced light pollution using full cutoff/downward focus/shielded lights- through the development area and all of Pitt County
- I prefer the business as usual plan which has been in place for the intersection of Hwy 903/11 since 2005. I have built my vision for my property around this zoning since I requested and was granted zoning (for parcels 77582&77505) for my property by the Winterville Town Council
- Upscale, nice shopping/restaurants within walking distance of neighborhoods
- Less industrial
- More areas for dining, entertainment, outdoor music venue
- I prefer the business as usual plan which allows property owners to develop their property to its maximum potential without constraints of central planning.

Question 5: What would you change about the draft recommendations?

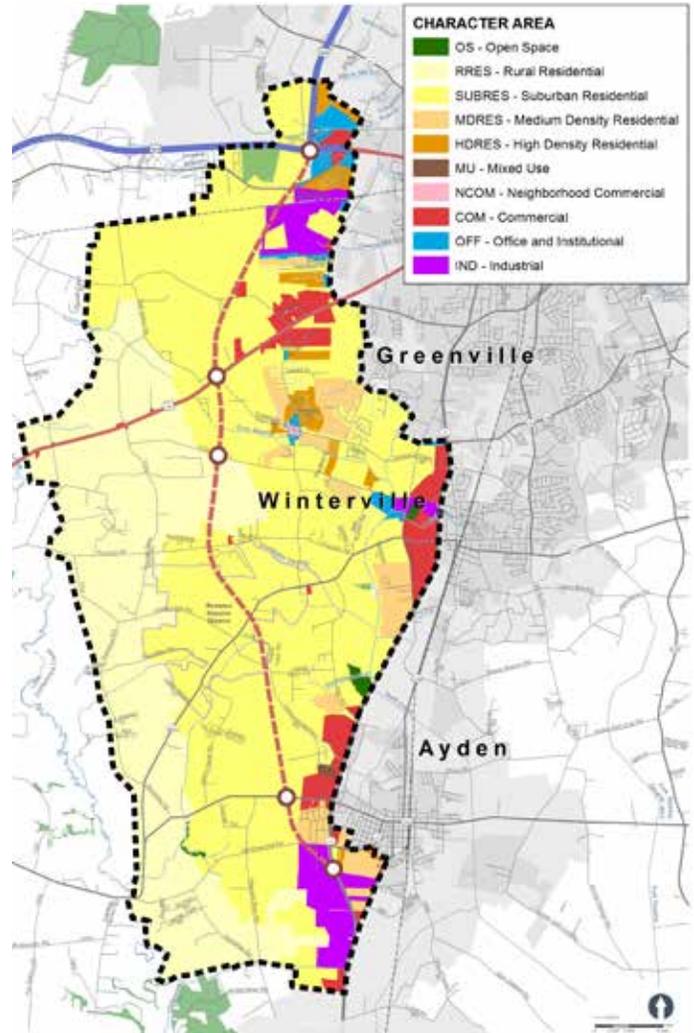
- Include roads seen from bypass
- Your trees/crape myrtles when grants can be found
- Decrease housing and industrial, increase parks and greenspace
- Thank you for your serious consideration of the important issues presented by this highway project. And thank you for your effort to protect Renston
- Businesses south of Ayden in the Pepsi and Ayden-Grifton area- mixed use area
- More industry. We are at Pepsi Plant on Hwy 11. Mixed use center- restaurants/hotel
- Would like to look at the transportation plan in the county/municipalities as area is developed
- Put emphasis on Firetower Road extension
- Again more commercial and mixed use coming off the SW Bypass. Gas station, McDonalds, grocery store etc is good and ok coming off bypass. Also higher density residential is needed. I agree with the prior study results ie residential, commercial, mixed use results, as per previous survey results. At least need more mixed use growth. Also Fire Station 8 (city of Greenville) at Davenport/Frog Level Rd is needed!
- No industrial at Greenville 264 gateway
- Provide some green spaces to buffer between the southern end industrial area and the A Time for Science nature center
- My property has been zoned Commercial Business since May 2006. On the draft plan presented 6/25 my property is shown as Mixed Use, a more restrictive zoning. I respectfully request the plan for future use show my property as Commercial Business. Thank you!

Scenario Planning

Business as Usual Scenario (BAU)

This scenario assumes no change from current zoning. This scenario would take place if no further rezonings were approved and the study area was built-out. It provides a baseline to compare alternatives against.

- » Policies/Components
 - » Keep existing zoning, rezonings discouraged
 - » Some commercial and industrial areas
 - » Mostly large-lot single family homes and limited opportunities for housing diversity
 - » No protection for prime agricultural or industrial areas
- » Outcomes
 - » Vacant and underutilized lands zoned commercial and industrial are developed
 - » New residential is marked by low density, large lot subdivisions
 - » Commercial and industrial opportunities are not captured



Precedent Imagery

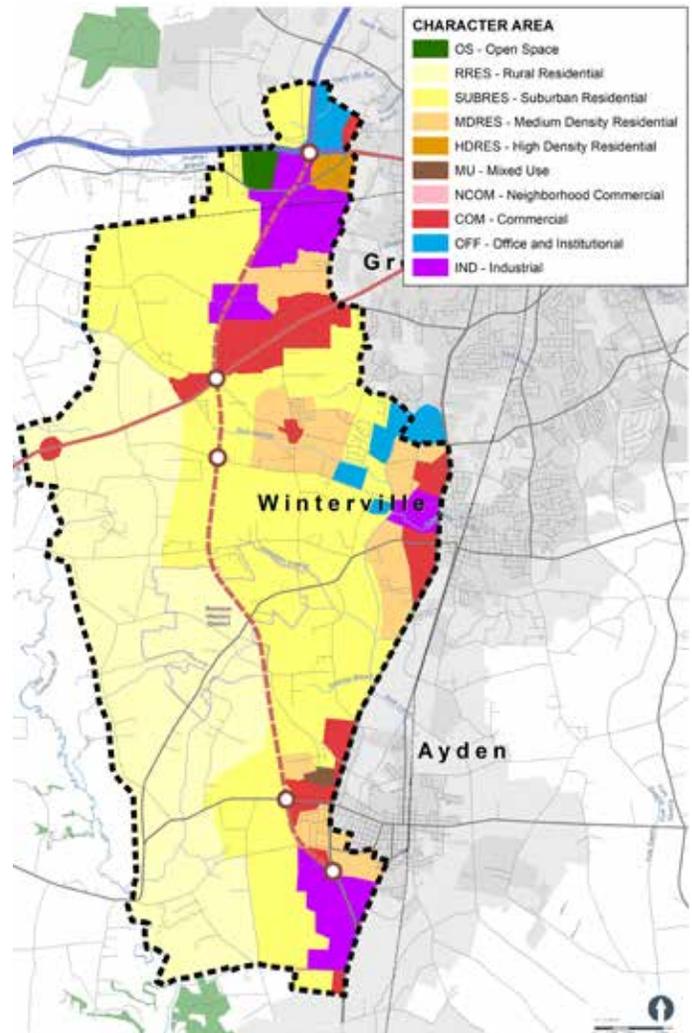


Plans/Trends Scenario (PT)

This scenario assumes land use decisions follow a typical pattern for new bypass areas and mostly follows existing land use plans. Residential development is widespread and may occur in leapfrog fashion, mostly on well and septic at low-medium densities. Some commercial and industrial development occurs near interchanges.

