

# Cluster Subdivisions

By Tanner Hayslette



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# Executive Summary

Conventional subdivisions have been relatively similar since the end of World War II. Developers designed subdivisions with the maximum number of houses with little regard to the environment or the residents' quality of life. As of late, there has been a hunt for alternative approaches to conventional subdivision designs. Urbanized areas have overflowed into the surrounding rural land by means of suburban development. This had led to the significant loss of agricultural land across the United States. A recent study by American Farmland Trust has proven that development around small towns, in the Midwest, has been instrumental to the loss of farmland. In North Carolina, "the threat is more than just urban sprawl" (Sallet, 2020). North Carolina's agricultural land is threatened by the subtle but harmful expansion of low-density residential developments. "Roughly 78% of the land developed or compromised in North Carolina fell into this category" (Sallet, 2020). Popular locations for development are around Raleigh, Charlotte, Durham, Greenville, Fayetteville, and Winston-Salem.

The effects of low-density residential developments are not immediately visible. This has delayed policy-based responses to said subdivisions. In the state of North Carolina, low-density residential developments are five times more likely to be transformed into highly developed urban areas than to be used for agricultural purposes. Low-density residential developments also create hardships for farmers and ranchers by making it harder for farmers to access and maintain their farms. Moreover, residents new to rural communities often complain about the tractors and other farming equipment's use of roads and the odor coming from agricultural operations. Furthermore, these low-density developments push necessary farming equipment dealers and crop retailers farther away from farmland. Many farmers are tempted to succumb to the pressures of development due to a financial payout or hardships created by sprawl. Another aspect contributing to the loss of farmland is that farmers approaching retirement often sell their agricultural land

to nonfarmers. This negatively impacts new farmers by making it harder for them to acquire farmland, along with increasing land prices due to encroaching development makes it very challenging for new farmers to purchase farmland.

"North Carolina's farms are under severe threat, with its best land succumbing to development" (Sallet, 2020). According to "Farms Under Threat: The State of the States," a report by American Farmland Trust, millions of acres of agricultural land across America has been developed or transformed into uses that endanger the farming industry from 2001 to 2016. "The report's Agricultural Land Protection Scorecard is the first-ever state-by-state analysis of policies that respond to the development threats to farmland and ranchland, showing that every state can, and must, do more to protect their irreplaceable agricultural resources" (Sallet, 2020). The report concluded that North Carolina was the second-most endangered state in the nation due to the depletion of farmland from poorly planned real estate development. Over 15 years, from 2001 to 2016, the state of North Carolina lost a total of 732,000 acres of agricultural land due to development or being made vulnerable. 387,000 acres of which were considered "Nationally Significant," meaning the land's most suitable use was agriculture. Billy Van Pelt II, the American Farmland Trust senior director of external relations, stated that, "North Carolina's farms are under some of the greatest threats of any state in the nation... This report identifies the urgent need for action to protect this land that is critical to North Carolina's agricultural economy and its ability to grow food and other crops. We've all witnessed the impacts of empty grocery store shelves in recent months – we must be vigilant in protecting our farms and ensuring that our food system is more secure and resilient" (Sallet, 2020).

Dedicated state and local action are a necessary response to counteract the diminishing amount of land, especially in North Carolina. "Pursuing

# Executive Summary

multiple approaches and linking them together is the most effective path” (Sallet, 2020). The state of North Carolina has been progressively addressing these issues by adopting state-level policies and programs to help preserve farmland. One of these programs is the Purchase of Agricultural Conservation Easement (PACE) programs. The PACE programs permanently safeguard farmland and ranchland from non-farm development by compensating landowners who decide to place an agricultural conservation easement on their property. The funding for purchasing said easements originates from the North Carolina Agricultural Development and Farmland Preservation Trust Fund.

Another way the state has addressed the preservation of farmland is by land-use planning. North Carolina enacts zoning regulations by requiring localities to adopt a comprehensive plan. However, some states play a more proactive role by requiring local governments to assess their agricultural resources and enforcing policies to guard them. Property Tax Relief (PTR) programs are also implemented to decrease the amount of property taxes for farmland. The most effective way to implement this program is by conducting a use-value assessment (UVA), by evaluating the current use value of the parcel. The state of North Carolina operates the Present-Use Valuation Program.

Agricultural districts are also established to create specific areas with the intent to support agricultural functions. These districts protect and incentivize farmers by including limits on eminent domain, limits on annexation, tax incentives, and protection from public facilities and infrastructure. A nonconventional approach is to require agricultural district enrollment to be eligible for PACE programs. North Carolina sanctions the implementation of Voluntary and Enhanced Voluntary Agricultural Districts, to limit the use of land to solely agricultural for several years at a time. Farm Link programs are used to establish a relationship between proposed land buyers and landowners who intend to keep their land agricultural. Farm Link programs are run by either public or private entities, offering a variety of services and resources

ranging from real estate postings to educational resources, trainings, and technical assistance.



To address the loss of farmland in North Carolina, Pitt County has been researching how to increase the regularity of cluster subdivisions. Pitt county is trying to incentivize and increase the use of cluster subdivisions to retain the rural characteristics of the county and preserve its’ agricultural land. The county has recently approved several subdivisions with elements of cluster developments, such as open space. A prime example of this is seen in the community of Rock Springs. Rock Springs contains several cluster components including the use of communal open space. This open space serves as an “agrihood” community, tying the residents of the community into the agricultural character of the county by utilizing the open space as a farmers’ market, which also has spurred (promoted) the local economy and small businesses throughout the county. Currently, Pitt County has minimal provisions regarding cluster subdivisions and wishes to expand upon the regulations concerning cluster subdivisions. The purpose of this report is to investigate the provisions of cluster subdivisions and their impact on reducing the loss and conversion of farmland in Pitt County, North Carolina.



Figure 3-1. The Renston Rural Historic District Boundary showing the typology of the land (Map made by Isiah Higgs)

# Demographics

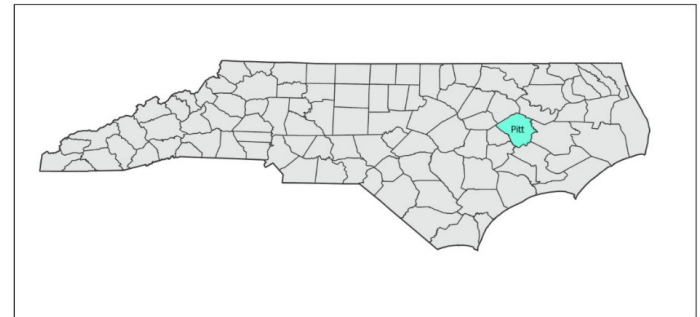
Pitt County, North Carolina, is in the Coastal Plain region of eastern North Carolina. Pitt County was established in 1760 from Beaufort County and named after William Pitt, earl of Chatham.

Pitt County is a rapidly growing, diversified employment, and service center for eastern North Carolina. It is also one of the fastest growing regions in the state of North Carolina.

Pitt County consists of 651.58 square miles of prime agricultural land. The county is a producer of tobacco, grain, peanuts, vegetables, eggs, soybeans, swine, and other livestock. Pitt County manufactures textiles, pharmaceuticals, concrete products, and furnaces. The county has a major outside factor, East Carolina University, creating an immense cultural and economic influence on the county. Pitt County is also influenced by environmental challenges such as flooding, especially in the low-lying land north of the Tar River. The Tar River flooded because of Hurricane Floyd in 1999 causing more than \$1.5 billion in damage.

Pitt County adopted its first Comprehensive Land Use Plan in 1990. Due to Pitt County's steadily increasing population and need for housing, the implementation of a land use plan was essential. The main goal of this Comprehensive Land Use Plan is to preserve the county's rural aesthetic and protect its agricultural resources. The Land Use Plan addresses

Pitt County, North Carolina

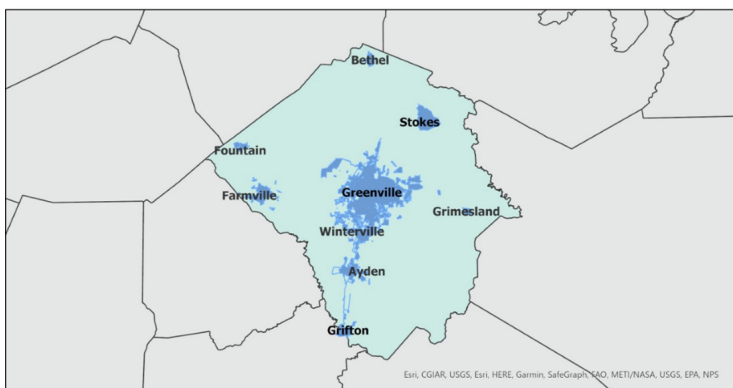


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01/30/2023



this by concentrating future development near existing city limits to create compact developments and reduce sprawl. Another goal of this Comprehensive Plan is to address community health due to the increasing rates of obesity seen nationally and locally. Obesity levels have risen due to the absence of convenient recreational activities and the unsupervised expansion of fast-food restaurants. The enactment of land use planning enables the County to improve the overall health of the community by providing residents access to healthy foods and a plethora of recreational activities. Pitt County also desires to create a protocol for sharing land use information to ensure coordinated planning and growth between municipalities within the county. Other goals of the county are to provide accessibility to safe and efficient transportation, to promote an orderly and efficient land use development pattern, to provide high quality public services and facilities, and to protect water quality and other natural features and resources. Pitt County adopted its first countywide Zoning Ordinance in 2003 to control the type and location of different land uses permitted in the County's jurisdiction. The County then went on to develop a Comprehensive Transportation Plan in 2005 and a Multi-jurisdictional Hazard Mitigation Plan in 2010.

