DRAFT REPORT v4

# CLEAR CREEK GROWTH ANALYSIS

**Prepared For: Henderson County, NC**

**Prepared By: Benchmark Planning**

**Date Prepared: December 21, 2017**

# EXECUTIVE SUMMARY

The analysis presented in this report was prepared to examine the growth potential and outcomes associated with different options for extending sewer service into the Edneyville community. The primary options for extending sewer that were examined were a scenario in which gravity sewer lines were extended through the Clear Creek basin to serve the new Edneyville Elementary School and the NC Justice Academy, and a scenario (the Barnwell option) that used a combination of gravity sewer and pump stations with force mains that would be installed along US 64 to serve the previously mentioned locations.

The analysis provides an introduction and general discussion of the two primary options under consideration. This is followed by an overview of existing conditions in the overall Clear Creek basin, including existing development patterns, the location of critical resources, such as orchards, and transportation resources. The study then provides additional insight into the extent of the potential primary service areas of each of the sewer options.

With primary service areas defined, the study then analyzes the availability of land for development (termed the "Primary Land Supply," defined on page 9) for each scenario, including how environmental constraints, such as floodplains, impact the potential availability of land. The result of this portion of the study identified close to 3,300 acres of land under the gravity sewer option and around 1,700 acres under the Barnwell option. The study then provides insight into the current regulatory environment and plans affecting growth in the area. This portion of the study translates current zoning into theoretical maximum development capacities for the Primary Land Supply – which found a regulatory capacity of around 16,000 dwelling units under the gravity sewer option, and 6,000 under the Barnwell option.

The analysis then examines past and projected growth trends to develop potential growth scenarios, including the number of dwelling units and acreage needed to accommodate growth in the basin between 2020 and 2040. Based on growth statistics and projections, it was estimated (based on market capture) that the basin could see demand for between 1,340 and 2,240 new dwelling units between 2020 and 2040. The associated analysis of demand for land found that both options should easily accommodate expected growth, even if the area's share of the overall new housing market increased to nearly double its historic market capture rate.

The next two sections of the analysis examine revenue generation potential based on observations of the area, and identify the potential to serve existing dwellings under each of the options. The study ends with a summary of the primary conclusions that were revealed in the course of the overall analysis.

# 1. Introduction

The following analysis was prepared to examine the growth potential and outcomes associated with different options for extending sewer service into the Edneyville community of Henderson County, which is located in the east-central portion of the county. The primary reason that the extension of sewer into this area is being considered by the county is the need to provide sewer service to the soon-to-be constructed replacement Edneyville Elementary School, which is situated in the heart of the Edneyville Community.

During the consideration of this project, it was determined that other opportunities could arise in conjunction with the proposed sewer extension, depending on the specific method that is chosen to provide sewer to the school. The primary options under consideration are:

1. Serving the school with a pump station and force main to the City of Hendersonville's system.
2. Serving the school with a gravity sewer system that would extend from the school along the lower Clear Creek Basin to the City of Hendersonville's system.
3. Serving the school with a combination of gravity sewer and pump stations in a system that would run primarily along US Highway 64 (known as the "Barnwell Option")

By extending sewer service to the school, the opportunity also presents itself to eliminate the existing package sewer plant that serves the NC Justice Academy. This option is being considered in several configurations as well, and could be achieved by either:

1. Serving the Justice Academy with a pump station that would be tied into a pressure sewer system serving the school.
2. Serving the Justice Academy with a pump station that would be tied into a gravity line serving the school.
3. Serving the Justice Academy with gravity sewer that would tie in to a gravity line serving the school.
4. Extending the system of combined gravity sewer and pump stations past the school and along US 64 to the Justice Academy.

In addition to providing sewer service to these two institutional uses, the extension of sewer into the Edneyville community could also bring about opportunities for the elimination of other existing small package sewer plants, provide options for businesses

and residences that are reaching the capacity or useful life of their onsite wastewater disposal systems, spur housing growth, and facilitate economic development.

With these opportunities in mind, the County Commissioners requested that a more thorough analysis of these options be prepared so that the impacts and opportunities of each of the options could be quantified and incorporated into the decision-making process. This report provides insight into the existing conditions in the Clear Creek Basin and an analysis of how each of the primary scenarios would influence growth and development in the area served by the sewer extension. This includes analyses of current land use and development patterns, the availability of land for development, the regulatory environment, the influence of adopted plans, and transportation issues. This report also provides insight into the potential growth scenarios associated with each major option, and a high-level overview of the fiscal impacts of the different outcomes.

# 2. Overview of the Clear Creek Basin

The Clear Creek basin (shown in Figure 1) occupies the east-central portion of Henderson County. The western portion of the basin lies along Interstate 26. This area is urban to suburban in nature, with the southwestern reaches of the basin being inside of the corporate limits of the City of Hendersonville. US Highway 64 is the primary east-west route through the area. The highway is a major thoroughfare and has an interchange with I-26 in Hendersonville. Clear Creek and US Highway 64 follow a nearly parallel path as they rise into the mountains that lie at the eastern end of the basin.

The development patterns and the highway become suburban and then quickly rural the further you travel east away from I-26 into the higher elevations of the basin. The lowland portions of the basin tend to be occupied by crop and pasture lands, while apple orchards occupy a fairly significant portion of the middle elevations in the valley. Once into the highlands, forested lands dominate the landscape.

Figure 2 provides an overview of the land cover patterns in the basin, along with an overlay of the location of the potential gravity-only sewer service option in order to provide additional context about the nature of the area that would be served by the most impactful of the sewer service options. This information was derived from the 2016 USDA land cover dataset and generalized into 4 classes – urban land, forests, crop / pasture land, and orchards – in order to provide a clear picture of the existing landscape in the basin. Given the importance of the apple industry to the community, an additional map was prepared (Figure 3), which provides an overview of just the land that is in use for orchards in the context of the gravity-only sewer service option.

