To: Board of Commissioners
   Planning Board

From: Jeremiah Combs, Planner

Date: November 10, 2022

Re: PD #2021-4
   Villages of Denver, LLC, applicant
   Parcel ID# 91568, 30147, 52404, and 100646

The following information is for use by the Lincoln County Board of Commissioners and the Planning Board at their joint meeting/public hearing on December 5, 2022.

Request

The applicant is requesting to rezone a 126-acre tract from PD-R CU (Conditional Use Planned Residential), R-T (Transitional Residential), R-SF (Residential Single-Family), and I-G (General Industrial) to PD-R (Planned Development-Residential) to permit a subdivision with up to 267 single-family detached homes. Under the Lincoln County Unified Development Ordinance, any proposed subdivision with 50 or more lots is subject to approval through the planned development process. A concept plan and a PD-R report with terms and conditions for the proposed development have been submitted as part of the rezoning application and would serve as the master plan for the development if the rezoning request is approved. The PD-R report includes commitments by the applicant to provide certain traffic improvements prior to the recording of the plat for the initial phase of the development. The improvements are based on a traffic impact analysis that is included with the application. In addition, the applicant has provided minutes from a community involvement meeting that was held December 14, 2021.

Site Area and Description

The subject property is located immediately north of the end of Kenyon Drive and south of Hagers Hollow Drive in Catawba Springs Township. The property is adjoined by the previous phases of the Villages of Denver subdivision to the south and the Hager’s Hollow and Deertrack subdivisions to the North and East respectively. The property is also adjoined by parcels zoned B-N (Neighborhood Business) and I-G (General Industrial). Land uses in this area primarily include residential and industrial.
Public Utilities

The applicant is proposing to serve the development with public water and public sewer. The applicant has been advised that Lincoln County currently could not allocate sewer capacity for the proposed development.

Land Use Plan and UDO Conformance

The subject property is part of an area designated by the Lincoln County Land Use Plan as Single-Family Neighborhood, suitable for densities up to 2.0 dwelling units per acre. The proposed density for this development is 2.11 units per acre.

The UDO requires that a planned development include a minimum of 12.5% recreation and open space. Approximately 41% of the acreage in this proposed development would be reserved as recreation and open space. The proposed master plan complies with the UDO’s subdivision standards for sidewalks and street trees.

The applicant has applied for waivers from the subdivision standards regarding the connectivity ratio for the new roads and the maximum block length. The Planning Board will hear and decide those requests following the rezoning hearing. Section 5.4.4 of the Lincoln County Unified Development Ordinance requires a minimum connectivity ratio of 1.4; the applicant’s site plan results in a proposed ratio of 1.33. Section 5.6.2 sets a maximum block length of 1,500 feet. The block length on one section of the new road providing access to Hagers Hollow Drive is in excess of 2,500 feet.

The applicant requested variances from Section 7.5 and Section 2.4 of the Lincoln County Unified Development Ordinance to permit the encroachment of the proposed right-of-way for the road accessing Hagers Hollow Dr into the streamside buffer and the project boundary buffer. The Lincoln County Board of Adjustment approved the variance requests following a public hearing on October 24, 2022.

Staff’s Recommendation

Staff recommends approval of the rezoning request. See proposed statement on following page.
Zoning Amendment
Staff’s Proposed Statement of Consistency and Reasonableness

Case No. PD #2021–4
Applicant Villages of Denver, LLC
Parcel ID# 91568, 30147, 52404, and 100646
Location Kenyon Dr. / Hager’s Hollow Dr.

Proposed amendment Rezone a 126-acre tract from PD–R CU (Conditional Use Planned Residential), R–T (Transitional Residential), R–SF (Residential Single–Family), and I–G (General Industrial) to PD–R (Planned Development–Residential) to permit a subdivision with up to 267 single–family detached homes

This proposed amendment is consistent with the Lincoln County Comprehensive Land Use Plan and other adopted plans in that:

The proposed development is located in an area designated by the Land Use Plan as Single Family Neighborhood.

This proposed amendment is reasonable in that:

The surrounding area is primarily residential and includes single family lots at a similar density. The proposal will provide for better mobility of residents in the existing residential development and first responders for public safety to N.C. 16 Business via an additional access on Hagers Hollow Dr.
Incomplete remainder of original plan (162 lots)

Additional area in proposed plan

**GENERAL NOTES:**

1. Topography provided by Aerodynamics Corp.
2. Boundary shown is by deed only. A complete boundary survey will be completed prior to final plat.
3. This conditional use plan represents the general lot and street configuration. Minor modifications to lots and streets may be required during final engineering design and approval.

**PROJECT INFORMATION:**

EXISTING ZONING: P-R

PROPOSED ZONING: P-R

PIN #'S: 4603-00-39-2945 & 4603-00-29-6705

TOTAL SITE AREA: 245.65 ACRES

PROPOSED LOTS: 685 LOTS (2.80/ACRE)

70' LOTS: 393
60' LOTS: 292

PROPOSED OPEN SPACE/AMENITY AREA: 44.77 ACRES (18%)
Planned Development Rezoning Application
Lincoln County Planning and Inspections Department
Zoning Administrator
115 W. Main St., Lincolnton, NC 28092
Phone: (704) 736-8440

PART I
Applicant Name  Villages of Denver, LLC
Applicant Address  1999 Circle Drive, Suite B, Cleveland, OH 44106
Applicant Phone Number  (216) 272-0265
Property Owner Name  Villages of Denver, LLC
Property Owner Address  1999 Circle Drive, Suite B, Cleveland, OH 44106
Property Owner Phone Number  (216) 272-0265

PART II
Property Location  Hagers Hollow Drive, Catawba Springs Township
Property ID (10 digits)  4604332972  Property size 5.952 AC
Parcel # (5 digits)  100646  Deed Book(s)  1225  Page(s)  57

PART III
Existing Zoning District  IG & R-SF  Proposed Zoning District  PD-Residential

Briefly describe how the property is being used and any existing structures.

The property is currently undeveloped, with no existing structures aside from the transmission structures associated with the existing Duke Energy ROW.

Briefly described the proposed planned development.

The proposed planned development will combine this parcel with parcels 30147, 91568, and 100646 to form a new community of 267 single family lots with an amenity for exclusive use by it's residents.

*SEE PLANNING DEPT. FOR PLANNED DEVELOPMENT FEES.

I hereby certify that all knowledge of the information provided for this application and attachments is true and correct to the best of my knowledge.

[Signature]
Applicant's Signature

[Date]

Date
Planned Development Rezoning Application
Lincoln County Planning and Inspections Department
Zoning Administrator:
115 W. Main St., Lincolnton, NC 28092
Phone: (704) 736-5440

PART I
Applicant Name Villages of Denver, LLC
Applicant Address 1999 Circle Drive, Suite B, Cleveland, OH 44106
Applicant Phone Number (216) 272-0265
Property Owner Name Edinger, Grena Wang
Property Owner Address 928 Spring Ted Ave., Henderson NV 89002
Property Owner Phone Number Not available

PART II
Property Location Old Post Road, Catawba Springs Township
Property ID (10 digits) 4604219266 Property size 52.389 AC
Parcel # (5 digits) 30147 Deed Book(s) 593 Page(s) 588

PART III
Existing Zoning District R-T and R-SF Proposed Zoning District PD-Residential

Briefly describe how the property is being used and any existing structures.
The property is currently undeveloped, with no existing structures aside from the transmission structures associated with the existing Duke Energy ROW.

Briefly described the proposed planned development.
The proposed planned development combines this parcel with parcels 91568, 52404, and 100646 to form a new community of 267 single family lots with an amenity for exclusive use by its residents.

*SEE PLANNING DEPT. FOR PLANNED DEVELOPMENT FEES.*

I hereby certify that all knowledge of the information provided for this application and attachments is true and correct to the best of my knowledge.

