Capital Impacts Study

Goochland County, Virginia

Submitted to:

Goochland County, Virginia

February 2, 2018

TischlerBise
FISCAL | ECONOMIC | PLANNING

4701 Sangamore Road
Suite S240
Bethesda, Maryland 20816
800.424.4318
www.tischlerbise.com

TischlerBise
4701 Sangamore Road
Suite S240
Bethesda, Maryland 20816
800.424.4318

www.tischlerbise.com

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INTRODUCTION FROM THE COUNTY

BOARD OF SUPERVISORS

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Kendall C. Peterson, Chair, District 5

John A. Budesky
County Administrator

Derek Stamey, MPA
Deputy County Administrator

Todd Kilduff, P.E.
Assistant County Administrator

January 29, 2018

Goochland County is excited to present this Capital Impacts Study. As Goochland County is becoming a destination for residential and commercial development, the Board of Supervisors has committed to having tools and processes to effectively evaluate the potential impacts of growth. Accordingly, we commissioned a top-notch fiscal and economic analysis consultant, Tischler Bise, to prepare this study in order to provide county citizens, staff, Planning Commissioners, and our Board with data and information about the anticipated impacts development may have on public facilities. We believe in making data-driven decisions, and the Capital Impacts Study will allow us to continue to fulfill our mission to provide high quality services to county citizens and businesses in an efficient, effective, and accountable manner.

In order for county staff to be able to use the data from the Capital Impacts Study to evaluate individual proposed developments, Tischler Bise also created a Capital Impacts Model which uses both the study data and the specific characteristics of a proposed residential development (location, number of units, etc.) to calculate the anticipated impacts from that development. The Capital Impacts Model provides county staff with a mechanism to make specific calculations (both total and per unit) of the impacts from a proposed development and provide the Board with information for analyzing the anticipated impacts from each development proposal.

The Capital Impacts Study includes data about all of the county's capital facilities (public safety, public schools, roads, parks and recreation, courts, environmental, general government, and libraries). It also analyzes facility use from both residential and commercial development. The breadth of this data will allow the Board to make data-driven decisions about development proposals. While the Capital Impacts

1800 Sandy Hook Road
P. O. Box 10, Goochland, VA 23063
(804) 556-5800 ● (804) 556-4617 Fax ● (TDD 711 (Virginia Relay))
Email: countyadmin@goochlandva.us

Study will serve as an overall long-term planning document, its genesis originated from a change in state cash proffer law which limited the County's ability to accept cash proffers for residential development.

Prior to a 2016 state law change, residential development proposals were evaluated based not only on applicable planning principles, but also on whether developers were mitigating the development's anticipated fiscal impacts on capital facilities for public safety, roads, parks and recreation, and libraries. The most significant change in the new law is that residential development impacts must be evaluated geographically as being "specifically attributable" to capital facilities. Accordingly, the study identifies three county regions – Eastern, Central, and Western. Regional differences in the number of residents per household and the availability of public facilities leads to differing impacts being identified for each region. Another change in the law is that cash proffers can only be accepted to construct needed public facility capacity, rather than to offset incremental increases in the anticipated use of facilities due to new residents. Finally, the new law eliminated libraries as a cash-proffer-eligible category.

In closing, let me again emphasize that Goochland County is excited to have the Capital Impacts Study and Model as tools to allow it to make data-driven decisions and improve its ability to engage in long-term planning for the county. The Board of Supervisors appreciates that these tools will provide additional transparency to county citizens about the impacts of development, and that these tools will assist in achieving and maintaining Goochland County's goal to be a prosperous and vibrant community.

John A. Budesky

John A. Budesky
County Administrator

1800 Sandy Hook Road
P. O. Box 10, Goochland, VA 23063
(804) 556-5800 ● (804) 556-4617 Fax ● (TDD 711 (Virginia Relay))
Email: countyadmin@goochlandva.us

EXECUTIVE SUMMARY

Overview

TischlerBise has been retained by Goochland County, Virginia, to analyze the **capital impacts of new development.** The objective is to quantify the capital costs generated by new development in the County, specifically in light of changes to Cash Proffer law in Virginia. The assignment includes the development of a Capital Impacts Model (CapIM) for use in:

1. Calculating the "static" capital impact of new development by type of land use and
2. To allow County staff to use the Capital Impacts Model to determine the capital costs for development projects that take into consideration whether capacity is available or not (and therefore, whether a cash proffer can be offered and accepted by the County).

TischlerBise evaluated capital impacts for the following categories of public capital improvements: (1) Public Schools, (2) Parks and Recreation, (3) Public Safety: Sheriff, (4) Public Safety: Fire and Rescue, (5) Public Safety: Animal Protection, (6) Transportation, (7) Library, (8) General Government, (9) Courts, and (10) Environmental Services/Solid Waste. Methodologies and calculations are presented in this report as supporting documentation for estimating capital impacts from new growth as well as potential support for cash proffers.

Background on Cash Proffers

Cash proffers are one-time voluntary monetary commitments made at the time of rezoning to offset the impact on certain public facilities from new residential development. The funds ultimately collected from cash proffers are used to construct capital improvements to mitigate capital impacts with the goal of maintaining levels of service. Funds can only be used for **capital** improvements that provide **additional capacity**, not operations or maintenance. Cash proffer are calculated using level of service standards to account for infrastructure that may currently have excess capacity.

Cash proffers cannot be used to correct existing deficiencies. However, since cash proffers do not apply to "by-right" development but only apply during the rezoning process, only a portion of the impacts from new growth can be mitigated through cash proffers. Cash proffers are a small part of an overall funding strategy and should not be regarded as a total solution for infrastructure financing needs. Therefore, other strategies and revenue sources are needed to offset the impact to infrastructure from new growth.

Cash proffers are authorized under Virginia Code §15.2-2303 and §15.2-2298. A major change to cash proffer authority was enacted in 2016 affecting Section 15.2-2303.4(B). The new section states that localities cannot request or accept an *unreasonable* proffer or deny a rezoning application or proffer condition amendment due to applicant's failure or refusal to submit an unreasonable proffer.

The implementation of this change to the cash proffer law hinges on defining an unreasonable proffer, or more positively, defining a reasonable proffer. This report and the accompanying Capital Impacts Model address this requirement specifically for Goochland County and provides a tool for ongoing implementation of the cash proffer law.

Furthermore, the changes to the cash proffer law restrict the infrastructure categories to public transportation facilities, public safety facilities, public school facilities, and public parks and further restricts the impacts that can be addressed to capacity improvements associated with construction projects.

Capital Impacts Approach

TischlerBise evaluated possible methodologies and documented appropriate demand indicators by type of land use for the infrastructure categories addressed in this study. The formula used to calculate each capital impact is diagrammed in a flow chart at the beginning of each chapter. Specific capital costs have been identified using local data and current dollars (2017). Because cash proffers reflect a point in time, the calculations and study should be updated periodically (typically 3 to 5 years). Costs reflect the direct impact of new development on the need for new facilities and infrastructure and do not reflect secondary or indirect impacts.

Capital impacts and resulting cash proffer amounts are calculated to recognize three key elements: ***need, benefit, and proportionality***.

- First, to justify a cash proffer for public facilities, it must be demonstrated that new development/rezonings will create a **need** for capital improvements (including an assessment of existing capacity).

- Second, new development/rezonings must derive a **benefit** from the payment of the cash proffers (i.e., in the form of public facilities constructed within a reasonable timeframe).

- Third, the cash proffer to be paid by a particular type of development (land use) should not exceed its **proportional** share of the capital cost for system improvements.

For each capital impact calculation, the report includes a summary table indicating the specific factors used to derive the amounts. These factors are referred to as "Level of Service" (LOS) standards.

The capital impacts outlined in this report reflect the actual cost to the County generated from new residential and non-residential development, and as such, each represents the true capital impact generated by type of land use for each public facility category.

The Capital Impacts Model developed for the County by TischlerBise is the tool to use to determine if a cash proffer can be collected due to the presence of "excess capacity" or not. The Model provides a cash proffer calculation for County staff to use in determining the reasonableness of a cash proffer for a particular development project.

Methodologies

Any one of several legitimate methods may be used to calculate cash proffers. The choice of a particular method depends primarily on the service characteristics and planning requirements for the facility type being addressed. Each method has advantages and disadvantages in a particular situation, and to some extent can be interchangeable, because each allocates facility costs in proportion to the needs created by development.

Reduced to its simplest terms, the process of calculating cash proffers involves two main steps: (1) determining the cost of development-related capital improvements and (2) allocating those costs equitably to various types of development. In practice, though, the calculation of cash proffers can become quite complicated because of the many variables involved in defining the relationship between development and the need for facilities. The following paragraphs discuss three basic methods for calculating cash proffers and how those methods can be applied.

Plan-Based Calculation. The plan-based method allocates costs for a specified set of improvements to a specified amount of development. The improvements are identified by a facility plan and development is identified by a land use plan. In this method, the total cost of relevant facilities is divided by total future demand to calculate a cost per unit of demand. Then, the cost per unit of demand is multiplied by the amount of demand per unit of development (e.g., housing units or square feet of building area) in each category to arrive at a cost per specific unit of development (e.g., single family detached unit).

Incremental Expansion Calculation. The incremental expansion method documents the current level of service (LOS) for each type of public facility in both quantitative and qualitative measures, based on an existing service standard (such as square feet per student). This approach ensures that there are no existing infrastructure deficiencies or surplus capacity in infrastructure. New development is only paying its proportionate share for growth-related infrastructure. The level of service standards are determined in a manner similar to the current replacement cost approach used by property insurance companies. However, in contrast to insurance practices, the cash proffer revenues would not be for renewal and/or replacement of existing facilities. Rather, revenue will be used to expand or provide additional facilities, as needed, to accommodate new development. An incremental expansion cost method is best suited for public facilities that will be expanded in regular increments, with LOS standards based on current conditions in the community.

Cost Recovery or Buy-In Calculation. The rationale for the cost recovery approach is that new development is paying for its share of the useful life and remaining capacity of facilities already built or land already purchased from which new growth will benefit. This methodology is often used for systems that were oversized.

At the beginning of each capital facility chapter the chosen methodology will be explained and illustrated with a figure.

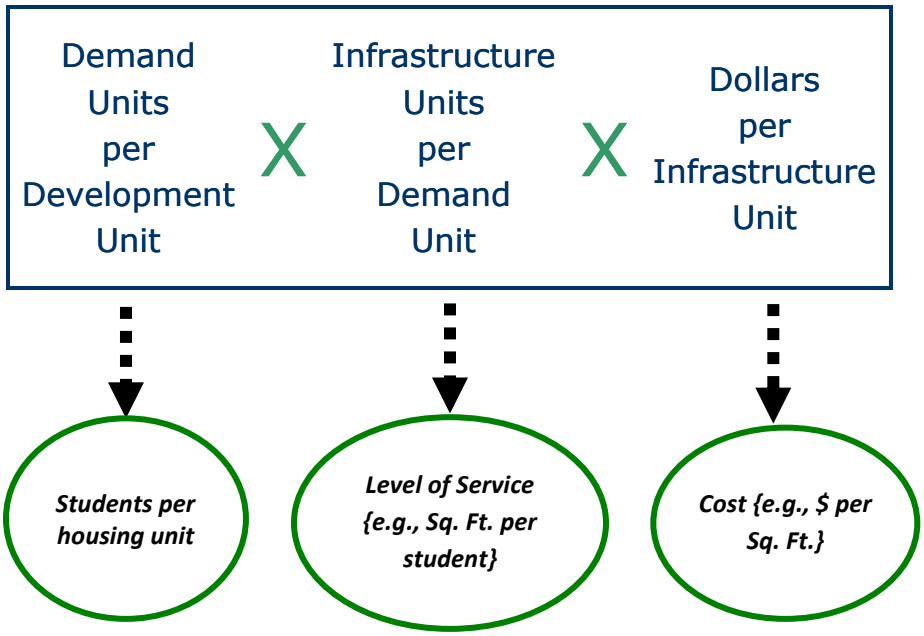
Generic Cash Proffer Calculation

In contrast to development exactions, which are typically referred to as project-level improvements, cash proffers fund growth-related infrastructure that will benefit multiple development projects, or the entire jurisdiction. The basic steps in a generic cash proffer formula are illustrated in Figure 1.

The first step is to determine an appropriate demand indicator, or service unit, for the particular type of infrastructure. The demand/service indicator measures the number of demand or service units for each unit of development. For example, an appropriate indicator of the demand for schools is growth in student enrollment and the increase in enrollment can be estimated from the average number of students per housing unit. The second step in the generic formula is to determine infrastructure units per demand unit, typically called **level of service (LOS) standards**. In keeping with the school example, a common LOS

standard is square feet per student. The third step in the generic formula is the cost of various infrastructure units. To complete the schools example, this part of the formula would establish the cost per square foot for school construction.

Figure 1. Generic Cash Proffer Formula



Credits

A general requirement common to cash proffer methodologies is the evaluation of *credits*. Two types of credits should be considered, **future revenue credits** and **site-specific credits**. Future revenue credits are necessary to avoid potential double payment situations arising from a one-time cash proffer payment plus the payment of other revenues that may also fund the same growth-related capital improvements.

Future revenue credits are dependent upon the cash proffer methodology used in the cost analysis. The incremental expansion methodology is best suited for public facilities that will be expanded incrementally in the future. Because new development will provide front-end funding of infrastructure, there is a potential for double payment of capital costs due to future principal payments on existing debt for public facilities. That is, because new development that may pay a cash proffer will also pay taxes to retire debt for the same type of infrastructure, a credit is included in the cash proffer calculation to account for this. (A credit is not necessary for interest payments if interest costs are not included in the cash proffers.)

The plan-based methodology is also used in this study. When using a plan-based method, it is important to determine if new development will contribute toward the cost of future public facilities.

The second type of credit is a **site-specific credit** for system improvements that have been included in the cash proffer calculations. A site-specific credit is handled during implementation and would reduce the cash proffer amount due to contributions of improvements or land that mitigate new development's impact on the infrastructure needs covered in the cash proffer program. Policies and procedures related to site-specific credits for system improvements should be addressed in the policy that establishes the Cash Proffer program. However, the general concept is that developers may be eligible for site-specific credits or reimbursements *only if they provide system improvements that have been included in the cash proffer calculations*. Project improvements normally required as part of the development approval process would not be eligible for credits against cash proffers.

Summary of Capital Impacts Approach

A summary of infrastructure categories, components, and geographies used in the analysis is provided below in Figure 2.

Figure 2. Summary of Goochland County Capital Impacts Methodologies

Type of Public Facility	Infrastructure Components and Geography Used		Cost Allocation	Methodology
Public Schools*	▪ Public School Facilities ○ Elementary School: Service Areas ○ Middle & High School: Countywide		Public School Students from Residential Development	Plan-Based Approach
Parks and Recreation*	Countywide ▪ Regional Parks ▪ Multiuse Trails ▪ Indoor Recreation Facilities	Service Areas ▪ Community Parks ▪ District Park ▪ Walking Trails	Residential	Plan-Based Approach
Public Safety: Sheriff*	▪ Sheriff Offices & Storage: Countywide		Residential and Nonresidential	Incremental Approach
Public Safety: Fire and Rescue*	▪ Fire Stations & Vehicles: Service Areas ▪ Fire Department Office & Training Center: Countywide		Residential and Nonresidential	Plan-Based Approach
Public Safety: Animal Protection*	▪ Animal Shelter: Countywide		Residential	Incremental Approach
Transportation*	▪ Roads Improvements and Expansion: Service Area ▪ Intersection Improvements: Service Area		Residential and Nonresidential	Plan-Based Approach
Libraries	▪ Central Library: Countywide		Residential	Plan-Based Approach
General Government	▪ General Government Facilities: Countywide		Residential and Nonresidential	Incremental Approach
Courts	▪ Court Facilities: Countywide		Residential and Nonresidential	Plan-Based Approach
Environmental Services/Solid Waste	▪ Convenience Sites: Countywide		Residential	Plan-Based Approach

Note: the public facilities with an asterisk are eligible for cash proffers.