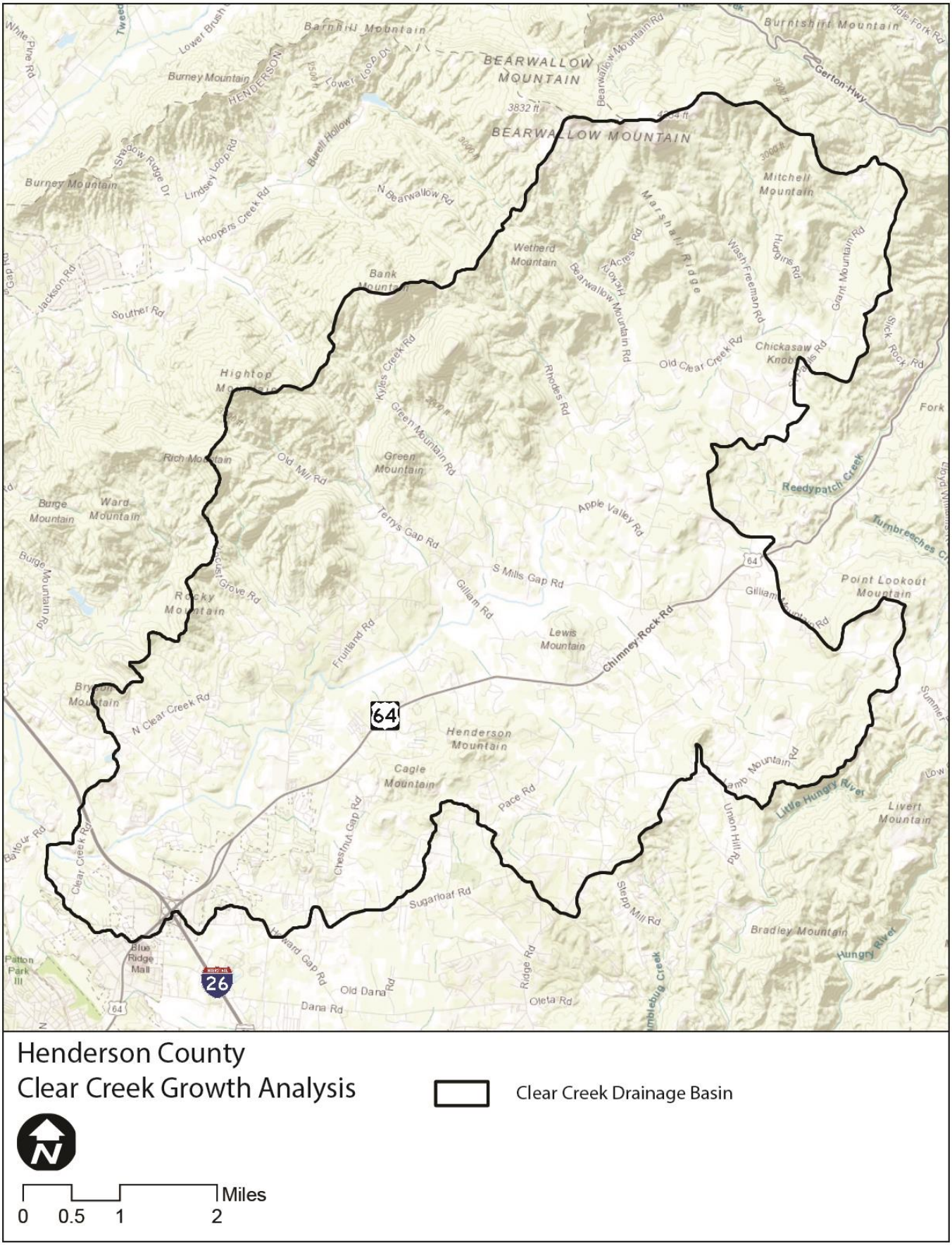


Figure 1: Clear Creek Drainage Basin

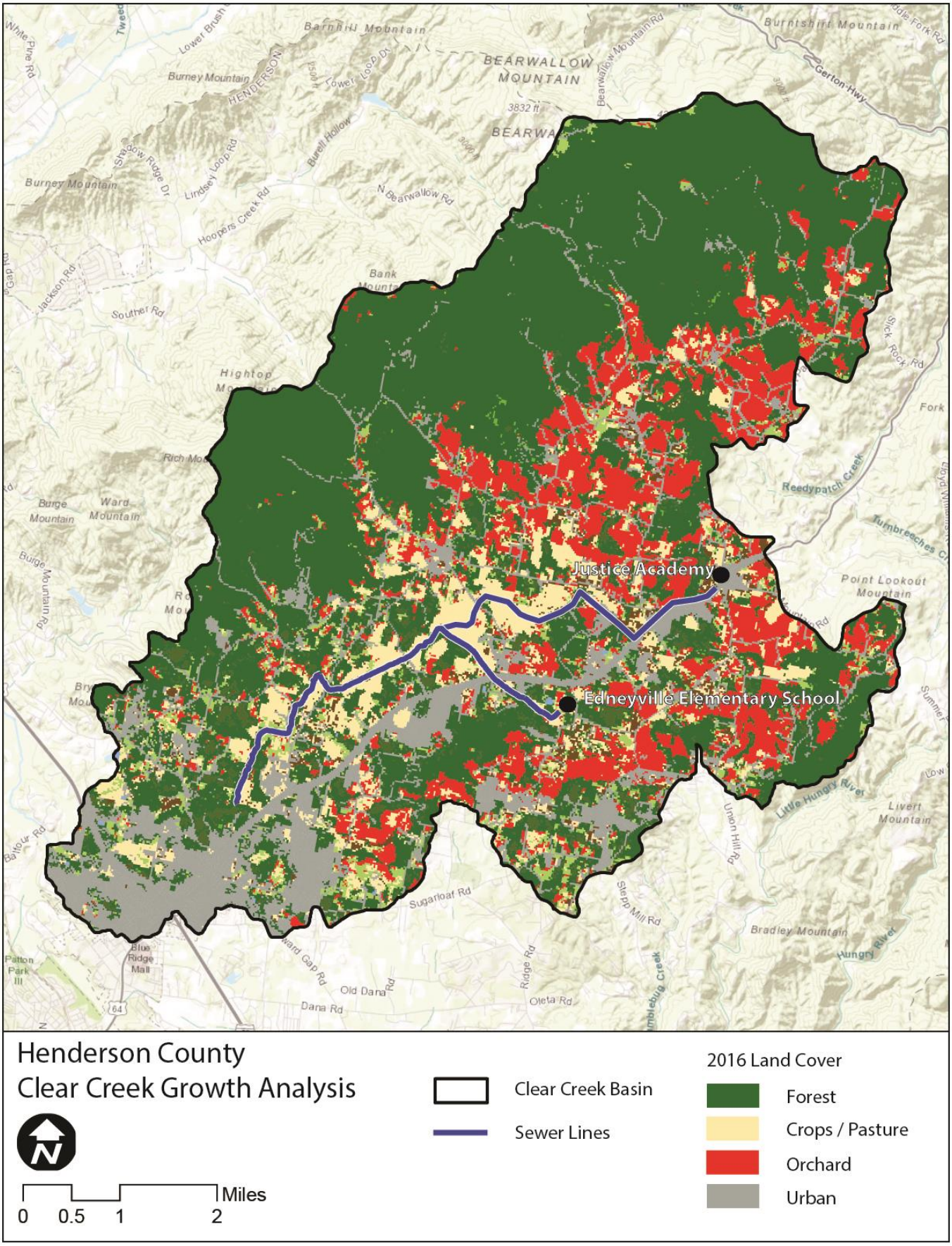


Figure 2: 2016 Land Cover (Generalized) with Gravity Sewer Option Overlay

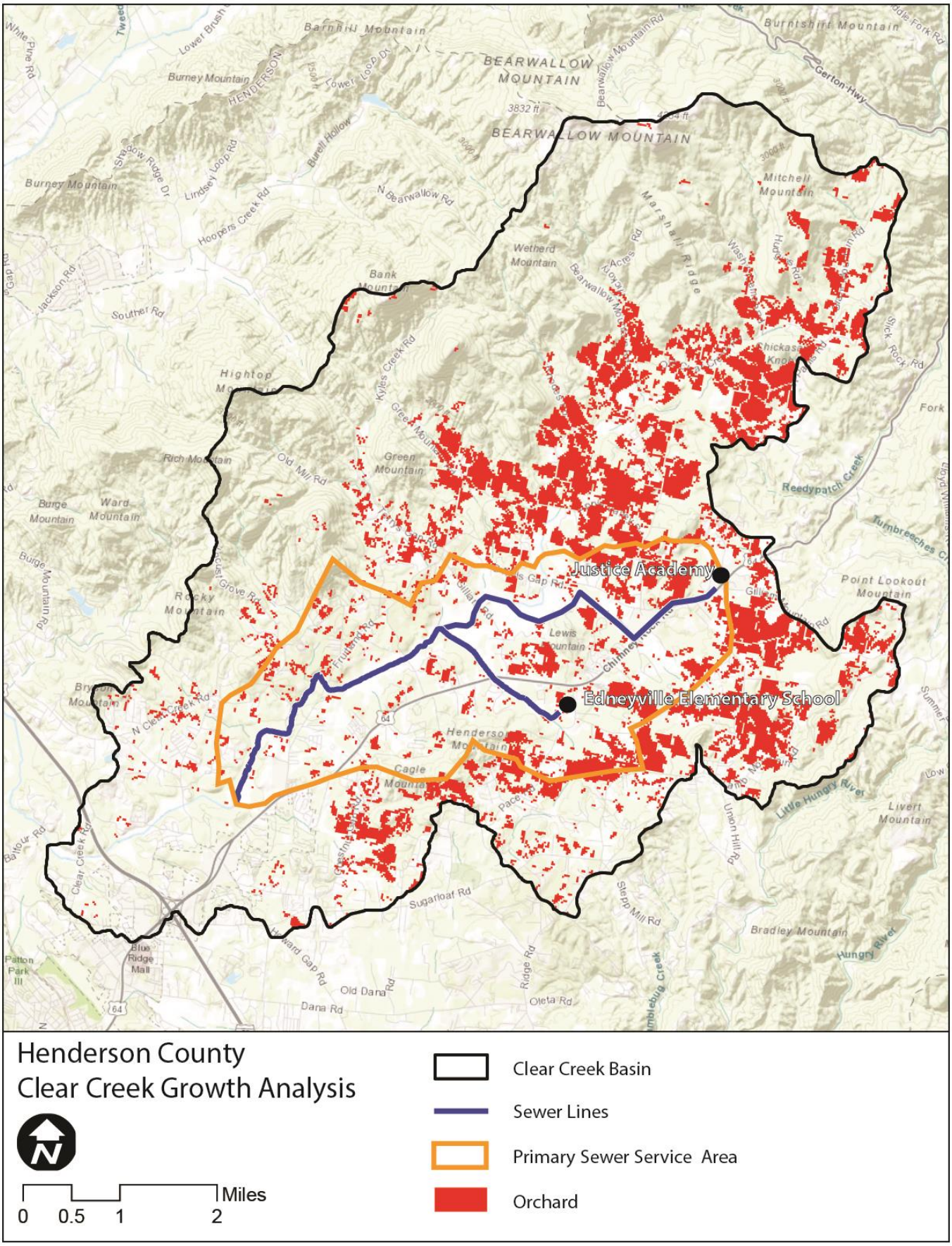


Figure 3: Orchard Locations with Gravity Sewer Option Overlay

As discussed previously, the land cover data in Figure 2 shows the decreasing degree of urbanization and the transition to a rural landscape over a fairly short distance from Interstate 26 and the City of Hendersonville. Although generally rural in nature, the basin has experienced a fairly significant degree of land subdivision activity, and accompanying residential development. While fairly well dispersed throughout the basin, and generally more dense in areas that are close to Hendersonville, there are a number of pockets of development that are more suburban than rural in nature found in the area, particularly along, and in close proximity to the main roads (US 64, Fruitland Rd., Clear Creek Rd.) that traverse the area. In addition, there are several dispersed areas of relatively dense development that have occurred in the higher elevations of the basin. The land subdivision pattern in the basin – displayed from the perspective of parcel density, is shown in Figure 4.

The majority of the homes and businesses in the basin are served by onsite wastewater systems. In reviewing the soil survey data for the county that is published by the Natural Resources Conservation Service, it was found that the overwhelming majority of the soils in the basin were of a type that are classified as having "severe" limitations for onsite wastewater disposal. While this does not, and has not, preclude the ability to use such a system, it does make it more difficult in the long run to maintain onsite systems and for smaller parcels, especially those developed prior to more stringent environmental health standards being enacted, could make them unusable over the long-term if sufficient repair area is not available. Where soil conditions or the intensity of a particular development has made on-site wastewater disposal infeasible, small package plants have been used to facilitate wastewater disposal. A small portion of the lower (western) end of the basin is served by the City of Hendersonville's municipal sewer system, which primarily serves customers inside of the city limits. The proposed options for extending sewer into the Clear Creek basin would all join in to the City's system on Clear Creek just north of the I-26 / US 64 interchange

The primary transportation route serving the area is US Highway 64. From its interchange with I-26, the highway runs northeastward through the central portion of the basin, first as a five-lane undivided highway, and then tapering to a relatively narrow two-lane cross section just east of North Henderson High School / Fruitland Rd. NCDOT planning guidelines measure the Level of Service (LOS) of roadways on a scale of A to F, with a D rating equating to "poor" function of the roadway. When a roadway reaches Level E, it is at full capacity, and considered to have "extremely poor" function. Relative to maintaining a "D" Level of Service, US 64 is currently at approximately 86% of capacity between Howard Gap Road and Prestwood Lane. Between Prestwood Lane and Gilliam Road, it is at approximately 73% of its capacity, and from Gilliam Road to St. Pauls Road it is at approximately 57% of capacity (see Figure 5). In reviewing the French Broad MPO's 2040 Metropolitan Transportation Plan, there were no projects identified through the horizon year of the plan (2040) to improve US 64, or any of the other main roads serving the area.