[Signature]
Date 5/2012

Applicant's Signature
**Planned Development Rezoning Application**
Lincoln County Planning and Inspections Department
Zoning Administrator
115 W. Main St., Lincolnton, NC 28092
Phone: (704) 736-8440

PART I
Applicant Name  Villages of Denver, LLC
Applicant Address  1999 Circle Drive, Suite B, Cleveland, OH 44106
Applicant Phone Number  (216) 272-0265
Property Owner Name  Villages of Denver, LLC
Property Owner Address  1999 Circle Drive, Suite B, Cleveland, OH 44106
Property Owner Phone Number  (216) 272-0265

PART II
Property Location  Old Post Road, Catawba Springs Township
Property ID (10 digits)  4604237212  Property size  14.034 AC
Parcel # (5 digits)  52404  Deed Book(s)  2823  Page(s)  165

PART III
Existing Zoning District  B-N, R-SF, R-T  Proposed Zoning District  PD-Residential

Briefly describe how the property is being used and any existing structures.

The property is currently undeveloped, with no existing structures aside from the transmission structures associated with the existing Duke Energy ROW.

Briefly described the proposed planned development.

The proposed planned development combines this parcel with parcels 91568, 100646, and 30147 to form a new community of 267 single family lots with an amenity for exclusive use by its residents.

*SEE PLANNING DEPT. FOR PLANNED DEVELOPMENT FEES.*

**Hereby certify that all knowledge of the information provided for this application and attachments is true and correct to the best of my knowledge.**

Applicant's Signature  Date
**TERMS & CONDITIONS**
The Meadows at Denver

**General Site Notes:**

1. These development standards form a part of the rezoning plan associated with the rezoning application filed by villages of Denver, LLC (the "petitioner") for an approximately 126.42 acre site located near NC 16 business and Hagers Hollow Dr. in Lincoln County, North Carolina. The "site" is comprised of all or portions of tax parcel nos. 30147, 52404, 91568, 100646 as depicted in the rezoning plan.

2. Development of the site will be governed by the rezoning plan, the planned development master plan, these development standards, and the applicable provisions of the Lincoln County Unified Development Ordinance (the "UDO") in place on the date of the filing of the application for approval of the rezoning plan with Lincoln County.

3. Unless the rezoning plan or these development standards establish more stringent standards, the regulations established under the UDO for the Planned Development Residential Zoning District (PD-R) shall govern all development taking place on the site.

4. The configuration, placement, and size of the street rights of way, access points, and common areas depicted on the rezoning plan are schematic in nature and subject to the terms of these development standards and the UDO which may be altered or modified during the design, development, and construction phases. The exact alignments of the internal drives and internal public streets have not been determined and are subject to final design and engineering plans, and modifications or alteration of these alignments may take place during design, development, and construction phases. The development of the site as generally depicted on the rezoning plan may be phased. Any proposed phasing must align with required infrastructure and erosion control measures; provided each phase or sequence of improvements in the site will meet all UDO requirements. Utilities, infrastructure, and grading shall be delivered to each individual phase as each is developed.

5. The parcels of land that comprise the site may be recombined or further subdivided provided that any such recombination or subdivision meets the requirements of the UDO.

6. Further amendments to the rezoning plan and/or these development standards may be applied for by the then owner or owners of the site in accordance with provisions of the UDO; provided in the event any portion of the site is conveyed to a third party, petitioner may request an amendment to the rezoning plan without the written consent of any other owner of all or any portion of the site unless such amendment constitutes a change in the use of the portion of the site owned by such owner, provided petitioner provides for such amendment right in the recorded private restrictive covenants that govern the site. All requirements in connection with the amendment will be calculated on the site as a whole in the same manner such requirements were calculated.
at the time of the initial approval. This note shall be shown on the final plat when recorded.

7. Approval of this conditional rezoning shall constitute establishment of vested rights in the landowner (and its successors or assigns) for a period of five years pursuant to N.C. Gen Stat §160a-385.1.

**Permitted Uses:**
The uses permitted for this site are those permitted in the PD-R zoning district which included all uses permitted by right, as conditional uses, and as special uses, in residential districts and any incidental and accessory uses associated therewith that are allowed in residential districts.

**Transportation/Access/Parking:**
1. Vehicular access to the site shall be as generally depicted on the rezoning plan. The placement and configuration of each vehicular access point are subject to any modifications required to accommodate final site and construction plans and designs and to any adjustments required for approval by Lincoln County and/or the North Carolina department of transportation.
2. The alignments of the internal drives and parking areas to be located on the site are subject to any modifications or alterations required during the design, development, and construction permitting processes.
3. The signal and turn lanes recommended in the TIA at the intersection of Hagers Hollow Drive and Highway 16 shall be installed prior to the recording of the initial phase.

**Open space:**
1. As required by section 2.4.9.a.5 of the UDO, development of the site shall include a minimum of 12.5 percent recreation and open space.
2. As required by section 3.3.9 of the UDO, a homeowners’ association shall maintain the open space and any amenities created as part of the open space.

**Landscaping and screening:**
Unless otherwise specified herein, development of the site shall comply with the landscaping and screening requirements of section 3.4.3 of the UDO.

**Buffer:**
50’ and 20’ undisturbed buffers shall be provided along property boundaries as shown in the rezoning plan.

**Trees:**
Trees within the undisturbed buffers as shown in the rezoning plan are required to be saved. Additional trees are not required to be saved but will be preserved within the open space areas to the extent possible.

**Lighting:**
Lighting installed on the site shall comply with the requirements of the UDO.
**Signs:**
All signs installed on the site shall comply with the requirements of the UDO.

**Water and sewer:**
The site shall be served with public water and public sewer. It is the developer/owner's responsibility to make all improvements to the Lincoln County water & sewer system to accommodate their development.

**Planned development district standards:**
Pursuant to section 2.4.9 of the UDO, all bulk, area, and dimensional standards shall be established at the time of approval.

1. If this rezoning application is approved, all conditions applicable to the use and development of the site imposed under these development standards and the rezoning plan will, unless amended in the manner provided under the UDO, be binding upon and inure to the benefit of petitioner and the current and subsequent owners of the site and their respective successors in interest and assigns.

2. Throughout these development standards, the term petitioner shall be deemed to include the heirs, devisees, personal representatives, successors in interest and assigns of petitioner or the owner or owners of the site from time to time who may be involved in any future development thereof.
Beth Bailey made a brief slide show presentation about the proposed development, including the original approved plan for the final phase of Villages of Denver and the new proposed plan that would replace it. She identified the two site accesses from Kenyon Drive and Hagers Hollow Drive and explained the offsite road improvements recommended by the traffic impact analysis, which include turn lanes and a traffic signal at the intersection of Hagers Hollow Drive and N.C. 16 Business.

18:04:10 From Debra Howe: is this about a Vod expansion or the new meadows development

Beth Bailey, PLA with McKim & Creed: It is a stand-alone community. Adjacent to VOD; edge of VOD to Hagers Hollow Rd.

18:11:14 From jason.geml: So basically you want to impede onto our private road being Andrew Point? What happened to the VOD only wanting an access for emergency vehicles only?

Jeremiah Combs: No access on Andrew Pointe Dr. That is not DOT maintained; Hagers Hollow is; and that is what is being proposed.

Emergency vehicles only was an earlier proposal and the applicant decided a full-fledged DOT access is what they decided to pursue. That led to them coming back to the Board of Commissioners and requesting additional acreage be pulled in and a separate community be created. They are now proposing an access that would be built to DOT standards all the way from Hagers Hollow to Natalie Commons and Optimist Club.

18:13:13 From Patricia: (1) What is the developer going to do to mitigate the adverse effects of clearing 126 acres of woods which will result in poorer air quality (trees clean the air), loss of wildlife habitat, more storm water runoff, etc. (2) What is the developer going to do to mitigate the adverse impacts of potentially 534 more vehicles on already-crowded roads (267 homes x2)?