» Policies/Components

- » Land uses and densities based on the Pitt County Land Use Plan, Greenville Land Use Plan in some areas, the Winterville and Ayden Land Use Plans and rezoning trends
- » Some new commercial and industrial areas
- » Mostly large-lot single family homes and limited opportunities for housing diversity
- » No protection for prime agricultural lands or areas
- » Outcomes (compared to BAU)
 - » More commercial land (+50%)
 - » More industrial land (+70%)
 - » Higher utility costs due to dispersed growth
 - » Commercial land may exceed demand



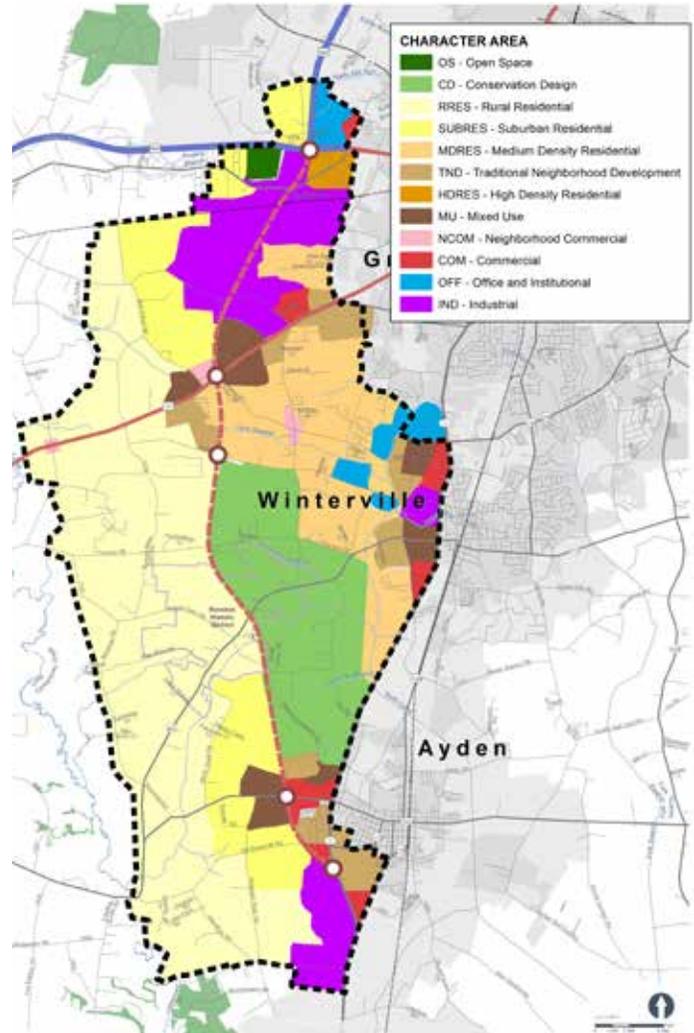
Precedent Imagery



New Horizons Scenario (NH)

This scenario includes more land for future industrial development and new development types like mixed use development and traditional neighborhood development (TND) to create gateways into towns with small-scale activity centers. Conservation subdivisions are encouraged along Swift Creek to increase open space along a future greenway.

- » Policies/Components
 - » Mixed use and traditional neighborhood development on well-located sites
 - » Medium density areas where sewer extension is feasible
 - » Protection of industrial land between NC 13 and US 264
 - » Conservation design along Swift Creek (flexibility in lot size in exchange for more open space and parks in new development)
- » Outcomes (compared to BAU)
 - » More commercial land (+36%)
 - » The most industrial land compared to of all the scenarios (+175%)
 - » More open space in new development (+50%)
 - » More residential in walkable areas (25% of total)



Precedent Imagery



Rural Preservation Scenario (RP)

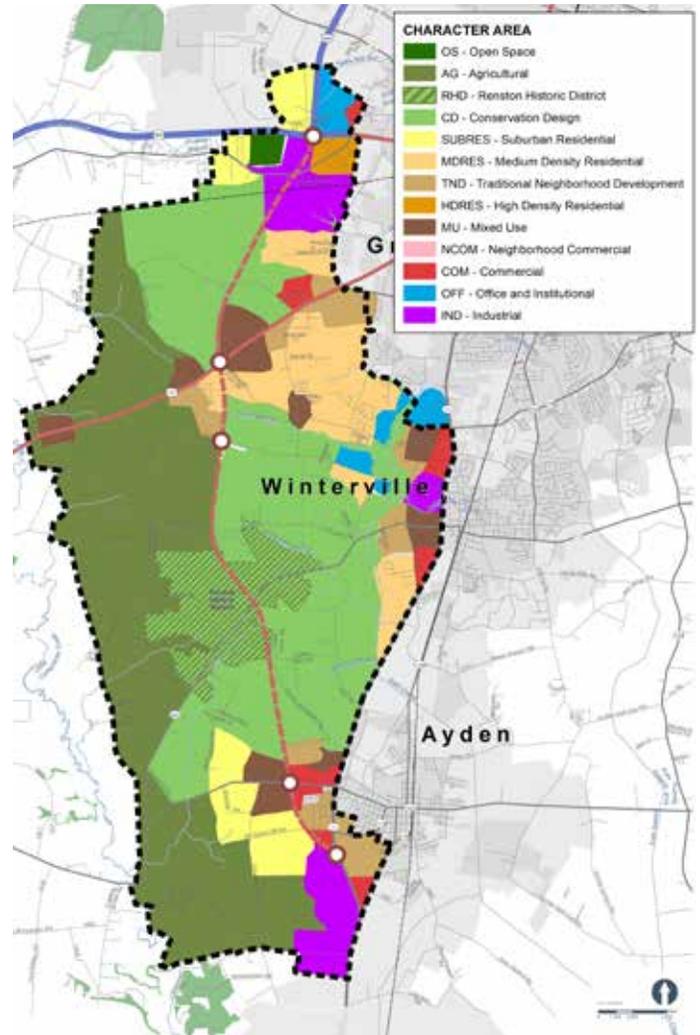
This scenario focuses on protecting the rural character of the corridor. It includes a modest increase in land for industrial and commercial over current zoning while encouraging policies that protect existing farmland. Interchange areas have some mixed use development and traditional neighborhood development (TND). Open space and historical areas are preserved on the edges and in the Renston Historic District.

» Policies/Components

- » Focus on policies to discourage farmland conversion (i.e. Ag. zoning)
- » Modest increases in commercial and industrial areas
- » Some mixed use and TND areas
- » Overlay or design guidelines for Renston Historic District
- » Conservation design along the majority of the bypass

» Outcomes (compared to BAU)

- » Modest increases in commercial and industrial potential (+21%, +44%)
- » Smallest urban footprint of the scenarios / protection of farm and forest lands
- » The most walkable neighborhoods out of all scenarios
- » Open space in conservation subdivisions



Precedent Imagery



SECTION 5 | APPENDIX

PERFORMANCE MEASURES

A GIS based model was utilized to compare impacts of alternative land use scenarios. The results below show which scenarios perform better or worse than the Business As Usual (BAU) scenario.