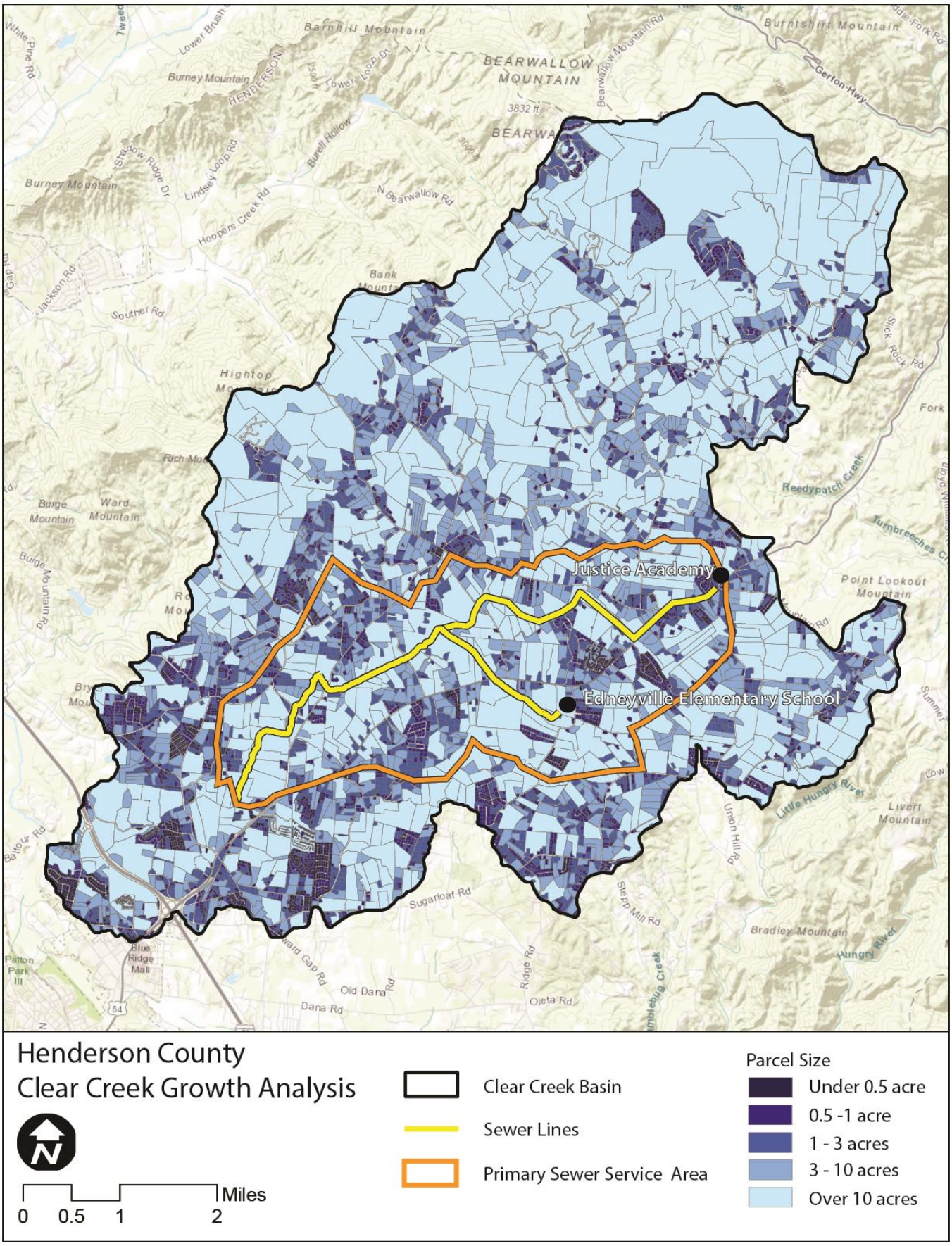


Figure 4: Existing Land Subdivision Pattern with Gravity Sewer Option Overlay

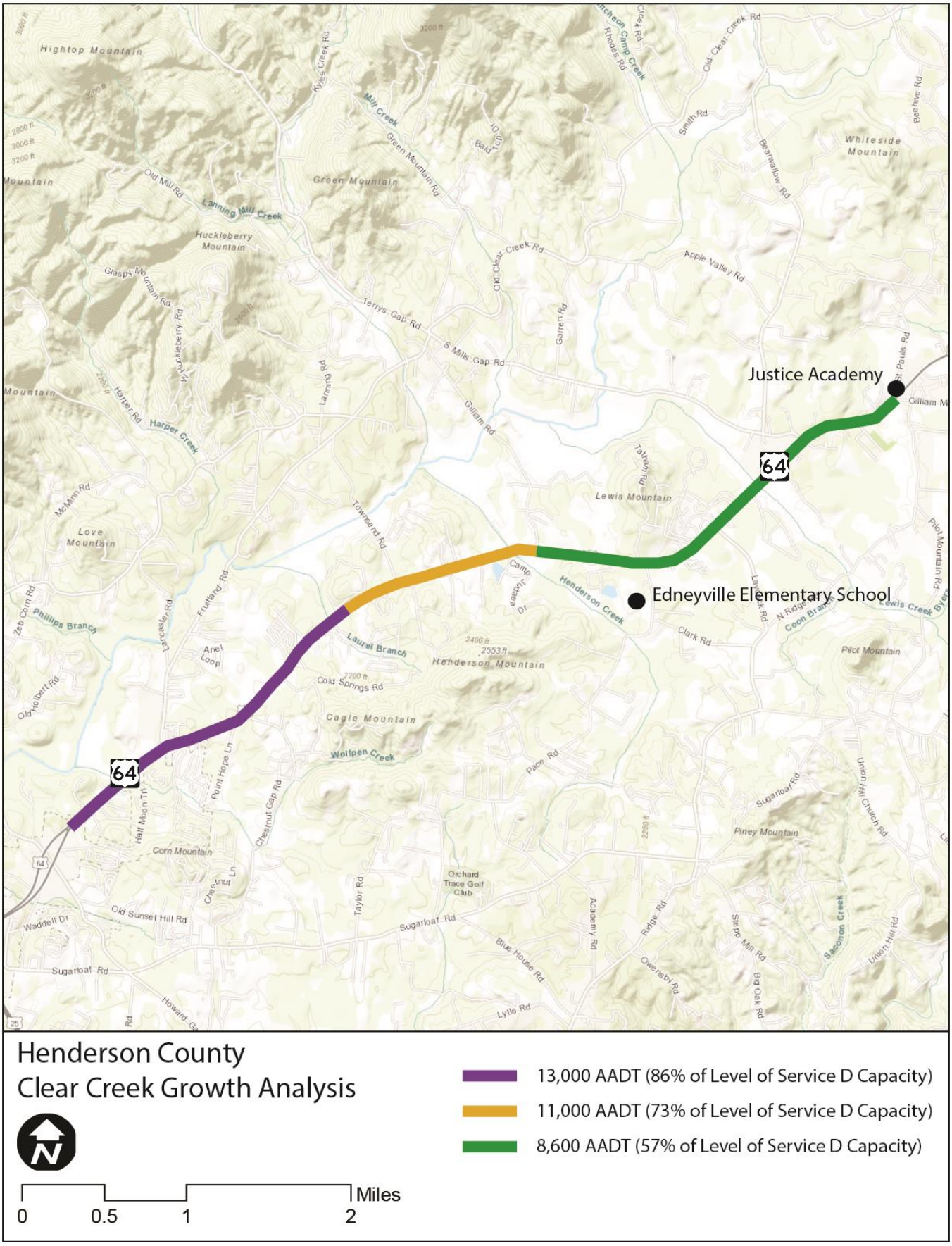


Figure 5: US 64 Average Daily Traffic Volume and Level of Service Capacity

# 3. Sewer Expansion Scenarios

As discussed in the introduction of the report, there are a number of different options for extending sewer into the Clear Creek basin. Since it was determined early in the analysis that the options that rely only on pressure sewer systems (pump stations and force mains with extremely limited ability for other users to tie into the system) would have little to no impact on growth or development trends in the study area, this section focuses on the scenarios that would provide gravity sewer service in the basin. This leaves two primary options to consider: extending gravity sewer along Clear Creek (including gravity sewer to the Justice Academy) and using a combination of gravity sewer and pump stations, primarily along US 64, to serve the school and the Justice Academy (the Barnwell Option).

Under the gravity sewer option, which would extend sewer primarily along Clear Creek, the extension to the school would provide relatively feasible access to gravity sewer service to an area containing a total of approximately 4,050 acres of land (6.3 square miles). If the option to extend gravity sewer all the way to the Justice Academy were chosen, this would add another 2,100 acres, for a total of approximately 6,150 acres, or just under 10 square miles of area with feasible access to sewer without the use of pump stations. It should be noted that while this would provide "access" there would be significant investments needed in the installation of collection lines to the main outfall to actually serve the majority of the area, with the main sewer line making this possible. See Figures 6 and 7 for the approximate locations of the lines and their general gravity sewer service areas (these are generally constrained to within 0.5 – 1 mile of the system, depending on topography).

The second option (Barnwell Option), with its combination of gravity sewer and pump stations / force mains, primarily along US 64, would serve both the school and the Justice Academy as well. The location of the system's lines, relative to the topography and drainage ways in the basin, however, would serve only 2,300 acres on gravity sewer – primarily on the south / east side of US 64. Although properties on the north / west side of the highway would be in very close proximity to the sewer, access to the system by means of gravity sewer may be infeasible in many cases (depending on the depth that it is installed), thus necessitating the installation of additional pump stations to expand its service potential. Figure 8 shows the general location of this option and its general gravity sewer service area (generally constrained to within 0.5 – 1 mile of the system, depending on topography).

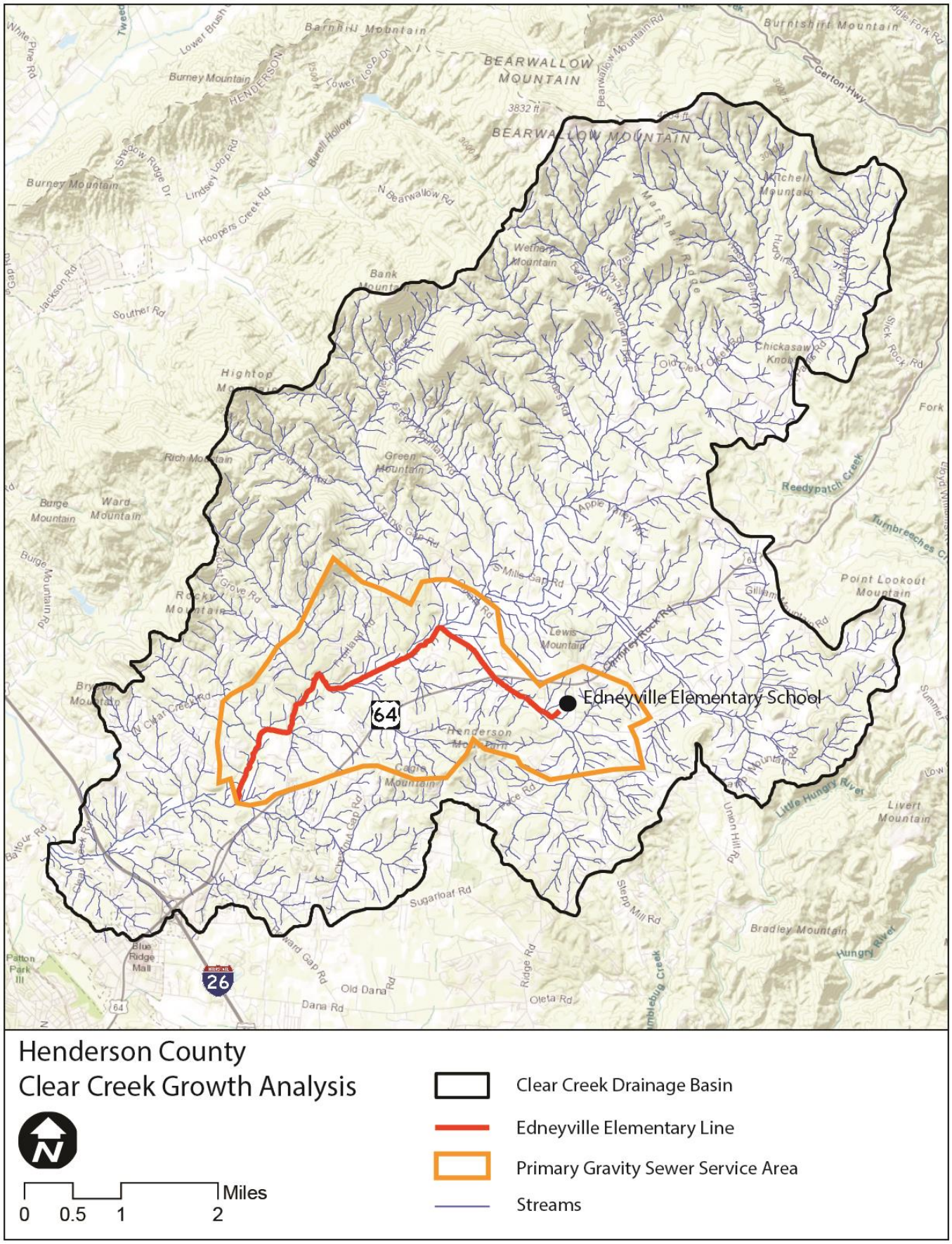


Figure 6: Edneyville Elementary Gravity Sewer Service Line and General Service Area