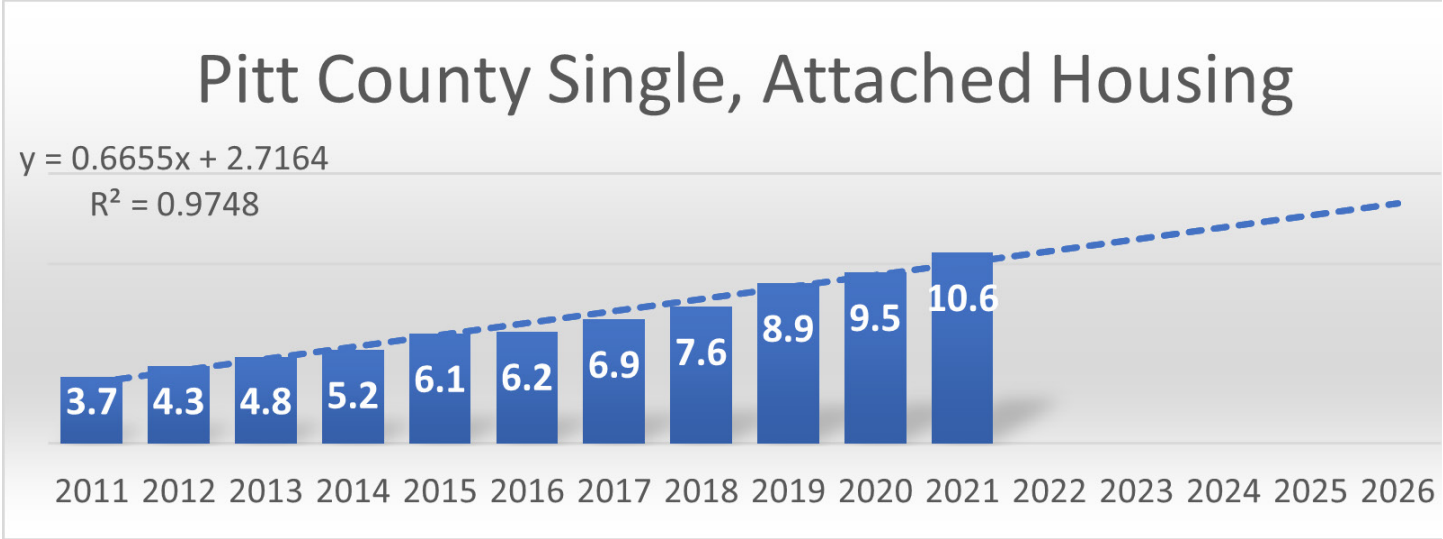
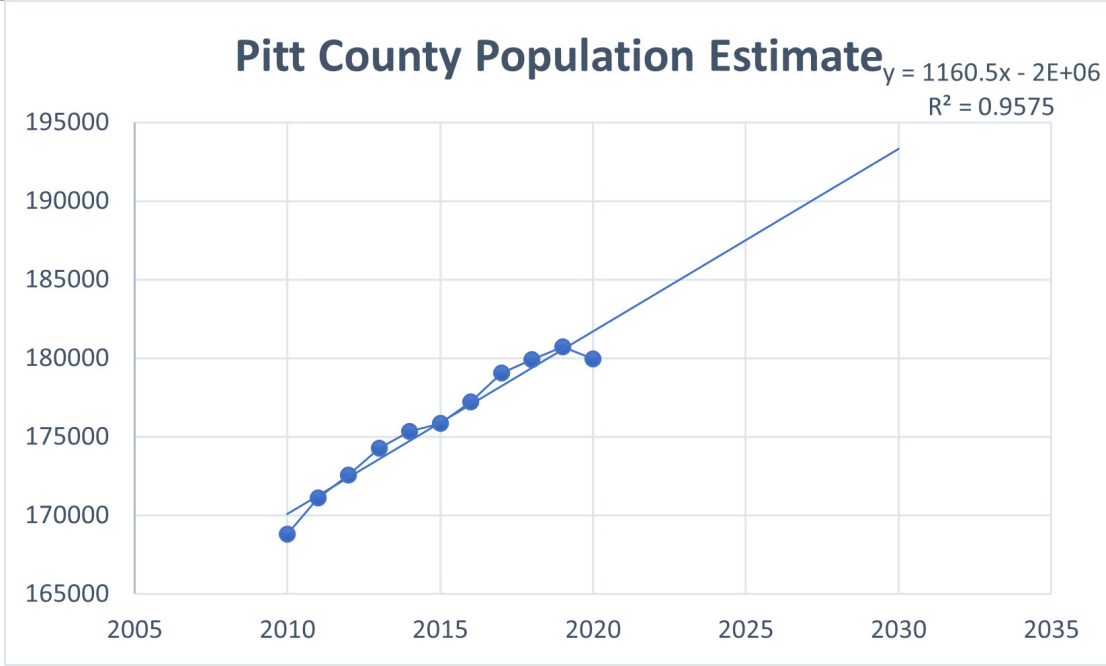
## Pitt County Towns



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# Demographics



### Pitt County Total Households

$y = 658.69x + 63414$   
 $R^2 = 0.9859$



■ Total households 64,0 64,5 65,4 66,0 66,4 67,5 68,8 68,8 69,1 69,7 70,6 71,1

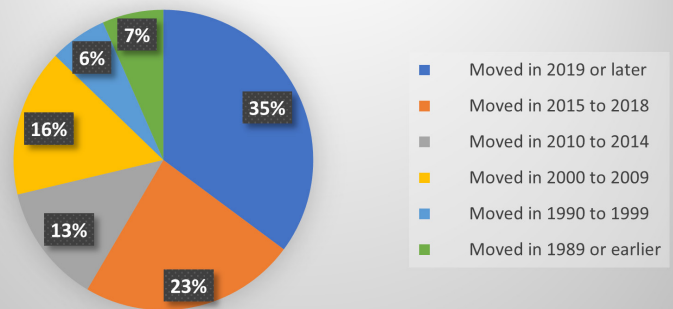
# Demographics

Pitt County's total population is projected to increase based on the consistent increase of population in Pitt County from 2010 to 2020. The population is expected to continue to rise following the same trend.

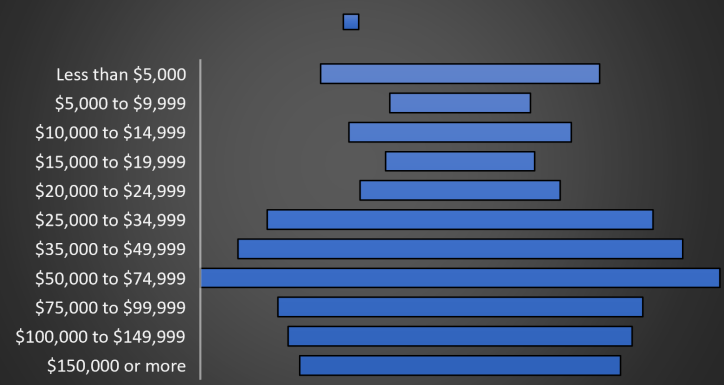
The total number of households has been increasing corresponding to the increase of population. With the continuous need for housing within Pitt County, it is imperative that the new subdivisions are planned in a methodical, thoughtful, and conscientious manner. This is because the soil essential for septic systems and agricultural land is scarce. North Carolina's soil generally is clay based, meaning that it does not drain as effectively as other soils. This mixed with the wetlands and flood prone areas found in Pitt County, leaves Pitt County with minimal usable soil. With an increasing demand for housing, it is extremely hard for Pitt County to delegate between providing necessary subdivisions and retaining its rural character and way of life. This proves that implementing and incentivizing the use of cluster subdivisions is a necessary function for the long-term sustainability of the county.

The number of attached housing units has been steadily increasing since 2010. This number is projected to continue rising in the future. In 2021, the number of attached housing structures was 7,525 and this number is projected to rise in the following years. This showcases a trend with the number of attached housing units in Pitt County increasing each year. This trend proves that the residents of Pitt County are moving into single, attached housing units more and more as the years go by, further increasing the want of smaller lot sizes and a larger sense of community. This need can be solved by the reduced lot size, open space, and recreational facilities provided by the development of cluster subdivisions.

### Pitt County Occupied Housing Units Estimate



### Pitt County Income



# What is a Cluster Subdivision?

Cluster subdivisions are defined as a form of development that allows a decline in lot size and follows different subdivision requirements compared to conventional subdivisions, if there are not more lots than a traditional subdivision nor an increase in overall density. The leftover land is typically dedicated to open space, recreational activities, agriculture, or the preservation of environmentally sensitive locations.

The disorganization of suburban development has led to diminishing community cohesiveness, according to APA PAS Report 135. The typical subdivision design is very repetitive, dull, and lacks variety. Also, the lot size requirements are intended to be large enough to handle individual sewage disposal and are often bigger than the owner wishes to maintain. In that regard, cluster subdivisions are described as a major breakthrough in suburban development. However, many questions and details regarding cluster subdivisions are unclear. There are many different schemes and designs that have been identified as cluster subdivisions, but few have actually been developed. The Planning Advisory Service, with the help of several planners and lawyers, has publicized several plans and supporting materials about this kind of subdivision development. Although, these schemes are a representation of several different points of view of what a cluster subdivision should look like. This approach was necessary due to the different challenges faced by each individual community. There are variations in the proposed layout of the subdivision, the physical features of the area, and the local ordinances involving cluster subdivisions.

The remaining open space involving cluster developments can be used in a variety of ways including reserved open space, riparian buffers, agricultural land, community gardens, and timber production, the possibilities are endless.