	BAU	PT	NH	RP
 FISCAL IMPACT				
POTENTIAL FOR COMMERCIAL DEVELOPMENT				
POTENTIAL FOR INDUSTRIAL DEVELOPMENT				
SEWER DEMAND IN UTILITY SERVICE AREAS				
 SUPPORT OUR COMMUNITIES				
PERCENT OF RESIDENTIAL IN ETJS (EXTRATERRITORIAL JURISDICTIONS NEAR TOWNS)				
MIXED USE GATEWAY				
 PROTECT NATURAL RESOURCES				
ACRES OF PRIME FARMLAND PROTECTED				
OPEN SPACE IN NEW DEVELOPMENT				
 INCREASE HOUSING AND TRANSPORTATION OPTIONS				
PERCENT RESIDENTIAL IN WALKABLE AREAS				

Results Key

-  = Worse or Same as BAU
-  = Minor Improvement
-  = Significant Improvement Compared to BAU Scenario

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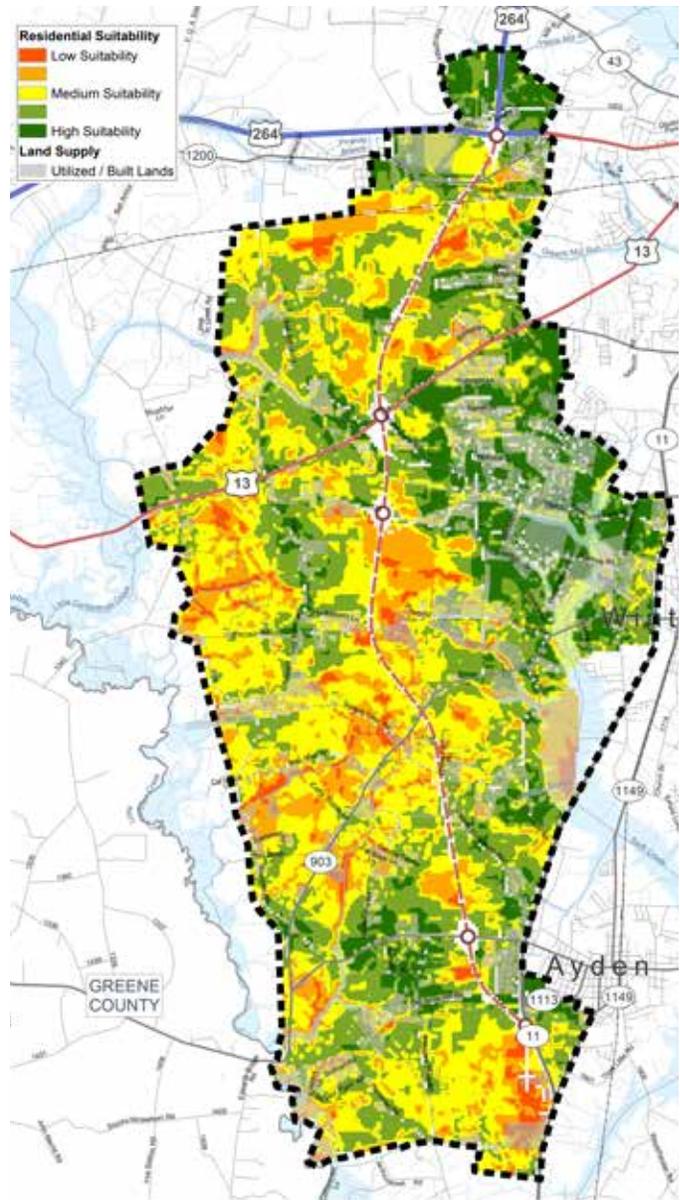
Suitability Analysis

A GIS-based suitability analysis was conducted to identify land economically and environmentally suitable for different land use types. This analysis was used to inform the update of the Future Land Use Plan.

Residential Suitability Factors

- » Lands near existing single-family development
- » Lands proximal to municipal limits
- » Lands near existing commercial and services
- » Lands near schools and parks
- » Lands not proximal to industrial uses
- » Lands proximal to employment centers
- » Lands not environmentally constrained
- » Lands on large parcels
- » Hydric soils