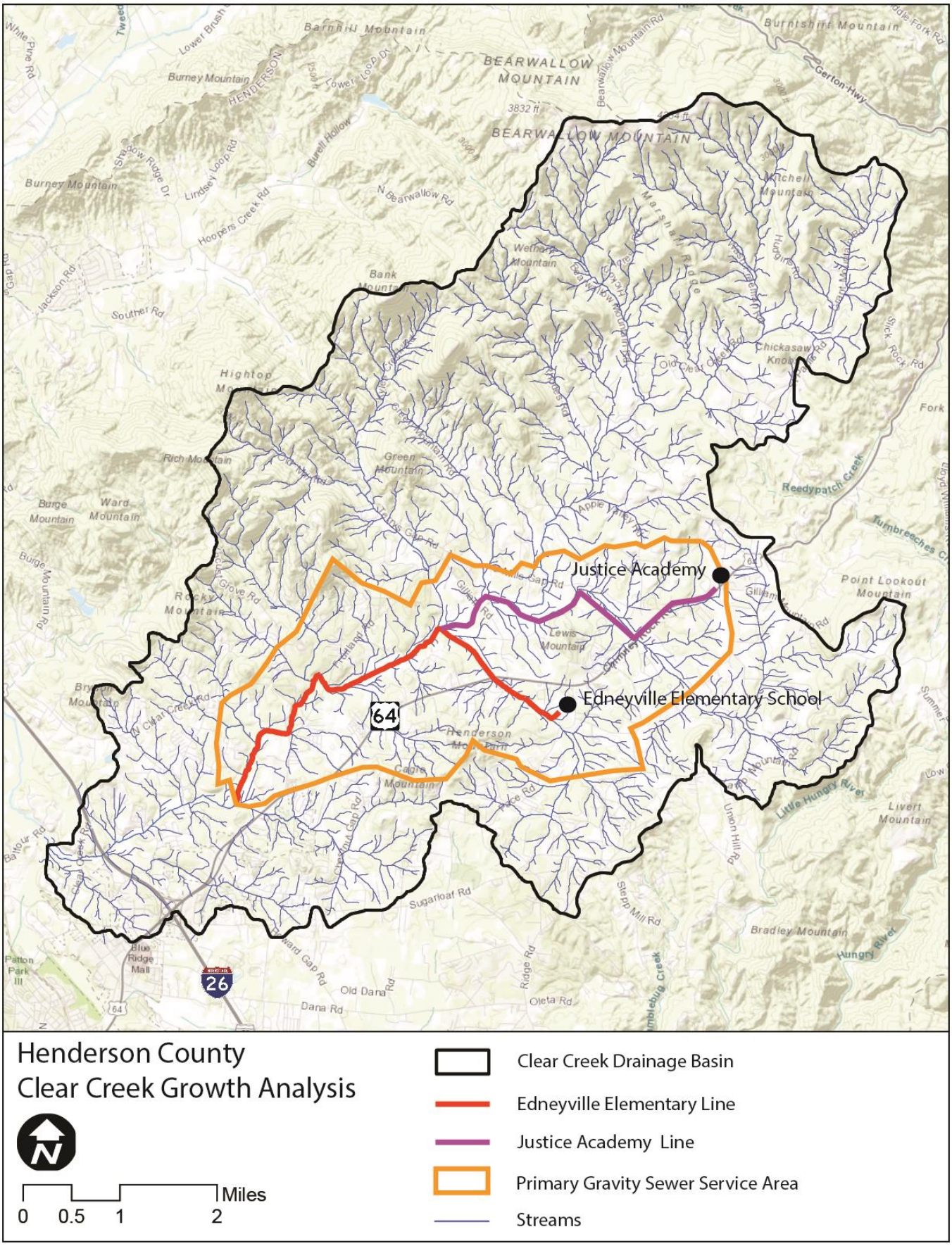


Figure 7: Combined Gravity Sewer Service Lines and General Service Area

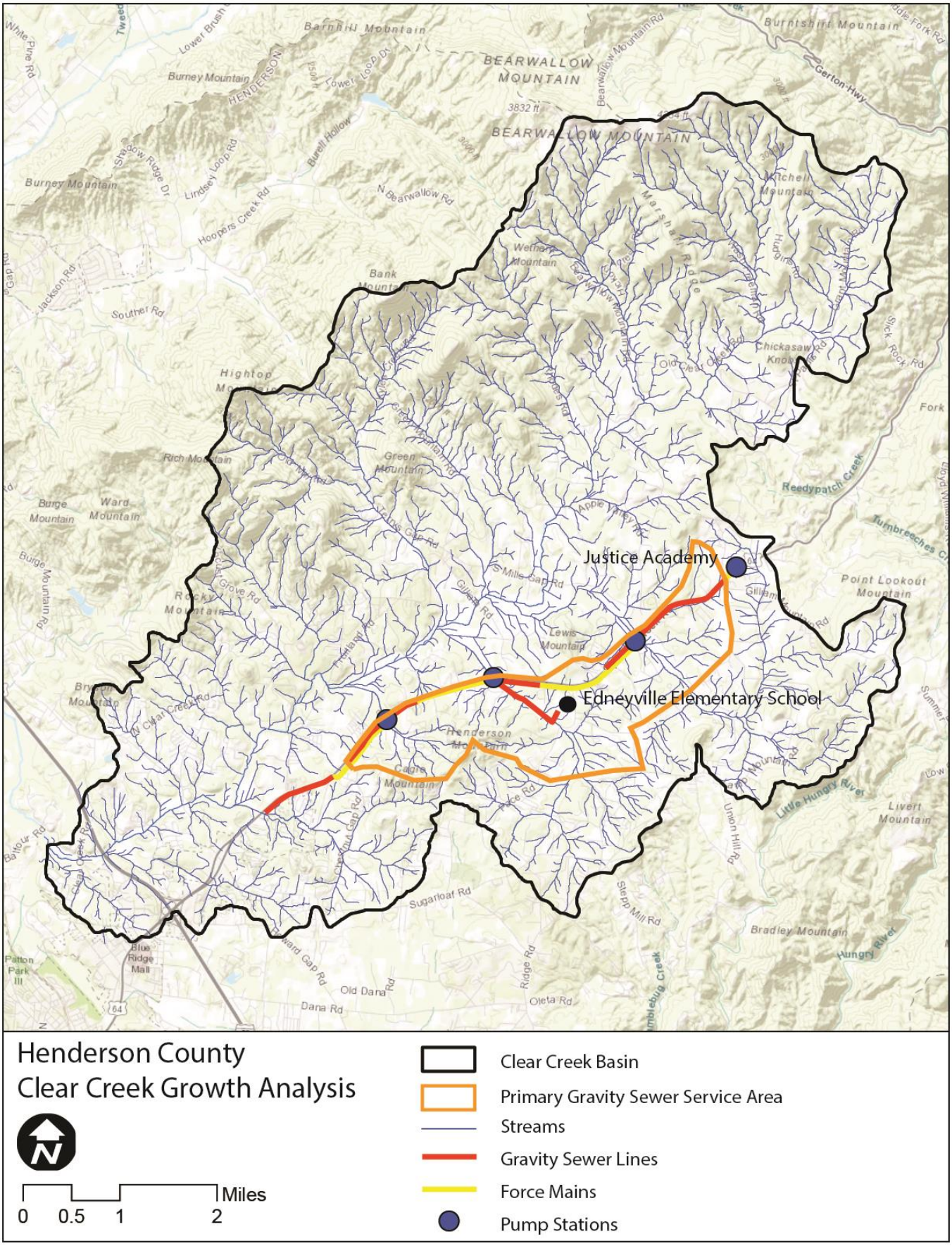


Figure 8: Barnwell Option System and General Gravity Sewer Service Area

# 4. Development Capacity

Of the factors that feed into the modeling of the potential growth scenarios, the availability of land for development is, perhaps, the most critical. For the purposes of this study, the Henderson County parcel data was analyzed to identify those tracts of land that comprise what we term the "Primary Land Supply." This is the subset of the parcels within the potential service area under each scenario which are determined to have the fewest inherent barriers to change – generally undeveloped or in use for agricultural purposes. To ensure that we are examining only those parcels with the greatest capacity for development (in this case residential development was used as the proxy for overall development potential), only those parcels that contain 10 or more acres of land area are included in the Primary Land Supply.

The results of the land supply analysis for the gravity sewer extension scenarios revealed a Primary Land Supply of approximately 2,010 acres for the portion of the line that would serve the school, and an additional 1,260 acres for the portion of the line that would extend from the school line to the Justice Academy, for a combined total Primary Land Supply of 3,270 acres (see Figures 9 and 10). The analysis of the Primary Land Supply for the Barnwell option system included both those land supply parcels that could be served on gravity sewer, as well as those parcels that were adjacent to gravity sewer, but would likely require additional pump stations to serve them. The analysis revealed that the Primary Land Supply for the gravity served portion of this option is approximately 1,100 acres, while the portion of the Primary Land Supply that would likely require additional pump stations is approximately 620 acres (see Figure 11). It should be noted that, depending on the configuration and timing of new development, the Primary Land Supply parcels that are not able to be served by gravity lines could require 10 (or more) new pump stations to facilitate sewer dependent development patterns.

While topography will be a general constraint on the overall supply of buildable land within the Primary Land Supply, the predominant environmental constraint that should be considered when assessing the overall availability of land in the study area is the potential for flooding. Figures 11 and 12 overlay the 100 year floodplain on the Primary Land Supply for each of the options. The analysis of the data indicates that approximately 365 acres of the Primary Land Supply for the line serving the school in the first option is subject to flooding, as well as approximately 200 acres in the land supply serving the Justice Academy. The Primary Land Supply for the Barnwell option is much less impacted due to the location of the system, with only 140 acres potentially impacted.