Jeremiah: Second half of the question: Traffic study has been done and is being reviewed by DOT. Signalization and turn lanes were recommendations and part of the plan being reviewed by DOT.

Beth: We have done what we could with the site plan; only one stream crossing. Avoiding impacting the stream as best we could with grading. Kept road as far off stream as we could. Tried to locate the crossing where it would be most efficient. Storm water will be addressed with civil design. This will be addressed and will adhere to NCDNR guidelines.

A large portion of the site has been timbered before, substantial areas of regrowth. Definitely preserving larger trees around stream beds.

18:14:27 From Debra Howe: so traffic will go thru vod and drive between two vod house to enter meadows side entrance

That is correct.
From jason.geml: So now I am going to have the VOD (Meadows) going through my back yard?? You KIDDING ME?

Jeremiah: Not sure where you live. Reference the site plan.

From jason.geml: So already worked out with the county, PRIOR to purchasing the properties to expand?

The applicant has been in conversation with us for quite a few months on their proposal; and quite a few rounds of reviews and comments before this plan that is presented before you today.

From Debra Howe: how many houses per phase

Beth: Don’t have them off the top of my head. I believe it’s about 35-40% of lots in phase 1. 1/3 of remaining after that. Will check and get back.

From iPhone: How much space/woods will be left between the houses on the back of Durango to the phase 4 of meadows? We are all losing our private wooded lots that we paid additional fees for.

Beth: On this plan we show 20’ which is the zoning requirement.

From Bud Cesena: When will the roads in the VOD be turned over to DOT?

Beth: Bill:

From Amber Cornett: I own a plot of land, does this zoning affect my property, does theirs development affect it? I won’t lose portions of it will I?

Jeremiah: It does not affect your property individually, but if you received a letter, you own property within 1/8 of mile of this site.

From Meagan's iPhone: A traffic light is not enough to lessen the amount of traffic that 267 houses will add to denver. Denver is already over crowded

Jeremiah: Traffic study under review with DOT. The applicant will need to have an approved traffic study with improvements prior to proceeding to public hearing

From jason.geml: Please put the plot design of the proposed development

If you need more detail than the information on the screen, please be more specific.

From Bud Cesena: As we discussed yesterday in the Planning Board Meeting will the traffic control and streets be completed first or will they be done last?

Jeremiah: To some extent we will rely on DOT to tell us when the improvements are warranted.

Beth: text from the team.... DOT will inspect typically at build out, once they are acceptable they will adopt the roads.

From Linda: based on the TIA - what is the current LOS and what is the resulting LOS

Jeremiah: Level of Service is the grading metric for how the intersection performs. Any leg must offer a service level of C or better. If it is below level C the developer must install whatever improvements are necessary to bring that back up to a level of C. If the leg of service is already a level of D or lower, then the developer must bring it back up to a level D. We will make this traffic study available for viewing by the public when it is a final, sealed, approved traffic study.
18:23:59 From Gwendolyn Gregory: Since we just got the traffic light at 16 and Optimist to help relieve the traffic impat, how will this development make it easier for us to get in and out of our neighborhood?

Jeremiah: Traffic pattern currently has 2 points of access. This would provide a 3rd way in and out of VOD and this new neighborhood.

18:25:01 From Kimberly McGrath: We already have horrible traffic through our neighborhood putting our kids at risk from people who use our neighborhood as a cut through. How are you going to protect our children from people blowing through to highway 16?

Beth: Looking at “no outlet” signs for Hagers Hollow beyond the entrance for the new development. A speed table is being considered at Hagers Hollow entrance. Enhanced landscaping and monument sign to make it clear where the entrance is for the new community. Open to ideas.

18:26:10 From Kimberly McGrath: Also I paid a premium for a wooded lot with trees and now you want to chop them all down and give me a view of my neighbors bedroom?

Jeremiah: Buffers were discussed previously.

18:26:29 From Jason.Geml: I am against the power line set back

18:26:56 From iPhone: What is the price of the lot’s.

Beth: Similar to most recent in VOD, maybe higher. Prices will be set by builder.

18:27:14 From Jason.Geml: To the rt of the "open space" note Left of the stream.. That green corner touches my property

18:27:36 From Jason.Geml: Sorry, to the left of the open space note

18:28:17 From Debra Howe: is the developer going to finish vod b4 starting meadows

Beth: In all likelihood VOG will be more than likely close to finishing out. If approvals for the new development are given it will take us months to get through civil design. Could be 9 months or more after approval before any construction starts.

18:28:51 From Amber Cornett: They building a housing development

18:29:27 From Amber Cornett: How can we get a copy of this recording?

Jeremiah: Reach out to me, email is on the website; and we will get you a link to the file.

18:29:28 From Meagan's iPhone: Are the developers going to pay for the increase in our roads? We as taxpayers shouldn’t get stuck paying for widening the roads after this congests denver even more

Jeremiah: Developers would be responsible for required improvements.

18:29:46 From Josh Grant - LC Planning Manager: Thank you for all of the questions everyone. If you are just joining us, we will do our best to get to all of your inquiries and/or provide the applicant the opportunity to speak to any concerns you may have.

Thank you,
From Patricia: Adding turn lanes and a traffic light on NC-16 Business at Hagers Hollow will make it easier for the residents of the new development to get in and out, but is NOT going to mitigate adverse traffic impacts of adding potentially another 534 vehicles on NC-16 Business and going through VoD to get to Natalie Commons or Optimist Club Road.

Jeremiah: Thank you for your comment.

From jason.geml: How many cars per day is anticipated to access this new road through the Meadows, and VOD?

Jeremiah: I don’t know that we can nail down an exact number of trips generated through this new road. We can project, based on Institute of Traffic Engineers trip generation, the amount of new trips generated for the new homes; but we cannot project how many trips will be added from the existing homes using the new road.

From Debra Howe: when is the developer going to finish the Vod roads, the local school buses can not drive on them because they are still owned by developers and can not be just turned over because they do not meet county standards.

Jeremiah: Similar question already answered

From Linda: What is the developer proposing to give back to the community at large to mitigate the effects of this new development?

Jeremiah: Counties do not have the authority to impose impact fees. This is not something we could enforce even if the developer wanted to offer something.

From Debra Howe: has the builder been selected yet?

Beth: Not yet.

From jenniferjarvis: This question is for the residents on Hagers Hollow, are you all willing to sign a protest petition as soon as we get it circulated?

Jeremiah: Be aware, you are welcome to present this at the public hearing, but in the state of NC there isn’t a super majority vote required when a petition is brought before the Board.

From Debra Howe: will street lights be installed asap on the roads or will vod be driving thru pitch dark roads?

Bill Rice, Consultant: Street lights issue, I have spoken with Pike and they have the plan for the lighting; and they will be scheduling that. That info will be passed through the HOA.

From Beth Bailey: Lot Breakdown is as follows: Phase 1 - 131, Phase 2 - 54, Phase 3 - 50, Phase 4 - 32

From Kimberly McGrath: You will need to put in speed bumps. To stop cut through traffic no one pays attention to the speed signs and the cops don’t help us with that.

Jeremiah: That would need to be coordinated with DOT.
Tom Scott: VOD last phase will be 3C. Once completed it will be turned over to the HOA. As part of that turn-over they have to walk all streets with DOT and make all repairs. Streets would then be turned over to the NCDOT for maintenance. Due to sewer moratorium in Lincoln County, until 1st quarter or later of 2023. This new community, if approved, will be long after the completion of phase 3C.

Also I was sold a WOODED lot view not a 20 foot buffer where you cut down all the trees. That is not an acceptable answer a buffer is unacceptable!

18:42:54 From Debra Howe: school bus question skipped over

Jeremiah: That flows together with the timing discussed previously about the road being taken over by DOT.