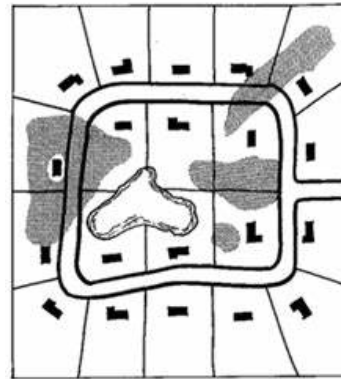


Figure A (rated by 25% as "rural")

44 acre parcel  
20 lots (2 acres each)  
No open space  
No pond access except from four lots

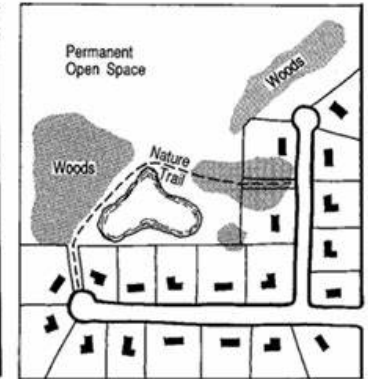
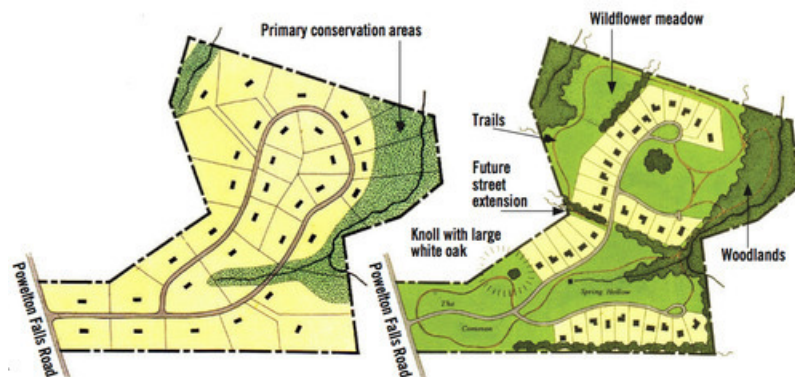


Figure B (rated by 75% as "rural")

44 acre parcel  
20 lots (3/4 acre each)  
25 acres of open space  
Pond access for all residents



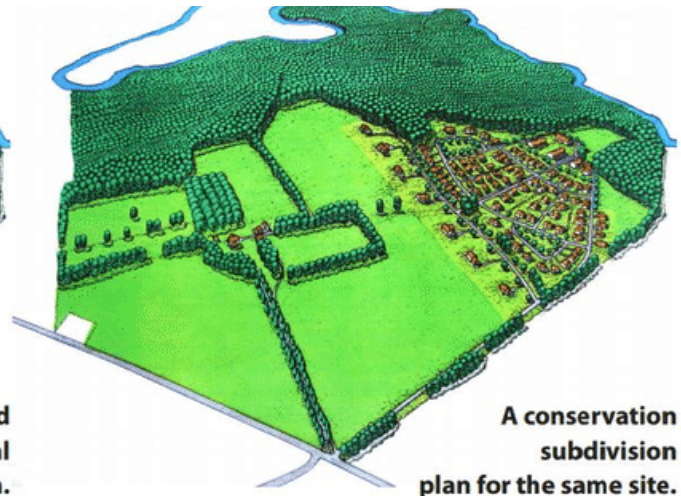
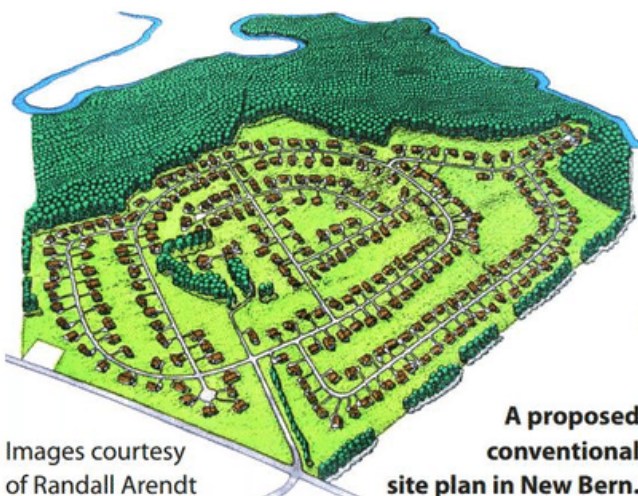
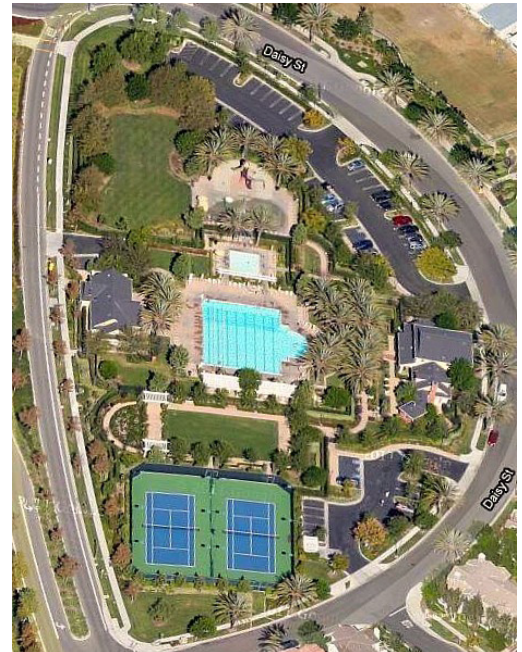
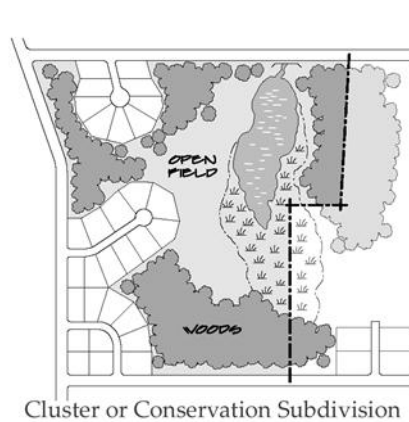
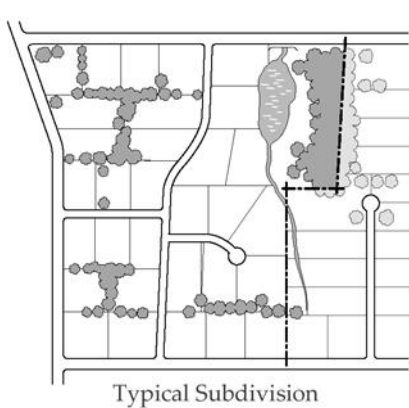


# Benefits

## Open Space

The benefits of cluster subdivisions range from preserving open space, providing habitats for wildlife, decreased runoff, they are cheaper to develop compared to typical subdivisions, maintains the rural character of the community, and increased density control.

One of the biggest benefits of cluster subdivisions is the significantly larger portion of open space compared to typical subdivisions. This open space can be used to preserve farmland, harvest timber, provide communal areas, trails, lakes, and more. The open space is typically not developed to provide a sense of openness that many people desire, but if it is developed, it is developed with the purpose of serving the community. A prime example of this would be the establishment of a daycare. Other examples include the creation of parks, play areas, community gardens, farmers markets, community pools, basketball and tennis courts, community barbecues, and neighborhood clubhouses. There are endless possibilities, however the services should reflect the needs of the community.



# Benefits

## Environmental

Another advantage of designing subdivisions in a cluster design is the environmental benefits. The increased open space provides a larger habitat for wildlife. Furthermore, these types of developments contain less reduced infrastructure costs including roads, sewer, and water, than regular subdivisions. This is important because it decreases the risk of flooding by the land naturally filtering and absorbing runoff. The undeveloped land creates valuable environmental corridors to protect natural features such as the Tar River, Lake Kristi, Clayroot Swamp, Pinelog Branch, and the many streams located throughout Pitt County. Below is a table showing the number of physical features



found in Pitt County, North Carolina. Every one of these natural features would benefit from being surrounded by cluster developments as opposed to sprawled developments.

The population is expanding at rates that are hard to keep up with. Places of residence and commercial buildings are having to be built to keep up with the growth of population. While this benefits new residences and can bring in an influx of new people to the area, it severely hinders the environment and wildlife. Wildlife is neglected when making these major decisions. Deforestation removes homes for all animals that resided there which pushes them into other areas that may not be fitting for them. Wildlife can also be forced into residential areas due to scavenging to find a habitable place to live, creating a threat against them based on people trying to get rid of such animals. The North Carolina Wildlife Resources Commission released a statement in 2002 explaining the impacts associated with public projects.

Physical Features	
<a href="#">Bays</a>	2
<a href="#">Lakes</a>	4
<a href="#">Streams</a>	61
<a href="#">Swamps</a>	5

# Benefits

The rapid development of traditional subdivisions threatens wildlife and habitats identified as conservation priorities, according to North Carolina's Wildlife Action Plan. Residential and commercial developments designed in a cluster pattern often disregard the needs of wildlife, resulting in habitats that are unable to support sensitive species.

Not only do the effects of immediate development have to be assessed, both the cumulative and secondary impacts, including the impacts on threatened and endangered species found in riparian systems, of public projects must be addressed. Wildlife is essential to a healthy ecosystem. A favorable ecosystem produces essential, raw materials, including clean water, clean air, food. A healthy ecosystem produces the highest quality agricultural products such as tobacco, grain, corn, soybeans, vegetables, peanuts, eggs, swine, and livestock, which the economy of Pitt County relies on. The less native wildlife in a region increases the risk of the ecosystems becoming degraded and vulnerable to disease and the invasion of nonnative species. The cluster design preserves more of the natural ecosystems leading to a healthier overall environment.