LAND USE ASSUMPTIONS

This chapter documents the demographic data and land use projections to be used in the Capital Impacts Model for Goochland County. The following includes discussion and findings on:

- Household Sizes
- Current population and housing unit estimates
- Residential projections
- Demographics for age-restricted housing units
- Student Generation Rates
- Current employment and nonresidential floor area estimates
- Nonresidential projections

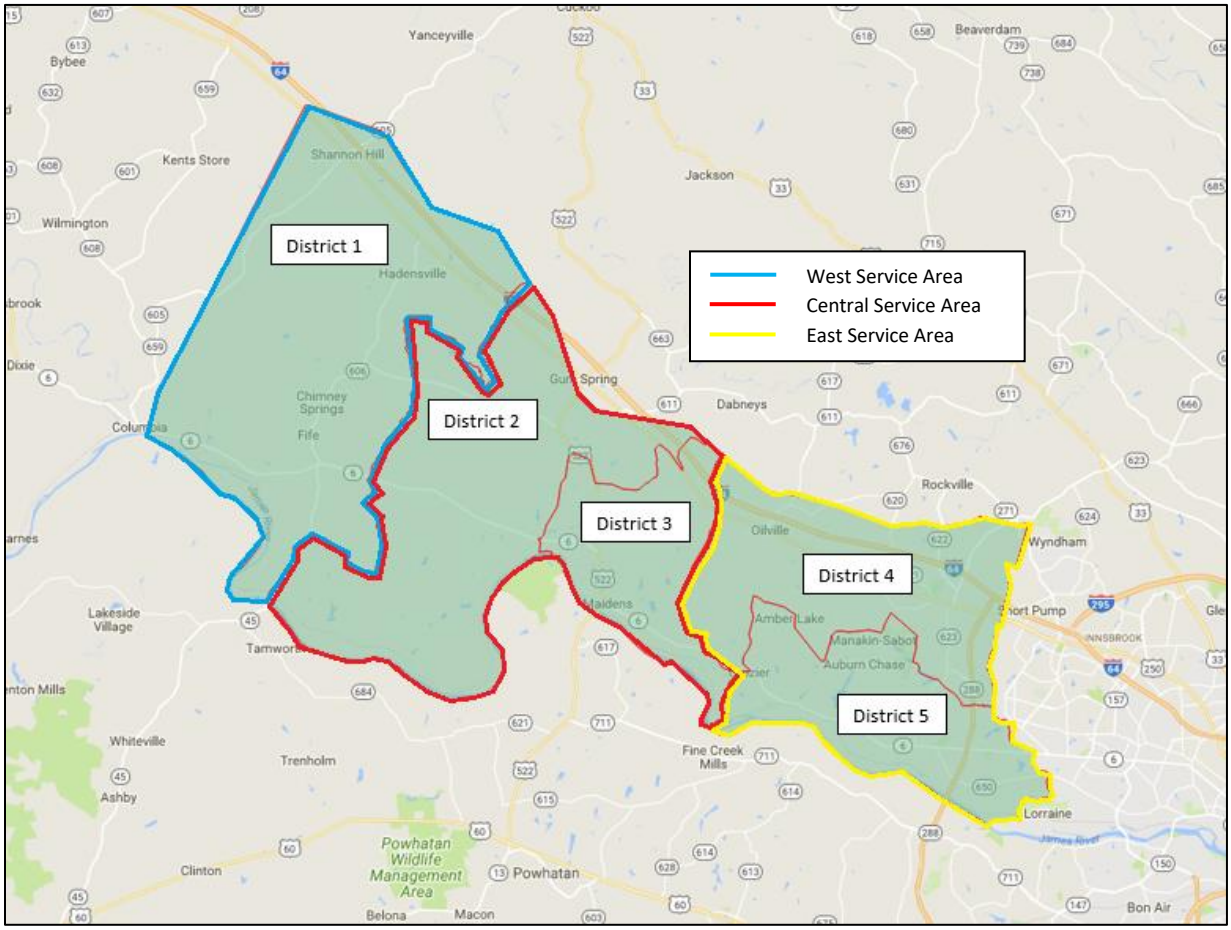
Note: calculations throughout this chapter are based on an analysis conducted using Excel software. Results are discussed in the memo using one-and two-digit places (in most cases), which represent rounded figures. However, the analysis itself uses figures carried to their ultimate decimal places; therefore, the sums and products generated in the analysis may not equal the sum or product if the reader replicates the calculation with the factors shown in the report (due to the rounding of figures shown, not in the analysis).

Service Areas

After interviews with County staff, three service areas were established based on their distinct growth patterns and characteristics: East, Central, and West. Goochland elementary school boundaries and the US Census Bureau's geographic areas known as "county subdivisions" were examined when determining the Service Area boundaries. The boundaries for the elementary schools and county subdivisions are very similar, but for data gathering purposes, the Service Areas follow the county subdivisions from the US Census Bureau. Illustrated in Figure 3, there are five subdivisions in Goochland County, named District 1-5. District 1's border is considered the West Service Area; District 2 and 3's outer border is considered the Central Service Area; District 4 and 5's outer border is considered the East Service Area.

These Service Areas also follow the fire and rescue districts that are used by Goochland County. Generally speaking, much of the current and future development is occurring in the East, while the West has been experiencing more limited growth. The Central Service Area holds many of the County's facilities, such as administration and school buildings. In the study's impact model, development will generate revenues and costs within their Service Area and capacity issues will be highlighted with much more detail compared to using the entire county as one Service Area.

Figure 3. Goochland County Service Area Map



Household Size

The capital impact analysis will use per capita standards and persons per housing unit (household size) to derive proportionate shares. (A household is a housing unit that is occupied by year-round residents.) When persons per housing unit are used in the calculations, infrastructure standards are derived using year-round population. TischlerBise recommends that capital impacts for residential development in Goochland County be analyzed according to the number of year-round residents per housing unit. Utilizing the most recent data on "county subdivisions" provided by the US Census Bureau, Figure 4 lists the 2015 population and housing stock of each Service Area. In the lower half of the Figure, the persons per housing unit factor (PPHU) is found. ***For single family units in the West the PPHU is 2.22, in the Central the PPHU is 2.23, and in the East the PPHU is 2.39.***

Figure 4. Persons Per Housing Unit by Service Area

Units in Structure	West Service Area			Central Service Area			East Service Area		
	Persons	Hsing Unit	PPHU	Persons	Hsing Unit	PPHU	Persons	Hsing Unit	PPHU
Single, Detached and Attached	3,442	1,563	2.20	6,609	2,877	2.30	9,214	3,852	2.39
Mobile Homes	480	200	2.40	276	210	1.31	106	49	2.16
2 to 4	0	0	-	0	0	-	10	10	1.00
5 or More	0	0	-	0	0	-	272	46	5.91

Units in Structure	West Service Area			Central Service Area			East Service Area		
	Persons	Hsing Unit	PPHU	Persons	Hsing Unit	PPHU	Persons	Hsing Unit	PPHU
Single Family [1]	3,922	1,763	2.22	6,885	3,087	2.23	9,320	3,901	2.39
Multifamily [2]	0	0	-	0	0	-	282	56	5.04

[1] Includes single family detached and attached amd mobile homes

[2] All other housing types

Source: U.S. Census Bureau 2011-2015 American Community Survey

The US Census estimates that there were no multifamily units in either the West or Central Service Area. The PPHU for multifamily units in the East is unusually high, so a factor was calculated for the west end of the neighboring Henrico County, VA. The two western county subdivisions of Henrico County, Tuckahoe and Three Chopt Districts, border the East Service Area of Goochland County. ***Combined, the Tuckahoe and Three Chopt subdivisions of Henrico County have a multifamily PPHU factor of 1.72. It is anticipated that multifamily development in Goochland County will have similar characteristics to multifamily development in neighboring Henrico County. Therefore, TischlerBise recommends using this multifamily PPHU instead of the unusually high factor found for Goochland County.*** This factor will be used for all three Service Areas.

Figure 5. Persons Per Housing Unit, Tuckahoe and Three Chopt Subdivisions of Henrico County, VA

Units in Structure	Persons	Hsing Units	PPHU
Single, Detached and Attached	102,070	37,602	2.71
Mobile Homes	243	89	2.73
2 to 4	6,242	3,038	2.05
5 or More	22,621	13,777	1.64

Units in Structure	Persons	Hsing Units	PPHU
Single Family [1]	102,313	37,691	2.71
Multifamily [2]	28,863	16,815	1.72

[1] Includes single family detached and attached and mobile homes

[2] All other housing types

Source: U.S. Census Bureau 2011-2015 American Community Survey

Service Area Proportion of Goochland County

In Figure 6, the population and housing units are totaled for each Service Area. The East Service Area accounts for about half of the population and single family housing units in Goochland County, while the Central Service Area accounts for about a third and the West Service Area accounts for about a fifth. This is the population and housing stock from 2015, the most recent data available from the US Census. The growth since 2015 is added to calculate 2017 (base year) totals.

Figure 6. Service Area Proportion of Goochland County

	Population	%	Single Family Units	%	Multifamily Units	%
East Service Area	9,602	47%	3,901	45%	56	100%
Central Service Area	6,885	34%	3,087	35%	0	0%
West Service Area	3,922	19%	1,763	20%	0	0%
Goochland County	**20,409**	**100%**	**8,751**	**100%**	**56**	**100%**

Single Family includes detached, attached, and mobile homes

Multifamily includes other housing types

Source: U.S. Census Bureau 2011-2015 American Community Survey

Historical Building Permits

To calculate the base year housing stock and population, building permit data is used. Provided by the County, Figure 7 lists the annual building permit data for 2015-2017. Growth in 2015, 2016, and 2017 will be applied to the 2015 housing stock total to estimate base year housing levels. Since the US Census Bureau's American Community Survey was completed in July 2015, to eliminate possible double counting the 2015 building permit total is prorated by half. Furthermore, the 2017 permit data is current through October 2017. Additionally, there was a large two-phase multifamily development beginning in 2013 which is not included in the 2015 US Census data, so the first phase of the development (totaling 255 multifamily units) is included in the base year total. As a result, 437 new single family homes and 710 multifamily homes are added to 2015 housing unit totals.

Figure 7. Housing Growth from 2015-2017

Growth from building permits

Housing Type	2015*	2016	2017	Total
Single Family	81	135	221	437
Multifamily	0	82	373	455

Additional growth to be included

Housing Type	Units
Single Family	0
Multifamily	255

Total growth from 2015-2017

Housing Type	Units
Single Family	**437**
Multifamily	**710**

Source: Goochland County

* Half of the 2015 building permits. There were a total of 162 permits in 2015.

Note: The 2017 data is current through the month of October.

Current Population and Housing Units

To calculate the study's base year (2017) housing and population assumptions, the 2015 housing stock data provided by the US Census Bureau and the data on housing growth since 2015 are utilized. According to the permit data, of the new single family units built since 2015, 52 are in the West Service Area, 134 new units are in the Central Service Area, and 251 new units are in the East Service Area. All the multifamily units were constructed in the East Service Area.

Figure 8 details population estimates for each Service Area using the corresponding PPHU factors for single family and multifamily housing units. As an example, the West Service Area has 1,815 single family units and the PPHU for single family units in the West is 2.22. By multiplying the two, the population, 4,038, is calculated for the West. County total base year population is estimated at 22,456.

However, the countywide population provided by County staff is 22,708, slightly higher than the population in Figure 8. The population listed in the figure is only residents in single family and multifamily units and does not include other populations, like those in group quarters. To include these other populations, the County's countywide population total will be used in the base year's projections.

Figure 8. Base Year Population and Housing Units

	West	Central	East	Total
Population	4,038	7,184	11,235	22,456
Housing Units				
Single Family	1,815	3,221	4,152	9,188
Multifamily	0	0	766	766
Total	1,815	3,221	4,918	9,954

Source: TischlerBise
Note: The base year population includes only housing unit population. As a result, it is slightly less than the County's countywide population estimate (22,708).

Population and Housing Unit Projections

Provided by Goochland County staff, Figure 9 lists the housing developments in the County that are in the pipeline to be developed in the near future. These totals are used to determine the housing growth projections for the East and Central Service Areas. Although there are no current projects for the West Service Area, growth is expected, although relatively small. According to permit data, from 2015-2017 there were 52 new single family housing units built in the West Service Area. The annual average of 17 housing units is applied to estimate growth in the West.

Figure 9. Anticipated Future Housing Development in Goochland County (as of 2016)

Housing Type	Units
Single Family	
East Service Area	
CCRC	1,000
Creekmore Place	16
Hunt Club Hill	34
Kinloch Sections 8,9, & 10	140
Mosaic West Creek	520
Parkside Village	126
Readers Branch	206
Swanson Ridge	100
Tuckahoe Creek	47
Subtotal	2,189
Central Service Area	
Breeze Hill	131
Krueger/Harris Rezoning	66
Lanes End	29
Monteiro Estates	54
Rockets Ridge	46
Rose Retreat	45
Swann's Inn - Johnson	15
Subtotal	386

Housing Type	Units
Multifamily	
East Service Area	
Bristol	114
CCRC	300
Manakin Towne	229
Patterson Avenue	300
Subtotal	943

Single Family Total	**2,575**
Multifamily Total	**943**
New Housing Grand Total	**3,518**

Source: Goochland County

TischlerBise obtained and evaluated available projections from the Weldon Cooper Center and the Goochland County Comprehensive Plan as well as evaluated recent building permit activity and anticipated pipeline development, both of which are described above. Based on TischlerBise's analysis of the data, it is projected that there will be a growth of 2,748 single family housing units and 943 multifamily housing units in Goochland County over the next ten years. Based on the location of developments in the pipeline, 2,189 single family units (80 percent) are anticipated in the East, 386 single family units (14 percent) in the Central, and 173 single family units (6 percent) in the West. Also, all the multifamily developments are expected in the East with 369 housing units being projected for 2018 and the remainder developing over the following years. Although developments may occur in a "bumpy" fashion, the model uses a straight-line approach for the growth over the next ten years. As a result, the East Service Area averages 313 housing units every year, the Central Service Area averages 39, and the West Service Area averages 17.

Housing growth drives population growth in the model. The annual increase in population is calculated by multiplying new housing units by their corresponding PPHU. To capture all populations in Goochland County, the base year population is consistent with the countywide population provided by County staff. This allows for populations not in single family and multifamily housing units, such as group quarters, to

be included in the projections. Below in Figure 10, the ten-year increase for each Service Area and Goochland County is projected. ***By 2027, it is assumed that there will be an increase of 6,854 residents in the East Service Area, 861 residents in the Central Service Area, and 386 residents in the West Service Area. The majority (85 percent) of the housing growth in Goochland County is projected to occur in the East.***

Figure 10. Population and Housing Unit Projections

	Base Year 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total Increase
GOOCHLAND COUNTY												
Population	22,708	23,990	24,748	25,505	26,263	27,020	27,778	28,535	29,292	30,050	30,807	8,099
Housing Units												
Single Family	9,188	9,463	9,738	10,013	10,287	10,562	10,837	11,112	11,387	11,662	11,936	2,748
Multifamily	766	1,135	1,199	1,263	1,326	1,390	1,454	1,518	1,581	1,645	1,709	943
Total	9,954	10,598	10,936	11,275	11,614	11,952	12,291	12,630	12,968	13,307	13,645	3,691
EAST SERVICE AREA												
Population	11,241	12,399	13,032	13,664	14,297	14,930	15,563	16,196	16,829	17,462	18,094	6,854
Housing Units												
Single Family	4,152	4,371	4,590	4,809	5,028	5,247	5,465	5,684	5,903	6,122	6,341	2,189
Multifamily	766	1,135	1,199	1,263	1,326	1,390	1,454	1,518	1,581	1,645	1,709	943
Total	4,918	5,506	5,789	6,071	6,354	6,637	6,919	7,202	7,485	7,767	8,050	3,132
CENTRAL SERVICE AREA												
Population	7,183	7,269	7,355	7,441	7,527	7,613	7,699	7,785	7,871	7,958	8,044	861
Housing Units												
Single Family	3,221	3,260	3,298	3,337	3,375	3,414	3,453	3,491	3,530	3,568	3,607	386
Multifamily	0	0	0	0	0	0	0	0	0	0	0	0
Total	3,221	3,260	3,298	3,337	3,375	3,414	3,453	3,491	3,530	3,568	3,607	386
WEST SERVICE AREA												
Population	4,029	4,068	4,106	4,145	4,183	4,222	4,260	4,299	4,337	4,376	4,414	385
Housing Units												
Single Family	1,815	1,832	1,850	1,867	1,884	1,902	1,919	1,936	1,954	1,971	1,988	173
Multifamily	0	0	0	0	0	0	0	0	0	0	0	0
Total	1,815	1,832	1,850	1,867	1,884	1,902	1,919	1,936	1,954	1,971	1,988	173

Note: As stated previously, the countywide population provided by the County is listed to include all populations, such as those in group quarters.

Age-Restricted Single Family Housing Unit

Along with single family and multifamily housing units, the Capital Impact Model includes age-restricted single family units. This type of residence has been included in the model based on the development trend in Goochland County. An age-restricted development is considered to only allow residents over the age of 55 and there are no permanent residents of school-age and are within a development community of similar homes.

These characteristics result in lower person per housing unit (PPHU) and vehicle trip factors. The person per housing unit factor for age-restricted single family housing units in Goochland County were found by using US Census 2011-2015 American Community Survey data. The sampling area for American Community Surveys generally encompasses a population of 100,000, so the sample used included Powhatan County as well. In Figure 11, the survey resulted in 1,160 housing units with 1,927 residents

over 55, a PPHU of 1.66. In Goochland County, the countywide PPHU is 2.30. By dividing the two factors, an adjustment factor of 72 percent is found and will be applied to the Service Area PPHUs.

Figure 11. Age-Restricted PPHU Adjustment Factor

	Persons Age 55+ (Region)	Housing Units (Region)	Persons Per Housing Unit (Region 55+ Residents)**	Total Persons Per Housing Unit (Countywide)	% Adj. for 55+ Resident Households
Total	1,927	1,160	1.66	2.30	72%

Source: US Census, 2011-2015 ACS 5-Year PUMS data

It is expected that household sizes for age-restricted homes will follow the same trend as non-age restricted single family homes, so in Figure 12 the adjusted factor found above is applied to the non-age restricted PPHUs to find the PPHUs for the age-restricted single family housing units in Goochland County.