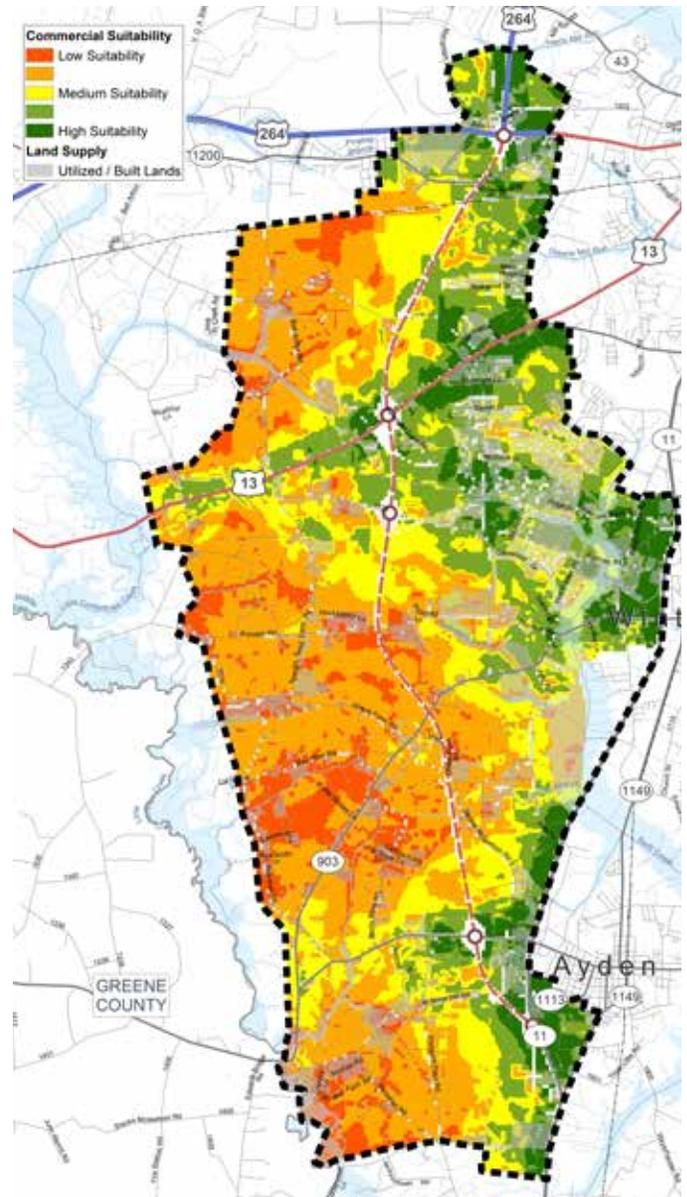
Residential Suitability



Commercial Suitability

Commercial Suitability Factors

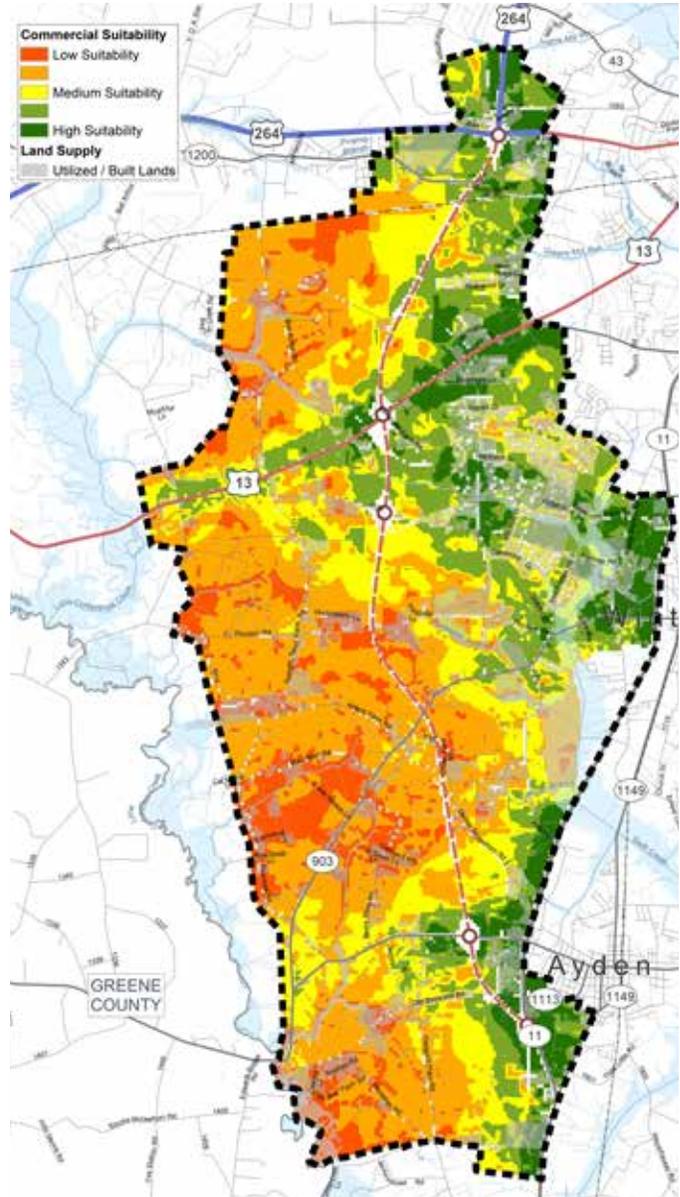
- » Lands near concentrations of existing single-family development
- » Lands near existing commercial and services
- » Lands adjacent to accessible high-traffic roadways
- » Lands proximal to exits
- » Lands proximal to sewer
- » Lands not environmentally constrained
- » Lands proximal to major intersections
- » Lands on large parcels



Industrial Suitability

Industrial Suitability Factors

- » Lands not proximal to incompatible residential uses
- » Lands proximal to existing industrial land uses
- » Lands proximal to railroads
- » Lands proximal to current and future exists
- » Lands proximal to sewer
- » Lands not environmentally constrained
- » Lands on large parcels



Transportation Assessment

Traffic Assumptions

Determination of 2040 Volumes

The 2040 Traffic Forecast for the SW Pitt Bypass (TIP Project #R-2250), dated October 27, 2014, was provided by NCDOT. The forecast included both 2014 and 2040 forecasts for both the no-build and build conditions. We compared the SE data information in the 2040 model to the potential land use around the Bypass. The findings were that the forecasted data was short of the expected land use. In comparing the 2014 land use levels to the 2040, we determined between a 3% and 4% growth rate. 2040 Average Annual Daily Traffic (AADT) volumes were determined using the 2014 Build forecast volumes and grown to 2040 using a growth rate of 3%, except for Forlines Road, which was grown at 4%.

The NC 11 & Fire Tower Road and Forlines Road & Fire Tower Road Extension intersections were not part of the forecast, therefore an estimation of volumes at these intersections was needed. Based on traffic counts taken 2012 and recorded 2012 historic AADT data, a 2012 estimate was created for the current road configuration (SW Pitt Bypass no-build and Fire Tower Road Extension no-build). Some of the traffic volumes were then shifted to the proposed Fire Tower Road Extension, to give an idea of how traffic might have looked in 2012, if the Fire Tower Road Extension project had been completed at that time. This 2012 build Fire Tower Road Extension scenario was grown to 2040 volumes at a rate of 4% on Forlines Road/Fire Tower Road Extension, and 3% on NC 11 and existing Fire Tower Road. The next step was to consider how construction of the SW Pitt Bypass would affect volumes at these intersections. The bypass is expected to have a peak of 42,400 vehicles per day in 2040. Therefore, the 2040 volumes on NC 11 were reduced by that amount or roughly 50% of the volumes.

Analysis and Recommendations

Peak hour volumes for each study area intersection were calculated using the North Carolina Department of Transportation's Intersection Analysis Utility (IAU) spreadsheet. The IAU calculates both the AM and PM peak hour volumes using the inputs from the 2040 volumes and forecast. The 2040 Peak Volumes figure shows the volumes used for each movement of the study area intersections.

Synchro was used to determine effectiveness of the intersections using the calculated AM and PM peak hour volumes. Lane configurations were determined by using the peak hour volumes to ensure an acceptable D or better Level of Service (LOS). Synchro determines LOS and delay for an intersection and for each individual leg of an intersection, shown in the intersection LOS and delay table. The Lane Configuration figure shows the final lanes needed at each intersection with storage lengths for turn lanes. The storage lengths are found from the 95% percentile queues

determined from the Synchro analyses. That figure also shows the differences between the hearing map and the recommendations of this study.

Lane recommendations from the public hearing maps and this study's recommendations are shown below (increases shown in bold):

US 13 & Davenport Farm Road:

- » The hearing map:
 - » Northeast bound: two through lanes, one left turn lane, one right turn lane.
 - » Southeast bound: one combined through and right turn lane, one left turn lane.
 - » Southwest bound: two through lanes, two left turn lanes, one right turn lane.
 - » Northwest bound: one through lane, two left turn lanes, one right turn lane.
- » Increases:
 - » None.

US 13 & SW Pitt Bypass (western intersection):

- » The hearing map (partial cloverleaf interchange):
 - » Northeast bound: two through lanes, one right turn lane.
 - » Southeast bound: one combined through and right turn lane, two left turn lanes, one right turn lane.
 - » Southwest bound: two through lanes with an earlier right turn exit.
- » Increases (**standard diamond interchange**):
 - » None.

US 13 & SW Pitt Bypass (eastern intersection):

- » The hearing map (partial cloverleaf interchange):
 - » Northeast bound: two through lanes with an earlier right turn exit.
 - » Southwest bound: two through lanes, one right turn lane.
 - » Northwest bound: one combined through and left turn lane, one left turn lane, one right turn lane.
- » Increases (**standard diamond interchange**):
 - » Northwest bound: add one right turn lane to create two right turn lanes.

Forlines Road & SW Pitt Bypass (western intersection):

- » The hearing map:
 - » East bound: one through lane, one right turn lane.
 - » South bound: one combined through and left turn lane, one left turn lane, one right turn

lane.

- » West bound: one through lane, one left turn lane.
- » Increases:
 - » None.

Forlines Road & SW Pitt Bypass (eastern intersection):

- » The hearing map:
 - » East bound: two through lanes, one left turn lane.
 - » West bound: one through lane, one right turn lane.
 - » North bound: one combined through lane and left turn lane, one right turn lane.
- » Increases:
 - » None.

NC 102 & SW Pitt Bypass (western intersection):

- » The hearing map (standard diamond interchange):
 - » East bound: one through lane, one right turn lane.
 - » South bound: one combined through and left turn lane, one right turn lane.
 - » West bound: one through lane, one left turn lane.
- » Increases (**partial cloverleaf interchange**):
 - » North bound: create one right turn lane due to cloverleaf ramp.

NC 102 & SW Pitt Bypass (eastern intersection):

- » The hearing map:
 - » East bound: one through lane, one left turn lane.
 - » West bound: one through lane, one right turn lane.
 - » North bound: one combined through and left turn lane, one right turn lane.
- » Increases:
 - » East bound: add one left turn lane to create two left turn lanes.
 - » West bound: add one right turn lane to create two right turn lanes.

Results

The only intersection in the study area that was not LOS D or better is the NC 11 & Fire Tower Road intersection. This intersection is LOS E with each leg, at its worst, also being LOS E. Because of the many variables that went into calculating volumes at this intersection (as described

above), it is recommended that more extensive study be given to this area.