The implementation of cluster subdivisions would also give Pitt County the opportunity to gain income from nature-based tourism and recreational activities due to the larger portion of undeveloped land. Parts of this land could be dedicated to greenways, trails, boat docks, educational centers, and to promote an overall healthier lifestyle. However, to pursue the economic benefits correlated with healthy wildlife and flourishing ecosystems, conservation efforts must be prioritized. The preservation of ecosystems and wildlife is essential to improve and increase the opportunities of future generations to thrive with abundant access to raw materials, such as clean air and water, and the ability to enjoy, experience, and learn about Pitt County's native species and natural environment.

The North Carolina Wildlife Resources Commission is responsible for protecting, perpetuating, and restoring the state's wildlife. However, the state agency does not have regulatory authority over the land most of these habitats are located on. This makes it extremely difficult for the agency to effectively execute their objectives. The duty of protecting and preserving environmental resources for future generations is collectively held by private landowners, local governments, and the public.

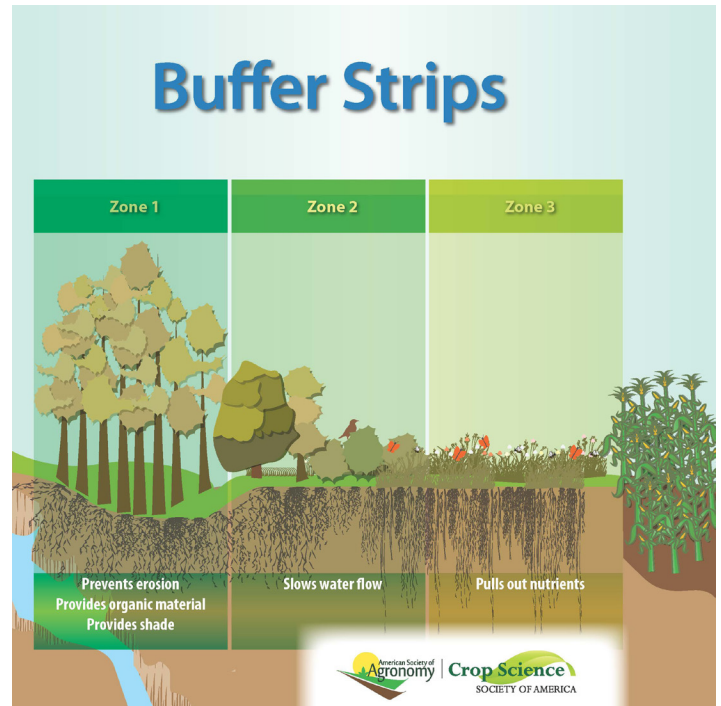
The population is expanding at rates that are hard to keep up with. Places of residence and commercial buildings are having to be built to keep up with the growth of population. While this benefits new residences and can bring in an influx of new people to the area, it severely hinders the environment and wildlife. Wildlife is neglected when making these major decisions. Deforestation removes homes for all animals that resided there which pushes them into other areas that may not be fitting for them. Wildlife can also be forced into residential areas due to scavenging to find a habitable place to live, creating a threat against them based on people trying to get rid of such animals. The North Carolina Wildlife Resources Commission released a statement in 2002 explaining the impacts associated with public projects.

The cluster design provides advantages to developers as well. Cluster subdivisions are typically cheaper to develop and offer incentives to developers. The cluster design requires less infrastructure such as roads and utility costs, if applicable, and allows the developers to bypass natural obstacles. Due to the increased quality of life and services provided by cluster subdivisions, the market price of the homes is typically more compared to traditional subdivisions.

# Benefits

The proximity of the homes in cluster subdivisions increases the use of package septic systems connecting to multiple homes and ensures that each home does not have to be on septic friendly soil. This helps preserve better soil for other uses such as agriculture.

The cluster subdivision design is essential to maintaining the rural character of the community by effectively retaining portions of farmland, permeable soil, fields, and trees. This correlates to the environmental benefits of this design by preserving and protecting the natural features of the county and subdivision. Even though the individual lot sizes are smaller than typical subdivisions, cluster subdivisions meet the density requirements set by the county of Pitt.



# The Differences Between Urban and Rural Cluster Subdivisions

Instead of preserving land for agriculture, wildlife, or timber production like rural cluster subdivisions, urban subdivisions focus on providing open space to benefit the environment. These benefits include increased air quality and a better quality of life for its residents. The open space is typically occupied by trees, parks, or community gardens. These areas increase the number of pervious surfaces, creating less runoff and more efficient drainage.

Urban cluster subdivisions and their open space focus on making up for the lack of open space by providing recreational opportunities such as parks to increase the residents' quality of life. This opportunity for open space can also be used to increase the amount of drainage due to the large number of impervious surfaces in urban areas.

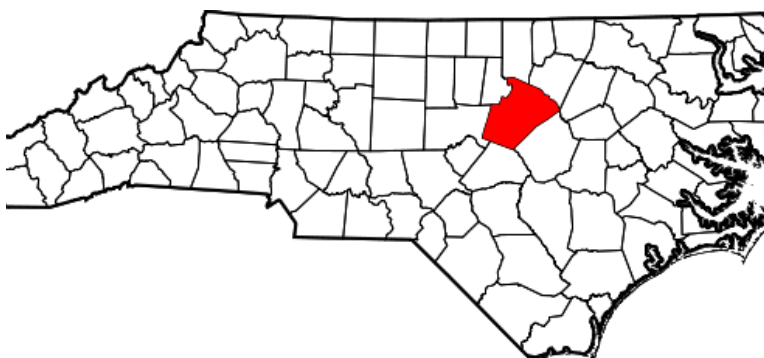
However, the purpose of rural cluster subdivisions is to preserve the existing rural atmosphere and decrease the expansion of sprawl developments. The purpose is also to increase the quality of life.



# Regional Use of Cluster Subdivisions

## Wake County, North Carolina

Wake County, North Carolina, describes cluster and open space developments as both requiring a certain portion of the development to be permanently considered as open space. The difference between a cluster development and an open space development is the amount of required open space and the minimum required land for the development. Open space developments require from 30% to 40% of the development to be open space, while cluster developments require 10% to 25% of the development to be open space. The percentages range depending on if the proposed subdivision is located within or outside of an urban area or water supply watershed. The minimum subdivision site size of a cluster open space development is 10 acres. However, the minimum amount of land required for an open space development is 25 acres. The minimum open space requirements for cluster open space development entails that at least 10 percent of the land development must be permanently designated as open space if the development is within an Urban Services Area or Water Supply Watershed. For cluster open space developments located in a Non-Urban Area or Water Supply Watershed, at least 25 percent of the subdivision's total land area must be permanently identified as open space. At least 30 percent of the total land must be permanently considered open space for open space developments located within an Urban Services Area or Water Supply Watershed. However, for the same type of open space developments located within a Non-Service Area or Water Supply Watershed at least 40 percent of the total subdivision must be designated as open space.



The following chart lists the maximum density and minimum lot size requirements for cluster open space developments. These standards apply to all cluster open space developments without community wastewater.

District	Cluster-Open Space Development		
	Maximum Density (units/acre) <sup>[1]</sup>	Minimum Lot Size	
		Area (square feet) <sup>[1][2][3]</sup>	Width (feet)
R-80W	0.50	40,000	110
R-80	0.50	40,000	110
R-40W	1.00	20,000	75
R-40	1.00	20,000	75
R-30	1.45	12,000	60
R-20	2.17	6,000	50
R-15	2.90	5,000	45
R-10	4.35	3,000	40
R-5	8.70	3,000	40
HD	1.45	12,000	60
GB	2.17	6,000	50
O&I	1.45	12,000	60

Before the most recent text amendment, the minimum lot size requirements per dwelling depended on how much of the development was preserved for open space. The minimum area of the lot size decreased as more of the development was dedicated to open space. This variety is only shown within the following districts: R-80, R-40, R-30, and HD. The area of the lot size differs by a variety of intervals including 5,000 square feet for the R-80 district, 1,000 square feet for the R-40 district, and 500 square feet for both the R-30 and HD districts. The intervals correlate to if the open space development has more than or equal to 30 percent, 35 percent, or 40 percent open space. For example, the minimum lot size for the R-80 district ranges from 35,000 square feet if the development has 30 to 34.9 percent of open space, 32,500 square feet if the development has 35 to 39.9 percent of open space, and 30,000 square feet if the development has 40 percent or more of open space. In comparison, the minimum lot size of a duplex in a R-80W district is 60,000 square feet.