Figure 12. Age-Restricted Single Family PPHU by Service Area

Service Area	Non-Age Restricted PPHU	Age-Restricted PPHU
East	2.39	1.73
Central	2.23	1.61
West	2.22	1.61

Note: Countywide adjustment factor is applied to Single Family PPHUs for each Service Area to find Age Restricted PPHUs.

Student Generation Rates

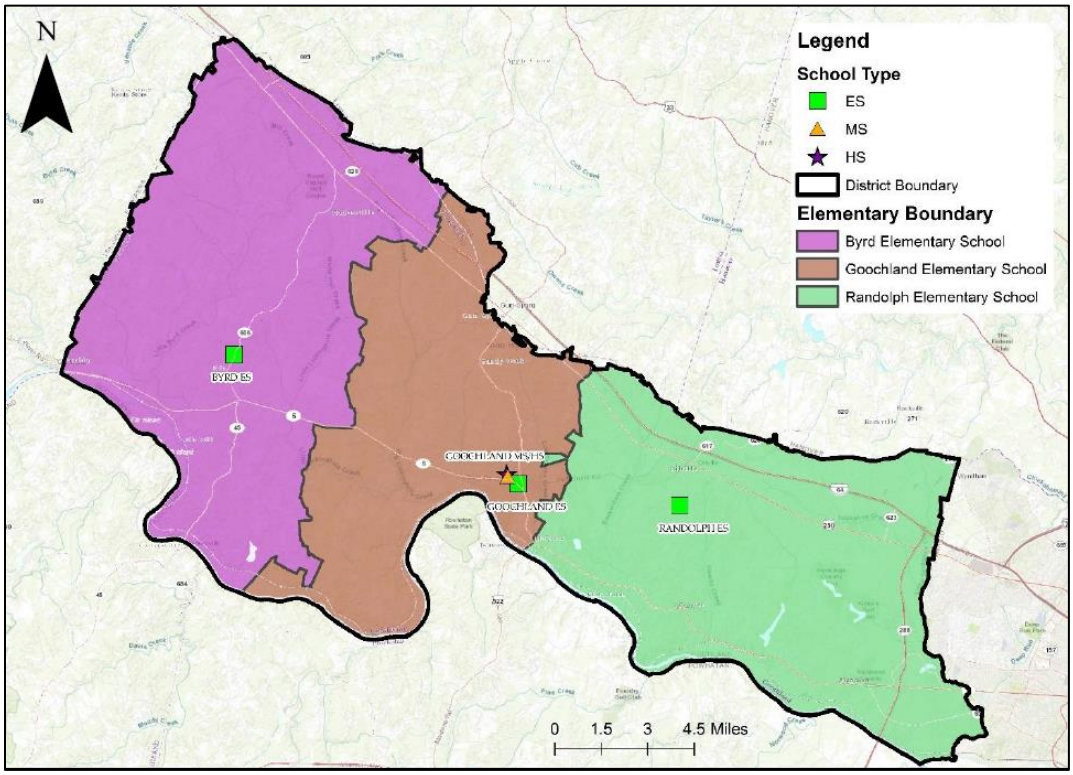
Goochland County provided student generation rates, calculated for Goochland County Public Schools by Cooperative Strategies.[1] The term "student generation rate" refers to the number of public school students per housing unit in the county. Public school students are a subset of school-aged children, which also includes students in private schools and home-schooled children. Student generation rates are calculated for the single family (includes detached, attached, mobile homes) and multifamily housing units.

Current grade configurations at Goochland County Public Schools are used to derive the student generation rates: Elementary (grades K-5), Middle (grades 6-8), and High (grades 9-12). There are three elementary schools in the County: Randolph, Goochland, and Byrd. Shown in Figure 13, Randolph Elementary School's boundary matches well with the East Service Area; Goochland Elementary School's boundary matches well with the Central Service Area; Byrd Elementary School boundary matches well with the West Service Area. There is one middle school and high school serving the three Service Areas.

[1] Source: Cooperative Strategies, Facility Master Plan Presentation, October 10, 2017.

Although there are similar geographies between the Service Areas and elementary school boundaries, the CapIM Model will have a separate identifying menu to select the elementary school boundary the development resides in. This will allow for more accurate student generation projections.

Figure 13. Goochland County Elementary Schools' Boundaries



Source: Cooperative Strategies, Facility Master Plan Steering Committee #1, 2017

From the data provided, Figure 14 lists the base year student enrollment for each Service Area. Of the total in the County, 40 percent of the elementary students reside in the East, 30 percent in the Central, and 30 percent in the West. The Countywide enrollment for the middle school and high school is provided since those schools serve the whole county. Additionally, there are 27 students in Goochland County who attend the Maggie Walker Governors School.

Figure 14. Current Student Enrollment by Service Area

	East/ Randolph ES	Central/ Goochland ES	West/ Byrd ES	Countywide/ Goochland MS	Countywide/ Goochland HS	Total
Attendance	462	316	330	607	838	2,553

Fall Student Record Count submitted to Virginia Department of Education (as of October 1,2017)

In Figure 15, the results of the Cooperative Strategies student generation study are listed by the Service Area. As noted previously, due to the similar boundary lines between the Service Areas and elementary schools, the data provided based on elementary school boundaries is used for the study's Service Areas.

Figure 15. Goochland County Student Generation Rate by Service Area

Service Area	Single Family Housing Unit				Multifamily Housing Unit			
	K - 5	6 - 8	9 -12	K - 12	K - 5	6 - 8	9 -12	K - 12
East/Randolph ES	0.09	0.05	0.06	0.19	0.01	0.01	0.01	0.03
Central/Goochland ES	0.22	0.15	0.16	0.52	0.00	0.00	0.00	0.00
West/Byrd ES	0.18	0.10	0.14	0.42	0.00	0.00	0.00	0.00

Source: Cooperative Strategies, Facility Master Plan Presentation, October 10, 2017

Note: Figures are directly from referenced study and therefore the totals do not sum due to rounding.

Student Generation Projections

Student enrollment projections are shown in Figure 16 are from Cooperative Strategies and were adopted by the Goochland School Board. Over the next ten years, it is projected that there is a growth of 565 students in the Goochland County Public Schools. Of the total growth, an increase of 141 elementary school students are projected, 162 students at Goochland Middle School, and 262 students at Goochland High School.

Figure 16. Student Generation Projections

Service Area	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Increase
East/Randolph ES	480	504	510	508	513	509	529	532	541	533	535	55
Central/Goochland ES	353	356	368	369	390	392	400	404	411	404	406	53
West/Byrd ES	361	350	354	363	375	380	389	391	398	393	394	33
Countywide/Middle School	607	598	628	675	684	724	682	719	702	762	769	162
Countywide/High School	812	865	890	900	921	938	1,025	1,024	1,081	1,089	1,074	262
Total	2,613	2,673	2,750	2,815	2,883	2,943	3,025	3,070	3,133	3,181	3,178	565

Source: Goochland County; Cooperative Strategies, Facility Master Plan Presentation, 2017

Current Nonresidential Estimates

In addition to data on residential development, the calculation of capital impacts requires data on employment (number of jobs) and nonresidential square footage in Goochland County. Historical and current employment data is provided by the Virginia Employment Commission and the US Bureau of Labor Statistics' Quarterly Census of Employment Wages. From
Figure 17, since 2012, there has been an average annual increase of 769 jobs and it is estimated that there are 15,628 jobs in the base year.

Figure 17. Historical Employment, Goochland County

	2012	2013	2014	2015	2016	2017	Average Increase
Goochland County	11,785	12,479	13,943	15,040	15,399	15,628	769

Source: Quarterly Census of Employment and Wages - Bureau of Labor Statistics

Provided by County staff,

Figure 18 lists the new nonresidential square footage in Goochland County for the past five years. Since 2012, the County has averaged an increase of 375,949 square feet per year.

Figure 18. Historical Nonresidential Floor Area Growth, square feet

	2012	2013	2014	2015	2016	Average Increase
Goochland County	1,037,522	384,661	128,162	97,494	231,906	375,949

Source: Goochland County

Provided through the Virginia Employment Commission, the majority of current jobs in Goochland County are in Office/Other Services. In Figure 19, the nonresidential floor area for each industry sector is included with employment totals. This allows for a square foot per job factor to be calculated. These factors are used to project job growth from nonresidential developments.

Figure 19. Base Year (2017) Job Totals, Floor Area, and Square Feet per Job Factor

Industry Sector	Jobs	Floor Area (Sq. Ft.)	Square Feet per Job	Job per 1,000 SF
Retail	975	409,232	420	2.38
Office/Other Services	11,633	3,513,734	302	3.31
Industrial	2,377	1,129,020	475	2.11
Institutional	629	938,541	1,492	0.67
Unclassified	14	-	-	
Total	15,628	5,990,527	383	

Source: Virginia Employment Commission; Goochland County

In Figure 20, nonresidential floor area by Service Area and industry is listed. Currently, most of the nonresidential development has occurred in the East. However, there are variations based on the type of industry. These proportions will be used to allocate projected nonresidential growth.

Figure 20. Base Year (2017) Nonresidential Floor Area by Service Area

Service Area	Retail	%	Office/Other Services	%	Industrial	%	Institutional	%	Total	%
East	202,903	50%	3,180,016	91%	824,059	73%	549,809	59%	4,756,787	79%
Central	178,183	44%	221,845	6%	212,545	19%	281,580	30%	894,153	15%
West	28,146	7%	111,873	3%	92,416	8%	107,152	11%	339,587	6%
Total	409,232	100%	3,513,734	100%	1,129,020	100%	938,541	100%	5,990,527	100%

Source: Goochland County

Nonresidential Floor Area and Employment Projections

TischlerBise anticipates a high level of nonresidential growth will follow the residential development in Goochland County. The County is well positioned to benefit in the short and long term from growth in the Richmond region. Much of the employment growth is expected to be in the Office and Retail industries, but the Institutional and Industrial industries are expected to see growth as well. After consulting with County staff and analyzing the past growth and projects in the County's pipeline, it is projected that across the County, over the next ten years, the Office industry will grow by 5,208 jobs and the Retail industry will grow by 3,159 jobs.

Although limited industrial development is currently in the County's pipeline, it is assumed that there will be some industrial development that follows other nonresidential growth. Furthermore, there is a low vacancy rate of nonresidential properties and a wide range of available land for industrial purposes in Goochland County. Based on the current number of jobs in the county, the industrial sector accounts for 15 percent of the county's total. To project industrial growth, 15 percent is applied to the square footage growth of retail and office/other services sectors based on the assumption that the relative mix of nonresidential land uses will stay stable. This results in a growth of 435,000 square feet of industrial development over the 10-year period.

Similarly, the institutional sector is projected based on growth in the County. However, since the institutional sector includes uses such as schools and hospitals, the projected growth is driven by a mixture of the County's population and pipeline projects. According to County staff, a conservative estimate of job growth from projects in the pipeline is 1,500 over the next 10 years. Additionally, from the population growth projected over the next ten years, another 252 jobs are projected. Combined, a total of 1,752 jobs are projected for the Institutional sector. For all the industry sectors a straight-line approach is used to project the growth, shown in Figure 21.

To allocate future growth to the three Service Areas, the base year proportions for each industry sector, found in Figure 20, are used. In total, an increase of 11,035 jobs is projected in Goochland County over the next 10 years, with 5,208 in Office/Other Services, 3,159 in Retail, 1,752 in Institutional, and 915 in Industrial. Over the ten-year projected time period, there is a growth of 5,948,000 nonresidential square feet projected and based on the assumed spatial distribution of growth in the county, the majority of nonresidential growth occurs in the East Service Area. In the Central Service Area, the majority of nonresidential floor area growth is observed in the Institutional and Retail industries. In the West Service Area, the largest growth in nonresidential floor area is in the Institutional sector.

Figure 21. Nonresidential Floor Area and Employment Projections

	Base Year 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total Increase
GOOCHLAND COUNTY												
Jobs	15,614	16,717	17,821	18,924	20,028	21,131	22,235	23,338	24,442	25,545	26,649	11,035
Nonresidential Sq. Ft. (1,000s)												
Retail	409	542	674	807	940	1,072	1,205	1,337	1,470	1,603	1,735	1,326
Office/Other Services	3,514	3,671	3,828	3,986	4,143	4,300	4,458	4,615	4,772	4,929	5,087	1,573
Industrial	1,129	1,173	1,216	1,259	1,303	1,346	1,390	1,433	1,477	1,520	1,564	435
Institutional	939	1,200	1,461	1,723	1,984	2,246	2,507	2,769	3,030	3,292	3,553	2,615
Total	5,991	6,585	7,180	7,775	8,370	8,965	9,560	10,154	10,749	11,344	11,939	5,948
EAST SERVICE AREA												
Jobs	13,115	13,912	14,710	15,507	16,305	17,102	17,900	18,697	19,494	20,292	21,089	7,974
Nonresidential Sq. Ft. (1,000s)												
Retail	203	269	334	400	466	532	597	663	729	795	860	657
Office/Other Services	3,180	3,322	3,465	3,607	3,749	3,892	4,034	4,177	4,319	4,461	4,604	1,424
Industrial	824	856	888	919	951	983	1,014	1,046	1,078	1,110	1,141	317
Institutional	550	703	856	1,009	1,162	1,316	1,469	1,622	1,775	1,928	2,082	1,532
Total	4,757	5,150	5,543	5,936	6,329	6,722	7,115	7,508	7,901	8,294	8,687	3,930
CENTRAL SERVICE AREA												
Jobs	1,795	2,035	2,276	2,516	2,756	2,996	3,237	3,477	3,717	3,957	4,197	2,402
Nonresidential Sq. Ft. (1,000s)												
Retail	178	236	294	351	409	467	525	582	640	698	755	577
Office/Other Services	222	232	242	252	262	272	281	291	301	311	321	99
Industrial	213	221	229	237	245	253	262	270	278	286	294	82
Institutional	282	360	438	517	595	674	752	831	909	988	1,066	784
Total	894	1,048	1,203	1,357	1,511	1,666	1,820	1,974	2,128	2,283	2,437	1,543
WEST SERVICE AREA												
Jobs	704	770	835	901	967	1,033	1,099	1,164	1,230	1,296	1,362	658
Nonresidential Sq. Ft. (1,000s)												
Retail	28	37	46	56	65	74	83	92	101	110	119	91
Office/Other Services	112	117	122	127	132	137	142	147	152	157	162	50
Industrial	92	96	100	103	107	110	114	117	121	124	128	36
Institutional	107	137	167	197	227	256	286	316	346	376	406	299
Total	340	387	435	482	530	577	625	672	720	767	815	475

Long-Term Countywide Growth

To perform a longer projection, 25 years, the Richmond Regional Transportation Planning Organization's 2040 residential and nonresidential projections were utilized. In Figure 22, through 2027 the projections are consistent with the projections above. After 2027, a straight-line approach is used and is carried through for several years after 2040. At the end of the 25-year projection period, there would be 9,228 new housing units with 20,248 new residents in Goochland County. Additionally, it is projected that nonresidential floor area will grow by 6,900,000 square feet, generating 13,159 jobs. These projections can be used to determine the level of demand on County facilities and examine the County's 25-Year Capital Improvement Program

Figure 22. Long-Term Growth, Residential and Nonresidential

							5-Year Increments				
	Base Year 2017	2018	2019	2020	2021	2022	2027	2032	2037	2042	Total Increase
RESIDENTIAL											
Population	22,708	23,990	24,748	25,505	26,263	27,020	30,807	34,857	38,907	42,956	20,248
Housing Units											
Single Family	9,188	9,463	9,738	10,013	10,287	10,562	11,936	13,311	14,685	16,059	6,871
Multifamily	766	1,135	1,199	1,263	1,326	1,390	1,709	2,181	2,652	3,124	2,358
Total	9,954	10,598	10,936	11,275	11,614	11,952	13,645	15,491	17,337	19,182	9,228
NONRESIDENTIAL											
Jobs	15,614	16,717	17,821	18,924	20,028	21,131	26,649	27,357	28,065	28,773	13,159
Nonresidential Sq. Ft. (1,000s)											
Retail	409	542	674	807	940	1,072	1,735	1,781	1,827	1,873	1,464
Office/Other Services	3,514	3,671	3,828	3,986	4,143	4,300	5,087	5,222	5,357	5,492	1,979
Industrial	1,129	1,173	1,216	1,259	1,303	1,346	1,564	1,605	1,647	1,689	560
Institutional	939	1,200	1,461	1,723	1,984	2,246	3,553	3,648	3,742	3,836	2,898
Total	5,991	6,585	7,180	7,775	8,370	8,965	11,939	12,256	12,574	12,891	6,900

Source: Richmond Regional Transportation Planning Organization, *Socioeconomic Data Report*, 2015

CAPITAL IMPROVEMENT PROJECTS

The Goochland County's 25-Year Capital Improvement Program (CIP) is the basis of the Capital Impact Model (CapIM). The infrastructure categories that are included in the CIP use the projects' values and capacities to determine the level of service standards and cost factors involved in the capital impact and cash proffer calculations. The projects used in the CapIM Model are listed in Figure 23 and Figure 24. The inclusion of projects in the County's CIP allows for the CapIM Model to apply the plan-based methodology. Infrastructure categories where additional capacity is not planned at this time are not included in the cash proffer calculation (e.g., Sheriff facilities). However, this document includes a summary of current levels of service and the capital impact cost from growth.