18:44:42 From Debra Howe: bill we are asking about in meadows street lights not Vod. but thanks for the vid info

18:44:53 From iPhone: Why do the neighborhoods need to be joined in phase 1 vs phase 4 to reduce construction traffic through villages of Denver

Jeremiah: A good portion of this site was the original phase 4 of VOD. A condition with the original rezoning was that a third access be provided prior to the final phase. Hagers Hollow is that 3rd access point. That needs to be a part of phase 1 of this development to satisfy the requirement of the original approval.

18:45:03 From iPhone: Where will the construction entrance for meadows of Denver be?

Jeremiah: Construction entrance will be off Hagers Hollow.

18:45:17 From iPhone: The first home was built in the villages of Denver 15 years ago. There are kids walking 1 mile to the bus stop due to the roads being private

18:45:19 From Linda: This question is for the developers representative - not county staff - since the county can't force you to pay impact fees are you planning on giving anything back to this community such as public open space to help mitigate the effects of this development - open space outside of the development

Tom: Currently not in the plan but we will take under advisement.

18:45:52 From iPhone: Who owns parcel 30147?

Tom: Under contract; not scheduled to close until March.

18:48:28 From Debra Howe: will the developer ensure the VOD that No construction vehicles for meadows will drive thru vod

Tom: Because they are public roads we are hamstrung by what DOT allows us to do.

18:50:03 From Debra Howe: they are not public roads. you still own them

Tom: The roads will ultimately end up being public roads, once we have done the repairs they are asking us to do. We will be doing a preliminary walk through with NCDOT first part of the year to look at the turn over.
Debra Howe: if they were public roads then ncdot would allow buses

Bill?: By the time work will be starting on the new development, we expect the roads in VOD will have been turned over to the state.

Jeremiah: I would like to point out that while privately maintained all roads in VOD are dedicated as public roads for public use.

Bill?: Why do the neighborhoods need to be joined in phase 1 vs phase 4 to reduce construction traffic through villages of Denver

Answered above

Bill?: if the meadows gets denied will the developer revert back to phase 4 vod

Jeremiah: The developer could. That plan is approved. They would be limited to the boundary shown on the original plan.

Bill?: so either way hagers will be an exit

Tom: Yes

Bill?: If construction workers are coming from optimist club/hwy 16 it will route them through woods Dr. How will they ensure the construction entrance will be hagers hollow?

Jeremiah: Land clearing phase might be Hagers Hollow alone, but once roads are built, they are public roads and limiting through traffic during home construction phase will be difficult.

Bill?: there's no way to access to hwy 16 instead of hagers

Jeremiah: Access to Bus. Hwy 16 or the bypass would require access over private property and for the bypass railroad track. Bypass is a full controlled access highway.

Bill?: how many houses were proposed in the original 2001 phase 4

Jeremiah: Original plan was for 685 homes; 523 have been recorded. Under currently approved plan 162 more lots could be recorded. Under proposed plan 267 are recorded for a difference of 105 additional lots.

Kimberly McGrath: What will the country do about the epa impact of the amount of led that is most likely in that hill that has been used for years as a shooting range?

Linda: why does the developer feel the need to add the additional 105 homes

LC Planning Staff

Josh Grant - LC Planning Manager: Thank you all for participating this evening.

LC Planning Staff

Kimberly McGrath: Unmute me
Commissioner Cesena: Where is the hill that is used for a shooting range. We need to look at this; lead removal could be required. Could be incredibly expensive. This could be significant environmental impact.

Kimberly: It’s in Phase 4. It’s been a gun range for a very long time. The developer is aware of this.

Tom: aware and it is not a good thing to have lead and the developer will have to deal with that.

19:04:50 From wardk: Where will the meeting be held

19:05:50 From jenniferjarvis: Please repeat meeting date and time and location

19:06:35 From Josh Grant - LC Planning Manager: March 7th tentatively. 353 N Generals Blvd Lincolnton, NC 28092 unless overflow is scheduled for 115 W Main Lincolnton, NC 28092. The community will receive notice of the public hearing.

Commissioner Sigmon commented that he is appreciative of the info presented. Important for all people to be involved in the process. Encouraged people to come to the hearing.
Submitted to: Villages of Denver, LLC
1999 Circle Drive, Suite B
Cleveland, OH 44106

Submitted by: Gannett Fleming
28 Schenck Parkway
Suite 200
Asheville NC 28803
(828) 771-0871
NC Lic. No. F-0270

May 4, 2022
TRAFFIC IMPACT ANALYSIS

For

Villages of Denver
Lincoln County, North Carolina

Prepared For:

Villages of Denver, LLC
1999 Circle Drive, Suite B
Cleveland, OH 44106

Prepared By:

Gannett Fleming

Excellence Delivered As Promised

28 Schenck Parkway
Suite 200
Asheville, NC 28803
NC Licensure No. F-0270

9 December 2021
(Gannett Fleming Project No. 069131)
Revised
4 May 2022

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Appendix D – NCDOT Checklist and MOA
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I. Executive Summary

INTRODUCTION
A residential development known as Villages of Denver is proposed on SR 2022 (Hagers Hollow Road) in Lincoln County, NC. The project will consist of 267 single family homes.

According to the proposed Site Plan developed by McKim & Creed 6/2021, direct access to the development is planned on SR 2022 (Hagers Hollow Road) with full movement access. The intersection of NC 16 Bus and SR 2022 (Hagers Hollow Road) is currently unsignalized.

TRIP GENERATION
The amount of traffic generated by a new development is a function of the size and type of development. Once the proposed land use data for the site are known, the number of trips generated by the development can be estimated. Trip generation data for this report was conducted in accordance with the procedures outlined in the Institute of Transportation Engineers (ITE) report entitled Trip Generation. Table 1 illustrates the number of daily, AM peak hour, and PM peak hour trips expected to be generated by the proposed development.

Traffic impact is determined by estimating the total number of daily vehicle trips, as well as the number of peak hour vehicle trips. Table 1 indicates the proposed development will generate approximately 2,491 total trips per day, 182 trips in the AM Peak Hour, and 250 trips in the PM Peak Hour when it is fully built out.

Table 1 –Trip Generation Summary

<table>
<thead>
<tr>
<th>LUC</th>
<th>Description</th>
<th>Density</th>
<th>Variable</th>
<th>PK HR</th>
<th>METHOD</th>
<th>Daily</th>
<th>AM</th>
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<td>210</td>
<td>Single Family</td>
<td>267</td>
<td>Units</td>
<td>Adj</td>
<td>EQN</td>
<td>2491</td>
<td>157</td>
<td>93</td>
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</table>

Total New Trips: 2491

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<tr>
<td>47</td>
<td>135</td>
<td>182</td>
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<tr>
<td>93</td>
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<table>
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<th>Out</th>
<th>Total</th>
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<tbody>
<tr>
<td>157</td>
<td>93</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

CAPACITY ANALYSIS
Capacity analyses were performed for 2021 Existing conditions, 2025 Background, and 2025 Future Buildout conditions for the following intersections:

- NC 16 Bus at SR 1389 (Fairfield Forest Road) (signalized intersection)
- NC 16 Bus at SR 2022 (Hagers Hollow Road) (unsignalized intersection)
- NC 16 Bus at SR 1379 (Webbs Road) (signalized intersection)

RECOMMENDED IMPROVEMENTS

To mitigate the traffic-related impacts caused by the Villages of Denver Residential Development and to provide for safe, efficient, and reliable traffic flow, Gannett Fleming recommends the following:
NC 16 Bus / SR 1389 (Fairfield Forest Road)
Gannett Fleming recommends no changes at this intersection.