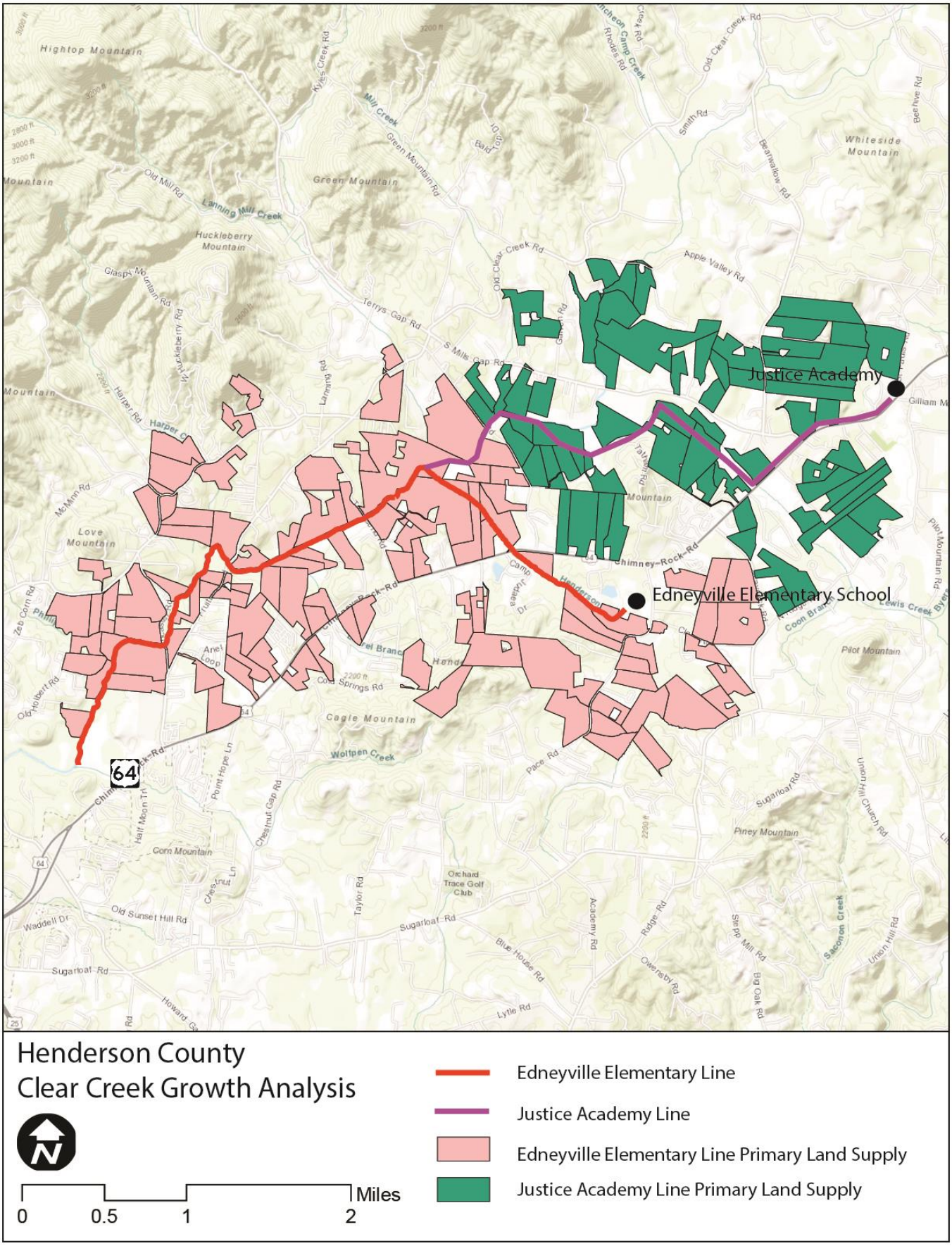


Figure 9: Gravity Sewer Option Primary Land Supply

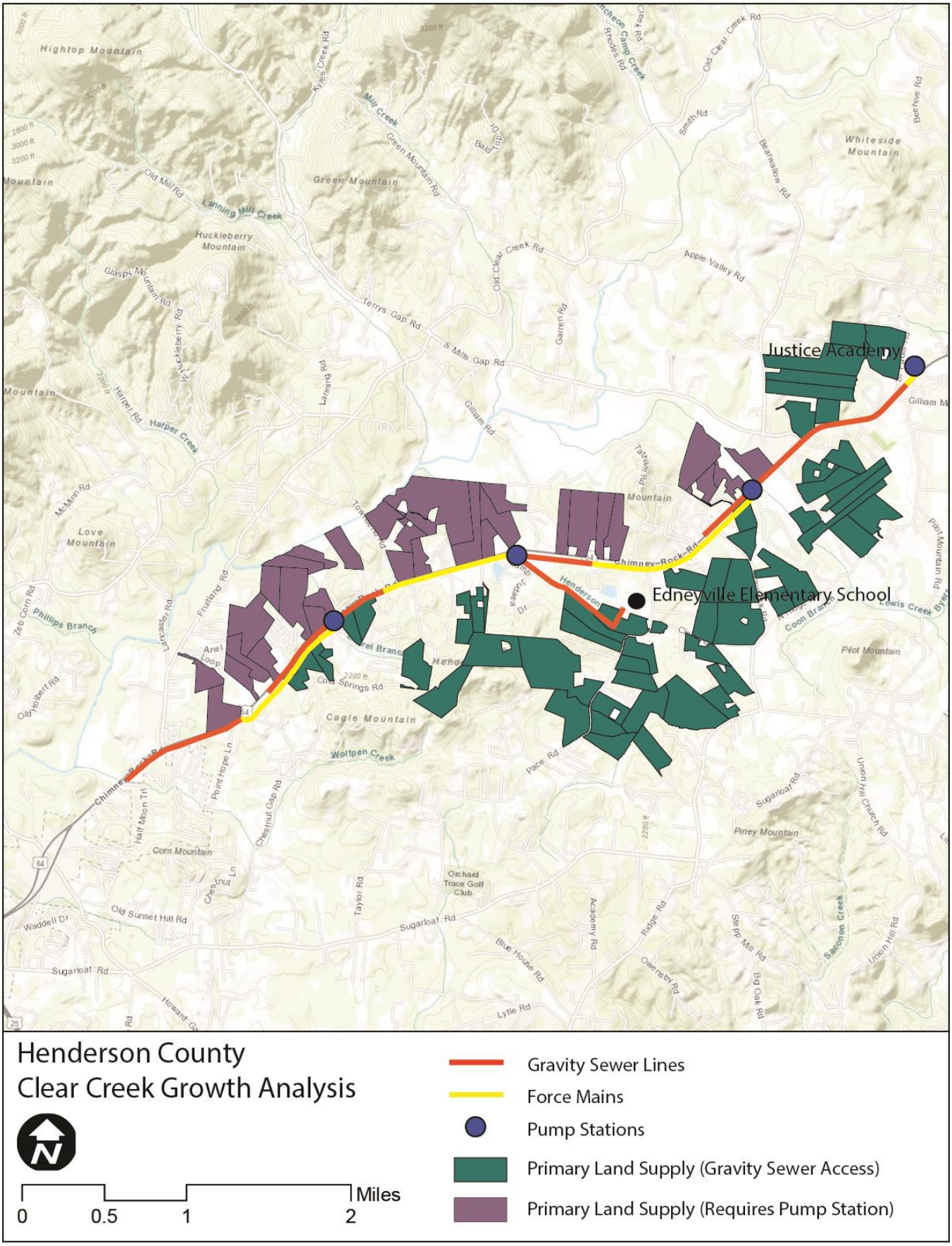


Figure 10: Barnwell Option Primary Land Supply

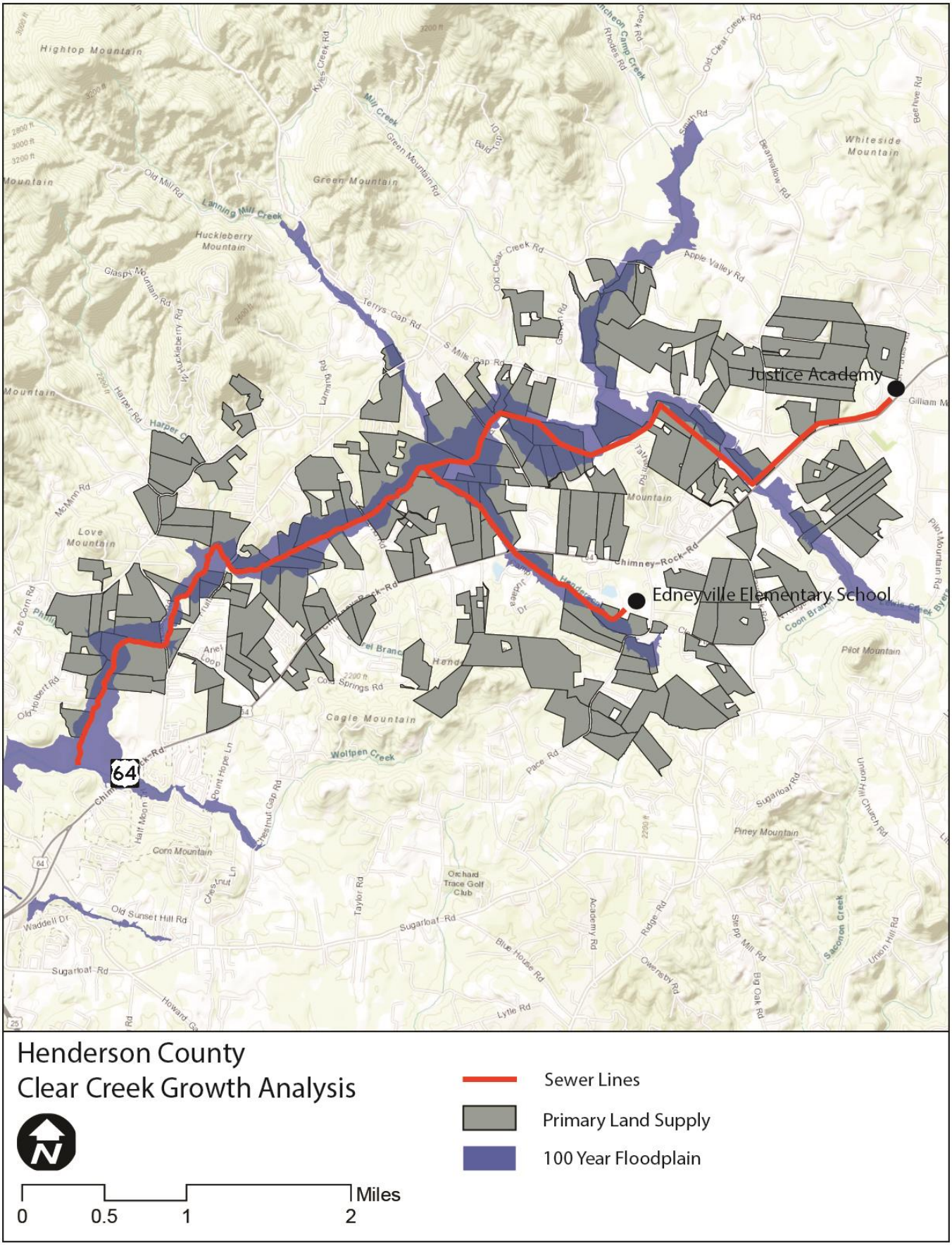


Figure 11: Gravity Option Primary Land Supply Floodplain Impacts

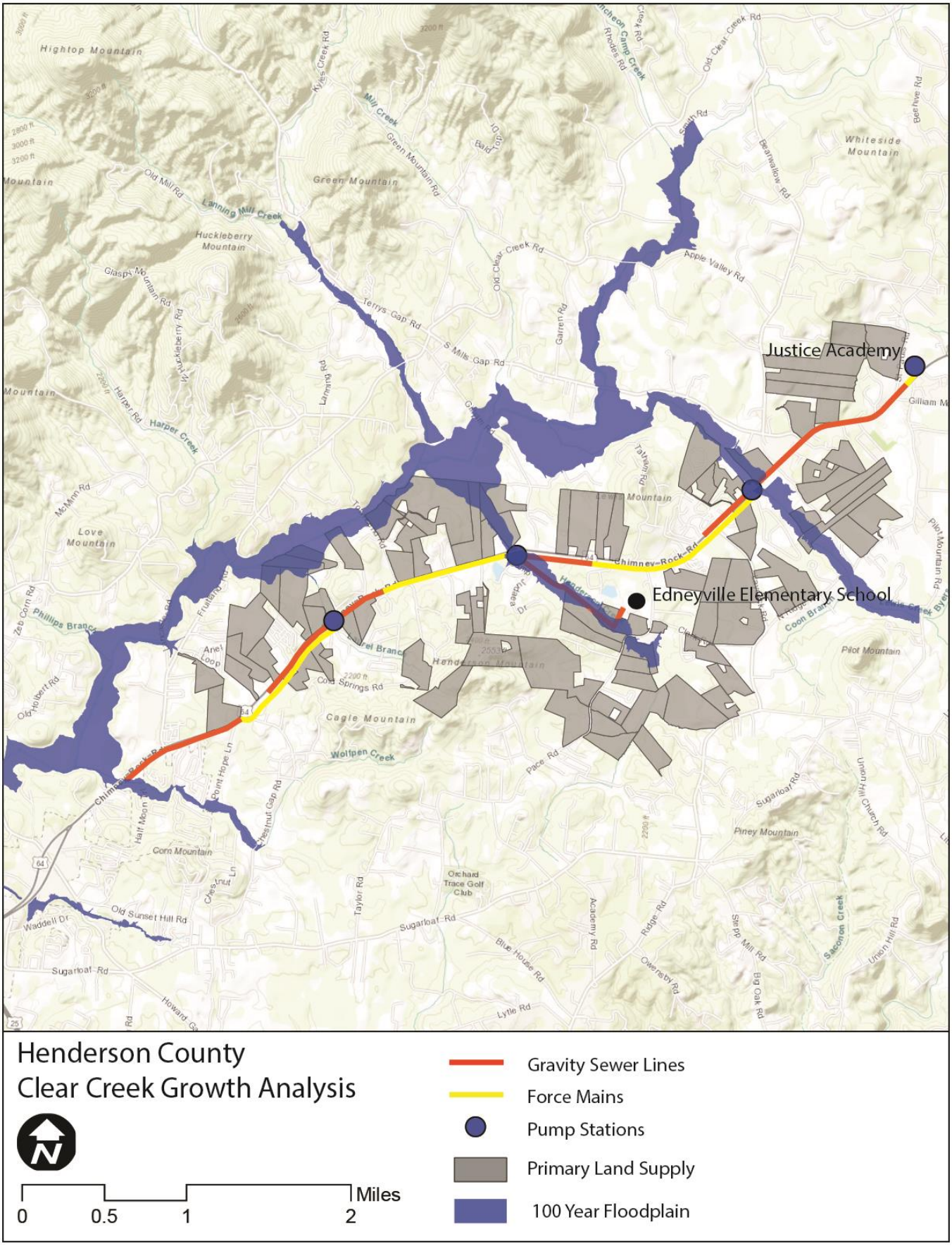


Figure 12: Barnwell Option Primary Land Supply Floodplain Impacts

# 5. Regulatory Capacity and Constraints

If sewer is available, the primary constraint to development is typically land use regulation. In this case, the entire area being analyzed is subject to the regulations that are within the Henderson County Land Development Code. The zoning classifications are in turn influenced by the adopted plans covering the area, including the Henderson County Comprehensive Plan and the Edneyville Community Plan. Perhaps the most influential factor in the assignment of zoning designations to the area has been the adopted growth management strategy map that is part of the Comprehensive Plan (see Figure 13, below).

The growth management strategy divides the county into an "Urban Service Area", a "Rural / Urban Transition Area", and "Rural / Agricultural Areas." The Urban Service area, where policies favor higher density development, does not occupy much of the basin, while the vast majority of it is within the Rural / Urban Transition Area, where policy states that density should be limited to no more than 2 dwelling units per acre.

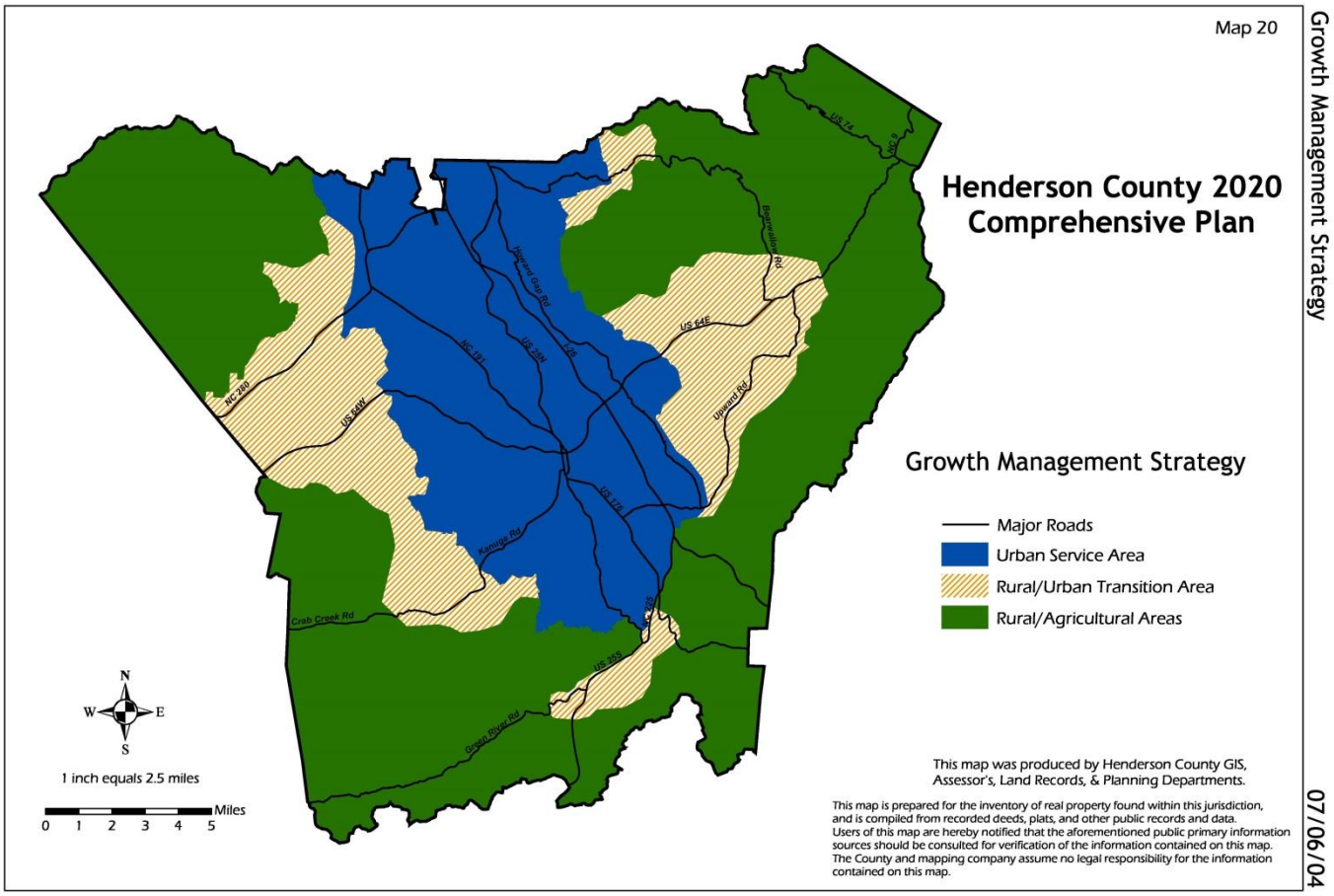


Figure 13: Henderson County Growth Management Strategy Map

The application of zoning within the basin has closely followed the growth management strategy, with the vast majority of the area zoned R2R, which limits development to 1-2 dwelling units per acre, depending on access to water and sewer services. Only those areas that are within the Urban Services area, or are within an area zoned LC, currently permit residential development at a density that is typically considered feasible to provide sewer service (including line extensions), which is generally 4 dwelling units per acre. Policy statements in the Comprehensive Plan indicate that as utility services are extended, the growth management strategy should be reviewed to ensure that it is consistent with development capacity. This, in turn, may influence future zoning decisions in the portion of the basin that is served by sewer if the growth strategy map is updated.