The other problem area in the study occurs at the northwest bound approach of the US 13 & Davenport Farm Road intersection. While the intersection operates at an acceptable LOS D in both the AM and PM peak hours, this individual leg operates at LOS E in the AM peak hour. Because the other legs of the intersection are at an acceptable LOS, no further recommendations are given for this intersection.

Further Study: Forlines Road Roundabouts

There is a possibility that due to the growth within the study area that Forlines Road may eventually have a four-lane divided typical section between the Fire Tower Road Extension/Reedy Branch Road and the SW Pitt Bypass interchange ramps. The analyses show acceptable levels of service at all intersections using the 2040 volumes as explained above. The volumes are showing a large amount of through traffic that would be accessing the new bypass from the interchange. Therefore, roundabouts may be used as a better way to alleviate traffic concerns along Forlines Road in the future. Roundabouts should be considered at all cross intersections such as Frog Level Road as well as the interchange ramps at the SW Pitt Bypass. Roundabouts are not only good for moving both peak and non-peak traffic, but also good delineators for communities and spaces to place gateways and features.

Further Study: Fire Tower Road Extension to Forlines Road – Possible Roundabout

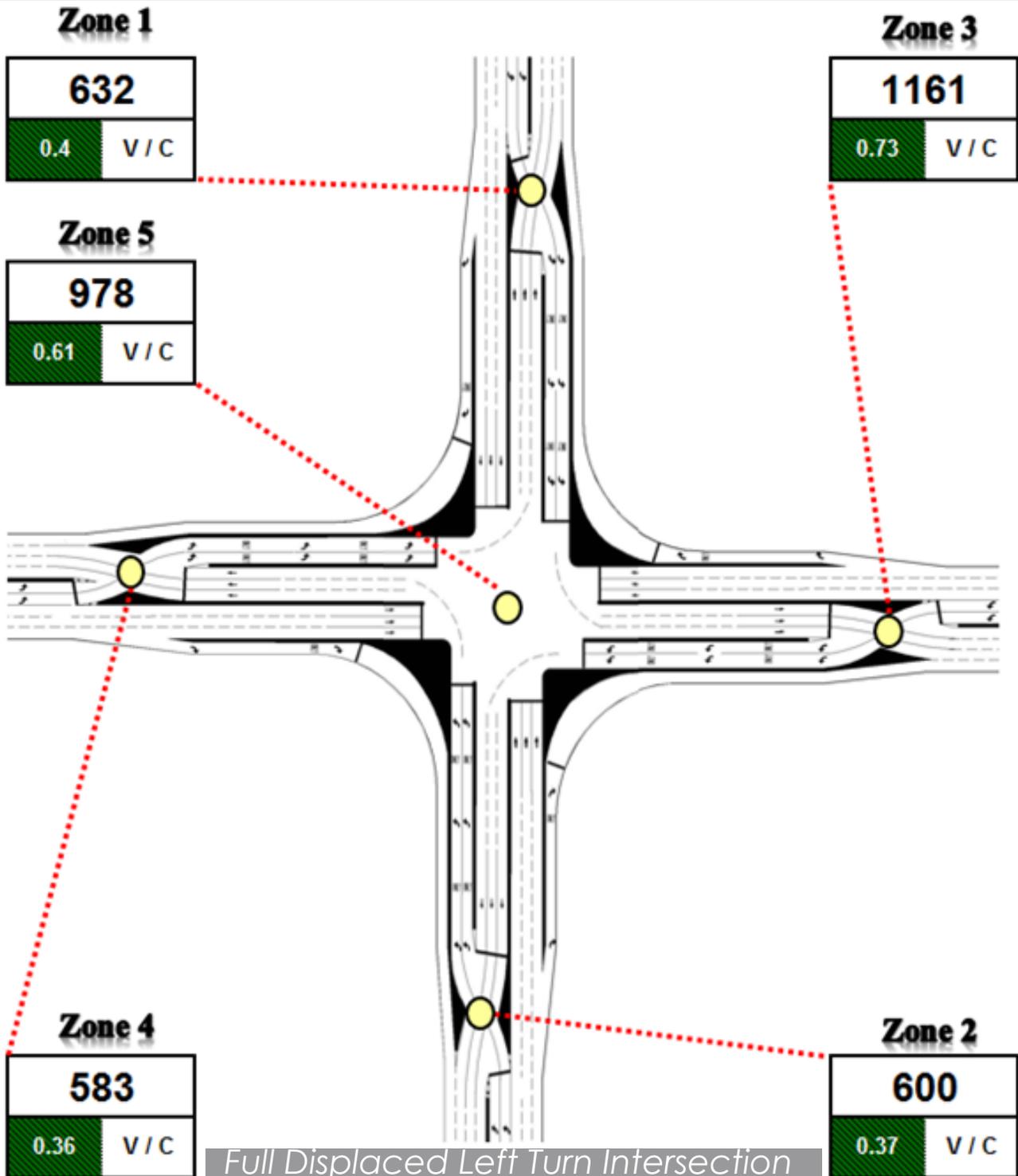
CAP-X, a FHWA planning traffic tool spreadsheet, was used to examine the intersection of the future Fire Tower Extension connection to Forlines Road to determine if a roundabout would have an acceptable level of service. A two-lane roundabout will operate at LOS E. The major factor is the large number of vehicles predicted to use this intersection as described in the 2040 volume assumptions above. As the Fire Tower Extension gets further studied, a two-lane roundabout at this location should be considered.

Further Study: NC 11/Fire Tower Road

In the capacity analyses, it was determined that the overall intersection at NC 11 and Fire Tower Road is operating at a LOS E. Due to the volumes being close to capacity, CAP-X was used to determine if any alternative intersection type may work better than a conventional intersection with multiple two-left turn lane approaches. Using the lanes as shown in the Lane Configuration Diagram. NC 11 & Fire Tower Rd intersection will work best as a Full Displaced Left Turn (also known as a CFI or Continuous Flow Intersection). The intersection also meets an acceptable LOS as an East-West Partial Displaced Left Turn, a North-South Partial Median U-Turn, and a Northeast Quadrant Roadway. These alternative intersections type may include more right-of-way and may also affect driveways and access that are close to the existing intersection.