Figure 23. Projects in Goochland County's Capital Improvement Program (CIP) included in Capital Impact Model

Facility	Location	Service Area [East, Central, West]	Cost	Capacity Unit	Demand Unit Capacity	Cost per Demand Unit	Incorporated in CapIM Model
Public School Projects							
New Randolph Elem	TBD	East	$29,450,000	Student	500	$58,900	Yes
New Goochland Elem	TBD	Central	$23,266,608	Student	500	$46,533	Yes
New Byrd Elem	TBD	West	$23,873,271	Student	400	$59,683	Yes
New CTE addition at GHS	3250 River Rd W	Countywide	$9,875,000	Student	176	$56,267	Yes
Addl gym at GHS	3250 River Rd W	Countywide	$3,250,000	Student	59	$55,555	Yes
Parks and Recreation Projects							
Eastern Community Park	TBD	East	$525,000	Acres	29.5	$17,816	Yes
Oilville/Cardwell District Park	TBD	East	$850,000	Acres	51.1	$16,623	Yes
Leakes Mill Park	3951 River Rd W	Central	$700,000	Acres	3.0	$233,333	Yes
Matthews Park	5399 Matthews Rd	West	$909,000	Acres	36.0	$25,250	Yes
East End Park	TBD	Countywide	$4,000,000	Acres	80.0	$50,000	Yes
Tucker Park	1300 Maidens Rd	Countywide	$585,000	Acres	40.0	$14,625	Yes
Elk Island Recreation Area	TBD	Countywide	$70,000	Acres	2.7	$26,415	Yes
Matthews Park Trail	5399 Matthews Rd	West	$16,000	Miles	0.8	$20,000	Yes
Tucker Park Trail	1300 Maidens Rd	Countywide	$15,000	Miles	0.8	$20,000	Yes
East End Trails	TBD	Countywide	$1,680,000	Miles	6.0	$280,000	Yes
Court House Greenway Project	TBD	Countywide	$3,250,000	Miles	11.6	$280,000	Yes
Fire & Rescue Projects							
New Fire Station	TBD	East	$5,375,000	Square Feet	12,000	$447.00	Yes
Station Expansion	TBD	East	$2,310,400	Square Feet	6,000	$385.00	Yes
New Fire Station	TBD	East	$5,620,000	Square Feet	12,000	$468.00	Yes
New Fire Station	TBD	Central	$5,190,000	Square Feet	12,000	$432.00	Yes
New Fire Station	TBD	Central	$6,450,000	Square Feet	12,000	$537.00	Yes
Substation	TBD	West	$5,652,000	Square Feet	12,000	$471.00	Yes
Fire Training Center	TBD	Countywide	$5,040,000	Square Feet	11,376	$443.00	Yes

Source: Goochland County 25-Year Capital Improvement Program, 2017

Figure 24. Projects in Goochland County's Capital Improvement Program (CIP) included in Capital Impact Model

Facility	Location	Service Area [East, Central, West]	Cost	Capacity Unit	Demand Unit Capacity	Cost per Demand Unit	Incorporated in CapIM Model
Transportation Projects							
Hockett Road Realignment	Holly Lane to Broad Street Road	East	$561,000	Vehicle Miles Traveled	1,654,553	$2.95	Yes
Oilville Concept Road #1	Oilville Road to Landis Road	East	$5,250,000	Vehicle Miles Traveled	1,654,553	$0.32	Yes
Route 288 Bridge/Three Chopt Rd	Route 288	East	$1,500,000	Vehicle Miles Traveled	1,654,553	$1.10	Yes
Wilkes Ridge Parkway Extension	Route 288	East	$1,500,000	Vehicle Miles Traveled	1,654,553	$1.10	Yes
Centerville Concept Road 7	Plaza Drive to Manakin Town	East	$235,000	Vehicle Miles Traveled	1,654,553	$7.04	Yes
Ashland Road	Broad Street to Hanover County	East	$7,425,000	Vehicle Miles Traveled	1,654,553	$0.22	Yes
Rockville Road	Ashland Road to Hanover County	East	$1,201,500	Vehicle Miles Traveled	1,654,553	$1.38	Yes
Blair Road	Blair Road	East	$278,500	Vehicle Miles Traveled	1,654,553	$5.94	Yes
Hockett Road	Tuckahoe Creek Parkway to Holly Lane	East	$4,169,500	Vehicle Miles Traveled	1,654,553	$0.40	Yes
Hockett Road	Patterson Avenue to Tuckahoe Creek Parkway	East	$6,389,000	Vehicle Miles Traveled	1,654,553	$0.26	Yes
Broad Street Road	Tuckahoe Creek Parkway to Ashland Road	East	$9,678,000	Vehicle Miles Traveled	1,654,553	$0.17	Yes
Broad Street Road	Manakin Road to Cardwell Road	East	$27,785,000	Vehicle Miles Traveled	1,654,553	$0.06	Yes
Broad Street Road	Cardwell Road to Fairground Road	East	$3,309,500	Vehicle Miles Traveled	1,654,553	$0.50	Yes
Fairground Road Extension	Sandy Hook Road to River Road West	Central	$1,950,000	Vehicle Miles Traveled	615,633	$0.32	Yes
Bulldog Way	Sandy Hook Road to River Road West	Central	$125,000	Vehicle Miles Traveled	615,633	$4.93	Yes
Fairground Road	Sandy Hook Road to Maidens Road	Central	$1,241,500	Vehicle Miles Traveled	615,633	$0.50	Yes
Fairground Road	Maidens Road to Broad Street Road	Central	$4,221,500	Vehicle Miles Traveled	615,633	$0.15	Yes
Sandy Hook Road	Sandy Hook Village to Louisa County	Central	$4,678,500	Vehicle Miles Traveled	615,633	$0.13	Yes
Broad Street Road	Fairground Road to Hadensville Village - Western Portior	Central	$14,190,250	Vehicle Miles Traveled	615,633	$0.04	Yes
Broad Street Road	Fairground Road to Hadensville Village - Eastern Portion	Central	$14,190,250	Vehicle Miles Traveled	615,633	$0.04	Yes
Hadensville-Fife Road	River Road West to Old Fredericksburg Rd	West	$5,980,000	Vehicle Miles Traveled	291,985	$0.05	Yes
Old Fredericksburg Road	Broad Street Road to I-64	West	$535,000	Vehicle Miles Traveled	291,985	$0.55	Yes
Library Projects							
Library - New	Eastern Goochland	Countywide	$2,670,000	Square Feet	11,257	$237.18	Yes
Library - Expansion	3075 River Rd W	Countywide	$300,000	Square Feet	1,625	$184.62	Yes
Court Projects							
New Circuit Court Building	2938 River Road West	Countywide	$25,120,000	Square Feet	41,800	$600.96	Yes
Parking Lots	Court House Complex	Countywide	$120,000	Square Feet	43,560	$2.75	Yes
Environmenal Service/Solid Waste Projects							
Mini-Convenience Center	TBD	Countywide	$550,000	Square Feet	1,657	332	Yes

PROJECT APPROACH

The assignment for Goochland County involves two main elements:

1. Calculating the "static" capital impact of new development by type of land use and
2. To allow County staff to use the Capital Impacts Model to determine the capital costs for development projects that take into consideration whether capacity is available or not (and therefore, whether a cash proffer can be offered and accepted by the County).

This report provides the static list of capital impacts and supporting narrative.

The Model calculates the cost to serve the land use first and then determines whether there are capacity needs in the service area for the particular facility. Therefore, throughout this report, service areas/regions are identified with levels of service reported in that way.

Two sections are provided in the following pages: (I) Cash Proffer Categories and (II) Non-Cash Proffer Categories.

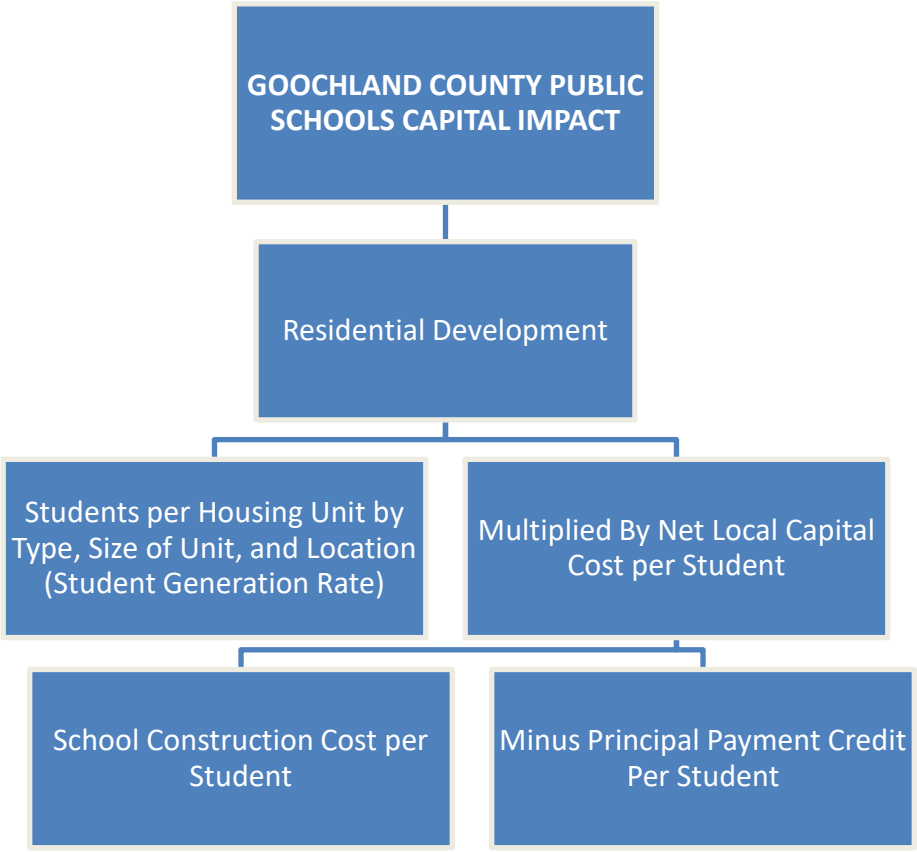
I. Cash Proffer Categories

PUBLIC SCHOOLS CAPITAL IMPACTS

Public School capital impacts are determined using the ***plan-based methodology*** and costs are allocated 100 percent to residential development. The methodology is based on the cost to provide future public school capacity due to growth and is calculated using the current average Goochland County public school student generation rates, projects listed in the County's 25-Year Capital Improvement Program (by type of unit), level of service standards (capacity), and local costs.

The plan-based methodology used to calculate the capital impacts is illustrated in Figure 25. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the components. Schools capital impacts are derived from the product of students per housing unit (by type of unit) and the net capital cost per student. The boxes in the next level down indicate detail on the components included in the proffer. A credit for future principal payments on existing General Obligation and other debt is included.

Figure 25. Goochland County Public Schools Capital Impacts Methodology Chart



Public School Students per Housing Unit

Goochland County provided student generation rates by type of housing unit and grade level from a separately prepared study completed by Cooperative Strategies.[2] The term "student generation rate" refers to the number of public school students per housing unit in the County. (Public school students are a subset of school-age children, which includes students in private schools and home-schooled children. *Data reflect public school students only*.)

Student generation rates are calculated for the three Service Areas and in two housing unit types: (1) single family (includes detached, attached, and manufactured homes); and (2) multifamily. Rates are provided for three school levels: (1) Elementary School (grades K-5); (2) Middle School (6-8) and (3) High School (grades 9-12).

Average rates for Goochland County Public Schools are shown below. Additionally, the Age-Restricted Single Family housing unit does not generate any students.

- East Service Area: 0.19 students per single family unit, .03 students per multifamily unit.
- Central Service Area: 0.52 students per single family unit.
- West Service Area: 0.42 students per single family unit.

Note: Currently, there are no multifamily housing units in the Central or West Service Area. Multifamily student generation rates used are the same for all service areas.

Figure 26. Goochland County Student Generation Rates

	Single Family Housing Unit				Multifamily Housing Unit			
Service Area	K - 5	6 - 8	9 -12	K - 12	K - 5	6 - 8	9 -12	K - 12
East/Randolph ES	0.09	0.05	0.06	0.19	0.01	0.01	0.01	0.03
Central/Goochland ES	0.22	0.15	0.16	0.52	0.01	0.01	0.01	0.03
West/Byrd ES	0.18	0.10	0.14	0.42	0.01	0.01	0.01	0.03

Source: Cooperative Strategies, Facility Master Plan Presentation, October 10, 2017
Note: Figures are directly from referenced study and therefore the totals do not sum due to rounding.
The Age-Restricted Single Family housing unit does not generate any students.

The CapIM allows for selection by Service Area of the County.

Public School Facilities Level of Service Standards

This section provides current inventories and levels of service for elementary, middle, and high schools in Goochland County Public Schools. The data contained in these tables determine Level of Service (LOS)

[2] Cooperative Strategies, Facility Master Plan Board Presentation, October 17, 2017

infrastructure standards for school buildings and sites on which the capital impacts are based. Levels of service are shown based on two sets of figures—current enrollment and capacity. Both enrollment and capacity are based on the data from Cooperative Strategies, *Facility Master Plan Presentation*, October 10, 2017; the enrollment figures are from 2016-2017 Actual Enrollment and the capacity reflects the Division Target Capacity for Maximum Class Size. All references to capacity in this chapter refer to Division Target Capacity for Maximum Class Size.

Elementary Schools

As indicated in Figure 27, County elementary schools have a total of 158,624 square feet of floor area on 59 acres. In Fall 2017, the total enrollment is 1,108 and the total capacity is 1,038. Utilization is calculated by dividing enrollment by school capacity and is currently at 107 percent.

Levels of service are shown at the bottom of Figure 27. Goochland County Public Schools Elementary Schools Level of Service. Level of service standards are calculated by dividing the amount of infrastructure by total enrollment or capacity. Current levels of service are also shown by subarea of the County.

Capacities and utilization by Service Areas are summarized at the bottom of the figure. **The utilization percentages shown are used in the Capital Impacts Model to determine whether a cash proffer is triggered. Capacity needs are triggered based on a utilization percentage at 100 percent or higher.**

Figure 27. Goochland County Public Schools Elementary Schools Level of Service

Facility	Region	Site Acreage	Building Square Feet	Official 2017-2018 Enrollment	Capacity	Current Utilization
Randolph Elementary	East	31.0	62,468	462	409	113%
Goochland Elementary	Central	18.0	42,079	316	316	100%
Byrd Elementary	West	10.0	54,077	330	313	105%
	TOTAL	**59.0**	**158,624**	**1,108**	**1,038**	**107%**

ELEMENTARY Total Levels of Service	Demand Units (Students)	Acres per Student	Building SF per Student
LOS based on Current Enrollment	**1,108**	**0.053**	**143**
LOS based on Capacity	1,038	0.057	153

ELEMENTARY Summary by Region	Site Acreage	Building Square Feet	2017-2018 Enrollment	Capacity	Current Utilization
East	31.0	62,468	462	409	**113%**
Central	18.0	42,079	316	316	**100%**
West	10.0	54,077	330	313	**105%**
TOTAL	**59.0**	**158,624**	**1,108**	**1,038**	**107%**

Source: Cooperative Strategies, Facility Master Plan Board Presentation, October 2017

Summary by Region: ELEMENTARY	Demand Units (Enrollment)	Demand Units (Capacity)	Acres per Student	Building SF per Student (Enrollment)	Building SF per Student (Capacity)
East	462	409	0.067	135	153
Central	316	316	0.057	133	133
West	330	313	0.030	164	173

Middle School

The Goochland Middle school has a total of 103,302 square feet of floor area. The Middle School and High School complex is 107 acres, which is split between the schools based on their total square feet. In Fall 2017, the total enrollment is 607 and the school capacity is 695. Utilization is calculated by dividing enrollment by school capacity. Current middle school utilization is 87 percent.

Levels of service are shown at the bottom of Figure 28. Goochland County Public Schools: Middle Schools Level of Service. Level of service standards are calculated by dividing the amount of infrastructure by total enrollment and capacity. There is a level of service of 149 square feet per student.

Since there is only one middle school serving the whole County, capacities and utilization are countywide, not by Service Areas. **The utilization percentages shown are used in the Capital Impacts Model to determine whether a cash proffer is triggered. Capacity needs are triggered based on a utilization percentage at 100 percent or higher.**

Figure 28. Goochland County Public Schools: Middle Schools Level of Service

Facility	Region	Site Acreage	Building Square Feet	Official 2017-2018 Enrollment	Capacity	Current Utilization
Goochland Middle School	Countywide	42.5	103,302	607	695	87%
	TOTALS	**42.5**	**103,302**	**607**	**695**	**87%**

MIDDLE SCHOOL Total Levels of Service	**Demand Units (Students)**	**Acres per Student**	**Building SF per Student**
LOS based on Current Enrollment	607	0.070	170
LOS based on Capacity	**695**	**0.061**	**149**

Source: Cooperative Strategies, Facility Master Plan Board Presentation, October 2017

High School

Goochland High school has a total of 175,073 square feet of floor area on 64.6 acres. In Fall 2017, there are 838 students enrolled at the school and the capacity is 916. Utilization is calculated by dividing enrollment by school capacity. Current high school utilization is 91 percent.