Figures 14 and 15 detail the currently assigned zoning districts that regulate the development of the parcels that comprise the Primary Land Supply. Within the gravity sewer service area associated with the line serving the school, the zoning has been applied to the Primary Land Supply as follows:

- R1: 287 acres
- R2R: 1,255 acres
- R3: 50 acres
- LC 417 acres

The Primary Land Supply in the extended gravity sewer service area serving the Justice Academy is currently zoned as follows:

- R2R: 1,206 acres
- LC: 43 acres
- CC: 11 acres

The Primary Land Supply associated with the Barnwell sewer service option is currently zoned as follows:

- R1: 37 acres
- R2R: 1,494 acres
- LC: 179 acres
- CC 12 acres

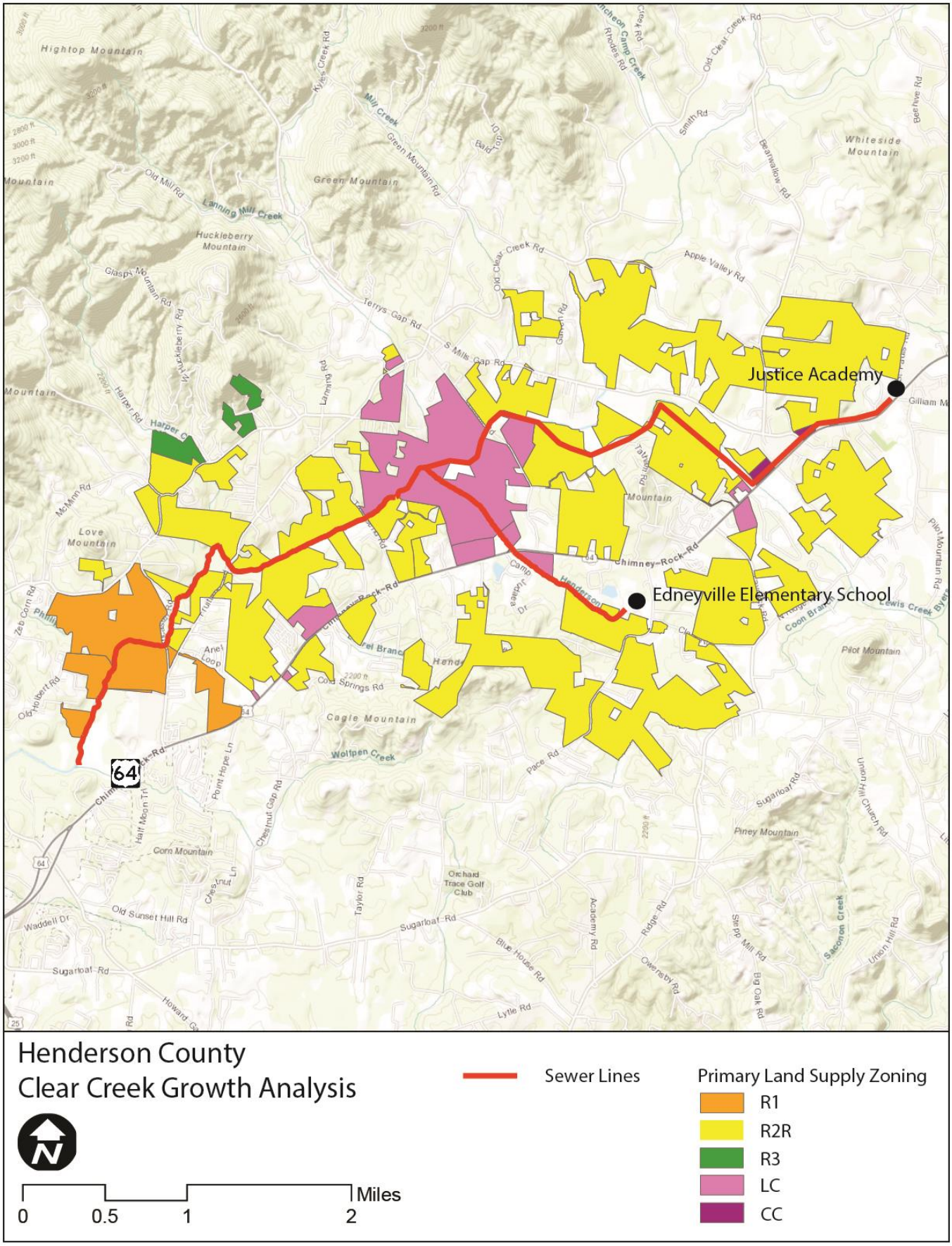


Figure 14: Gravity Sewer Option Current Zoning

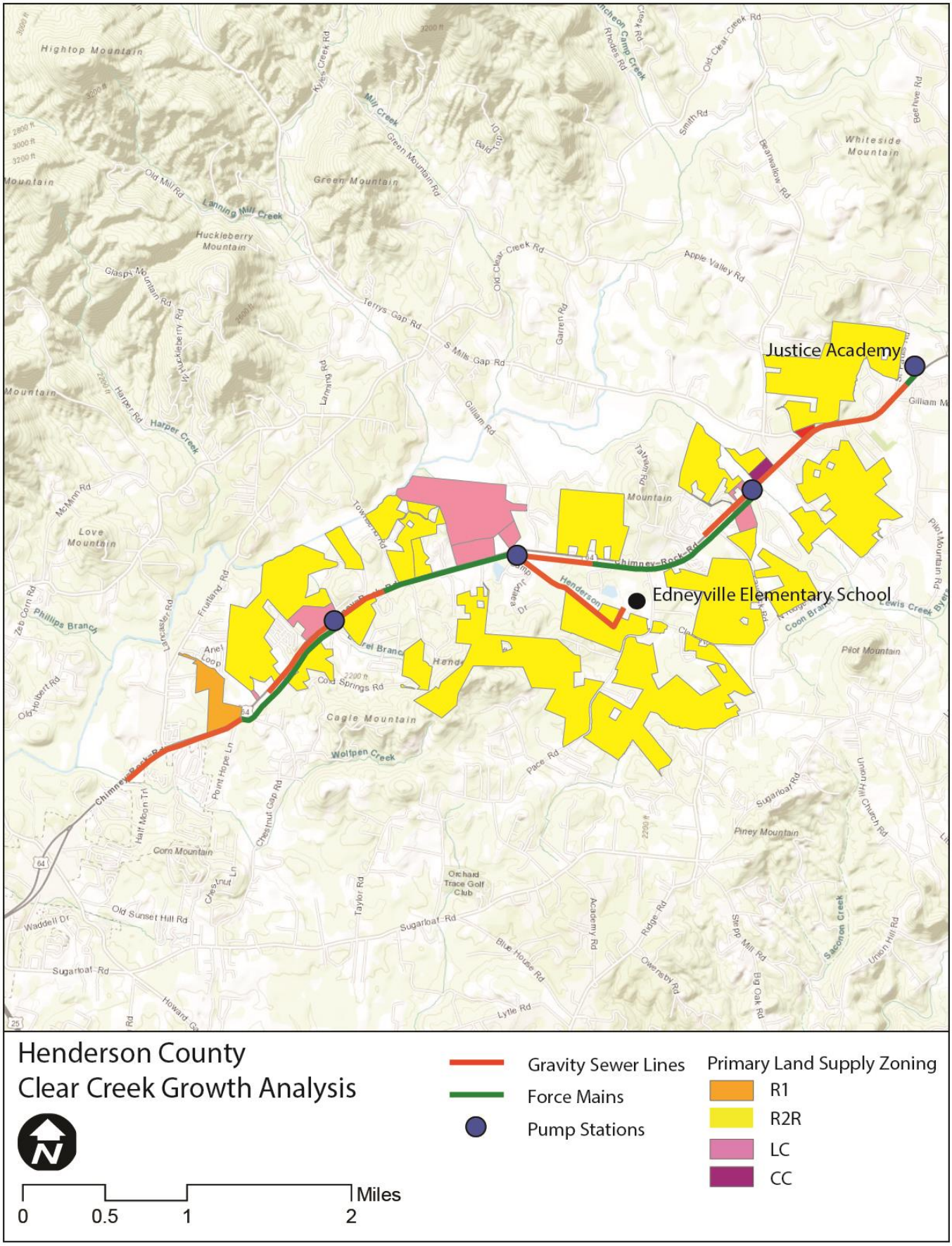


Figure 15: Barnwell Option Current Zoning

The current regulations of the LDC permit single family residential development within the districts applied within the study area in the following quantities (with sewer service available):

- R1: 8 dwelling units per acre[1]
- R2R: 2 dwelling units per acre
- R3: 0.66 dwelling units per acre
- LC: 4 dwelling units per acre[1]
- CC: not permitted[1]

*[1]The R1, LC and CC districts each allow up to 16 multi-family dwelling units per acre to be developed where public utilities are available.*

Based on the current zoning designations and the assumption that the area will be served by sewer, the Primary Land Supply for each of the areas could yield the following theoretical maximum number of single family dwelling units:

- **Gravity Sewer Option:** 9,091 Single Family Dwelling Units
    - School Line: 6,507 Single Family Dwelling Units
    - Justice Academy Line: 2,584 Single Family Dwelling Units

- **Barnwell Option:** 4,000 Single Family Dwelling Units

Factoring in the permitted multi-family residential development density that is allowed in the R1, LC and CC districts, the theoretical maximum yields increase significantly, as shown below:

- **Gravity Sewer Option:** 16,907 Total Dwelling Units
    - School Line: 13,807 Total Dwelling Units
        - 2,543 Single Family Dwelling Units
        - 11,264 Multi-Family Dwelling Units
    - Justice Academy Line: 3,100 Total Dwelling Units
        - 2,412 Single Family Dwelling Units
        - 688 Multi-Family Dwelling Units

- **Barnwell Option:** 6,044 Total Dwelling Units
        - 2,988 Single Family Dwelling Units
        - 3,056 Multi-Family Dwelling Units

It should be noted that these theoretical maximum yields are being provided only for the purpose of demonstrating the potential outcome of the current regulatory environment within the areas that may be served by sewer – it is not intended as a prediction of the final yields of any particular parcel or development.

With regard to commercial development opportunities within the potential sewer service areas, the Future Land Use Map in the Comprehensive Plan designates several "Community Service Centers" in the vicinity of the areas that would gain service under either of the two options. While predicting the nature and extent of such development is not part of this study, it would be reasonable to conclude that such areas would benefit from the growth in market potential associated with new residents, and would likely experience significant growth pressure from new convenience retail and service businesses looking to expand into the area and serve the growing population. A map detailing the location of the designated Community Service Centers within the Clear Creek basin and the location of property zoned for commercial use that falls within the extent of the gravity sewer service area is shown in Figure 16. The distribution of the acreage of the commercially zoned properties is shown below:

**Existing Commercial Zoning:**

- CC: 49 acres
- LC: 629 acres
- O&I: 35 acres

Of further note is the potential for industrial development within the study area. While none of the land within the Primary Land Supply is currently zoned with an industrial designation, the adopted Edneyville Community Plan does identify an area, along Clear Creek, that it designates for future industrial use (see Figure 17). Although this area has some environmental constraints (flood hazard), there is a significant amount of land that may be potentially available for development. The land in this area is currently primarily zoned for commercial use (LC zoning district), but is for the most part still undeveloped. This area would have immediate access to sewer if the gravity option is selected, but other constraints may limit the amount of interest that it receives from industrial developers, especially given its relative distance to I-26 and the lack of immediate access to a four-lane highway. Not that this would remove this area from consideration for industrial development, but it would most likely attract a niche manufacturer who valued the rural setting over other factors.