# Regional Use of Cluster Subdivisions

For open space developments with access to both community water and sewer services, the standards are listed below:

District	Open Space Development		
	Maximum Density (units/acre) <sup>[1]</sup>	Minimum Lot Size	
		Area (square feet) <sup>[1][2][3]</sup>	Width (feet)
80W	0.50	20,000	75
80	0.50	20,000	75
40W	1.00	10,000	60
40	1.00	10,000	60
30	1.45	6,000	50
20	2.17	6,000	45
15	2.90	5,000	45
10	4.35	3,000	40
5	8.70	3,000	40
30	1.45	6,000	50
20	2.17	6,000	45
40	1.45	6,000	50

All additional lot and building standards that apply to both cluster and open space developments are listed below:

	R-80W	R-40W	R-30	R-20	R-15	R-10	R-5	HD	GB	C
Minimum Lot Frontage	30	30	30	30	30	30	30	30	30	30
Perimeter Setback <sup>[1]</sup>	30	30	30	30	30	30	30	30	30	30
Minimum Required Setbacks (ft.) Cluster Subdivisions <sup>[2]</sup>										
Front	20	15	15	15	10	10	10	15	10	10
Side	20	15	15	15	10	10	10	15	10	10
Rear	10	7.5	5	5	5	5	5	5	5	5
Corner	15	15	15	15	15	15	15	15	15	15
Minimum Required Setbacks (ft.) Open Space Subdivisions <sup>[2]</sup>										
Front	20	15	15	15	10	10	10	15	10	10
Side	20	15	15	15	10	10	10	15	10	10
Rear	10	7.5	5	5	5	5	5	5	5	5
Corner	15	15	15	15	15	15	15	15	15	15

The general requirements for cluster or open space developments regarding maximum density state that the maximum number of dwelling units allowed is equal to the site's total land area multiplied by the maximum density standard. If the site of the cluster or open space development is in more than one zoning district, the maximum number of dwelling units permitted must be determined separately from the other portion or portions of the parcel located in different zoning districts. The density of certain portions of the

zoning districts. The density of certain portions of the development may be transferred from one portion to another if this does not result in an increase of the total number of dwelling units on the overall site. The design of the lot must be regularly shaped, meet or exceed the minimum lot area and lot width standards. The side lot lines extending from a road must be relatively perpendicular or radial to the road's right-of-way boundary. The amount of open space within a cluster or open space development must be equal to or exceed the minimum open space requirements. To meet the minimum open space requirements, the open space must be in one or more parcels that are dedicated as permanent, active, or passive open space.

In Wake County, the open space found within cluster and open subdivisions must be dedicated to one or more specific uses. The first of these uses include the preservation of any identifiable natural hazard areas, meaning areas that pose a significant hazard to people or property such as wetlands and floodways. The second use listed is the protection of naturally significant areas including sensitive plant communities and the habitats of endangered wildlife, or other environmentally sensitive areas where development could possibly jeopardize ecosystems or water quality. The next use is the conservation of any important historic resources. For example, barns, archeological sites, mills, and homesteads. Another use includes outdoor recreation opportunities including sports fields, playgrounds, swimming pools, tennis courts, basketball courts, walking trails, nature trails, bikeways, golf courses, and picnic areas. These recreational activities can be for either the public, the residents of the subdivision, or employees and their guests. Membership requirements or a fee may be applied for the use of recreational facilities including golf, tennis, or swim clubs. The recreational opportunities meet the code if the residents or employees have an opportunity to join the club or pay to use the club. Another applicable use of open space is the possession, use, or control of productive farmland or forestland for continued agricultural or forestry use or areas adjacent to farmland recognized as a voluntary

# Regional Use of Cluster Subdivisions

agricultural district or enhanced voluntary agricultural district.

Conserving and avoiding development in any natural hazard areas on the site of the subdivision is the highest priority for the location, use, and design of open space. Open space may only contain buildings, structures, parking spaces, and accessways that are necessary and complement its principal use. Examples of these include a pathway, recreational club house, driveway, utility lines, small parking area, barns and other agricultural storage and processing facilities. Another acceptable use of open space is to irrigate reclaimed water, following the standards set forth in the North Carolina Administrative Code. No wastewater treatment sites or sewage treatment sites or sewage treatment sites that do not meet the standards set forth in NCAC are acceptable. However, open space may contain single water supply wells or subsurface sewage disposal fields if they do not conflict with the initial uses of the open space or do not meet water reuse standards.

The size, location, and character of open space is required to be appropriate for its intended use. The examples Wake County used is that in open space used for recreation, specifically active recreation, should be designed and located so the area can be conveniently and safely accessible by its intended users. Also, for open space used for baseball fields or other active recreational facilities, the open space should be located on land that is relatively flat and dry.

The residents of the subdivision are required to have direct access to and use of at least ten percent of the total development site. The open space provisions also mention that the developer must transfer that portion or all the open space to a property owners association, public agency, or nonprofit organization willing to accept the responsibility of managing and maintaining the open space in correlation to its intended use for the continued maintenance and preservation of open space. Each parcel of dedicated or reserved open space must be displayed on all subdivision plats and a record

plat recorded at the Register of Deeds including the plot of where the open space will be and its intended use. The owner of an open space parcel can rededicate the parcel for another permitted use by submitting another record plat demonstrating the location of the parcel and its new intended use.

The responsibility to maintain the open space is left to the owner of the open space. Maintenance of the open space is essential for it to effectively function as its intended use. For cluster or open space developments located in low density areas, the retention of undeveloped open space in a natural or vegetated state must be confirmed by the Register of Deeds either included as a recorded document for the establishment of an appropriate legal entity such as a homeowner's association, land conservation organization, or property owners' association, or in a maintenance agreement included in the property deeds. This legal entity is responsible for the control and maintenance of open space.

For potential future development sites located in an Urban Services Area or Water Supply Watershed area identified as Community, Community Reserve, or a Walkable Center on Wake County's Development Framework Map Municipal Transition Area. Provided that the current density is less than the recommended density for that area based on the Land Use Comprehensive Plan, one or more parcels can be reserved as designated a potential future cluster or open space development. These parcels do not contribute to the open space requirements, density calculations, or impervious surface coverage regarding the development. Parcels reserved for potential future developments cannot be developed except for the use of open space, community well, or septic field serving the planned development. However, if the parcel is rezoned to allow a higher density the parcel can be developed as it is not needed to meet density standards.



# Regional Use of Cluster Subdivisions

## Cumberland County, North Carolina

Cumberland County encourages cluster subdivision developments specifically in the Fort Bragg Special Interest Area. They are focused in this area because it is the location of the known habitat and forage areas of the protected Red-Cockaded Woodpecker. To review subdivision plans within the Fort Bragg Special Interest Area, the Planning and Inspections Staff, Military Planner assigned to the affected military base, and the local office of the U.S. Fish and Wildlife Service all need to approve the preliminary plan. Then, the Military Planner and Fish and Wildlife representative will assist the developer by identifying the areas where trees and ecosystems should be maintained.

Every new residential lot or unit is required to provide a portion of land to be open space. The purpose of this is to provide park, recreation, and open space areas in new residential subdivisions. The required discretion depends on if the subdivision is in an affected area or not. Regardless, the proposed plan must be consistent with the Parks and Recreation Master Plan. Certain areas including the Fort Bragg Special Interest Area and other environmentally sensitive areas are designated by an overlay zone that follows the regulations set forth by the adopted Parks and Recreation Master Plan or another adopted open space or greenway plan. These regulations entail a recreational area requirement that is dedicated to public use.

The amount of park, recreation, or open space is required to be 800 square feet per dwelling lot or unit. Water bodies may be applicable to this category if they are offered to a public entity and approved by the affected governing body. The recreational area may also include a mixture of land above the Special Flood Hazard Area, land in the Special Flood Hazard Area, and water bodies within the development. The size of the recreation areas must be fitting to the functional use and maintenance of the area. However, if the development requires less than 25,000 square feet of recreational area or open space, the developer may pay

a fee to be exempt from providing onsite recreational areas if they meet the following criteria from the Parks and Recreation Director:

- The onsite recreation area must not be combined with an area serving adjacent property or properties to form a functionally usable and maintainable area; or
- The open space or recreational needs for the development can be met by existing or planned public recreation areas. While determining the size of the development, the Planning Staff shall consider the entire subdivision regardless of if the subdivision is built in phases. The developer of any development that is exempt from providing an on-site recreation area is required to pay a fee to be used to acquire recreation areas for any park type listed in the Parks and Recreation Master Plan to benefit the residents of the general area.

The standards for recreational areas contain seven different categories: Unity, Usability, Shape, Location, Access, Landscaping, and Additional Requirements.

For unity, the dedicated recreational area must be on a single parcel of land, whether the subdivision or development is built in phases or not, except if the Planning Director with the Parks and Recreation Director's recommendation concludes that multiple parcels would better serve the residents of the subdivision and the public.

The usability is defined as how much of the recreational area can be used. A maximum of half of the area may be water. If one-half of the proposed area is water, the remaining land must be designated for a park. The usability of the recreational area must be determined by the Planning Director with a recommendation from the Parks and Recreation Director. However, the governing body of the affected jurisdiction shall make the final decision.

The shape of the area shall be designed to be usable for recreational facilities, including, but not limited to, swimming pools, tennis courts, clubhouses, athletic fields, basketball courts, swings, slides, a play-

# Regional Use of Cluster Subdivisions

ground, open play area, or picnic area.

The location of the recreational area must be located to reasonably serve the recreational needs of the residents within the development or subdivision. With a recommendation from the Parks and Recreation Director, the Planning Director may require that the recreational area be located on the outer limits or edge of the subdivision to allow its enlargement by combining the area with other recreational areas with adjacent subdivisions or other developments. When an adjacent property or properties are publicly owned, or when there are adopted plans that identify the area as a future recreational area to be obtained by the affected jurisdiction, the affected jurisdictions Park and Recreation Director, with approval from its governing body, may come to terms about the location of the recreational area or fee. The fee is only applicable when it is determined to be in the best interest of the immediate residents and is in accordance with the jurisdiction's long-range parks and recreation plan or overall Comprehensive Plan. Examples of this include acquiring larger, more economical tracts of land offsite from the subdivision or other development for the tract located within the development. This is only allowed when there is not adequate or sufficient park and recreation area to meet the needs of the affected residents.

All housing units in the development or subdivision must have easy, free, and convenient ingress and egress to and from the recreational area within the subdivision. Cumberland County defines this as having streets, public walkways, or trails, with at least one access point being a minimum width of 20 feet. Recreational areas are commonly accessible from a public street, and the right-of-way for this access must be shown on the preliminary plan. Recreational areas that do not have frontage on a public street but are adjacent to an existing public recreation area that has such access are exempt from this requirement.