Levels of service are shown at the bottom of Figure 29. Level of service standards are calculated by dividing the amount of infrastructure by total enrollment and capacity. There is a level of service of 191 square feet per student.

Since there is only one high school serving the whole County, capacities and utilization are countywide, not by Service Areas. **The utilization percentages shown are used in the Capital Impacts Model to determine whether a cash proffer is triggered. Capacity needs are triggered based on a utilization percentage at 100 percent or higher.**

Figure 29. Goochland County Schools: High School Level of Service

Facility	Region	Site Acreage	Building Square Feet	Official 2017-2018 Enrollment	Capacity	Current Utilization
Goochland High School	Countywide	64.6	175,073	838	916	91%
	TOTALS	**64.6**	**175,073**	**838**	**916**	**91%**

HIGH SCHOOL Total Levels of Service	**Demand Units (Students)**	**Acres per Student**	**Building SF per Student**
LOS based on Current Enrollment	838	0.077	209
LOS based on Capacity	**916**	**0.071**	**191**

Source: Cooperative Strategies, Facility Master Plan Board Presentation, October 2017

Planned Public School Facilities

There are three new elementary school planned in Goochland County's 25-Year Capital Improvement Program to accommodate current and future demand on the current school facilities. One new school is planned to serve each of the three Service Areas. The three elementary schools total a combined 202,000 square feet and have a capacity of 1,400. Building square feet per student (capital impacts level of service) for each new planned elementary school are shown below, which are used in the capital impacts calculations. Additionally, there are plans for two additions to the Goochland County High School which will add a capacity of 234 students to the school.

Figure 30. Planned New School Facilities

Elementary Schools

Facility	Service Area	Value	Site Acreage	Building Square Feet	Value per Square Feet	Capacity	Value per Student	Building SF per Student
New Randolph Elem	East	$29,450,000	15	71,000	$415	500	$58,900	**142**
New Goochland Elem	Central	$23,266,608	15	71,000	$328	500	$46,533	**142**
New Byrd Elem	West	$23,873,271	15	60,000	$398	400	$59,683	**150**
	TOTAL	$76,589,879	45	202,000	$379	1,400	$54,707	144

Goochland High School Improvements

Facility	Service Area	Value	Site Acreage	Building Square Feet	Value per Square Feet	Capacity	Value per Student	Building SF per Student
New CTE addition at GHS	Countywide	$9,875,000	-	30,000	$329.17	176	$56,268	171
Addl gym at GHS	Countywide	$3,250,000	-	10,000	$325	59	$55,556	171
	TOTAL	$13,125,000	-	40,000	$328	234	$56,090	171

Source: Goochland County 25-Year Capital Improvement Program, 2017
Note: the cost for the new Goochland Elementary School found in the County's CIP has been reduced by the cost for a new early childhood center that is located in the facility

Credit for Future Principal Payments on School Improvements

Because the County has debt financed recent school construction projects, TischlerBise recommends including a credit for future principal payments. Goochland County currently has an outstanding debt (principal only) totaling approximately $9,555,000 for schools from two bonds. Shown in Figure 31, by FY2027 both bonds will be paid in full. (Only credits for principal payments are included because interest costs are not included in the capital impact calculation.)

A credit is necessary since new residential units that may pay school cash proffers will also contribute to future principal payments on school debt through property taxes. Credits are calculated on a per student basis to reflect the proportionate share of debt service per development unit, which is based on demand specific to the land use receiving the credit (i.e., for schools, the land use is a housing unit). It is not linked to property value, which would shift the cash proffer approach away from a land use regulation toward a tax.

The credit amount of $2,959 is subtracted from the gross capital cost per student to derive a net capital cost per student for school facilities

Figure 31. Principal Payment Schedule for School Debt

	PRINCIPAL PAYMENTS				
Fiscal Year	2006 VPSA Bond	1999 VPSA Bond	**TOTAL**	**Total Students**	**Credit per Student**
FY18	$535,000	$1,330,000	$1,865,000	2,495	**$747.49**
FY19	$535,000	$1,400,000	$1,935,000	2,578	**$750.70**
FY20	$535,000	$1,475,000	$2,010,000	2,653	**$757.63**
FY21	$535,000		$535,000	2,728	**$196.08**
FY22	$535,000		$535,000	2,804	**$190.81**
FY23	$535,000		$535,000	2,879	**$185.81**
FY24	$535,000		$535,000	2,955	**$181.07**
FY25	$535,000		$535,000	3,030	**$176.56**
FY26	$535,000		$535,000	3,105	**$172.28**
FY27	$535,000		$535,000	3,181	**$168.19**
	$5,350,000	$4,205,000	$9,555,000		**$3,526.62**

Discount Rate	5.0%
Net Present Value	**$2,959**

Note: To account for the time value of money, total credit per student is discounted using a net present value formula assuming the average interest rate from current debt as shown.
Source: Goochland County, Notes to Financial Statements

Public Schools Capital Impact Input Variables

Factors used to determine school capital impacts are summarized in Figure 32. Capital impacts for public schools are based on student generation rates (i.e., public school students per housing unit) and are only determined for residential development. (For further discussion on student generation rates see the Land Use Assumptions Chapter.) Level of service standards are based on current costs per student for public school buildings as discussed in the previous sections and summarized below. The credit for future principal payments is subtracted from the gross capital cost per student to derive the net capital cost per student.

Figure 32. Public Schools Capital Impacts Input Variables

INPUT VARIABLES

Public School Students Per Housing Unit	East			Central			West		
	ES	MS	HS	ES	MS	HS	ES	MS	HS
Single Family Housing Unit	0.09	0.05	0.06	0.22	0.15	0.16	0.18	0.10	0.14
Multifamily Housing Unit	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Source: Cooperative Strategies, Facility Master Plan Presentation, October 10, 2017

Note: The Age-Restricted Single Family housing unit does not generate any students.

Current Level of Service Standards	East	Central	West		
	Randolph ES	Goochland ES	Byrd ES	Middle	High
Building Square Feet Per Student	142	142	150	149	191
Total Cost Per Square Foot	$414	$327	$397	$0	$328
Total Building Construction Cost Per Student	**$58,788**	**$46,434**	**$59,550**	**$0**	**$62,690**
Total Gross Capital Cost Per Student	**$58,788**	**$46,434**	**$59,550**	**$0**	**$62,690**
Local Share of Capacity Cost	100%	100%	100%	100%	100%
Total Gross Local Capital Cost Per Student	**$58,788**	**$46,434**	**$59,550**	**$0**	**$62,690**
Principal Payment Credit Per Student	**($2,959)**	**($2,959)**	**($2,959)**		**($2,959)**
Total Net Local Capital Cost Per Student	**$55,829**	**$43,475**	**$56,591**	**$0**	**$59,731**

Please note: Costs are shown for both infrastructure components in this report to document development's share of the cost to provide the facilities. Despite capacity being available at the Middle and High School, there is still a "capital cost impact" to the County from new development. However, due to the current cash proffer law, capacity triggers are required for cash proffer acceptance. These capacity triggers are integrated into the CapIM and allows the user to identify the total cost of growth as well as the potential cash proffer amount (which may be different due to service area differences and existing capacities).

Capital Impacts for Public Schools

The Figures below show the capital impact for Public Schools in Goochland County for each Service Area. The costs are calculated by multiplying the student generation rate by the net capital cost per student for each type of school by type of housing and then added together to derive the total Public Schools capital impact amount.

For example, in Figure 33 for a single family in the East Service Area, the elementary portion of the capital impact is calculated by multiplying the student generation rate of 0.09 by the net capital cost per elementary student of $58,788, which results in $5,024 (truncated) per single family detached housing unit. This is repeated for the other school levels. All portions are added together to calculate the total capital impact by type of residential unit (i.e., for Single Family Housing Unit in East Service Area, $5,024 + $3,583 = $8,607.) The calculation is repeated for each type of land use.

Figure 33. Goochland County Public Schools Capital Impact by Housing Unit, East Service Area

SCHOOL CAPITAL IMPACT: Goochland County Public Schools				
Capital Impact Per Housing Unit	Elementary	Middle	High	**TOTAL**
Single Family Housing Unit	$5,024	$0	$3,583	**$8,607**
Multifamily Housing Unit	$558	$0	$597	**$1,155**
Age Restricted Single Family Housing Unit	$0	$0	$0	**$0**

Figure 34. Goochland County Public Schools Capital Impact by Housing Unit, Central Service Area

SCHOOL CAPITAL IMPACT: Goochland County Public Schools				
Capital Impact Per Housing Unit	Elementary	Middle	High	**TOTAL**
Single Family Housing Unit	$9,563	$0	$9,556	**$19,119**
Multifamily Housing Unit	$434	$0	$597	**$1,031**
Age Restricted Single Family Housing Unit	$0	$0	$0	**$0**

Figure 35. Goochland County Public Schools Capital Impact by Housing Unit, West Service Area

SCHOOL CAPITAL IMPACT: Goochland County Public Schools				
Capital Impact Per Housing Unit	Elementary	Middle	High	**TOTAL**
Single Family Housing Unit	$10,185	$0	$8,361	**$18,546**
Multifamily Housing Unit	$565	$0	$597	**$1,162**
Age Restricted Single Family Housing Unit	$0	$0	$0	**$0**

PARKS AND RECREATION CAPITAL IMPACTS

Goochland County has a parks and recreation system with facilities that serve different geographic areas. To determine the capital impact on parks and recreation from new development in the County, the following types of facilities are analyzed for the geographic areas noted:

Countywide

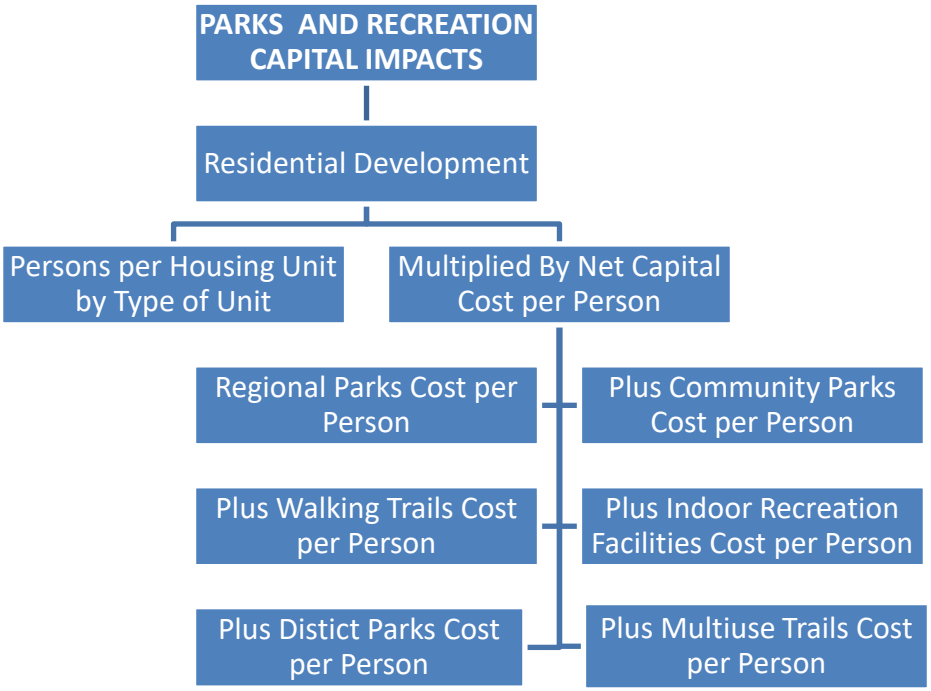
- Regional Parks
- Indoor Recreation Facilities
- Multiuse Trails

Service Areas

- District Parks
- Community Parks
- Walking Trails

Figure 36 diagrams the ***plan-based methodology*** used to calculate the Parks and Recreation capital impact. Costs are allocated 100 percent to residential development. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the components. The Parks and Recreation capital impacts are derived from the product of persons per housing unit (by type of unit) multiplied by the net capital cost per person. The net capital cost is a result of the park facilities listed in the County's 25-Year CIP and the level of service standard calculated at either a Countywide or Service Area basis.

Figure 36. Parks and Recreation Capital Impact Methodology Chart



Park and Recreation Facilities in Capital Improvement Program

In Figure 37, the Park and Recreation facilities from the County's CIP that expand the County's capacity to serve their population are listed. Goochland County has three classifications for parks: Community, District, and Regional. District Parks serve a population that is within a 19-minute drive and Community Parks serve the local area. Regional Parks serve the entire County. There are two types of trails in Goochland County: walking and multiuse. Walking trails are generally incorporated into a park and serve the same population that the park does. Multiuse trails are lengthier trail systems that can be used for several types of activities (i.e. walking, jogging, and biking) and serve the entire County.

Figure 37. Park Facilities in Capital Improvement Program by Type and Service Area

Parks - East

Type	Name	Address	Use	Acres	Value	$/Acre	Service Area
Community	Eastern Community Park	TBD	Multiuse	29.5	$525,000	$17,816	East
District	Oilville/Cardwell District Park	TBD	Multiuse	51.1	$850,000	$16,623	East
			Subtotal	**80.6**	**$1,375,000**	**$17,059**	

Parks - Central

Type	Name	Address	Use	Acres	Value	$/Acre	Service Area
District	Leakes Mill Park	3951 River Rd W	Soccer	3	$700,000	$233,333	Central
			Subtotal	**3**	**$700,000**	**$233,333**	

Parks - West

Type	Name	Address	Use	Acres	Value	$/Acre	Service Area
Community	Mathews Park	5399 Matthews Rd	Picnic Area	36.0	$909,000	$25,250	West
			Subtotal	**36.0**	**$909,000**	**$25,250**	

Parks - Countywide

Type	Name	Address	Use	Acres	Value	$/Acre	Service Area
Regional	East End Park	TBD	Multiuse	80.0	$4,000,000	$50,000	Countywide
Regional	Tucker Park	1300 Maidens Rd	Picnic Area	40.0	$585,000	$14,625	Countywide
Regional	Elk Island Recreation Area	TBD	Picnic/Boat Ramp	2.7	$70,000	$26,415	Countywide
			Subtotal	**122.7**	**$4,655,000**	**$37,953**	
			Parks Grand Total	**242.3**	**$7,639,000**	**$31,533**	

Walking Trails - West

Type	Name	Address	Use	Miles	Value	$/Mile	Service Area
Community	Mathews Park	5399 Matthews Rd	Walking	0.8	$16,000	$20,000	West
			Subtotal	**0.8**	**$16,000**	**$20,000**	

Walking Trails - Countywide

Type	Name	Address	Use	Miles	Value	$/Mile	Service Area
Regional	Tucker Park	1300 Maidens Rd	Walking	0.75	$15,000	$20,000	Countywide
			Subtotal	**0.75**	**$15,000**	**$20,000**	
			Walking Trails Grand Total	**1.55**	**$31,000**	**$20,000**	

Multiuse Trail - Countywide

Type	Name	Address	Use	Miles	Value	$/Mile	Service Area
Regional	East End Trails	TBD	Multiuse	6.0	$1,680,000	$280,000	Countywide
Regional	Court House Greenway Project	TBD	Multiuse	11.6	$3,250,000	$280,000	Countywide
			Multiuse Trail Grand Total	**17.6**	**$4,930,000**	**$280,000**	

Source: Goochland County 25-Year Capital Improvement Program; Goochland County Park Master Plan, 2010
Note: highlighted information has been estimated using costs found in the County's Park Master Plan, 2010

The CapIM model will evaluate the capital impact a development has on all types of Park and Recreation facilities. However, to comply with the 2016 Virginia Cash Proffer law, it is only the park and recreation facilities that are included in Goochland County's CIP that are considered to be eligible for cash proffers at this time.

Parks Inventory and Level of Service

For all the Parks and Recreation components, except Multiuse Trails, capital impacts are calculated based on current levels of service for existing parks and indoor recreation facilities. The analysis first establishes a Countywide level of service for each type of facility and then determines whether there is excess capacity or a deficit in each park region for that type of park. Figure 38 lists the Community Parks, District Parks, Regional Parks, Walking Trails, and Indoor Recreational Facilities.