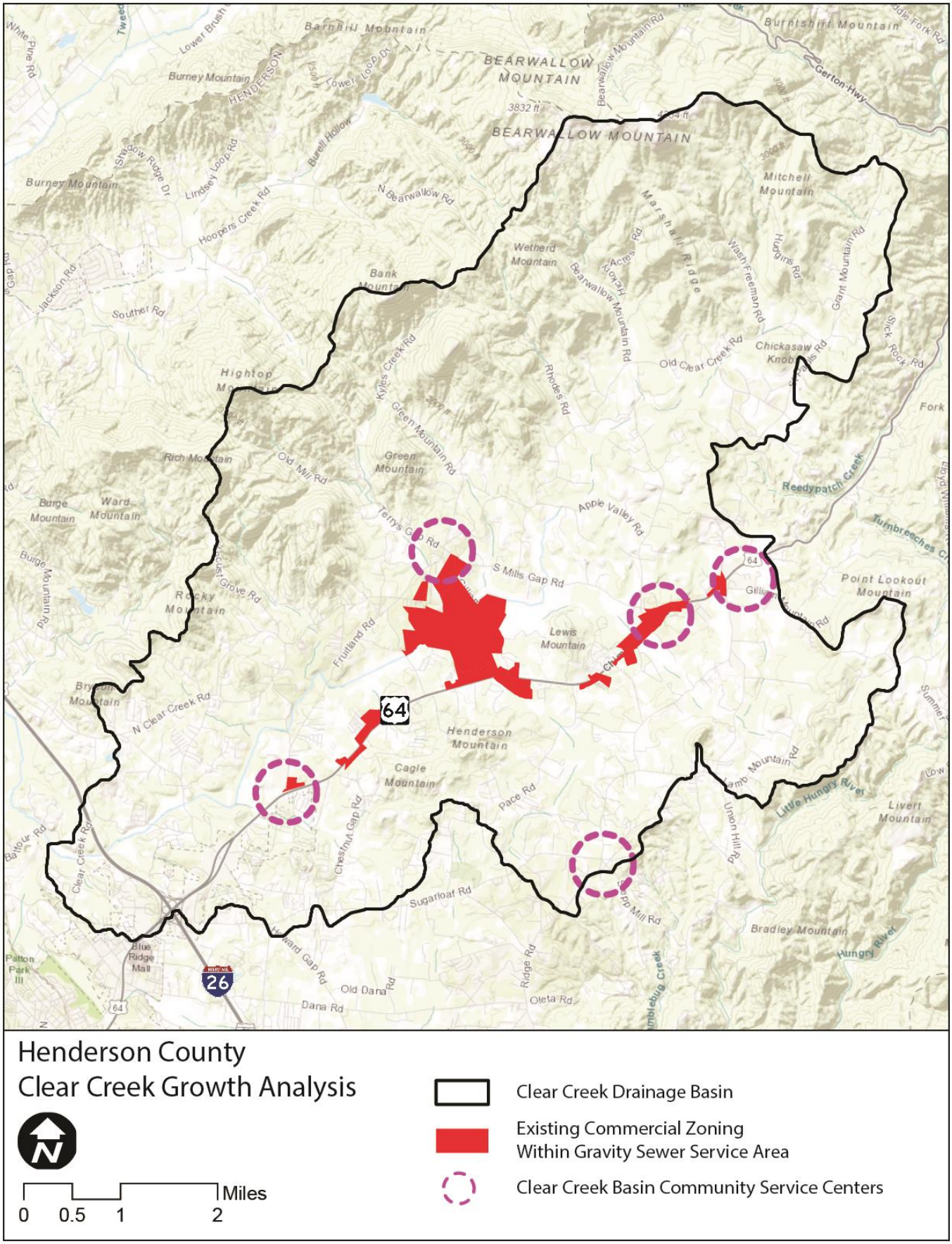


Figure 16: Clear Creek Basin Community Service Centers and Commercial Zoning

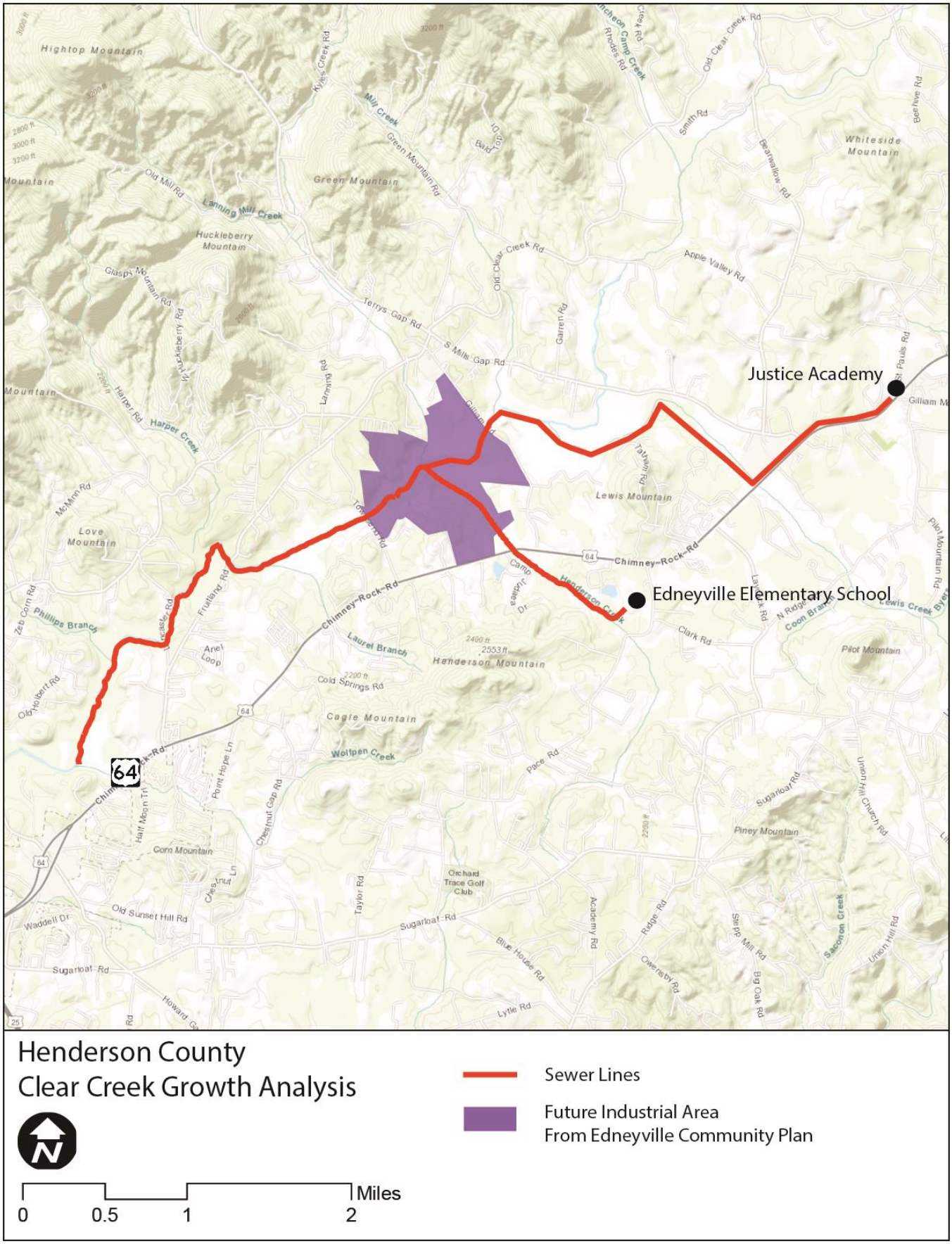


Figure 17: Edneyville Community Plan Industrial area Designation with Gravity Sewer Overlay

# 6. Potential Growth Scenarios

Having identified the service areas, land supply, and regulatory constraints, the next phase of the study analyzed demographic and housing trends to finalize the potential growth scenarios that could evolve. In addition to the previously discussed inputs, this phase incorporates past building activity data, population projections from the Office of State Management and Budget, and US Census Bureau data regarding the composition of the housing stock and the size of households.

Some of the key assumptions and inputs into this part of the analysis were:

- Average Household Size: 2.3
- OSBM Population Projections for Henderson County:
    - 2020 – 2030: + 13,500
    - 2030 – 2040: +7,100
- Detached Dwellings Share of Housing Stock: 84%

Data obtained from Henderson County indicated that since the year 2000, the Clear Creek basin has typically accounted for around 13% of all new detached dwellings built in the county. Based on this, two scenarios were reviewed – one which keeps this rate relatively steady and in line with the most recent years (15% rate), and one which assumes that the expansion of sewer provides a significant boost in the share of homebuilding activity directed toward this area. The previously mentioned inputs were combined in a simple model to then estimate the amount of land necessary to accommodate growth pressure under each growth rate. The results of the first analysis were then expanded to include potential demand for multi-family dwellings as well to present a full picture of the basin's overall growth potential.

The results of the demand analysis indicated that at the following market capture rates the demand for new detached dwellings in the study area would be:

- 15% Market Capture Rate:
    - 2020 – 2030: 74 detached dwellings per year
    - 2030 – 2040: 39 detached dwellings per year
    - **TOTAL: 1,130 detached dwellings**

- 25% Market Capture Rate:
    - 2020 – 2030: 123 detached dwellings per year
    - 2030 – 2040: 65 detached dwellings per year
    - **TOTAL: 1,880 detached dwellings**

This further translates into the following demand for land to accommodate growth under each scenario over the 20 year period between 2020 and 2040:

- 15% Market Capture Rate:
    - Land Needed at 2 du/acre (dwelling units / acre)
        - 2020 – 2030: 37 acres per year
        - 2030 – 2040: 19 acres per year
        - **TOTAL: 560 acres**
    - Land Needed at 4 du/acre
        - 2020 – 2030: 18 acres per year
        - 2030 – 2040: 10 acres per year
        - **TOTAL: 280 acres**

- 25% Market Capture Rate:
    - Land Needed at 2 du/acre
        - 2020 – 2030: 62 acres per year
        - 2030 – 2040: 32 acres per year
        - **TOTAL: 940 acres**
    - Land Needed at 4 du/acre
        - 2020 – 2030: 31 acres per year
        - 2030 – 2040: 16 acres per year
        - **TOTAL: 470 acres**

If the demand for multi-family housing (traditionally 14% of the county's housing stock) is added into the growth scenario estimates, the analysis indicates that the demand in the Clear Creek basin would be:

- 15% Market Capture Rate:
    - 2020 – 2030: 88 dwellings per year
    - 2030 – 2040: 46 dwellings per year
    - **TOTAL: 1,340 dwellings**

- 25% Market Capture Rate:
    - 2020 – 2030: 147 dwellings per year
    - 2030 – 2040: 77 dwellings per year
    - **TOTAL: 2,240 dwellings**

With multi-family housing included in the projections for the amount of land necessary to accommodate the growth potential, the dwelling unit per acre yield is adjusted

slightly upward to 5 dwelling units per acre, which translates into the following demand for land to meet population growth projections from 2020 to 2040:

- 15% Market Capture Rate:
    - Land Needed at 5 du/acre
        - 2020 – 2030: 18 acres per year
        - 2030 – 2040: 9 acres per year
        - **TOTAL: 270 acres**

- 25% Market Capture Rate:
    - Land Needed at 5 du/acre
        - 2020 – 2030: 29 acres per year
        - 2030 – 2040: 15 acres per year
        - **TOTAL: 440 acres**

Each of the options for providing sewer service to the Clear Creek basin identified more than a sufficient amount of land resources within the Primary Land Supply to accommodate demand if this area receives 25% of all new housing construction that is needed to provide for the most recent county population growth projections. As a point of comparison, it could be assumed that if an option is chosen that does not include gravity sewer, demand may stay the same, but due to the lack of sewer, the same growth would occur in a more dispersed manner since there is no particular reason to concentrate development in areas that have the most direct access to the sewer.

The lower densities associated with this potential scenario (which would probably exclude most multi-family development) would likely also mean more raw land being converted from open space or agricultural uses for development. Under the 15% market capture scenario (including the demand for multi-family dwellings that would be filled with single family dwellings), up to 1,340 acres may be needed to meet demand at 1 dwelling unit per acre (compared to 270 at 5 du/acre). If market capture increases to 25%, the demand for land could increase to 2,240 acres (compared to 440 at 5 du/acre). In that final scenario, the amount of land demanded by the market would outstrip the primary land supply in the Barnwell option, and would exceed the amount of land in the Primary Land Supply under the gravity option if only the gravity line to the school were constructed.

*Note that the figures shown in the preceding tables for the number of dwelling units and acreage were rounded to eliminate fractional numbers of dwellings and acres for the purpose of simplifying the tables. Due to this, there is some variance in certain instances where dwelling units are converted to acreage demand numbers.*

# 7. Ad Valorem Tax Revenue Generation

Among the items that were considered as part of this study was the relative ad valorem tax (property tax) revenue generated under various circumstances. The existing conditions of the Clear Creek basin were analyzed to determine the likely value of new development for comparison purposes. The study analyzed single family residential dwelling value information in the county's tax parcel data. To develop a standard value for new residential development only those parcels smaller than one acre were included in the assessment. It was found that the following characteristics applied within the study area for single family homes on "small" lots:

- Average Parcel Size: 0.575 acre
- Mean Value/Acre for Developed Single Family Lots: $48,700
- Mean Heated square footage for Single Family Dwellings: 1,681 sf
- Mean Value / square foot for Single Family Dwellings: $80.77
- Mean Single Family Dwelling Building Value: $137,465

If applied to various common development scenarios, the following average valuations apply:

- Single Family Dwellings on 0.25 Acre Lot: $149,640
- Single Family Dwellings on 0.5 Acre Lot: $161,815
- Single Family Dwellings on 1 Acre Lot: $186,164

Based on current property tax rates, the following annual property tax revenue generation is achieved based on different development densities (on a per developed acre basis:

- 1 dwelling unit / acre: $1,052
- 2 dwelling units / acre: $1,829 ($914.50 per DU)
- 4 dwelling units / acre: $3,382 ($845.50 per DU)

The total variance between revenue generation per acre at a density of 4 dwelling units per acre and 1 dwelling unit per acre is over $1,800 per year. The same 4 dwelling units would generate nearly $1,000 more in revenue per year spread out over four 1 acre lots, but the land resources necessary to generate the additional revenue are at least four times as high when adding in open space, roads, and other necessary development components. The efficiencies gained by developing more densely, coupled with the greater likelihood of the need for sewer should be weighed against the higher property

tax revenue generation potential per acre when development is distributed more widely across the landscape.

## 8. Customer Base

The final component of the study examined the potential for the acquisition of new sewer customers from the base of existing residences in the primary service areas under each of the scenarios. While no guarantee can be made regarding the desire, necessity, or likelihood of any particular customer hooking on to the system, this will give a relative indication of the potential customer base available in each scenario. As was noted previously, the majority of potential customers would likely require significant investments (absent an adjacent development) to tie in to the system given the relatively long distances that most are located from the main lines in each scenario.

Under the gravity sewer option, it was found that there were approximately 650 potential residential customers in the primary service area associated with the gravity line serving the school, including around 425 within 0.5 mile of the line. If the gravity line to the Justice Academy is constructed as well, the total residential customer base increases to approximately 1,050 customers, including around 750 within 0.5 mile of the line (see Figures 18 and 19). The analysis of the Barnwell option revealed a total of approximately 510 potential residential customers (see Figure 20). The figure for the Barnwell option does not include any potential customers who would require a grinder pump or similar pressure system to access the sewer system.