NC 16 Bus / SR 2022 (Hagers Hollow Road)
Gannett Fleming recommends the installation of a fully actuated traffic signal and dedicated left and right turn lanes on the NC 16 Bus approaches with 150 feet of full storage with appropriate tapers. Gannett Fleming recommends the installation of a right turn lane with 100 feet of full storage with appropriate taper on the Hagers Hollow approach.

NC 16 Bus / SR 1379 (Webbs Road)
Gannett Fleming recommends no changes at this intersection.

SR 2022 (Hagers Hollow Road) / Proposed Site Access
Gannett Fleming recommends that this intersection be constructed as shown on the site plan with full access out control. Sufficient stem length should be provided per NCDOT Guidelines to prevent exiting traffic from interfering with internal circulation.

CONCLUSIONS
This Traffic Impact Analysis shows that the proposed Villages of Denver development impacts on the traffic operations at the study area intersections will be mitigated by the recommended improvements. With the recommended improvements in place, the proposed development will not negatively impact the health, safety, and welfare of the traveling public.
II. Introduction

A residential development known as Villages of Denver is proposed on SR 2022 (Hagers Hollow Road) in Lincoln County, NC. The project will consist of 267 single family homes.

According to the proposed Site Plan developed by McKim & Creed 6/2021, direct access to the development is planned on SR 2022 (Hagers Hollow Road) with full movement access. The intersection of NC 16 Bus and SR 2022 (Hagers Hollow Road) is currently unsignalized.

The purpose of this report is to evaluate the traffic impacts from the proposed Villages of Denver residential development and to recommend transportation improvements needed to mitigate congestion that may result from the additional site traffic. This report presents trip generation, trip distribution, traffic analyses, and recommendations for transportation improvements needed to meet anticipated traffic demands. This report examines existing 2021 existing conditions, 2025 Background conditions, and 2025 Future Buildout conditions.
Figure 1 - Project and Count Locations
Figure 2 - Site Plan
III. Inventory of Traffic Conditions

A. Study Area
The City of Asheville and North Carolina Department of Transportation (NCDOT) requested the following intersections be analyzed to determine the associated impacts from the proposed residential development:

- NC 16 Bus at SR 1389 (Fairfield Forest Road) (signalized intersection)
- NC 16 Bus at SR 2022 (Hagers Hollow Road) (unsignalized intersection)
- NC 16 Bus at SR 1379 (Webbs Road) (signalized intersection)

B. Existing Conditions
A description of transportation facilities in the general vicinity of this proposed development is as follows:

**NC 16 Bus** is maintained by NCDOT as a primary highway. It has a two-lane profile in the study area with some additional turn lanes at various intersections. It is a major north/south route in the area. The 2019 ADT was measured at 12,500 vehicles per day south of the project location. NC 150 is classified as an “minor arterial” by NCDOT.

**SR 1389 (Fairfield Forest Road)** is maintained by NCDOT as a secondary road with a cross section of two lanes. It has an AADT of 4,400. SR 1389 (Fairfield Forest Road) is classified as a “local road” by NCDOT.

**SR 2022 (Hagers Hollow Road)** is maintained by NCDOT as a secondary road with a cross section of two lanes. SR 2022 (Hagers Hollow Road) is classified as a “local road” by NCDOT.

**SR 1379 (Webbs Road)** is maintained by NCDOT as a secondary road with a cross section of two lanes. It has an AADT of 8,100. SR 1379 (Webbs Road) is classified as a “local road” by NCDOT.

The existing lane configurations and traffic control for the study area intersections are shown in Figure 2.

C. Projected Transportation Improvements
There are currently no STIP projects planned in the study area.
IV. Traffic Generation

The amount of traffic generated by a new development is a function of the size and type of development. Once the proposed land use data for the site are known, the number of trips generated by the development can be estimated. Trip generation data for this report was conducted in accordance with the procedures outlined in the Institute of Transportation Engineers (ITE) report entitled *Trip Generation*. Table 1 illustrates the number of daily, AM peak hour, and PM peak hour trips expected to be generated by the proposed development.

**Table 1 - Trip Generation Summary**

<table>
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<tr>
<th>LUC</th>
<th>Description</th>
<th>Density</th>
<th>Variable</th>
<th>PK HR</th>
<th>METHOD</th>
<th>Daily</th>
<th>AM</th>
<th>PM</th>
<th>Total</th>
<th>AM</th>
<th>PM</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>Single Family</td>
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<td>Units</td>
<td>Adj</td>
<td>EQN</td>
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<td>47</td>
<td>135</td>
<td>182</td>
<td>157</td>
<td>93</td>
<td>250</td>
</tr>
</tbody>
</table>

Total New Trips

<table>
<thead>
<tr>
<th>Daily</th>
<th>AM</th>
<th>PM</th>
<th>Total</th>
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<tr>
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<td>93</td>
<td>250</td>
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</tbody>
</table>

Traffic impact is determined by estimating the total number of daily vehicle trips, as well as the number of peak hour vehicle trips. Table 1 indicates the proposed development will generate approximately 2,491 total trips per day, 182 trips in the AM Peak Hour, and 250 trips in the PM Peak Hour when it is fully built out.

V. Traffic Distribution

To properly determine the impact of the traffic generated by the proposed development, it is necessary to determine the distribution of traffic to and from the development. These percentages are based on the projected traffic patterns and population / employment centers in the area. They are also based on existing ADTs and data obtained from traffic counts.

The project traffic distribution is shown in Figure 6.
VI. Projected Traffic Volumes

A. Existing Traffic
Gannett Fleming partnered performed traffic counts at the existing intersections identified in the scoping of this analysis. The 2021 Traffic Count Volumes are shown in Figure 4.

In accordance with NCDOT Congestion Management Guidelines, Gannett Fleming “balanced” the factored traffic volumes. This balancing reconciles volumes for adjacent intersections on shared routes.

B. Historical Traffic Growth
Historical traffic growth is the increase in traffic volumes due to usage increases and non-specific growth throughout the area. To account for normal increases in traffic as well as smaller, undetermined development, the existing 2021 traffic volumes were grown by 2% per year compounded annually to 2025 to develop Background traffic volumes. This percentage is based on NCDOT AADT Maps² and observed growth patterns in this area of Lincoln County. The 2025 Background AM and PM peak hour traffic volumes are illustrated in Figure 5.

C. Approved Development Traffic
Approved development traffic is traffic generated by specific approved but not yet constructed, developments within the vicinity of the subject project. No other major developments are approved for construction by 2025 in the immediate vicinity that would influence the growth rate beyond the 2% factor used in this analysis; therefore, no approved developments were included in this analysis.

D. 2025 Total Traffic
To obtain total 2025 Future Buildout traffic volumes the development traffic was distributed by percentage as shown on Figure 6 and the volumes are shown in Figure 7 and were added to the 2025 Background traffic volumes. The AM and PM peak-hour turning movements for the studied intersections were then calculated and analyzed for the build-out years. The 2025 Future Buildout traffic volumes for the AM and PM peak hours are illustrated in Figure 8.
Figure 4 - 2021 Traffic Count Volumes
Figure 5 - 2025 Background Traffic Volumes
Figure 6 - Land Use Trip Distribution
Figure 7 - Land Use Traffic Volumes
Figure 8 - 2025 Future Buildout Volumes
VII. Traffic Analysis

The study area intersections were analyzed using the methods outlined in the *Highway Capacity Manual* and Synchro Version 11 Software. The *Highway Capacity Manual* defines capacity as “the maximum rate of flow at which persons or vehicles can be reasonably expected to traverse a point or uniform section of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions, usually expressed as vehicles per hour or persons per hour”.

Level of service (LOS) is a term used to represent different traffic conditions and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorist/or passengers". Level of Service varies from Level A, representing free flow, to Level F where traffic breakdown conditions are evident. Level B represents good progression with minimal congestion. At Level C, the number of vehicles stopping is significant, although many still pass through the intersection without stopping. Level D represents more congestion, but the overall operations are acceptable. At Level E, freedom to maneuver within the traffic stream is extremely difficult with driver frustration being generally high.