Figure 38. Current Parks and Recreation Inventory

Community Parks

Type	Name	Address	Use	Acres	Value	Service Area
Community	Matthews Park	5399 Matthews Park Rd	Picnic Area	36	$450,000	West
Source: Parks & Recreation Master Plan, 2010			**Total**	**36**	**$450,000**	
			Average Cost Per Acre		**$12,500**	

District Parks

Type	Name	Address	Use	Acres	Value	Service Area
District	Leakes Mill Park	3951 River Rd West	Soccer/Park	176	$4,287,000	Central
District	Goochland Sports Complex	1802 Sandy Hook Rd	General Rec	8	$1,051,200	Central
District	Central High School (Old School)	2748 Dogtown Rd	General Rec	23	$505,200	Central
Source: Parks & Recreation Master Plan, 2010			**Total**	**207**	**$5,843,400**	
			Average Cost Per Acre		**$28,229**	

Regional Parks

Type	Name	Address	Use	Acres	Value	Service Area
Regional	Hidden Rock Park	1920 Hidden Rock Lane	Baseball/Park	60	$2,090,400	Countywide
Regional	Tucker Park	1300 Maidens Road	Picnic Area	36	$2,856,400	Countywide
Source: Parks & Recreation Master Plan, 2010			**Total**	**96**	**$4,946,800**	
			Average Cost Per Acre		**$51,529**	

Walking Trails

Type	Name	Address	Use	Miles	Value	Service Area
Community	Matthews Park	5399 Matthews Park Rd	Walking	1.0	$20,000	Central
District	Leakes Mill Park	3951 River Rd West	Walking	5.0	$100,000	Central
Regional	Tucker Park	1300 Maidens Road	Walking	1.5	$30,000	Countywide
Regional	Hidden Rock Park	1920 Hidden Rock Lane	Walking	2.0	$40,000	Countywide
Regional	Courthouse Trails	2938 W River Road	Walking	1.0	$20,000	Countywide
Source: Parks & Recreation Master Plan, 2010			**Total**	**10.5**	**$210,000**	
			Average Cost Per Mile		**$20,000**	

Indoor Recreational Facilities

Type	Name	Address	Use	Sq. Ft.	Value	Service Area
Regional	Goochland Sports Complex	1802 Sandy Hook Rd	Goochland	16,000	$1,818,200	Countywide
Regional	Central High School (Old School)	2748 Dogtown Rd	P&R Programs	24,500	$4,762,800	Countywide
Source: Goochland County Facility List, 2017			**Total**	**40,500**	**$6,581,000**	
			Average Cost Per Square Foot		**$162**	

Levels of service are calculated for each type of park based on acreage totals. The methodology is based on the assumption that the County will maintain its current level of service by developing parks to serve new development. However, for some types of park facilities in some Service Areas, there is "excess capacity," which in the Goochland County CapIM means that there is a higher level of service in that Service Area compared to the County as a whole. For the Service Areas that have a deficit, the level of service is lower than the Countywide standard. For example, shown in Figure 39, the East Service Area has a current deficit of District Parks.

Figure 39. Parks Level of Service Standards and Cost Factors

Park Category	Service Area	Improved Acres	Unit	Population	Current LOS (Units / 1,000 persons)	Imp. Acres Reqd at County LOS by Category of Park	Current Excess Capacity or (Deficit)
Regional Park	Countywide	96		22,708	4.23	96.00	0.00
	Subtotal	**96**		**22,708**	**4.23**	**96.00**	**0.00**
District Park	East	0		11,241	0.00	102.47	(102.47)
	Central	207		7,183	28.82	65.48	141.52
	West	0		4,029	0.00	36.73	(36.73)
	Subtotal	**207**		**22,708**	**9.12**	**207.00**	**0.00**
Community Park	East	0		11,241	0.00	17.82	(17.82)
	Central	0		7,183	0.00	11.39	(11.39)
	West	36		4,029	8.93	6.39	29.61
	Subtotal	**36**		**22,708**	**1.59**	**36.00**	**0.00**
			Miles		**Miles/1,000 persons**	**Linear Miles**	**(Lin. Miles)**
Walking Trail	East		4.50	11,241	0.40	5.20	(0.70)
	Central		10.50	7,183	1.46	3.32	7.18
	West		4.50	4,029	1.12	1.86	2.64
	Subtotal	**0.00**	**10.50**	**22,708**	**0.46**	**10.50**	**0.00**
			Sq. Ft.		**Sq. Ft./1,000 persons**		
Indoor Rec Facility	Countywide		40,500	22,708	1,784	40,500.00	0.00
	Subtotal	**0**	**40,500**	**22,708**	**1,784**	**40,500.00**	**0.00**

Source: Park inventories from Goochland County Department of Parks and Recreation; regional population from US Census and ESRI; Goochland County 25-Year Capital Improvement Program; TischlerBise analysis.

Multiuse Trail Facility

Since the East End Trail and Court House Greenway Project will be the County's first multiuse trails, a plan-based approach is used to determine a planned level of service and the capital impact from growth. The construction of the trails will serve countywide current and future population, so a LOS standard is found by dividing the total length of the trails (17.6 miles) by the county's total projected 2042 population (42,956). The standard is then combined with the cost per mile of the trail to find the cost per person.

Figure 40. Multiuse Trail Level of Service Standards and Cost Factors

Recreation Facility	Service Area	Miles	Value$	$/Mile
East End Trail	Countywide	6.0	$1,680,000	$280,000
Court House Greenway Project	Countywide	11.6	$3,250,000	$280,000
TOTAL		**17.6**	**$4,930,000**	**$280,000**

Source: Goochland County 25-Year Capital Improvement Program

Note: highlighted information has been estimated using costs found in the County's Park Master Plan, 2010

Countywide Level of Service	
Total Linear Miles	**17.6**
Population (2042)	**42,956**
Linear Miles per 1,000 Persons	**0.41**
Total Cost per Mile	**$280,000**
Cost per Person	**$114.80**

Park and Recreation Facility Growth Needs

As Goochland County grows there will be an increase demand on the park system. This future demand in the East Service Area is illustrated in Figure 41. By applying the level of service factors to the increase in population, the needed park acres, trail miles, and recreational square feet to accommodate the growth is calculated.

As shown at the bottom of the Figure, by the end 2042, the population growth in the East Service Area will generate a demand of 72.4 Regional Park acres, 156.2 District Park acres, 27.2 Community Park acres, 7.9 Walking Trail miles, and 30,559 square feet of Indoor Recreational Facility. There are capital projects listed in the County's CIP for all those categories except for Indoor Recreational Facility. As a result, 59 percent of the Regional Park capacity increase in the CIP accommodates the growth in the East Service Area, 92 percent of the Community Park capacity increase in the CIP accommodates growth, and 100 percent of the new capacity for District Parks and Walking Trails in the CIP will be to accommodate growth.

Figure 41. Growth Demand on Park and Recreation Facilities, East Service Area

	Residential	Regional Park Cumul. Capital Need	District Park Cumul. Capital Need	Community Park Cumul. Capital Need	Walking Trail Cumul. Capital Need	Indoor Rec. Cumul. Capital Need
Unit of Growth	Population, Net Increase	Acres	Acres	Acres	Miles	Square Feet
Base Year						
2018	1,158	4.9	10.6	1.8	0.5	2,065
2019	1,791	7.6	16.3	2.8	0.8	3,194
2020	2,424	10.2	22.1	3.8	1.1	4,323
2021	3,056	12.9	27.9	4.8	1.4	5,451
2022	3,689	15.6	33.6	5.8	1.7	6,580
2023	4,322	18.3	39.4	6.9	2.0	7,709
2024	4,955	20.9	45.2	7.9	2.3	8,837
2025	5,588	23.6	50.9	8.9	2.6	9,966
2026	6,221	26.3	56.7	9.9	2.9	11,095
2027	6,854	29.0	62.5	10.9	3.2	12,224
2028	7,539	31.9	68.7	12.0	3.5	13,446
2029	8,224	34.8	75.0	13.0	3.8	14,668
2030	8,910	37.7	81.2	14.1	4.1	15,891
2031	9,595	40.6	87.5	15.2	4.4	17,113
2032	10,281	43.5	93.7	16.3	4.8	18,335
2033	10,966	46.4	100.0	17.4	5.1	19,558
2034	11,651	49.3	106.2	18.5	5.4	20,780
2035	12,337	52.2	112.5	19.6	5.7	22,002
2036	13,022	55.1	118.7	20.6	6.0	23,225
2037	13,707	57.9	125.0	21.7	6.3	24,447
2038	14,393	60.8	131.2	22.8	6.7	25,670
2039	15,078	63.7	137.4	23.9	7.0	26,892
2040	15,763	66.6	143.7	25.0	7.3	28,114
2041	16,449	69.5	149.9	26.1	7.6	29,337
2042	17,134	72.4	156.2	27.2	7.9	30,559

Source: TischlerBise analysis, see Land Use Assumptions Chapter

	Regional Park (acres)	District Park (acres)	Community Park (acres)	Walking Trail (miles)	Facility (sq. ft.)
LOS (unit per 1,000 people)	**4.2**	**9.1**	**1.6**	**0.5**	**1,784**
Total Demand (unit)	**72.4**	**156.2**	**27.2**	**7.9**	**30,559**
New Facilities from County CIP (unit)	**122.7**	**51.1**	**29.5**	**0.8**	**-**
Growth Share	**59%**	**100%**	**92%**	**100%**	**0%**

Source: Goochland County 25-Year Capital Improvement Program

The Central and West Service Area growth demands on Park and Recreation Facilities are illustrated in Figure 42 and Figure 43. From the Figures, it can be observed that there are no Community Parks planned in the Central Service Area and no District Parks planned in the West Service Area (along with no Indoor

Recreation Facilities planned Countywide). As noted earlier, the CapIM Model will calculate the capital impact of a development for all components that are affected. However, the cash proffer calculations only include those components with planned facilities included in the CIP.

Figure 42. Growth Demand on Park and Recreation Facilities, Central Service Area

	Residential	Regional Park Cumul. Capital Need	District Park Cumul. Capital Need	Community Park Cumul. Capital Need	Walking Trail Cumul. Capital Need	Indoor Rec. Cumul. Capital Need
Unit of Growth	Population, Net Increase	Acres	Acres	Acres	Miles	Square Feet
Base Year						
2018	86	0.4	0.8	0.1	0.0	154
2019	172	0.7	1.6	0.3	0.1	307
2020	258	1.1	2.4	0.4	0.1	461
2021	344	1.5	3.1	0.5	0.2	614
2022	430	1.8	3.9	0.7	0.2	768
2023	516	2.2	4.7	0.8	0.2	921
2024	603	2.5	5.5	1.0	0.3	1,075
2025	689	2.9	6.3	1.1	0.3	1,228
2026	775	3.3	7.1	1.2	0.4	1,382
2027	861	3.6	7.8	1.4	0.4	1,535
2028	947	4.0	8.6	1.5	0.4	1,689
2029	1,033	4.4	9.4	1.6	0.5	1,842
2030	1,119	4.7	10.2	1.8	0.5	1,996
2031	1,205	5.1	11.0	1.9	0.6	2,149
2032	1,291	5.5	11.8	2.0	0.6	2,303
2033	1,377	5.8	12.6	2.2	0.6	2,456
2034	1,463	6.2	13.3	2.3	0.7	2,610
2035	1,549	6.6	14.1	2.5	0.7	2,763
2036	1,635	6.9	14.9	2.6	0.8	2,917
2037	1,722	7.3	15.7	2.7	0.8	3,070
2038	1,808	7.6	16.5	2.9	0.8	3,224
2039	1,894	8.0	17.3	3.0	0.9	3,377
2040	1,980	8.4	18.0	3.1	0.9	3,531
2041	2,066	8.7	18.8	3.3	1.0	3,685
2042	2,152	9.1	19.6	3.4	1.0	3,838

Source: TischlerBise analysis, see Land Use Assumptions Chapter

	Regional Park (acres)	District Park (acres)	Community Park (acres)	Walking Trail (miles)	Facility (sq. ft.)
LOS (unit per 1,000 people)	**4.2**	**9.1**	**1.6**	**0.5**	**1,784**
Total Demand (unit)	**9.1**	**19.6**	**3.4**	**1.0**	**3,838**
New Facilities from County CIP (unit)	**122.7**	**3.0**	**-**	**0.8**	**-**
Growth Share	**7%**	**100%**	**0%**	**100%**	**0%**

Source: Goochland County 25-Year Capital Improvement Program

Figure 43. Growth Demand on Park and Recreation Facilities, West Service Area

	Residential	Regional Park Cumul. Capital Need	District Park Cumul. Capital Need	Community Park Cumul. Capital Need	Walking Trail Cumul. Capital Need	Indoor Rec. Cumul. Capital Need
Unit of Growth	Population, Net Increase	Acres	Acres	Acres	Miles	Square Feet
Base Year						
2018	38	0.2	0.4	0.1	0.0	69
2019	77	0.3	0.7	0.1	0.0	137
2020	115	0.5	1.1	0.2	0.1	206
2021	154	0.7	1.4	0.2	0.1	275
2022	192	0.8	1.8	0.3	0.1	343
2023	231	1.0	2.1	0.4	0.1	412
2024	269	1.1	2.5	0.4	0.1	480
2025	308	1.3	2.8	0.5	0.1	549
2026	346	1.5	3.2	0.5	0.2	618
2027	385	1.6	3.5	0.6	0.2	686
2028	423	1.8	3.9	0.7	0.2	755
2029	462	2.0	4.2	0.7	0.2	824
2030	500	2.1	4.6	0.8	0.2	892
2031	539	2.3	4.9	0.9	0.2	961
2032	577	2.4	5.3	0.9	0.3	1,029
2033	616	2.6	5.6	1.0	0.3	1,098
2034	654	2.8	6.0	1.0	0.3	1,167
2035	693	2.9	6.3	1.1	0.3	1,235
2036	731	3.1	6.7	1.2	0.3	1,304
2037	770	3.3	7.0	1.2	0.4	1,373
2038	808	3.4	7.4	1.3	0.4	1,441
2039	847	3.6	7.7	1.3	0.4	1,510
2040	885	3.7	8.1	1.4	0.4	1,578
2041	924	3.9	8.4	1.5	0.4	1,647
2042	962	4.1	8.8	1.5	0.4	1,716

Source: TischlerBise analysis, see Land Use Assumptions Chapter

	Regional Park (acres)	District Park (acres)	Community Park (acres)	Walking Trail (miles)	Facility (sq. ft.)
LOS (unit per 1,000 people)	**4.2**	**9.1**	**1.6**	**0.5**	**1,784**
Total Demand (unit)	**4.1**	**8.8**	**1.5**	**0.4**	**1,716**
New Facilities from County CIP (unit)	**122.7**	**-**	**36.0**	**0.8**	**-**
Growth Share	**3%**	**0%**	**4%**	**56%**	**0%**

Source: Goochland County 25-Year Capital Improvement Program

Parks and Recreation Input Variables and Capital Impacts

Factors used to determine parks and recreation capital impacts are summarized in Figure 44. Capital impacts for Parks and Recreation facilities are based on household size (i.e., persons per housing unit) and are only determined for residential development.

The top portion of the figure summarizes cost factors per demand unit by type of facility. In this case, there are six components to the capital impact calculation:

- District Park (determined by Service Area)
- Community Park (determined by Service Area)
- Walking Trails (determined by Service Area)
- Regional Park (determined Countywide)
- Indoor Recreation Facilities (determined Countywide)
- Multiuse Trails (determined Countywide)

Parks and recreation capital impacts are the product of persons per housing unit multiplied by the total net capital cost per person. An example of the calculation for a single family housing unit in the East Service Area is: the net capital cost per person for the Countywide portion ($565.05) is multiplied by the persons per housing unit in the East Service Area (2.39) to arrive at the capital impact for this component for a single family unit of $1,350 (truncated). Since the household sizes differ between Service Areas, the capital impact for each Service Area is listed in the lower portion of Figure 40.

Capital impacts are shown per housing unit for the other components that will be determined on a regional basis. Not all components will be triggered in all regions. See the "Service Area" section below.

Please note: Costs are shown for infrastructure components in this report to document development's share of the cost to provide the facilities. Despite capacity being available in some Service Areas, there is still a "capital cost impact" to the County from new development. However, due to the current cash proffer law, capacity triggers are required for cash proffer acceptance. These capacity triggers are integrated into the CapIM and allows the user to identify the total cost of growth as well as the potential cash proffer amount (which may be different due to service area differences and existing capacities).