## 9. Conclusions

The following is a brief summary of the main points and conclusions revealed during the preparation of this study:

1. The gravity sewer option, particularly with the addition of the Justice Academy extension, provides sewer service to a significant portion of the Clear Creek basin.

2. There are generally sufficient land resources in the primary service areas available under either main scenario to accommodate expected growth over the next 20 years.

3. The density made possible by sewer should help to conserve rural land resources by concentrating development.

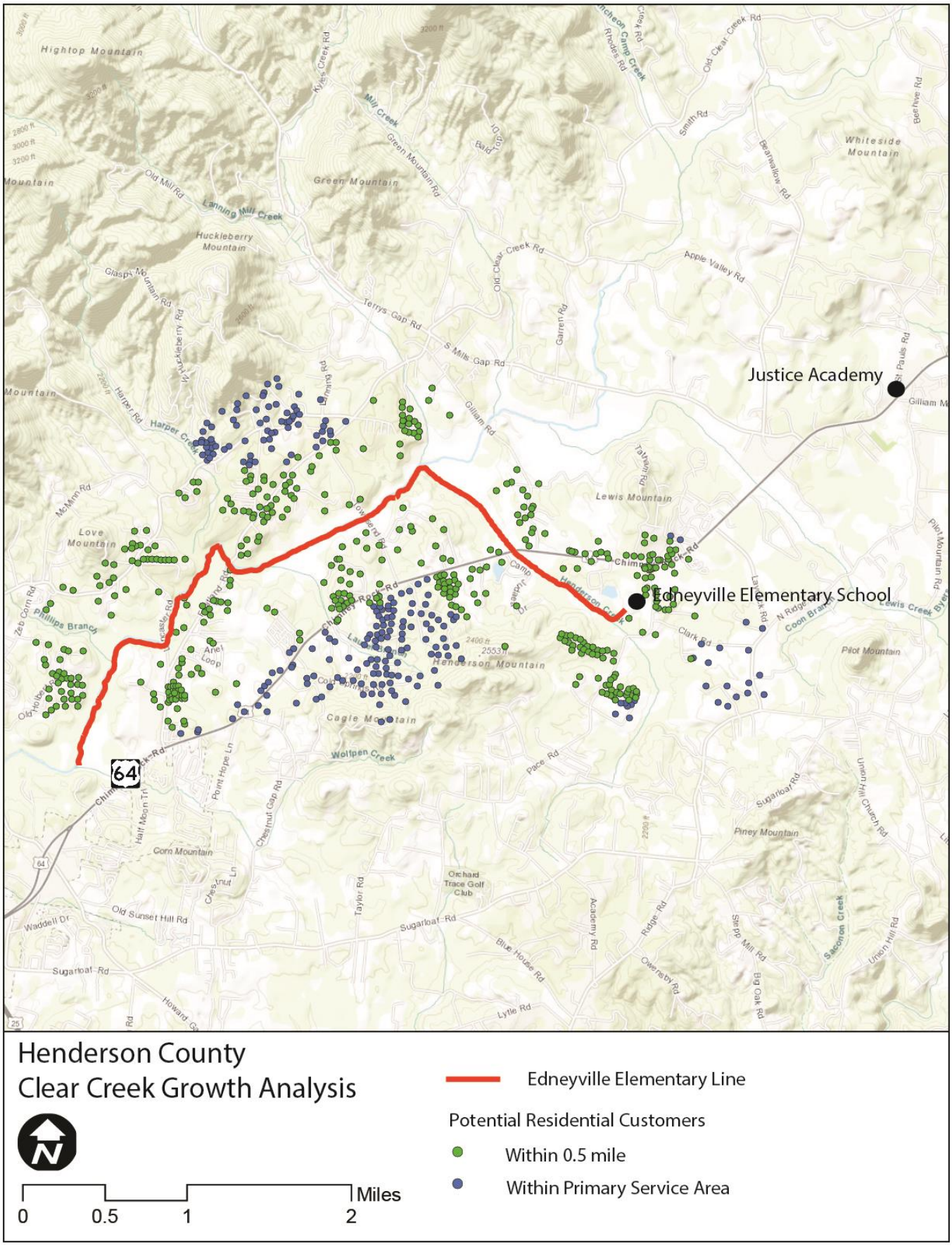


Figure 18: Edneyville Elementary Gravity Service Line Potential Customers

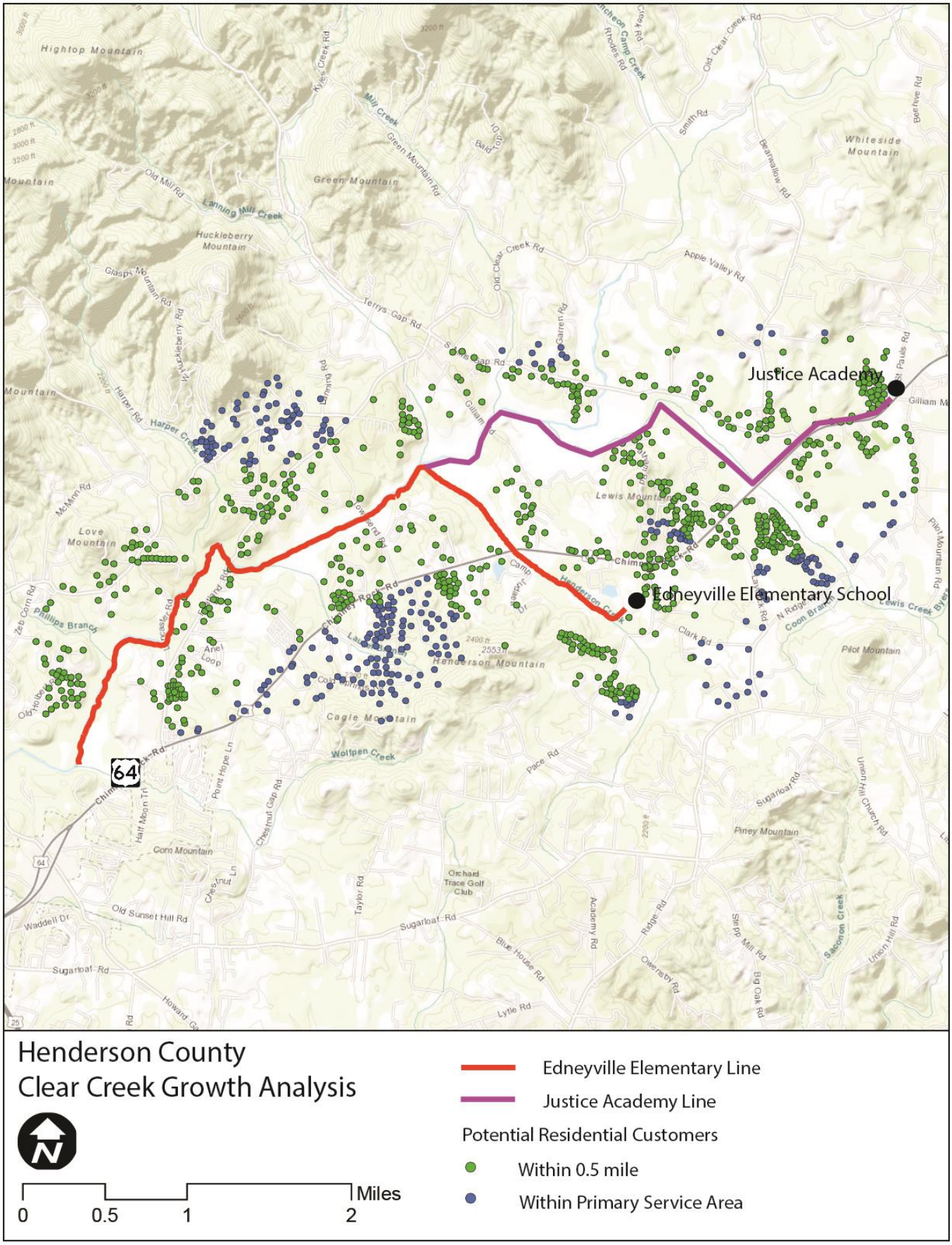


Figure 19: Combined Gravity Line Potential Customers

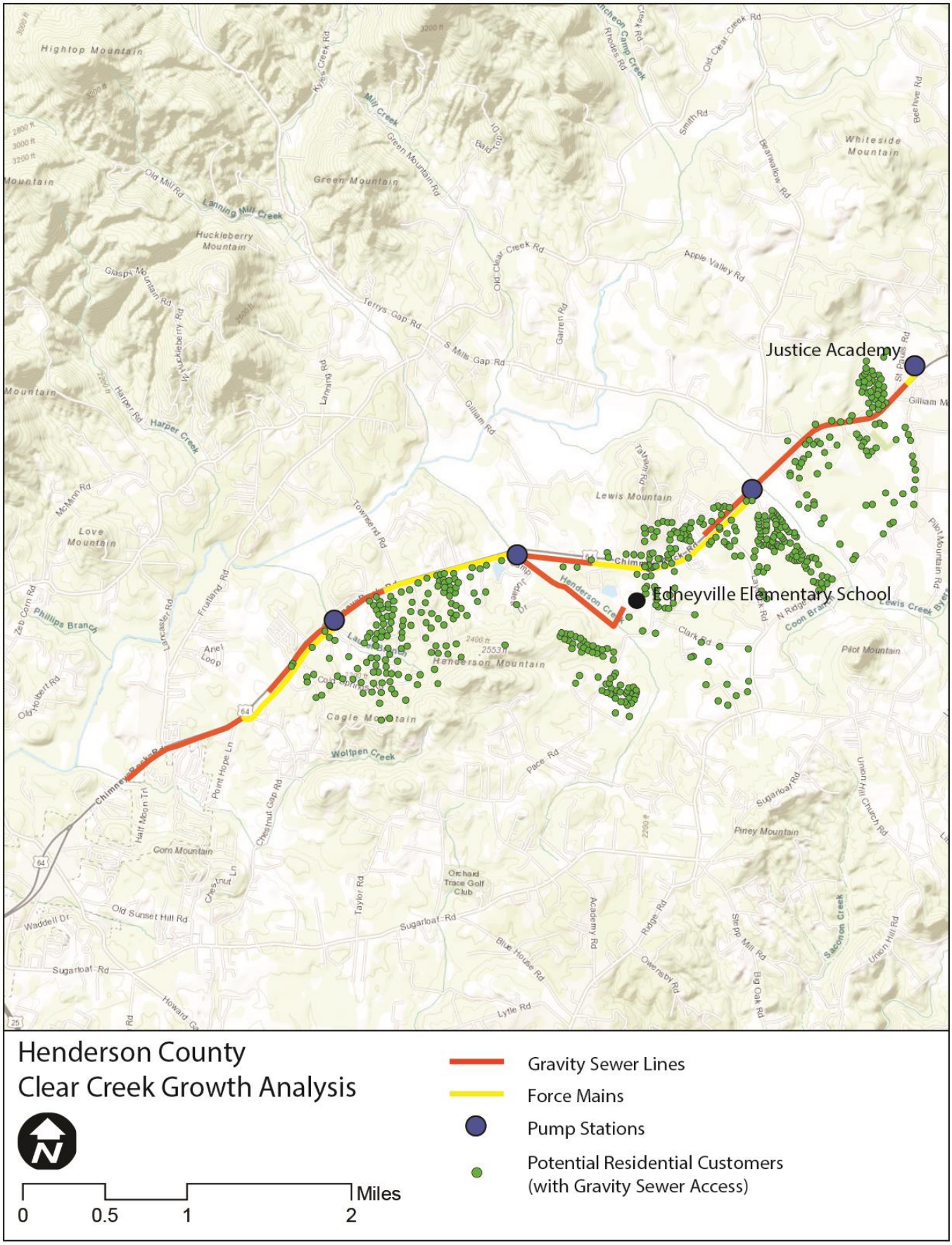


Figure 20: Barnwell Option Potential Customers

4. The Barnwell option may concentrate development more than the gravity option, thus preserving rural land resources, but there may be insufficient land within the primary service area to accommodate an acceleration in development activity over the next 20 years.

5. The use of only pressure sewer to serve the school and the Justice Academy will likely not prevent development in the study area. Without the sewer in place to concentrate development, sprawl and leapfrog development patterns are more likely to emerge.

6. While orchards make up a significant part of the rural landscape in the study area, they are more prevalent outside of the primary service areas than within them in either of the main options.

7. Industrial development in the study area, while potentially feasible, may be constrained by environmental and transportation concerns in the area where it has been planned.

8. Long range transportation plans do not include any projects to improve the primary highway arteries serving the Clear Creek basin.

9. US 64 is nearing Level of Service D capacity in the western portion of the study area.

10. The growth management strategy map should be adjusted to expand the Urban Service Area if sewer is installed in the basin. This should be followed by proactive rezoning of property to align with the growth strategy map in an effort to concentrate development away from the rural portions of the basin.