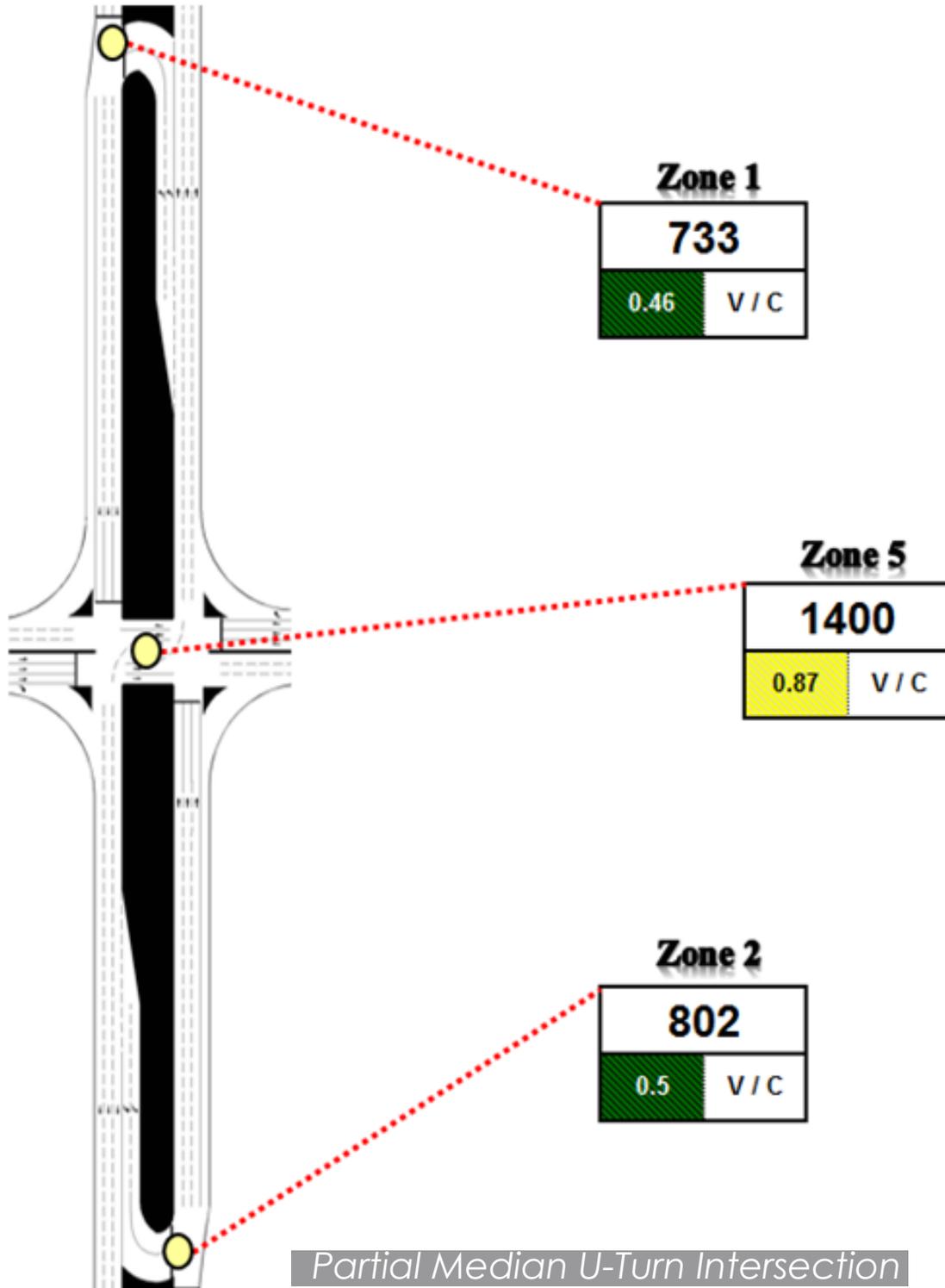
See pictures below for more detail of these intersection types.

Project Name:	NC 11 & Fire Tower PM	Critical Lane Volume Sum			
Project Number:	SW Pitt Bypass	< 1200	1200 - 1399	1400 - 1599	≥ 1600
Location:	Pitt	VOLUME / CAPACITY RATIO:		0.73	
Date:	August 16, 2018				

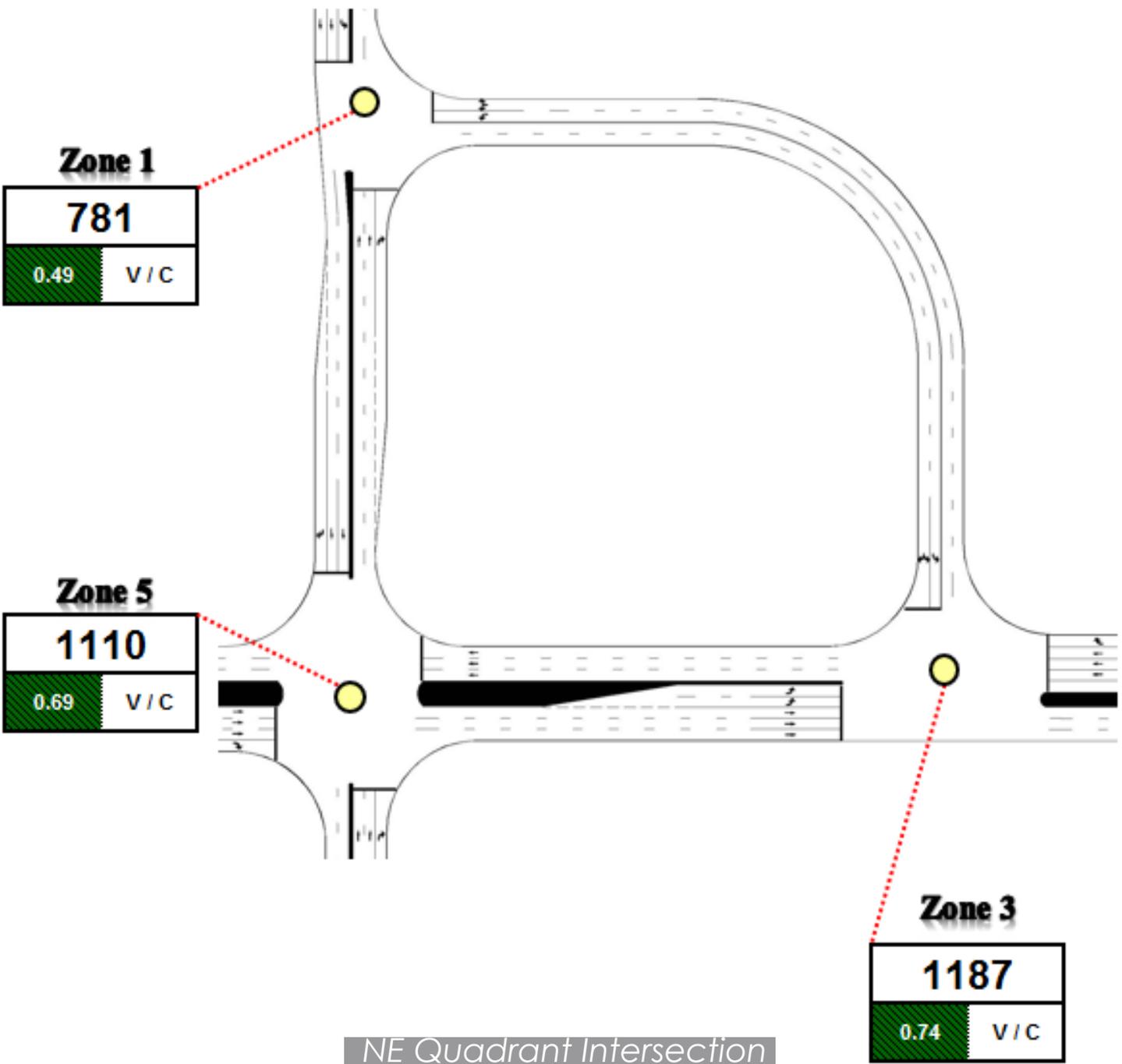


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Project Name:	NC 11 & Fire Tower PM	<i>Critical Lane Volume Sum</i>			
Project Number:	SW Pitt Bypass	< 1200	1200 - 1399	1400 - 1599	≥ 1600
Location:	Pitt	VOLUME / CAPACITY RATIO:		0.87	
Date:	August 16, 2018				