Figure 44. Parks and Rec Input Variables and Capital Impact by Type of Housing Unit

Infrastructure Cost	Demand Unit	COUNTYWIDE	REGIONS		
			East	Central	West
District Parks	per capita	na	$151.53	$2,127.00	$257.32
Community Parks	per capita	na	$28.24	$19.82	$40.03
Walking Trails	per capita	na	$9.25	$9.25	$9.25
Regional Parks	per capita	$160.45	na	na	na
Indoor Recreation Facilities	per capita	$289.80	na	na	na
Mulituse Trails	per capita	$114.80	na	na	na
GROSS COST PER PERSON		$565.05	$189.02	$2,156.07	$306.60
Debt Service Credit		$0.00	$0.00	$0.00	$0.00
NET CAPITAL COST		**$565.05**	**$189.02**	**$2,156.07**	**$306.60**

Residential Capital Impact per Housing Unit	*Service Area: East*	COUNTYWIDE	REGIONS
			East
Unit Type	**Persons per Housing Unit**	**Capital Impact $**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**	**Per Housing Unit**
Single Family Housing Unit	2.39	**$1,350**	**$451**
Multifamily Housing Unit	1.72	**$971**	**$325**
Age-Restricted Single Family Housing Unit	1.73	**$975**	**$326**

Residential Capital Impact per Housing Unit	*Service Area: Central*	COUNTYWIDE	REGIONS
			Central
Unit Type	**Persons per Housing Unit**	**Capital Impact $**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**	**Per Housing Unit**
Single Family Housing Unit	2.23	**$1,260**	**$4,808**
Multifamily Housing Unit	1.72	**$971**	**$3,708**
Age-Restricted Single Family Housing Unit	1.61	**$910**	**$3,472**

Residential Capital Impact per Housing Unit	*Service Area: West*	COUNTYWIDE	REGIONS
			West
Unit Type	**Persons per Housing Unit**	**Capital Impact $**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**	**Per Housing Unit**
Single Family Housing Unit	2.22	**$1,254**	**$680**
Multifamily Housing Unit	1.72	**$971**	**$527**
Age-Restricted Single Family Housing Unit	1.60	**$906**	**$491**

Cash Proffer Eligibility

To comply with the 2016 Cash Proffer law, a capacity need must be established. For Goochland County's CapIM Model and cash proffer analysis only the park components that are listed in the CIP have been identified with capacity needs to accommodate growth. Figure 45 illustrates the components that are eligible for cash proffers. The components in the Figure that are labeled as not applicable are too small to serve a Countywide population (District and Community Parks) or attract a population wider than its local Service Area (Regional Parks, Indoor Recreation Facilities, and Multiuse Trails).

Figure 45. Summary of Parks and Recreation Capacity Needs

Facility Type	East	Central	West	Countywide
District Parks	X	X		na
Community Parks	X		X	na
Walking Trails			X	X
Regional Parks	na	na	na	X
Indoor Recreation Facilities	na	na	na	
Multiuse Trails	na	na	na	X

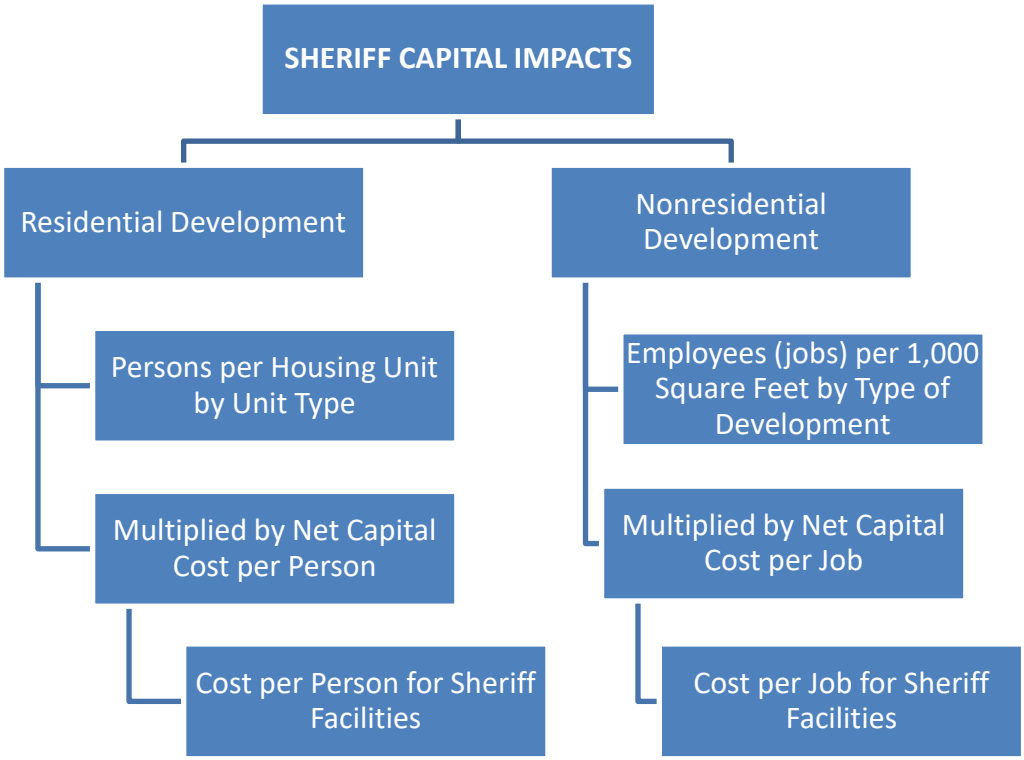
PUBLIC SAFETY CAPITAL IMPACTS: SHERIFF

There are three public facility subcategories included under Public Safety: Sheriff, Fire & Rescue, and Animal Control.

An ***incremental methodology*** approach is used to determine capital impacts for Sheriff facilities, which is diagrammed below. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the components. The residential portion of the Sheriff capital impact is derived from the product of Sheriff service calls per person multiplied by persons per housing unit (by type) multiplied by the net capital cost per person. The nonresidential portion is derived from the product of jobs per 1,000 square feet of nonresidential development multiplied by the net capital cost per job.

The Sheriff capital impacts are based on the County's current level of service and the cost to expand those facilities to serve growth. Sheriff capital impacts are calculated based on 2016 Sheriff calls for service data. The calls for service data provided by the County to TischlerBise was able to be delineated by land use and traffic (i.e., residential, nonresidential, and traffic). The traffic service calls are allocated to residential and nonresidential land uses based on vehicle trip totals. The County does not anticipate additional capacity for Sheriff facilities based on no projects included in the County's CIP. Therefore, the CapIM Model does not generate any ***eligible cash proffer costs for the Public Safety Sheriff subcategory.***

Figure 46. Sheriff Capital Impact Methodology Chart



Cost Allocation for Sheriff Facilities

A report of 2016 sheriff service calls to business was provided by County staff. In total, there were 5,232 calls attributed to business. However, traffic calls are included in the report and attributed to the nearest business. It is necessary to delineate the service calls from nonresidential land uses and traffic. As a result, 1,018 service calls were identified as traffic related. Additionally, the County's annual total for service calls was provided, so the residential calls are found by reducing the total by the nonresidential and traffic calls.

It is determined that of all the 23,352 calls for service for the Sheriff Department in 2016, 18,120 were from residential land uses, 4,214 were from nonresidential land uses, and 1,018 were traffic related. To allocate the traffic service calls to residential and nonresidential land uses, the base year daily vehicle trip totals were utilized. Shown in Figure 47, 66 percent of the vehicle trips in Goochland County are generated by residential land use, while 34 percent of the trips are generated by nonresidential land use. These proportions are used to allocate the traffic related Sheriff service calls. As a result, 80 percent of the totals calls for service are attributed to residential land uses and 20 percent attributed to nonresidential land uses.

Sheriff services are provided on a countywide basis in Goochland County; substations are not used in the County. Therefore, it is recommended that one service area be used to determine the capital impact on Sheriff facilities.

Figure 47. Goochland County Sheriff Calls for Service

Sheriff Service Calls

Land Use	Service Calls	%
Residential	18,120	78%
Nonresidential	4,214	18%
Traffic	1,018	4%
Total	23,352	100%

Base Year Total Daily Vehicle Trips

Land Use	Vehicle Trips	%
Residential	65,406	66%
Nonresidential	33,082	34%
Total	98,488	100%

Source: TischlerBise Analysis

Sheriff Service Calls Allocated by Land Use

Land Use	Service Calls	%
Residential	18,796	80%
Nonresidential	4,556	20%
Total	23,352	100%

Source: Goochland County

Sheriff Facilities Inventory and Level of Service

Sheriff capital impacts are based on current levels of service, which are derived from the current inventory of square footage and replacement value of existing facilities.

The square footage of the four Sheriff facilities in Goochland County is shown in Figure 48 and is allocated based on the service call data. The corresponding value of the facilities attributed to residential and nonresidential land uses is listed as well. The residential level of service, 0.89 square feet per person, is found by dividing the attributed square feet by the base year population. The nonresidential level of service, 0.32 square feet per job, is found by dividing the attributed square feet by the base year job total.

Figure 48. Sheriff Facilities Level of Service Standards

Facility	Location	Departments /Use	Sq.Ft.	Res %	Nonres %	Res SF	Nonres SF	Value	$/Sq. Ft.	Res. Value $	Nonres. Value $	Total Value $
Public Safety	2938 River Rd West G	Multiuse	13,661	80%	20%	10,929	2,732	$1,336,900	$98	$1,069,520	$267,380	$1,336,900
Evidence Storage-Sheriffs Impound Lot	2692 Courthouse Circle	Storage	120	80%	20%	96	24	$50,000	$417	$40,000	$10,000	$50,000
Emergency Operations Center	2938 River Rd West K	Emergency Operations	6,000	80%	20%	4,800	1,200	$10,000,000	$1,667	$8,000,000	$2,000,000	$10,000,000
Sheriff's Administration	2938 River Rd West C	Sheriff Operations	5,432	80%	20%	4,346	1,086	$780,700	$144	$624,560	$156,140	$780,700
		GRAND TOTAL	25,213			20,170	5,042	12,167,600	$482.59	9,734,080	2,433,520	12,167,600

Source: Goochland County Facility Inventory

	Residential	Nonresidential	Total
Total Square Feet	20,170	5,042	25,212
Base Year Population or Jobs	22,708	15,614	
Square Feet per Person or Job	0.89	0.32	
Total Cost per Sq. Ft.	$482.59	$482.59	
Cost per Person or Job	$429.51	$154.43	

Sheriff and Emergency Communications Input Variables and Capital Impacts

Level of service standards and cost factors for the Sheriff and Emergency Communications capital impacts are summarized from above and shown in the following figure.

Figure 49 and Figure 50. Capital impacts are based on household size (i.e., persons per housing unit) for residential development and employees per 1,000 square feet of floor area for nonresidential development. (For further discussion on demand factors, see the chapter Land Use Assumptions.)

The top portion of the figure summarizes cost factors per demand unit by type of facility. In this case, there is just one capital component in the capital impact calculation, Sheriff Facilities. Since the household sizes differ between Service Areas, the capital impact for each Service Area is listed in the lower portion of the following figure.

Figure 49. Sheriff and Emergency Communications Input Variables and Capital Impacts by Land Use, Residential

Infrastructure Cost	Demand Unit	COUNTYWIDE
Sheriff Facilities	per capita	$429.51
GROSS COST PER PERSON		$429.51
Debt Service Credit		$0.00
NET CAPITAL COST		**$429.51**

Residential Capital Impact per Housing Unit	*Service Area: East*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.39	**$1,026**
Multifamily Housing Unit	1.72	**$738**
Age-Restricted Single Family Housing Unit	1.73	**$741**

Residential Capital Impact per Housing Unit	*Service Area: Central*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.23	**$957**
Multifamily Housing Unit	1.72	**$738**
Age-Restricted Single Family Housing Unit	1.61	**$691**

Residential Capital Impact per Housing Unit	*Service Area: West*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.22	**$953**
Multifamily Housing Unit	1.72	**$738**
Age-Restricted Single Family Housing Unit	1.60	**$688**

Figure 50. Sheriff and Emergency Communications Input Variables and Capital Impacts by Land Use, Nonresidential

Infrastructure Cost	Demand Unit	COUNTYWIDE
Sheriff Facilities	per job	$154.43
GROSS COST PER JOB		$154.43
Debt Service Credit		$0.00
NET CAPITAL COST		**$154.43**

Nonresidential Capital Impact per 1,000 Square Feet		COUNTYWIDE
Nonresidential Land Use	**Employees per 1,000 Sq. Ft.**	**Capital Impact $**
	Per 1,000 Sq.Ft.	**Per 1,000 Sq.Ft.**
Retail	2.38	**$367**
Office and Other Services	3.31	**$511**
Industrial	2.11	**$325**
Institutional	0.67	**$103**

Sheriff and Emergency Communications Cash Proffer Eligibility

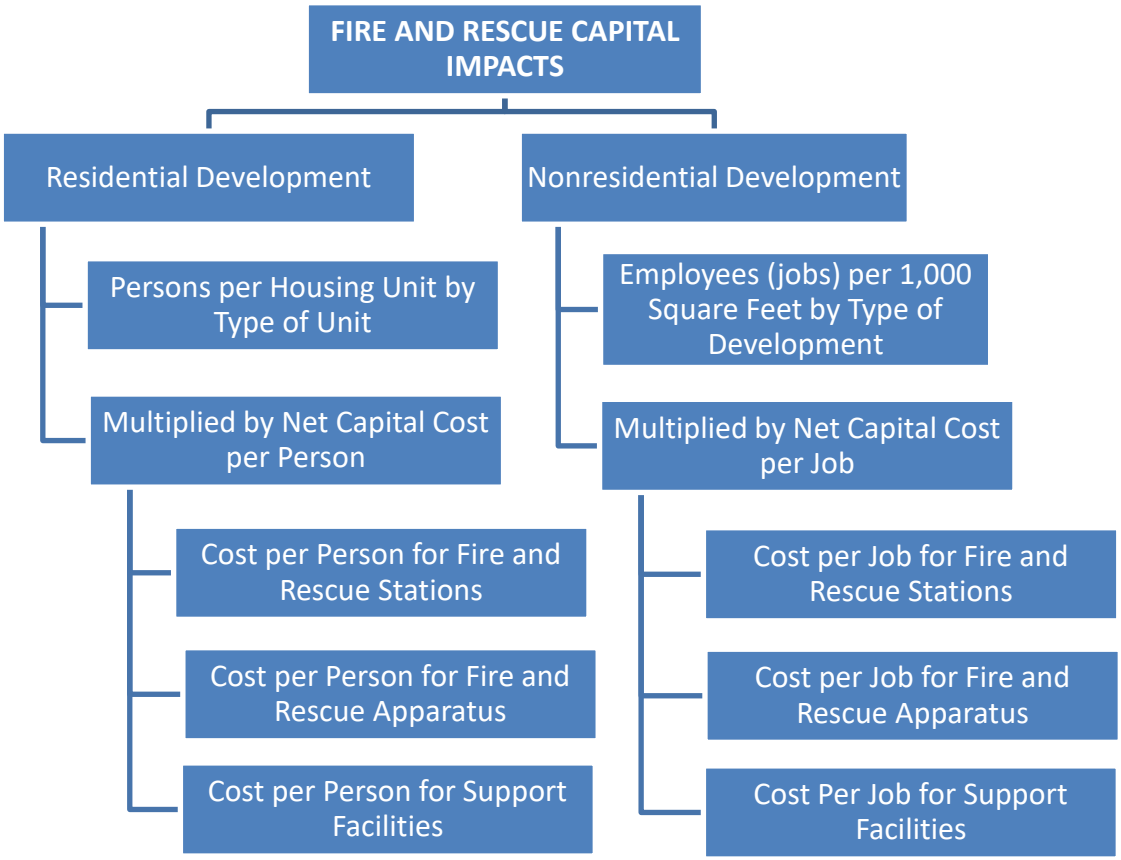
In the County's current 25-Year CIP, there are no Sheriff facility improvements included, therefore it is assumed there is sufficient capacity in current facilities to accommodate projected growth. As a result, to comply with the 2016 Virginia Cash Proffer law, a future development will not trigger an additional capacity project for Sheriff and Emergency Communications, thus ***the component is not included in the cash proffer calculation*** at this time.

PUBLIC SAFETY CAPITAL IMPACTS: FIRE AND RESCUE

Fire and Rescue is the second facility type included under the Public Safety capital impacts category. Goochland County Fire and Rescue services are primarily a volunteer operation with six stations. But the national and Goochland County trend has been and continues to be for increasing career staff due to significant decreases in the number and availability of volunteers. The County has invested in new and/or renovated fire and rescue stations in the recent past and has future projects programmed in the CIP. There are a number of projects in the County's CIP that will expand Fire and Rescue capacity. These new facilities will be able to serve the current population and future development. Because fire stations are organized by geographic fire districts, capital impacts are determined based on Service Area needs.

The ***plan-based methodology*** is used to calculate the Fire and Rescue capital impact and is outlined in Figure 51. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the components. The residential portion of the fire and rescue capital impact is derived from the product of persons per housing unit (by type) multiplied by the net capital cost per person. The nonresidential portion is derived from the product of employees per 1,000 square feet of nonresidential space multiplied by the net capital cost per employee (job).

Figure 51. Fire & Rescue Capital Impact Methodology Chart



Cost Allocation for Fire and Rescue Facilities

Proportionate share factors are used to allocate demand to residential and nonresidential development where appropriate. For facilities that serve both residential and nonresidential development, TischlerBise recommends using a proportionate share allocation based on a functional population approach. The functional population approach estimates the residential and nonresidential activity in the county by using the hours in a day. For the residents that are not working, their day is estimated to be split with 20 hours attributed to residential purposes and 4 hours to nonresidential purposes. For resident workers, 14 hours are attributed to residential purposes and 10 hours to nonresidential purposes. For non-resident workers in the county, 10 hours are attributed to nonresidential purposes in Goochland County.

Since Fire Department facilities are allocated within Service Areas, a proportionate share factor is calculated for each Service Area. From Figure 52 to Figure 54, it is observed that the East Service Area's proportionate share factor varies from the other two Service Areas. This is a result of the higher level of nonresidential development in the East and not elsewhere in the County.