Recreational areas must have an adequate natural or manmade buffer or screen to mitigate the potential negative impacts on adjacent residents.

The additional requirements for all land area dedicated to the public must meet the following provisions:

- The site must not be a former site or contain any remains of hazardous materials.
- If the recreational area is designed to contain a developed facility, both the facility and the recreational area must be approved by the affected governing body.
- If the land offered as the required recreational area is inconsistent with the Comprehensive Plan or the long-range plans for recreation space, the Planning Director, with a recommendation from the affected Parks and Recreation Director, may require a payment in lieu of the dedication or conveyance of recreational space. The Planning Director, with a recommendation of the Parks and Recreation Director, may also require a fee when the offered recreational area is less than one-half acre in size. The intention of long-range plans for recreation space is to best serve the needs of the residents of the subdivision or development and the general area, as described in the officially adopted Parks and Recreation Master Plan or collectively expressed through policies. If the preliminary plan does not indicate a designated park, recreation or open space areas, the presumption will be that the developer intends to pay a fee in lieu of dedication of open space or recreational area.

Cumberland County's provisions for cluster subdivisions are titled Variable Lot Residential Developments. The purpose of variable lot residential developments is to provide desirable open space, area for recreation, tree cover, scenic vistas, and site design variety in single family, residential subdivisions by allowing variations in lot sizes if the overall density of the development and maximum number of lots does not exceed what is permitted. The maximum number of lots shall be calculated by taking the gross land area committed to the development, subtracted by all land covered by water, wetlands, and floodways. From that number, subtract 20 percent for right-of-way. Then, divide the remainder by the minimum lot area

# Regional Use of Cluster Subdivisions

area requirement for single family dwellings of the designated zoning district. The result is the maximum number of lots that may be created in the development.

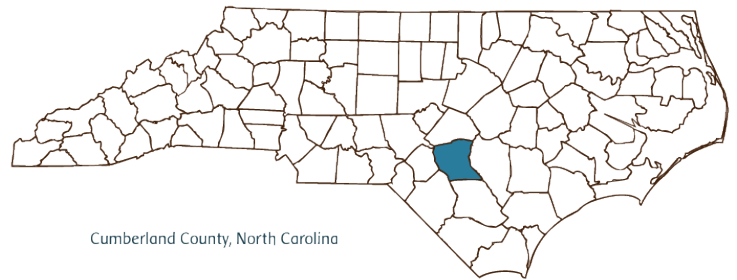
A variable lot residential development, or cluster development, is exempt from the minimum lot size requirements specific to that district. However, the lot size of any development may never be less than 75% of the minimum required for single family lots. All other dimensional requirements of the applicable ordinance shall be complied with.

At the discretion of the developer, a cluster development may utilize a range of lot sizes that do not conflict with the minimum requirements previously stated. The open space standards include where any reduction in lot size is made, an amount of land equal to the difference between the required minimum lot sizes for the applicable zoning district and the proposed minimum lot sizes, shall be reserved. This open space reservation is in addition to and separate from any open space dedication or reservation requirements. The subdivider or developer may pay a fee-in-lieu of, and be exempt from, providing this open space. However, the open space requirements for traditional subdivisions will still be applicable for the entire development.

All open space areas must be physically a part of the area being subdivided. These areas are required to be held under the ownership of a nonprofit corporation by the owners within the development. For the purposes of recording a subdivision plat, all open spaces and recreational areas shall be referred to as common area. Considering the purposes served by a cluster subdivision, the open space must be preserved for the perpetual benefit of the general public or the private properties in the development and must be restricted against private ownership for any other purpose. Recreational improvements likely to ensue a chance of a minor consequence in opposition to the purpose of these provisions may be made within the open space if the maximum coverage of each improvement does not exceed 20% of the total open space.

All lots within the development must have direct access to all parks or open spaces by means of public or private streets, dedicated walkways, or by fact of physical contiguity with other public lands or lands with common ownership by all residents.

If the deed to the open space is transferred to a homeowner's association or other nonprofit, the developer is required to file a declaration of covenants and restrictions that will govern the open space as a common area.



Cumberland County, North Carolina

# Regional Use of Cluster Subdivisions

## Buncombe County, North Carolina

Buncombe County has two different categories for provisions regarding cluster, or as their ordinance calls them, conservation developments. The conservation, or cluster, design is an option for both major and minor subdivisions to provide design flexibility that will allow for the preservation of conserved open space and dedicated farmland. The intent behind this type of development is to limit the number of disturbed areas, preserve ridge tops, woodlands, open spaces, floodplain, landslide hazard areas, agricultural land, and other environmentally sensitive areas. Conservation developments must be at least 10 acres and must dedicate 50% of the development to open space.

Cluster subdivisions are permitted in all zoning districts and watershed areas with no minimum lot size requirement applicable to single family cluster developments within watershed areas. However, the total number of lots must not exceed the number of lots permitted in single family detached developments. The density or built-upon area for the project must not exceed what is permitted for the critical area or balance of watershed, whichever applies. All built-upon areas must be designed and located to mitigate the impact of stormwater runoff to receiving water and minimize concentrated stormwater flow. The rest of the tract is required to stay in a vegetated or natural state. The title to the open space must be transferred to an incorporated homeowner's association for management; to a local government for preservation as a park or open space; or to a conservation organization for preservation in a permanent easement. If the property association is not incorporated, a maintenance agreement must be filed with the property deeds.

The density requirements for traditional single family residential developments state that no development is allowed to exceed one dwelling unit per two acres on a project-by-project basis. Residential lots must be at least two acres, or 80,000 square feet excluding roadway right-of-way, except within an approved

cluster subdivision. For all other residential and non-residential development, the development must not exceed six percent built-upon area. For watershed areas, single family residential developments are allowed at a maximum of one dwelling unit per acre to maintain undeveloped land use intensity. All other development, whether it is residential or nonresidential, is allowed a maximum of 12 percent built-upon area. Non-single family residential developments are permitted to occupy ten percent of the watershed area outside of the critical area and 70 percent built-upon area when approved as a special intensity allocation. The purpose of these development requirements in watershed areas is to effectively minimize built-upon surface area, lead stormwater away from surface waters, and incorporate best management practices to mitigate impacts on water quality. The permitted uses in watershed areas include agriculture, silviculture, residential development, nonresidential development except discharging landfills, non-discharging landfills, and residuals application sites.

In addition to conservation, or cluster, development regulations, Buncombe County has provisions in place regarding several types of alternative subdivisions. The first of these alternative subdivisions are alternative path hillside development subdivisions. Alternative path development provides design flexibility allowing for the preservation of environmentally sensitive features. The alternative approach is intended to minimize the impacts on disturbed areas and preserve ridge tops, woodlands, open spaces, floodplains, landslide hazard areas, and other environmentally sensitive areas. Minimum lot frontage and lot size requirements are not applicable to alternative path developments. The density requirements are equal to that of a traditional subdivision; however, a cumulative density bonus will be awarded for additional measures taken by the developer. Two percent of the total acreage is allowed to be developed for communal infrastructure in areas of 50 percent slope or greater. Dwelling units are not permitted to be located on areas with a slope

# Regional Use of Cluster Subdivisions

greater than or equal to 35 percent. Alternative path hillside developments must either be classified as a cluster development or a building and grading envelope conservation development.

The purpose of a cluster development, defined by Buncombe County, is to preserve ridge tops, woodlands, and open spaces, and to provide an alternative for those desiring to build more cost-effective homes on tracts by providing no lot size requirements and density bonuses by cluster development on the lower elevations and subtle slopes. The clustering of lots on lower elevations, less steep slopes, and less environmentally sensitive areas is permitted if these conditions are met. Thirty percent of the overall tract must be conserved and identified as primary and secondary conservation areas. Primary conservation areas include landslide hazard areas, surface waters and surface water buffers, 100-year floodplain, wetlands, and areas having an average natural slope greater than or equal to 35 percent. Secondary conservation areas consist of land that is currently undeveloped or in a natural state not meeting the definition of primary conservations, existing farmland, and other areas subject to review by the Planning Board. Areas required to be conserved must be located within identified primary conservation areas, but if more land needs to be conserved than the amount of primary conservation areas on the tract, secondary conservation areas are permitted to county towards the requirement. The areas identified for conservation shall be indicated on the final plat.

Conserved open space must remain in an undeveloped or natural state except for the development of non-motorized passive recreation such as walking and biking trails, gardening, camping areas, and similar low impact outdoor activities. The development of club houses, pools, golf courses, tennis courts, and other similar structures are not permitted for the use of passive recreation. The location, type, and materials used to construct passive recreation facilities must be submitted on the preliminary plans and be approved by the Planning Department. The development of

passive recreation areas within the conservation or open space areas must not exceed five percent of the total acreage of the tract. The method of conservation of open space must be stated on the subdivision plans and approved by the Planning Board or Department. The conservation space is required to be dedicated to, owned, and maintained by a homeowners' association in which the membership is mandatory for all homeowners within the development, a perpetual conservation easement on the open space enforced by a land trust or conservation organization, a governmental body including Buncombe County Parks and Recreation, the State of North Carolina, the United States Government, or any other entity designed to afford perpetual maintenance.