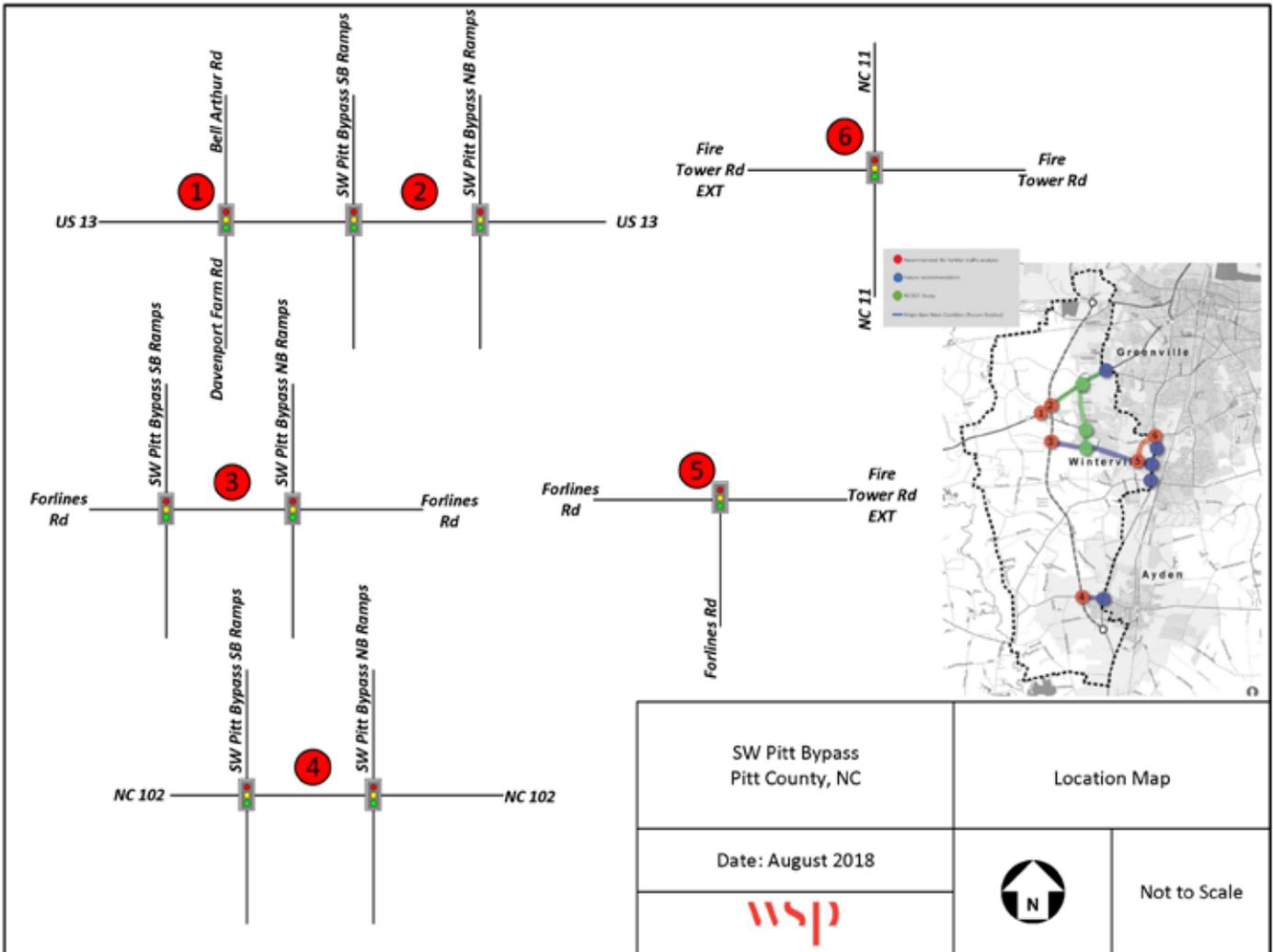


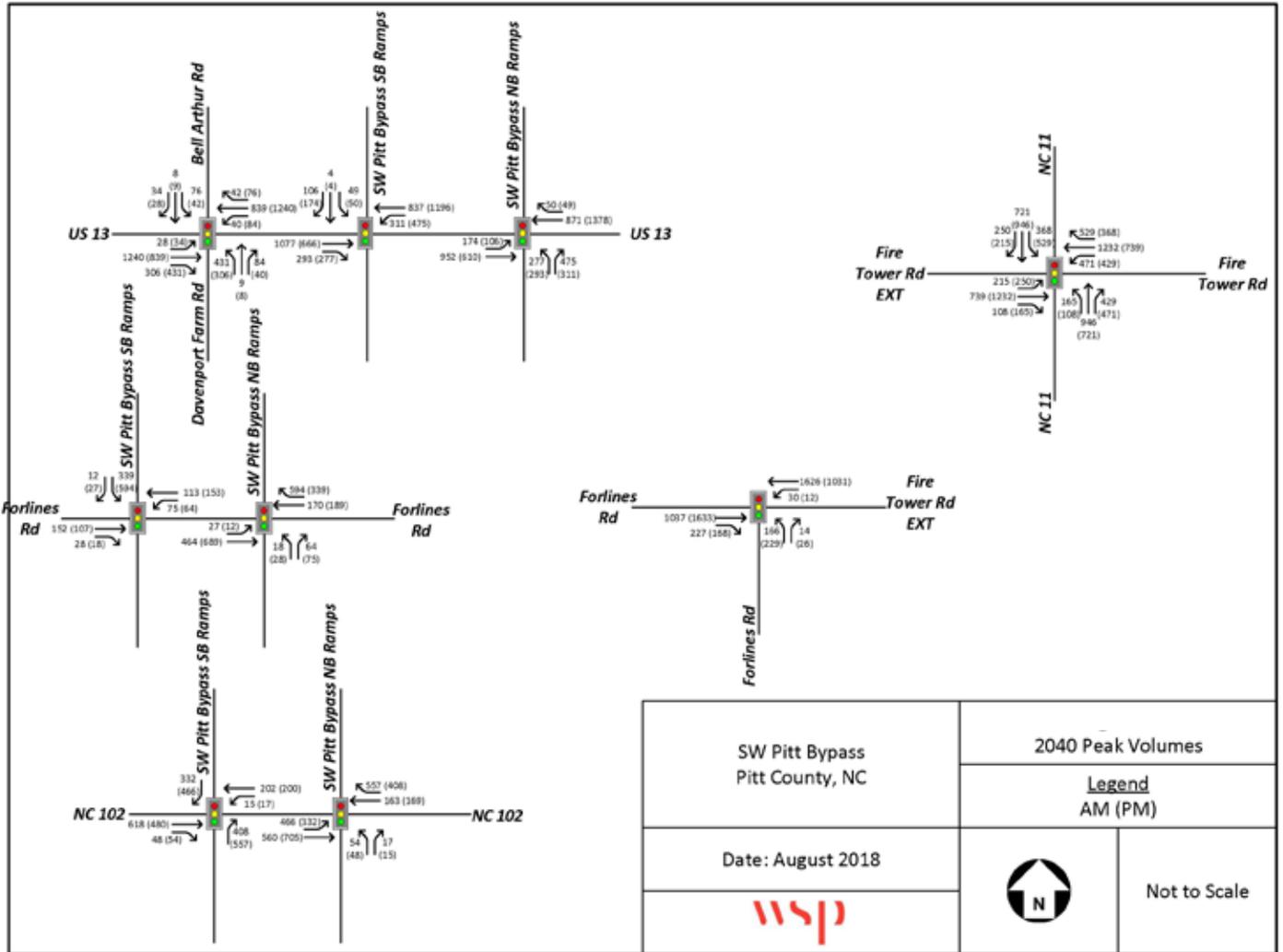
Project Name:	NC 11 & Fire Tower PM	Critical Lane Volume Sum			
Project Number:	SW Pitt Bypass	< 1200	1200 - 1399	1400 - 1599	≥ 1600
Location:	Pitt	VOLUME / CAPACITY RATIO:		0.74	
Date:	August 16, 2018				