For signalized intersections, service levels pertain to each approach as well as an overall value. The unsignalized intersection analysis method in the *Highway Capacity Manual* assigns LOS values for each movement that yields the right-of-way, but not to the overall intersection. This movement is generally a secondary movement from a minor street. At an unsignalized intersection, the primary traffic on the main roadway is virtually uninterrupted. Therefore, the overall level of service is usually much greater than what is represented by the results of the minor street movements. Synchro Version 11 will calculate an amount of delay for the overall intersection but will not assign a LOS value. Therefore, the overall intersection delay is not reported in the summary tables of this report. Generally, Level of Service D is acceptable for signalized intersections in suburban areas during peak periods. With the current method of reporting levels of service for unsignalized intersections, it is not uncommon for some of the minor street movements to be operating at a LOS F during the peak hours.

*Note: In accordance with NCDOT Guidelines, the minimum cycle length for a traffic signal was set as 90 seconds for a three-phase and 120 seconds for a four or more phase signal. All signals in this analysis were modeled as actuated/coordinated. Synchro modeling software may predict that cycle lengths greater than 180 seconds may be most efficient for coordinated signal systems. Additionally, signal timing for existing conditions was taken from NCDOT signal plans. Background and future conditions were modeled with the signals coordinated (as appropriate) and optimized. This resulted in LOS and delay improvements over the existing conditions.*

Table 3 and 3A present criteria of each level of service as indicated in the *Highway Capacity Manual*. 
Table 2 - Signalized Intersection Level of Service Criteria

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Stopped Delay Per Vehicle (sec)</th>
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<tbody>
<tr>
<td>A</td>
<td>&lt;10.0</td>
</tr>
<tr>
<td>B</td>
<td>&gt;10.0 and &lt;20.0</td>
</tr>
<tr>
<td>C</td>
<td>&gt;20.0 and &lt;35.0</td>
</tr>
<tr>
<td>D</td>
<td>&gt;35.0 and &lt;55.0</td>
</tr>
<tr>
<td>E</td>
<td>&gt;55.0 and &lt;80.0</td>
</tr>
<tr>
<td>F</td>
<td>&gt;80.0</td>
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</table>

Table 3A - Unsignalized Intersection Level of Service Criteria

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Average Total Delay (sec/veh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt;10</td>
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<tr>
<td>B</td>
<td>&gt;10 and &lt;15</td>
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<tr>
<td>C</td>
<td>&gt;15 and &lt;25</td>
</tr>
<tr>
<td>D</td>
<td>&gt;25 and &lt;35</td>
</tr>
<tr>
<td>E</td>
<td>&gt;35 and &lt;50</td>
</tr>
<tr>
<td>F</td>
<td>&gt;50</td>
</tr>
</tbody>
</table>

Capacity analyses were performed for 2021 existing conditions, 2025 Background, and 2025 Future Buildout conditions for the following intersection:

- NC 16 Bus at SR 1389 (Fairfield Forest Road) (signalized intersection)
- NC 16 Bus at SR 2022 (Hagers Hollow Road) (unsignalized intersection)
- NC 16 Bus at SR 1379 (Webbs Road) (signalized intersection)

Synchro 11 calculated the AM and PM peak hour level of service and delay for the study area intersections using methods outlined in the *Highway Capacity Manual*. All capacity analyses are included in Appendix B and are briefly summarized in the following sub-sections. It should be noted that under coordinated traffic signal operations, levels of service and delays may change with counterintuitive results. Individual approaches or intersections may experience less delay even with increased volumes due to the “system” approach taken by Synchro, where an individual intersection or approach may benefit from an increase or decrease in coordinated cycle lengths that may approach the optimum cycle length for that individual intersection.
1. **NC 16 Bus / SR 1379 (Webbs Road)**

The intersection of NC 16 Bus / SR 1379 (Webbs Road) is a signalized four-legged intersection. The capacity analysis for the Existing 2021 traffic condition revealed the intersection is currently operating at a Level of Service (LOS) B in both the AM and PM peak hours with delays of 18.9 and 19.7 seconds respectively. During the AM Peak Hour, the Webbs Road westbound approach is operating at LOS C with an overall approach delay of 20.6 seconds/vehicle and during the PM Peak Hour it operates at an LOS D with an approach delay of 45.2 seconds.

*Note: Signal timing for existing conditions was taken from NCDOT signal plans. Background and future conditions were modeled with the signals coordinated (as appropriate) and optimized. This resulted in some LOS and delay improvements (for certain approaches and the intersection as a whole) over the existing conditions.*

With normal traffic growth at 2% per year compounded annually, the total intersection and approach delays are expected to increase by 2025. During the 2025 Background traffic conditions, the intersection would be predicted to operate at an LOS B in the AM and C PM peak hours with delays of 17.2 and 20.5 seconds respectively. The Webbs Road westbound approach would be predicted to operate at LOS C with overall approach delays of 21.2 seconds/vehicle during AM Peak Hour and 34.6 seconds during the PM Peak Hour.

Under 2025 Future Buildout conditions, the intersection would be predicted to continue to operate at an LOS C during both the AM and PM Peak Hours conditions. The Webbs Road westbound approach would be predicted to operate at LOS C during the AM Peak Hour with an approach delay of 29.9 seconds. During the PM Peak Hour, the delays were expected to become 35.0 seconds with an LOS of C.

The queue lengths show change as a result of the addition of Villages of Denver traffic but are not expected to be unreasonable with the exception of the maximum queue length for the NC 16 Bus northbound approach which is expected to be 1160 feet during the 2025 Future Buildout PM Peak Hour.

Table 4 displays the Level of Service and Delay for the subject intersection for the 2021 Existing conditions, 2025 Background conditions, and 2025 Future Buildout conditions. Table 5 displays projected queueing for the aforementioned conditions.
### Table 4 - NC 16 Bus at Webbs Road Level of Service

<table>
<thead>
<tr>
<th>AM Peak Hour</th>
<th>2021 Existing</th>
<th>2025 Background</th>
<th>2025 Future Buildout</th>
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</thead>
<tbody>
<tr>
<td>Intersection Level of Service (LOS)</td>
<td>B</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Total Intersection Delay (Seconds)</td>
<td>18.9</td>
<td>17.2</td>
<td>20.8</td>
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<tr>
<td>Webbs Road Eastbound</td>
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<tr>
<td>Approach Delay</td>
<td></td>
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<td></td>
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<tr>
<td>Webbs Road Westbound</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Approach Delay</td>
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<td></td>
<td></td>
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<tr>
<td>NC 16 Bus Northbound</td>
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<tr>
<td>Approach Delay</td>
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<tr>
<td>NC 16 Bus Southbound</td>
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<tr>
<td>Approach Delay</td>
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<thead>
<tr>
<th>PM Peak Hour</th>
<th>2021 Existing</th>
<th>2025 Background</th>
<th>2025 Future Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection Level of Service (LOS)</td>
<td>B</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Total Intersection Delay (Seconds)</td>
<td>19.7</td>
<td>20.5</td>
<td>26.2</td>
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<tr>
<td>Webbs Road Eastbound</td>
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<tr>
<td>Approach Delay</td>
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<tr>
<td>Webbs Road Westbound</td>
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<tr>
<td>Approach Delay</td>
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<tr>
<td>NC 16 Bus Northbound</td>
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<tr>
<td>Approach Delay</td>
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<tr>
<td>NC 16 Bus Southbound</td>
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<tr>
<td>Approach Delay</td>
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#### Color Legend
- Green: Delay Decrease or LOS Improvement
- Yellow: Delay Increase > 25% or LOS Decrease by 1 Letter Grade
- Red: LOS "F"
<table>
<thead>
<tr>
<th></th>
<th>AM Peak Hour</th>
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<td>Queue Length</td>
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<td>95th Percentile</td>
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<td>95th Percentile</td>
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<td>NC 16 Bus Eastbound</td>
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<td>95th Percentile</td>
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<td>95th Percentile</td>
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<td></td>
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<td>72</td>
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<tr>
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<td>Queue Length</td>
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<td>72</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Maximum</td>
<td>72</td>
<td>Maximum</td>
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<td>Maximum</td>
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</tr>
<tr>
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<td></td>
<td>NC 16 Bus Southbound</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
2. **NC 16 Bus / SR 2022 (Hagers Hollow Road)**

The NC 16 Bus / SR 2022 (Hagers Hollow Road) intersection is currently an unsignalized four-legged intersection. Gannet Fleming performed a Signal Warrant Analysis, which revealed that the intersection with the traffic expected to be generated by Villages of Denver will meet signal warrants and NCDOT left and right turn warrants. The 2025 Future Buildout Conditions were modeled with a traffic signal and recommended turn lanes in place.