The disturbed and impervious area is calculated for the entire tract and includes all disturbance and impervious surface including but not limited to home sites, communal buildings such as clubhouses, infrastructure installments, and communal infrastructure such as roads and stormwater measures. Cluster developments that utilize septic systems must include, as a part of a soil investigation report, the conclusion that the amount of disturbance permitted on each individual lot is adequate for a minimum of a three-bedroom septic system and the construction of a 1,500 square foot single-family home. The maximum limitations for the gross site area being disturbed is 30 percent and the gross site area being impervious is 15 percent. The development and final plats must state the maximum allowed disturbed and impervious area for the entire tract as both a percentage and number of acres. The preliminary plan and final plat must provide the maximum amount of disturbed and impervious land including the installation of infrastructure and the development of lots, a description of the areas that may be disturbed, and an identification of the areas that are going to be dedicated to conservation space.

The second type of alternate subdivisions is the building and grading envelope conservation development. The purpose is the same as the alternative path

# Regional Use of Cluster Subdivisions

hillside development including the preservation of environmentally friendly areas and to provide design flexibility, however, this type of conservation development is intended to limit disturbed areas and environmentally sensitive areas such as floodplains, wetlands, steep slopes, and ridgelines. For building and grading envelope conservation developments, the site plan must identify the disturbance limitations for infrastructure installation. The disturbance of installing communal infrastructure shall not be greater than 15 percent of the total tract and impervious surfaces must constitute more than ten percent of the total tract. The preliminary and final plats must both state the total amount of disturbed and impervious area for the tract as a number of acres and a percent. Structures are only allowed to be constructed within the building and grading envelopes. The building and grading envelopes must not be located on a slope of 35 percent or higher, moderate and high-risk landslide hazard areas, surface waters and surface water buffers, 100-year flood plain, and wetlands. Building and grading envelopes are required to be at least 150 feet apart and the space in between building envelopes must consist of preserved vegetation. The envelopes must be no larger than 0.6 acres and inclusive of the structure, parking, well, and driveway. The location of individual septic systems is determined by the Buncombe County Health Department.

The lot size is dictated by the size of the building and grading envelope because the size of the lot must equal at least 300 percent of the size of the building and grading envelope. Construction and individual lot infrastructure related land disturbing activities, excluding individual septic systems, are limited to the area within the building and grading envelope. The envelopes must be precisely portrayed on the preliminary plat, on site during construction using fences, and recorded on the final plat. The amount and location of disturbances must be certified by a licensed professional before receiving the final certificate of occupancy. All land not included in lots, envelopes, or

for the installation of communal infrastructure must be conserved space. At least 15 percent of the overall tract is required to be conserved and that area must be designated as either primary or secondary conservation areas. The development of passive recreation areas within the conservation areas must not be greater than five percent of the overall tract. All the other standards are the same as the standards for alternative path hillside development subdivisions.

One way Buncombe County has incentivized the alternative path within the hillside development standards is by offering density bonuses. These density bonuses may be awarded based on certain development criteria designed in the way of a point system, which is shown below. Bonus points are cumulative and may be applied for density bonuses based on the alternative path chosen by the applicant. The density bonus based on the number of points earned is shown on the next table. The applicant must clearly identify how many points were earned and used on the submitted preliminary plans.

Points Chart

Action	Point Value
Percentage of entire tract disturbed (including infrastructure and lot development) is 20.00% or less, but greater than 18.00%	10
Percentage of entire tract disturbed (including infrastructure and lot development) is 18.00% or less, but greater than 16.00%	15
Percentage of entire tract disturbed (including infrastructure and lot development) is 16.00% or less, but greater than 14.00%	20
Percentage of entire tract disturbed (including infrastructure and lot development) is 14.00% or less	25
Amount of conserved green space is greater than 30% of the tract but less than or equal to 40% of the tract	10
Amount of conserved green space is greater than 40% of the tract but less than or equal to 50% of the tract	15
Amount of conserved green space is greater than 50% of the tract but less than or equal to 60% of the tract	20
Amount of conserved green space is greater than 60% of the tract	25
Development of any kind occurs only on slopes less than 35% as shown on submitted slope analysis and occurs on property consisting of the lowest 35% of the elevation of the tract	25
Development of any kind occurs in areas less than or equal to 25% as shown on submitted slope analysis and occurs on property consisting of the lowest 25% of the elevation of the tract	50

# Regional Use of Cluster Subdivisions

## Density Bonuses Based on Points

Points Earned	If development is an Alternative Path <i>Cluster Development</i> or <i>Building and Grading Envelope Conservation Development</i> , the allowed number of lots shall be the % listed below of the calculated density per subsection <a href="#">70-68(d)(2)</a> based on the number of points earned	If development is an Alternative Path <i>Building and Grading Envelope Conservation Development</i> , the following parameters shall be followed in regard to maximum size of building envelope, required size of individual lots, and spacing between lots based on the number of points earned		
		Envelopes shall be no greater than the acreage listed below	The lot size shall equal to at least the % listed below of the size of the building and grading envelope	Building envelopes shall be spaced at least the number of feet apart listed below
20	115%	0.65	280%	150
25	120%	0.66	260%	140
30	125%	0.67	240%	130
35	130%	0.68	220%	120
45	135%	0.69	200%	110
50	140%	0.7	180%	100
55	145%	0.71	160%	90
60	150%	0.72	140%	80
65	155%	0.73	120%	70
70—80	160%	0.75	100%	60
100	No density requirement	No building envelope size requirements	No size requirements for lots	No spacing requirements

The third and final type of alternative subdivision offered by Buncombe County is the conservation easement hillside development subdivision. For submitted subdivision plans, an average natural slope that contains a perpetual conservation easement is required to be obtained and enforced by a land trust or conservancy organization will be calculated without including the size of the conservation easement. The conserved space shall remain in an a natural, vegetated, and undeveloped state. The conservation easement, with prior approval from the county, will be established and designated of record before, or at the same time, as the recording of the first final subdivision plat along with the proposed holder of the conservation easement.

All subdivisions of land that are applicable to these requirements shall list three items on the original plat for the sake of record keeping. First, the average natural slope of the entire tract and each individual lot. Second, the maximum allowed disturbed acreage for infrastructure installation and each individual lot. Third, the maximum acreage allowed for impervious surfaces for infrastructure installation and each individual lot. Buncombe County emphasizes that anybody violating any provision of this section is to be subject to a civil penalty of anywhere from \$100 to \$1,000 per day. Each day the violation continues, a separate fee will be applied. Anybody who fails to comply with any provision of this section will have their development permit, building permit, or other work authorization revoked. Also, any land disturbance that exceeds the amount specified will be replanted in accordance with Buncombe County’s revegetation plan, and any impervious surface percentage that exceeds the amount specified will be removed.

Buncombe County defines the intention behind their conservation development standards as providing the flexibility in design that will allow for the preservation of conserved open space and dedicated farmland. Conservation developments are instituted to limit disturbed areas and preserve environmentally sensitive areas. All subdivisions that meet the definition for a hillside development cannot be conservation developments. Minimum lot frontage standards are not applicable to conservation developments and the total number of lots must not exceed the density limitations below.



Buncombe County, North Carolina

# Regional Use of Cluster Subdivisions

Zoning District	Maximum Density Lots Per Acre with Public Sewer Only	Maximum Density Lots Per Acre with Public Water and Sewer	Maximum Density Lots Per Acre No Public Water and Sewer
R-LD	1.00	1.00	1.00
R-1	3.00	5.00	1.4
R-2	3.00	7.00	1.4
R-3	4.00	7.00	1.4
N5	4.00	8.00	1.4
CS	4.00	8.00	1.4
EMP	4.00	8.00	1.4
CR	3.00	5.00	1.4
PS	4.00	8.00	1.4

Conservation developments in Buncombe County must be at least 15 acres in size and 50 percent of the overall tract must be conserved using a contiguous design. Existing agricultural land of ten acres or larger that will remain in active agricultural production can be counted as double the amount of conserved space. For it to be applicable, the agricultural land must be at least ten acres not including any land in forestry or horticultural production. To apply, the applicant shall submit an agricultural management plan proving how the active farmland will be managed, utilized, and the method of conservation. This plan must be reviewed and approved by the Buncombe County Planning Department and Cooperative Extension Office. Once it is approved, it will become a part of the approved subdivision plan. It is at the discretion of the Planning Department whether the existing agricultural land will be counted as double the amount of conserved area or not.

Further standards for conservation developments include that passive recreation is not allowed on conserved agricultural land. A 25-foot buffer strip must be provided where proposed lots touch surrounding property lines. A ten-foot buffer strip must be provided adjacent to the deeded public rights-of-way. The buffer strip may consist of existing vegetation or a row of evergreen trees, which at the time of planting must be at least five feet in height and no more

than eight feet apart. When buffers are required, they can be used towards the percentage of conservation area.

All the different types of alternative developments, including conservation developments, are similar in their purposes and standards but used in different ways. Buncombe County primarily uses conservation developments to conserve agricultural land, while alternative path hillside developments are used in to regulate development in areas with a natural slope to maintain the rural character of the county, and building and grading envelope developments are used to limit the use of grading to further preserve the mountainous terrain of the county. Overall, all the different types of alternative developments work together to create a more sustainable future for Buncombe County, North Carolina.



# Analysis of Pitt County's Ordinances

Pitt County, North Carolina, defines a cluster development as permitting smaller lot sizes with the stipulation that open space is reserved. The lot sizes and setback requirements are flexible if there is no increase in the density of the development. Pitt County's current requirements regarding cluster developments include that the development is at least ten acres if the development is in a SR, or MFR zoning district, or at least twenty-five acres if it is in an RR, RA, or R40 zoning district. The purpose of cluster development, as described by Pitt County, is intended to promote a subdivision design that minimizes the disturbance of land, encourages the grouping of building lots to better protect the county's natural resources, preserve open space, reduce stormwater run-off, and to contribute to the preservation of the area's rural or agricultural character. The development standards for cluster developments include that a portion of the land is to be permanently preserved as open space. This open space can be used for one of three purposes: to provide recreational opportunities for the residents of the development, to preserve and safeguard significant natural resources, or to protect productive farming and forestry uses.