Note: This diagram does not reflect the actual lane configuration of the Intersection

SECTION 5 | APPENDIX





SECTION 5 | APPENDIX

Intersection	LOS	Delay	Approach	LOS	Delay
	AM (PM)	AM (PM)		AM (PM)	AM (PM)
US 13 and Davenport Farm Rd	D (D)	41.5 (37.1)	NW	E (D)	67.3 (51.6)
			NE	D (C)	40.9 (31.4)
			SE	D (D)	48.5 (45.8)
			SW	C (D)	27.0 (38.3)
US 13 and SW Pitt Bypass SB Ramps	B (B)	14.9 (14.8)	NW		
			NE	A (A)	9.8 (9.7)
			SE	C (C)	30.0 (29.7)
			SW	B (B)	18.9 (15.7)
US 13 and SW Pitt Bypass NB Ramps	C (C)	31.0 (30.5)	NW	C (D)	24.6 (40.2)
			NE	C (B)	20.4 (11.1)
			SE		
			SW	D (D)	49.0 (36.2)
Forlines and SW Pitt Bypass SB Ramps	C (C)	22.9 (25.8)	N		
			E	C (C)	32.7 (32.6)
			S	B (C)	18.6 (26.0)
			W	C (C)	21.7 (21.4)
Forlines and SW Pitt Bypass NB Ramps	C (B)	21.0 (16.6)	N	C (C)	26.5 (22.2)
			E	B (B)	10.8 (17.7)
			S		
			W	C (B)	27.1 (14.1)
NC 102 and SW Pitt Bypass SB Ramps	C (C)	21.1 (29.4)	N	B (C)	13.5 (28.2)
			E	C (C)	24.3 (32.5)
			S	C (C)	30.9 (34.5)
			W	B (B)	10.5 (14.4)
NC 102 and SW Pitt Bypass NB Ramps	B (C)	14.9 (20.8)	N	B (B)	11.9 (11.9)
			E	B (C)	17.1 (27.0)
			S		
			W	B (B)	12.0 (10.6)
Forlines and Fire Tower Ext	C (C)	29.7 (30.6)	N	B (B)	17.1 (19.3)
			E	B (D)	12.8 (42.3)
			S		
			W	D (B)	44.0 (13.2)
NC 111 and Fire Tower Ext*	E (E)	63.3 (71.4)	N	E (E)	76.8 (71.2)
			E	D (E)	41.5 (76.4)
			S	E (F)	62.4 (83.1)
			W	E (D)	64.8 (53.3)

*Volumes calculated from 2012 AADTs. 10,000 vehicles were shifted onto new Fire Tower Rd Ext. Then volumes were projected to 2040 by growing NC 11 and existing Fire Tower Rd at 3% and Fire Tower Rd Ext at 4%. Volumes on NC 11 were then reduced by 42,200 (peak volume on US 264) to account for the shifting of traffic on NC 11.

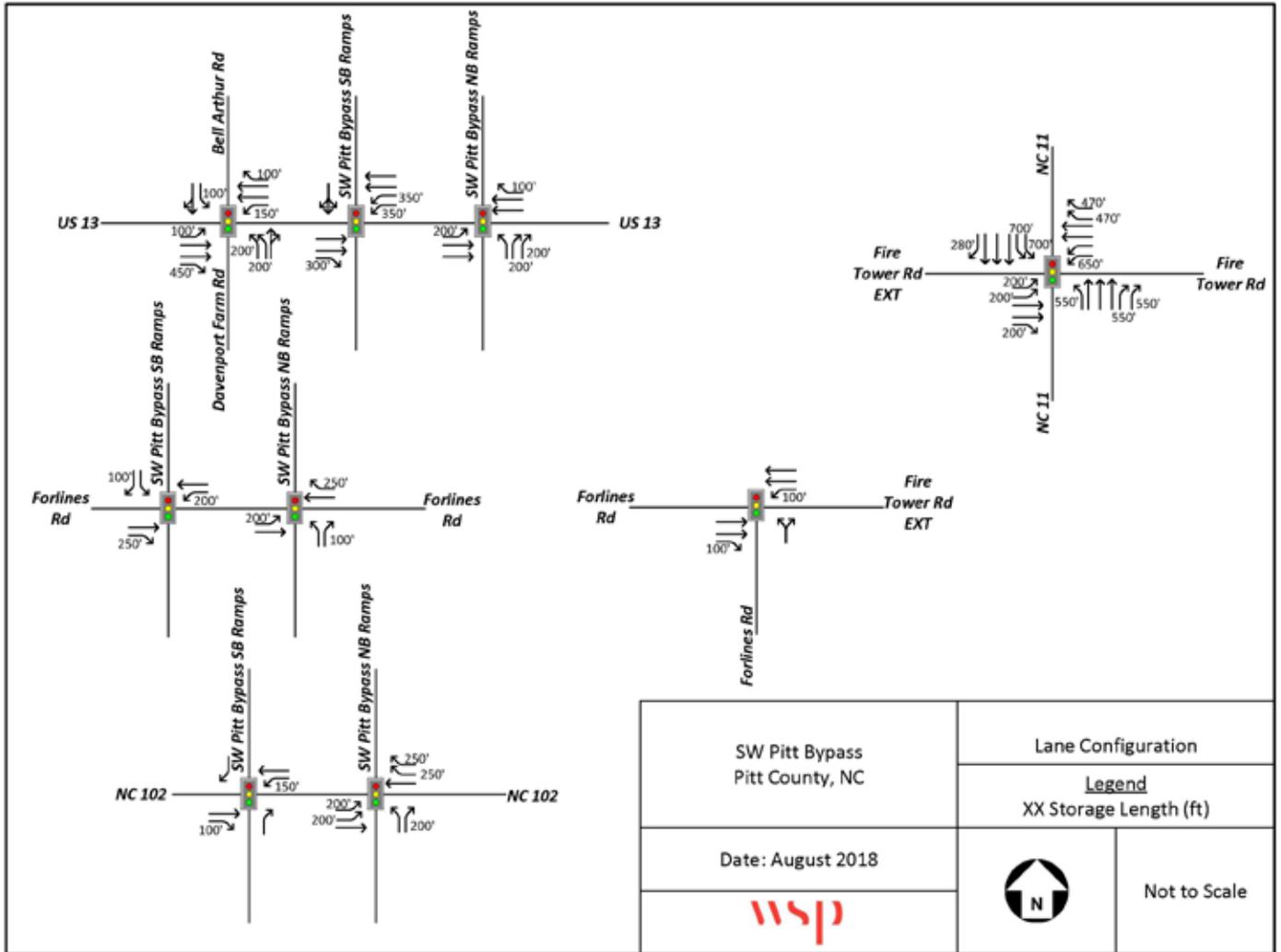


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» Greater Tickseed - George Wallace | <https://wallacegeo.blogspot.com/2016/08/whorled-coreopsis-greater-tickseed.html>

» Heavy Metal Switchgrass - Greener Earth Nursery | <https://www.greenerearthnursery.com/products/heavy-metal-switch-grass?variant=11327851973>

» Southern Wax Myrtle - **Unknown**

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» Live Oak - Austin Native Landscaping | <http://austinnativelandscaping.com/plant/quercus-virginiana-live-oak-southern-live-oak/>

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