With the addition of the traffic signal and left and right turn lanes, the intersection is predicted to operate with a LOS A during the 2025 Future Buildout conditions. The eastbound Hagers Hollow Road approach LOS is predicted to be B during the AM and PM Peak Hours, with delays of 14.9 and 16.2 seconds.

The queues predicted by Sim Traffic at this intersection will change pretty substantially with the installation of the traffic signal during 2025 Future Buildout conditions. There are expected to be queues on NC 16 Bus because vehicles will have to stop for the signal. They are not expected to be excessive, however.

Gannett Fleming recommends the installation of a fully actuated traffic signal and dedicated left and right turn lanes on the NC 16 Bus approaches with 150 feet of full storage and appropriate tapers. Gannett Fleming recommends the installation of a right turn lane with 100 feet of full storage and appropriate taper on the Hagers Hollow approach.

Table 6 displays the Level of Service and Delay for the subject intersection for the 2021 Existing conditions, 2025 Background conditions, and 2025 Future Buildout conditions. Table 7 displays projected queueing for the intersection.
<table>
<thead>
<tr>
<th>AM Peak Hour</th>
<th>2021 Existing</th>
<th>2025 Background</th>
<th>2025 Future Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection Level of Service (LOS)</td>
<td>N/A</td>
<td>N/A</td>
<td>A</td>
</tr>
<tr>
<td>Total Intersection Delay (Seconds)</td>
<td>N/A</td>
<td>N/A</td>
<td>7.8</td>
</tr>
<tr>
<td>Hagers Hollow Road Eastbound</td>
<td>LOS</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Approach Delay</td>
<td>18.3</td>
<td>20.3</td>
<td>14.9</td>
</tr>
<tr>
<td>Approach Delay</td>
<td>LOS</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>NC 16 Bus Northbound</td>
<td>LOS</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>NC 16 Bus Southbound</td>
<td>Approach Delay</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>LOS</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Approach Delay</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PM Peak Hour</th>
<th>2021 Existing</th>
<th>2025 Background</th>
<th>2025 Future Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection Level of Service (LOS)</td>
<td>N/A</td>
<td>N/A</td>
<td>A</td>
</tr>
<tr>
<td>Total Intersection Delay (Seconds)</td>
<td>N/A</td>
<td>N/A</td>
<td>7.6</td>
</tr>
<tr>
<td>Hagers Hollow Road Eastbound</td>
<td>LOS</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>Approach Delay</td>
<td>30.9</td>
<td>38.6</td>
<td>16.2</td>
</tr>
<tr>
<td>Approach Delay</td>
<td>LOS</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>NC 16 Bus Northbound</td>
<td>LOS</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>NC 16 Bus Southbound</td>
<td>Approach Delay</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>LOS</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Approach Delay</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Notes:**
- Delay Decrease or LOS Improvement
- Delay Increase > 25% or LOS Decrease by 1 Letter Grade
- LOS “F”
### Table 7 - NC 16 Bus / SR 2022 (Hagers Hollow Road) Queues

<table>
<thead>
<tr>
<th></th>
<th>AM Peak Hour</th>
<th></th>
<th>PM Peak Hour</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hagers Hollow Road Eastbound</td>
<td>69 52 18</td>
<td>54 25 3</td>
<td>54 25 3</td>
<td>54 25 3</td>
</tr>
<tr>
<td>NC 16 Bus Northbound</td>
<td>15 15 0</td>
<td>15 15 0</td>
<td>15 15 0</td>
<td>15 15 0</td>
</tr>
<tr>
<td>NC 16 Bus Southbound</td>
<td>154 3 0</td>
<td>150 0 0</td>
<td>150 0 0</td>
<td>150 0 0</td>
</tr>
<tr>
<td></td>
<td>130 63 182 192 220 186</td>
<td>134 56 232 364 269 142</td>
<td>134 56 232 364 269 142</td>
<td>134 56 232 364 269 142</td>
</tr>
</tbody>
</table>

**Notes:**
- Queue Length
- 95th Percentile
- Maximum
- Assumes a Traffic Signal Queue Decrease > 25%
- Queue Increase > Available Storage
3. NC 16 Bus / SR 1389 (Fairfield Forest Road)

The NC 16 Bus / SR 1389 (Fairfield Forest Road) intersection is currently a signalized three-legged intersection.

During 2021 Existing conditions, the intersection as a whole has a LOS of B for both the AM and PM Peak Hours with delays of 16.4 and 19.7 seconds respectively. The southbound NC 16 Bus approach AM Peak Hour and PM Peak Hour LOS is B.

Note: Signal timing for existing conditions was taken from NCDOT signal plans. Background and future conditions were modeled with the signals coordinated (as appropriate) and optimized. This resulted in some LOS and delay improvements (for certain approaches and the intersection as a whole) over the existing conditions.

During 2025 Background conditions, the LOS of the intersection as a whole is expected to be B with delays of 14.9 and 15.2 seconds respectively. The southbound NC 16 Bus approach would be expected to have an LOS of B during both the AM and PM Peak Hours with delays of 16.6 and 15.5 seconds respectively.

For the 2025 Future Buildout conditions, the LOS of the intersection as a whole is expected to be B with delays of 12.8 and 16.9 seconds respectively. The delay for the intersection as a whole is expected to decrease by 2.1 seconds for the buildout condition due to efficiencies gained from coordination with the proposed new signal at Hagars Hollow Road and the existing signal at Webbs Road. The southbound NC 16 Bus approach would be expected to have an LOS of B during both the AM and PM Peak Hours with delays of 11.5 and 18.2 seconds respectively.

The queues predicted by Sim Traffic at this intersection show some change as a result of the addition of Villages of Denver traffic but are not expected to be unreasonable. The PM Peak Hour maximum queue for the NC 16 Bus northbound approach is expected to decrease by about 6 car lengths from the 2025 Background to the 2025 Future Buildout conditions.