The lot sizes for cluster developments can be smaller than the minimum lot size if the development is compliant to the following standards for open space:

- The total amount of open space is equal to or exceeds 15% of the total land area of the development.
- The open space areas should primarily be used for the purpose of preserving sensitive environmental features and/or significant resource areas such as wetlands, hydric soils, riparian areas, cropland, pastures, mature trees and forests, and meadows.
- The open space will be undivided preserves that connect housing areas and property lines. The design of the subdivision should be designed compactly to create larger conservation areas that are accessible to as many lots as possible within the development. To complete this, the majority of lots should be surrounded by undivided open space. This will provide the residents with safe and convenient pedestrian access to the open space and distribute all residents with direct views and access, except if the development is encompassed by farmland or other resource areas susceptible to human disturbance.

# The Future of Cluster Subdivisions in Pitt County

The future of Pitt County and its sustainability will be determined by how well the effective soil, used for both septic systems and agriculture, is balanced. Both needs are essential to the county, which has sparked debate on which need should be prioritized. Historically, agriculture has been vital to Pitt County's economy and is currently the county's main source of income. However, Pitt County's rapid growth and projected increase in population and number of housing units poses a serious threat to the county's way of life, if it is not properly and promptly addressed.

Due to Pitt County's rural nature and sprawled residential development, investments in infrastructure such as sanitary sewer is unfeasible and nonessential. Therefore, it is imperative that cluster subdivisions are regularly implemented to beneficially preserve the essential soil. A key benefit of cluster subdivisions is that with the use of large-scale septic systems, only the system or systems are required to be located on septic-friendly soil. The remainder of the subdivision including the dwelling units and open space do not have to lie on septic-friendly soil, which will help preserve the essential soil.

The benefits of cluster subdivisions are endless and essential to the dilemma faced by Pitt County. To help combat the loss of farmland, the implementation of cluster subdivisions will help effectively balance the conflicting uses of permeable soil. Cluster subdivisions can conserve 30% to 70% of the land consumed by traditional subdivisions while providing open space and ecological corridors without a decrease in density. The element of open space is imperative to maintaining the rural character of the county by preserving and protecting valuable farmland, usable soils, timber, fields, and trees. More open space creates less impervious surfaces and more riparian buffers, decreasing the risk of flooding which has historically been a challenge faced by Pitt County.

The open space can be used in a variety of ways including, but not limited to, providing recreational activities such as walking or biking trails, parks, community gardens, farmers markets, pools, sports facilities including soccer fields, baseball fields, basketball courts, and tennis courts, and neighborhood clubhouses. With the development of a communal area, also comes a rise in community events and celebrations, including 4th of July events and concerts in the park, increasing the sense of community and quality of life for the residents.

# How Pitt County Can Encourage Cluster Subdivisions

The most beneficial way Pitt County can encourage cluster subdivisions is by offering multiple incentives, density bonuses, and alternative types of development as seen in Buncombe County. This strategic approach increases the developer's willingness to invest while forcing them to consider the environmental impacts of the development due to the strict regulations. Also, by providing multiple types of alternative subdivisions, developers have an array of options to choose from, making them feel less restricted. By analyzing the development from an environmentally friendly standpoint and implementing regulations that reflect that, such as built-upon area, disturbed area, and impervious area, developers are then forced to analyze how environmentally friendly their company is. Over time, this will cause developers to subconsciously think about the environmental impacts of their development, and development in general, shifting the focus of development from sprawl to cluster subdivisions.

Due to Pitt County currently having minimal standards for cluster subdivisions, the land within the county has not been used to its maximum potential. The amount of land in Pitt County's jurisdiction is limited and decreasing due to the increasing population and need for housing. However, developers are motivated by the amount of money the subdivision or development can bring in, so they tend to create sprawled subdivisions to increase their revenue, with little to no regard for the environment. The only way to shift the developers' focus is by placing strict regulations on the development of subdivisions.

Pitt County should increase the minimum amount of land dedicated to open space in cluster subdivisions from 15% to 30% and steadily increase the percentage over time, or Pitt County can offer multiple types of cluster subdivisions with varying open space requirements. However, to completely implement the use of open space in all subdivisions, Pitt County can also increase or create an open space requirement for traditional subdivisions as well. The county should also include regulations on the built-upon area, the amount of land disturbed, and the number of impervious surfaces. With those regulations in place, the county can then offer density bonuses by the percentage of affected land per category, incentivizing the sustainable development of land. In turn, this will help mitigate the rapid loss of soil used for both agriculture and septic systems by creating thoroughly planned communities.

To offer multiple types of clusters, or alternative, subdivisions, Pitt County can specify one type of development and its respected regulations for each major environmentally sensitive area. One set of regulations can be applicable to developments in agricultural districts or a development within a certain distance to farmland, timber production, or horticulture production. Another set of regulations, including the concentration of development on high ground and design recommendations to avoid runoff and minimize the number of impervious surfaces, can be implemented in flood-prone areas. A third set of regulations can be used for wetlands, protected species, and other environmentally sensitive areas. The regulations for these types of development should all focus on the environmental impacts of development such as minimizing the effects of runoff. While different districts have different priorities, this can easily be implemented by adding an overlay zone for residential development in the affected areas. Another effective way to categorize the use of open space is to dedicate the open space to one or more specific uses, as implemented by Wake County.

In non-environmentally sensitive areas, the balance between open space and recreational opportunities should be optimized. This will increase the quality of life, health, and sense of community amongst the residents.

# References

About Pitt County | Pitt County, NC. (n.d.). Wwww.pittcountync.gov. <https://www.pittcountync.gov/258/About-Pitt-County>

Carolina, N. (1970). SUBDIVISION ORDINANCE CUMBERLAND COUNTY CUMBERLAND COUNTY JOINT PLANNING BOARD. In AMENDMENTS THROUGH. [https://www.cumberlandcountync.gov/docs/default-source/planning-documents/ordinances/county/cumberland-county-subdivision-ordinance-\(revised-2-20-23\).pdf?sfvrsn=9440345b\\_2](https://www.cumberlandcountync.gov/docs/default-source/planning-documents/ordinances/county/cumberland-county-subdivision-ordinance-(revised-2-20-23).pdf?sfvrsn=9440345b_2)

Cluster Housing Saves Open Space. (2010). Useful-Community-Development.org. <https://www.useful-community-development.org/cluster-housing.html>

Cluster Subdivisions. (n.d.). American Planning Association. <https://planning.org/pas/reports/report135/ConservationRecommendationsforPriorityTerrestrialWildlifeSpeciesandHabitatsinNorthCarolina>. (n.d.). Retrieved April 24, 2023, from <https://www.ncwildlife.org/Portals/0/Conserving/documents/ConservingTerrestrialHabitatsandSpecies.pdf>

HOUSING INNOVATIONS PROGRAM Cluster Development TOOL PROFILE Objectives Housing Options in Expensive Markets Missing Middle Density. (n.d.). Retrieved April 24, 2023, from <https://www.psrc.org/media/2022>

IREDELL COUNTY PLANNING & DEVELOPMENT PLANNING STAFF REPORT Proposed Text Amendment -Subdivision Regulations EXPLANATION OF THE REQUEST. (n.d.). Retrieved April 24, 2023, from <https://www.iredellcountync.gov/AgendaCenter/View-File/Item/560?fileID=31417#:~:text=R5%20Major%20Subdivisions%2C%20Section%20B%20Cluster%20Subdivisions%20B>.

lindsay. (2020, May 18). What's at stake when we pave over, fragment and otherwise fail to protect farmland from the disruptions of development? American Farmland Trust. <https://farmland.org/fut-national-pr/>

Lori Sallet. (2020, May 18). What's at stake when we pave over, fragment and otherwise fail to protect North Carolina's farmland from the disruptions of development? American Farmland Trust. <https://farmland.org/fut-north-carolina-pr/#:~:text=However%2C%20the%20threat%20is%20more%20than%20just%20urban>

NC Farmland at Risk. (n.d.). Ncfarmlink.ces.ncsu.edu. Retrieved April 24, 2023, from <https://ncfarmlink.ces.ncsu.edu/nc-farmland-at-risk/>

Pitt County | NCPedia. (n.d.). Wwww.ncpedia.org. <https://www.ncpedia.org/geography/pitt>

The Advantages and Disadvantages of Cluster/Conservation Development – Community Planning and Zoning. (n.d.). Community-Planning.extension.org. <https://community-planning.extension.org/the-advantages-and-disadvantages-of-cluster-conservation-development/>

Unified Development Ordinance Text Amendment OA-02-22. (n.d.). Retrieved April 24, 2023, from <https://s3.us-west-1.amazonaws.com/wakegov.com-if-us-west-1/s3fs-public/documents/2022-12/OA-02-22%20Overview%20and%20Text%20Changes-combined.pdf>

US EPA, O. (2015, June 1). Large-Capacity Septic Systems. US EPA. <https://www.epa.gov/uic/large-capacity-septic-systems>

# References

Walljasper/Midwest, C. (2019, April 10). Disappearing farmland - Investigate Midwest. Investigate Midwest. <https://investigatemidwest.org/2018/09/18/disappearing-farmland/>

Zoning Ordinance. (n.d.). Retrieved April 24, 2023, from <https://www.pittcountync.gov/DocumentCenter/View/12299/Zoning-Ordinance---DRAFT-Edits>