Table 8 displays the Level of Service and Delay for the subject intersection for the 2021 Existing conditions, 2025 Background conditions, and 2025 Future Buildout conditions. Table 9 displays projected queueing for the intersection.
### Table 8 - NC 16 Bus at Fairfield Forest Road Level of Service

<table>
<thead>
<tr>
<th></th>
<th>AM Peak Hour</th>
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</thead>
<tbody>
<tr>
<td><strong>Intersection Level of Service (LOS)</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Intersection Delay (Seconds)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairfield Forest Road Eastbound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach Delay</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Fairfield Forest Road Westbound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach Delay</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>NC 16 Bus Northbound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach Delay</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>NC 16 Bus Southbound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach Delay</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>PM Peak Hour</th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Intersection Level of Service (LOS)</strong></td>
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</tr>
<tr>
<td>Total Intersection Delay (Seconds)</td>
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<tr>
<td>Fairfield Forest Road Eastbound</td>
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</tr>
<tr>
<td>Approach Delay</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Fairfield Forest Road Westbound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach Delay</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>NC 16 Bus Northbound</td>
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</tr>
<tr>
<td>Approach Delay</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>NC 16 Bus Southbound</td>
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</tr>
<tr>
<td>Approach Delay</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

#### Legend
- **Green**  | Delay Decrease or LOS Improvement
- **Yellow** | Delay Increase > 25% or LOS Decrease by 1 Letter Grade
- **Red**    | LOS "P"
### Table 9 - NC 16 Bus at Fairfield Forest Road Queues

<table>
<thead>
<tr>
<th>AM Peak Hour</th>
<th>2021 Existing</th>
<th>2025 Background</th>
<th>2025 Future Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Queue Length</td>
<td>Feet</td>
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<td>Maximum</td>
<td>30</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>95th Percentile</td>
<td>12</td>
<td>11</td>
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<tr>
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<td>Maximum</td>
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<td>95th Percentile</td>
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<td>NC 16 Bus Northbound</td>
<td>Maximum</td>
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<td>164</td>
<td>176</td>
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<td>NC 16 Bus Southbound</td>
<td>Maximum</td>
<td>259</td>
<td>443</td>
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<td>#411</td>
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<table>
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<th>2025 Background</th>
<th>2025 Future Buildout</th>
</tr>
</thead>
<tbody>
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<td>Feet</td>
</tr>
<tr>
<td>Fairfield Forest Road Eastbound</td>
<td>Maximum</td>
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<td>49</td>
</tr>
<tr>
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<td>95th Percentile</td>
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<td>Maximum</td>
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</tr>
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<td>114</td>
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<td>NC 16 Bus Northbound</td>
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</tr>
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<td>#427</td>
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<tr>
<td></td>
<td>95th Percentile</td>
<td>251</td>
<td>#416</td>
</tr>
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</table>
4. **SR 2022 (Hagers Hollow Road) / Proposed Site Access**

The 2022 (Hagers Hollow Road) / Proposed Site Access intersection is proposed as an unsignalized three-legged intersection. The capacity analyses for the 2025 Future traffic conditions revealed that all approaches are expected to operate at LOS A during both AM and PM Peak Hour conditions.

Queue lengths are expected to not be unreasonably long during the 2025 Future AM and PM Peak Hour conditions. The queue lengths for the dedicated turn lanes are predicted to be contained by the proposed storage.

Gannett Fleming recommends that this intersection be constructed as shown on the site plan with full access out control. Sufficient stem length should be provided per NCDOT Guidelines to prevent exiting traffic from interfering with internal circulation.

Table 10 displays the Level of Service and Delay for the subject intersection for the 2021 Existing conditions, 2025 Background conditions, and 2025 Future Buildout conditions. Table 11 displays projected queueing for the intersection.
### Table 10 - Hagers Hollow Road at Site Access Level of Service

<table>
<thead>
<tr>
<th>AM Peak Hour</th>
<th>2021 Existing</th>
<th>2025 Background</th>
<th>2025 Future Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection Level of Service (LOS)</td>
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<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Total Intersection Delay (Seconds)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Hagers Hollow Road Eastbound</td>
<td>LOS</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Approach Delay</td>
<td>N/A</td>
<td>N/A</td>
<td>A</td>
</tr>
<tr>
<td>Hagers Hollow Road Westbound</td>
<td>LOS</td>
<td>N/A</td>
<td>0.0</td>
</tr>
<tr>
<td>Approach Delay</td>
<td>N/A</td>
<td>N/A</td>
<td>A</td>
</tr>
<tr>
<td>Site Access Northbound</td>
<td>LOS</td>
<td>N/A</td>
<td>4.0</td>
</tr>
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<td>Approach Delay</td>
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<td>N/A</td>
<td>A</td>
</tr>
<tr>
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<td></td>
<td>N/A</td>
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</table>

<table>
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<tr>
<th>PM Peak Hour</th>
<th>2021 Existing</th>
<th>2025 Background</th>
<th>2025 Future Buildout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection Level of Service (LOS)</td>
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<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Intersection Delay (Seconds)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Hagers Hollow Road Eastbound</td>
<td>LOS</td>
<td>N/A</td>
<td>A</td>
</tr>
<tr>
<td>Approach Delay</td>
<td>N/A</td>
<td>N/A</td>
<td>0.0</td>
</tr>
<tr>
<td>Hagers Hollow Road Westbound</td>
<td>LOS</td>
<td>N/A</td>
<td>A</td>
</tr>
<tr>
<td>Approach Delay</td>
<td>N/A</td>
<td>N/A</td>
<td>6.1</td>
</tr>
<tr>
<td>Site Access Northbound</td>
<td>LOS</td>
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</tr>
<tr>
<td>Approach Delay</td>
<td>N/A</td>
<td>N/A</td>
<td>9.1</td>
</tr>
</tbody>
</table>

Legend:
- Green: Delay Decrease or LOS Improvement
- Yellow: Delay Increase > 25% or LOS Decrease by 1 Letter Grade
- Red: LOS "F"
Table 11 - SR 2022 (Hagers Hollow Road) / Proposed Site Access Queues

<table>
<thead>
<tr>
<th>AM Peak Hour</th>
<th></th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hagers Hollow Road Eastbound</td>
<td></td>
<td>Hagers Hollow Road Westbound</td>
</tr>
<tr>
<td>Queue Length</td>
<td></td>
<td>Site Access Northbound</td>
</tr>
<tr>
<td>Maximum</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>95th Percentile</td>
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<td>0</td>
</tr>
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<td>95th Percentile</td>
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<td>N/A</td>
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<td>95th Percentile</td>
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<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

| 2025 Future Buildout Feet | 2025 Background Feet | | 2025 Future Buildout Feet | 2025 Background Feet |
|---------------------------|----------------------|---------------------------|----------------------|
| 0 | N/A | | 0 | N/A | | 0 | N/A | | 0 | N/A | |
| 55 | N/A | | 54 | N/A | | 10 | N/A | | 10 | N/A | |
| 6 | N/A | | 5 | N/A | | 99 | N/A | | 99 | N/A | |
| 13 | N/A | | 10 | N/A | | 10 | N/A | | 10 | N/A | |
IX. Recommendations

NC 16 Bus / SR 1389 (Fairfield Forest Road)
Gannett Fleming recommends no changes at this intersection.

NC 16 Bus / SR 2022 (Hagers Hollow Road)
Gannett Fleming recommends the installation of a fully actuated traffic signal and dedicated left and right turn lanes on the NC 16 Bus approaches with 150 feet of full storage and appropriate tapers. Gannett Fleming recommends the installation of a right turn lane with 100 feet of full storage and appropriate taper on the Hagers Hollow approach.

NC 16 Bus / SR 1379 (Webbs Road)
Gannett Fleming recommends no changes at this intersection.

SR 2022 (Hagers Hollow Road) / Proposed Site Access
Gannett Fleming recommends that this intersection be constructed as shown on the site plan with full access out control. Sufficient stem length should be provided per NCDOT Guidelines to prevent exiting traffic from interfering with internal circulation.

CONCLUSIONS
This Traffic Impact Analysis shows that the proposed Villages of Denver development impacts on the traffic operations at the study area intersections will be mitigated by the recommended improvements. With the recommended improvements in place, the proposed development will not negatively impact the health, safety, and welfare of the traveling public.
IX. Conclusions

This Traffic Impact Analysis shows that the proposed Villages of Denver impacts on the traffic operations at the study area intersections will be mitigated by the recommended improvements. With the recommended improvements in place, the proposed development will not negatively impact the health, safety, and welfare of the travelling public.

X. References


2 NCDOT Interactive Traffic Volume Map: http://ncdot.maps.arcgis.com/apps/webappviewer/index.html?id=5f6fe58c1d90482ab9107ccc03026280