Figure 52. East Service Area Proportionate Share Factors

		Demand Units in 2015		Demand Hours/Day	Person Hours
Residential					
	Population	11,241			
55%	Residents Not Working	6,154		20	123,070
45%	Resident Workers	5,087			
16%	Worked in County		839	14	11,748
84%	Worked Outside of County		4,248	14	59,474
				Residential Subtotal	194,292
				Residential Share ==>	**56%**
Nonresidential					
	Non-Working Residents	6,154		4	24,614
	Jobs Located in County	13,115			
6%	Residents Working in County		839	10	8,391
94%	Non-Resident Workers (Inflow Commuters)		12,276	10	122,759
				Nonresidential Subtotal	155,764
				Nonresidential Share ==>	**44%**
				TOTAL	350,056

Source: 2015 Inflow/Outflow Analysis, OnTheMap Application, U.S. Census Bureau; TischlerBise Analysis

Figure 53. Central Service Area Proportionate Share Factors

	Demand Units in 2015		Demand Hours/Day	Person Hours
Residential				
Population	7,184			
55% Residents Not Working		3,933	20	78,653
45% Resident Workers		3,251		
16% Worked in County		536	14	7,508
84% Worked Outside of County		2,715	14	38,009
			Residential Subtotal	124,170
			Residential Share ==>	**79%**
Nonresidential				
Non-Working Residents		3,933	4	15,731
Jobs Located in County		1,795		
30% Residents Working in County		536	10	5,363
70% Non-Resident Workers (Inflow Commuters)		1,259	10	12,589
			Nonresidential Subtotal	33,683
			Nonresidential Share ==>	**21%**
			TOTAL	157,853

Source: 2015 Inflow/Outflow Analysis, OnTheMap Application, U.S. Census Bureau; TischlerBise Analysis

Figure 54. West Service Area Proportionate Share Factors

	Demand Units in 2015		Demand Hours/Day	Person Hours
Residential				
Population	4,038			
55% Residents Not Working		2,210	20	44,207
45% Resident Workers		1,827		
16% Worked in County		301	14	4,220
84% Worked Outside of County		1,526	14	21,363
			Residential Subtotal	69,790
			Residential Share ==>	**81%**
Nonresidential				
Non-Working Residents		2,210	4	8,841
Jobs Located in County		704		
43% Residents Working in County		301	10	3,014
57% Non-Resident Workers (Inflow Commuters)		402	10	4,024
			Nonresidential Subtotal	15,879
			Nonresidential Share ==>	**19%**
			TOTAL	85,669

Source: 2015 Inflow/Outflow Analysis, OnTheMap Application, U.S. Census Bureau; TischlerBise Analysis

Fire and Rescue Facilities in Capital Improvement Program

In Figure 55, further detail is provided on the planned costs to build new fire stations and training facilities in Goochland County. There is a total of $35,637,400 of Fire and Rescue capital facilities included in the County's CIP. By applying the corresponding proportionate share factors from Figure 52 - Figure 54, the values of the facilities are allocated to residential and nonresidential development. The average costs in each Service Area for new stations and expansions are applied to the level of service (Figure 57) to calculate the capital impact. It should be noted that the fire station costs in Figure 55 are solely for station construction. Another capital impact is calculated for fire apparatus and equipment.

Figure 55. Future Fire and Rescue Facilities Cost Detail

Facility	Location	Service Area [East, Central, West]	Sq. Ft.	Res %	Nonres %	Value	Res. Value $	Nonres. Value $	Total Value $	Value $ Per Sq. Ft.
New Fire Station	West Creek	East	12,000	56%	44%	$5,375,000	$3,010,000	$2,365,000	$5,375,000	$447
Station Expansion	Company 2	East	6,000	56%	44%	$2,310,400	$1,293,824	$1,016,576	$2,310,400	$385
New Fire Station	Oilville Area	East	12,000	56%	44%	$5,620,000	$3,147,200	$2,472,800	$5,620,000	$468
		Subtotal	30,000			$13,305,400	$7,451,024	$5,854,376		$443
Central										
Facility	**Location**	**Service Area [East, Central, West]**	**Sq. Ft.**	**Res %**	**Nonres %**	**Value**	**Res. Value $**	**Nonres. Value $**	**Total Value $**	**Value $ Per Sq. Ft.**
New Fire Station	District 2 Area	Central	12,000	79%	21%	$5,190,000	$4,100,100	$1,089,900	$5,190,000	$432
New Fire Station	Rock Castle	Central	12,000	79%	21%	$6,450,000	$5,095,500	$1,354,500	$6,450,000	$537
		Subtotal	24,000			$11,640,000	$9,195,600	$2,444,400		$485
West										
Facility	**Location**	**Service Area [East, Central, West]**	**Sq. Ft.**	**Res %**	**Nonres %**	**Value**	**Res. Value $**	**Nonres. Value $**	**Total Value $**	**Value $ Per Sq. Ft.**
Substation	Company 4	West	12,000	81%	19%	$5,652,000	$4,578,120	$1,073,880	$5,652,000	$471
		Subtotal	12,000			$5,652,000	$4,578,120	$1,073,880		$471
Countywide										
Facility	**Location**	**Service Area [East, Central, West]**	**Sq. Ft.**	**Res %**	**Nonres %**	**Value**	**Res. Value $**	**Nonres. Value $**	**Total Value $**	**Value $ Per Sq. Ft.**
Fire Training Center	Cardwell Road	Countywide	11,376	63%	37%	$5,040,000	$3,175,200	$1,864,800	$5,040,000	$443
		Subtotal	11,376			$5,040,000	$3,175,200	$1,864,800		$443
		Grand Total	$77,376			$35,637,400	$24,399,944	$11,237,456		$460
		Grand Total Fire Stations Only	$66,000			$30,597,400	$21,224,744	$9,372,656		$463

Source: Goochland County 25-Year Capital Improvement Program, 2017
Note: the floor area of the fire training center has been estimated based on the average cost of the East Service Area facilities, where the training will be located

Fire and Rescue Facilities Inventory Level of Service

Fire and rescue facilities capital impacts are based on current levels of service, which are derived from the current inventory of square footage and replacement value of current fire and rescue station space. Future capacity needs are identified in the County's Capital Improvement Plan. Found in Figure 56, the current total fire station square footage is 52,031 square feet. An additional 23,894 square feet of space is used for County Fire and Rescue Offices and the Fire Training Center.

Figure 56. Fire and Rescue Facilities Inventory

Facility	Location	Service Area [East, Central, West]	Sq.Ft.
Station 1 - Manakin	180 River Rd W	East	9,922
Station 2 - Crozier	1529 River Rd W	East	4,843
Station 3 - Centerville	52 Broad Street	East	8,859
Station 4 - Fife	2397 Handsville-Fife Rd	West	6,443
Station 5 - Courthouse	2710 Fairground Rd	Central	9,550
Station 6 - Hadensville	4810 Three Chopt Rd	West	12,414
Annex Building	2938 River Rd West I	Countywide	18,394
Fire Training Center	2466 Old Courthouse Rd	Countywide	5,500
		GRAND TOTAL	75,925
		GRAND TOTAL Fire Stations Only	52,031
		GRAND TOTAL Support Facilities Only	23,894

Source: Goochland County Facility List

In Figure 57, the fire station square footage for each Service Area is combined with the corresponding proportionate share factor to calculate the current level of service. The current level of service provided to residential and nonresidential developments for fire stations in Goochland County varies by Service Area because of the varying fire station locations, populations, and proportionate shares. The fire station floor area required in Figure 57 for each Service Area is calculated by multiplying the population or jobs by the County's overall level of service. The surplus or deficit is found by comparing current square feet in each Service Area by the required square feet to be at the County's overall level of service.

Figure 57. Fire and Rescue Station Level of Service Standards by Service Area

Service Area	Population	Total Sq. Ft.	Resid. Share %	Resid. Sq. Ft.	Res. LOS (Sq. Ft./Capita)	Res. Sq. Ft. Reqd at Current LOS	Res. Sq. Ft. Surplus (Deficit)
East	11,241	23,624	56%	13,229	1.18	18,047	(4,818)
Central	7,183	9,550	79%	7,545	1.05	11,532	(3,988)
West	4,029	18,857	81%	15,274	3.79	6,469	8,805
Total	22,453	52,031		36,048	1.61	36,048	0

Nonresidential Level of Service

Service Area	Jobs	Total Sq. Ft.	Nonres. Share %	Nonres. Sq. Ft.	Nonres. LOS (Sq. Ft./Capita)	Nonres. Sq. Ft. Reqd at Current LOS	Nonres. Sq. Ft. Surplus (Deficit)
East	13,115	23,624	44%	10,395	0.79	13,425	(3,030)
Central	1,795	9,550	21%	2,006	1.12	1,838	168
West	704	18,857	19%	3,583	5.09	720	2,862
Total	15,614	52,031		15,983	1.02	15,983	0

Fire and Rescue Growth Needs

As Goochland County grows, there will be an increase demand on the fire service areas. For example, projected future demand in the East Service Area is illustrated in Figure 58. By applying the level of service factors to the increase in population and jobs, the total new square footage to stay at the level of service is calculated. Overall, a need for 37,243 square feet is projected over the 25-year projection period. This demand is projected to be met by the new fire stations identified in the County's CIP, which total 30,000 square feet. As a result, 100% of the new capacity from the fire stations in the CIP are needed to accommodate growth.

Figure 58. Growth Demand on Fire and Rescue Facilities, East Service Area

	Residential	Nonresidential	Annual Capital Need	Cumulative Capital Need
Unit of Growth	Population Net Increase	Job Net Increase	Square Feet	Square Feet
Base Year				
2018	1,158	797	2,675	2,675
2019	1,791	1,595	1,832	4,508
2020	2,424	2,392	1,832	6,340
2021	3,056	3,190	1,832	8,172
2022	3,689	3,987	1,832	10,005
2023	4,322	4,785	1,832	11,837
2024	4,955	5,582	1,832	13,669
2025	5,588	6,379	1,832	15,502
2026	6,221	7,177	1,832	17,334
2027	6,854	7,974	1,832	19,166
2028	7,539	8,077	1,205	20,371
2029	8,224	8,179	1,205	21,577
2030	8,910	8,281	1,205	22,782
2031	9,595	8,384	1,205	23,987
2032	10,281	8,486	1,205	25,192
2033	10,966	8,588	1,205	26,397
2034	11,651	8,691	1,205	27,602
2035	12,337	8,793	1,205	28,807
2036	13,022	8,896	1,205	30,012
2037	13,707	8,998	1,205	31,218
2038	14,393	9,100	1,205	32,423
2039	15,078	9,203	1,205	33,628
2040	15,763	9,305	1,205	34,833
2041	16,449	9,407	1,205	36,038
2042	17,134	9,510	1,205	37,243

Source: TischlerBise analysis, see Land Use Assumptions Chapter

	Residential	Nonresidential
LOS (sq. ft. per unit)	1.61	1.02
Total Demands (sq. ft.)	27,509	9,734

Grand Total of Needed	37,243
New Facilities from County CIP (sq. ft.)	30,000
Growth Share	100%

Source: Goochland County 25-Year Capital Improvement Program, 2017

The demand for new facilities in the Central and West Service Areas are found in Figure 59 and Figure 60. These figures show that there will be additional demand for new facilities, but the growth share is much lower than in the East. As a result, there will be excess capacity in the new facilities that will be able to absorb growth beyond 2042.

Figure 59. Growth Demand on Fire and Rescue Facilities, Central Service Area

	Residential	Nonresidential	Annual Capital Need	Cumulative Capital Need
Unit of Growth	Population Net Increase	Job Net Increase	Square Feet	Square Feet
Base Year				
2018	86	240	384	384
2019	172	480	384	768
2020	258	721	384	1,152
2021	344	961	384	1,536
2022	430	1,201	384	1,921
2023	516	1,441	384	2,305
2024	603	1,682	384	2,689
2025	689	1,922	384	3,073
2026	775	2,162	384	3,457
2027	861	2,402	384	3,841
2028	947	2,433	170	4,011
2029	1,033	2,464	170	4,181
2030	1,119	2,495	170	4,350
2031	1,205	2,526	170	4,520
2032	1,291	2,556	170	4,690
2033	1,377	2,587	170	4,860
2034	1,463	2,618	170	5,029
2035	1,549	2,649	170	5,199
2036	1,635	2,680	170	5,369
2037	1,722	2,711	170	5,539
2038	1,808	2,741	170	5,708
2039	1,894	2,772	170	5,878
2040	1,980	2,803	170	6,048
2041	2,066	2,834	170	6,218
2042	2,152	2,865	170	6,387

Source: TischlerBise analysis, see Land Use Assumptions Chapter

	Residential	Nonresidential
LOS (sq. ft. per unit)	1.61	1.02
Total Demands (sq. ft.)	3,455	2,933

Grand Total of Needed	6,387
New Facilities from County CIP (sq. ft.)	24,000
Growth Share	27%

Source: Goochland County 25-Year Capital Improvement Program, 2017

Figure 60. Growth Demand on Fire and Rescue Facilities, West Service Area

	Residential	Nonresidential	Annual Capital Need	Cumulative Capital Need
Unit of Growth	Population Net Increase	Job Net Increase	Square Feet	Square Feet
Base Year				
2018	38	66	129	129
2019	77	132	129	258
2020	115	197	129	387
2021	154	263	129	517
2022	192	329	129	646
2023	231	395	129	775
2024	269	461	129	904
2025	308	526	129	1,033
2026	346	592	129	1,162
2027	385	658	129	1,291
2028	423	667	70	1,362
2029	462	675	70	1,432
2030	500	683	70	1,503
2031	539	692	70	1,573
2032	577	700	70	1,644
2033	616	709	70	1,714
2034	654	717	70	1,784
2035	693	726	70	1,855
2036	731	734	70	1,925
2037	770	743	70	1,996
2038	808	751	70	2,066
2039	847	759	70	2,137
2040	885	768	70	2,207
2041	924	776	70	2,277
2042	962	785	70	2,348

Source: TischlerBise analysis, see Land Use Assumptions Chapter

	Residential	Nonresidential
LOS (sq. ft. per unit)	1.61	1.02
Total Demands (sq. ft.)	1,544	803

Grand Total of Needed	2,348
New Facilities from County CIP (sq. ft.)	12,000
Growth Share	20%

Source: Goochland County 25-Year Capital Improvement Program, 2017

In Figure 61, the level of service in Figure 57 is listed along with the average cost per square foot of the planned fire stations in each of the Service Areas per the County's CIP. By combining the two, the capital impact for the fire station component is calculated. For example, the level of service for residential development is 1.61 square feet per person and in the East Service Area the cost per square foot is $443. Therefore, the cost per person in the East Service Area is $713.23 (1.61 x $443 = $713.23).

Figure 61. Fire Station Capital Impact Component

	Value $ Per Sq. Ft.	Res. LOS (Sq. Ft./Capita)	Res. Capital Impact/Capita	Nonres. LOS (Sq. Ft./Job)	Nonres. Capital Impact/Job
East	$443	1.61	**$713.23**	1.02	**$451.86**
Central	$485	1.61	**$780.85**	1.02	**$494.70**
West	$471	1.61	**$758.31**	1.02	**$480.42**

Fire Apparatus Capital Impact

In addition to new station space, it is anticipated that the County will purchase apparatus for the new fire stations. The following figures list the equipment identified in the County's CIP for the new stations. In Figure 62, the East Service Area is planned to have two new fire stations over the next 25 years: West Creek and Oilville. The East Station will be equipped with an engine, ambulance, and ladder truck. The proportionate share found for the East Service Area is used to allocate the cost of the apparatuses to residential and nonresidential development. Since it is anticipated that these stations will be serving population through 2042, the costs allocated for the apparatuses are divided by the projected population and jobs for 2042 in the East Service Area.

Figure 62. Fire and Rescue Apparatus Cost Detail, East Service Area

Apparatus	# of Units	Unit Cost ($2017)	Total Cost ($2017)
Engine	2	$755,000	$1,510,000
Ambulance	2	$475,000	$950,000
Ladder Truck	2	$1,320,000	$2,640,000
TOTAL	**6**		**$5,100,000**

Source: Goochland County 25-Year Capital Improvement Program, 2017

East	*Residential*	*Nonresidential*
Proportionate Share	*56%*	*44%*
Cost Allocation	**$2,856,000**	**$2,244,000**
Population or Jobs (2042)	**28,375**	**22,625**
Cost per Person or Job	**$100.65**	**$99.18**

Source: Goochland County Fire and Rescue; TischlerBise analysis.

In Figure 63, the same calculation is done to determine the cost for new fire apparatus associated with the two fire stations planned in the Central Service Area. There is an engine, ambulance, and tanker planned for each station.

Figure 63. Fire and Rescue Apparatus Cost Detail, Central Service Area

Apparatus	# of Units	Unit Cost ($2017)	Total Cost ($2017)
Engine	2	$755,000	$1,510,000
Ambulance	2	$475,000	$950,000
Tanker	2	$425,000	$850,000
TOTAL	**6**		**$3,310,000**

Source: Goochland County 25-Year Capital Improvement Program, 2017

Central	*Residential*	*Nonresidential*
Proportionate Share	*79%*	*21%*
Cost Allocation	**$2,614,900**	**$695,100**
Population or Jobs (2042)	**9,335**	**4,660**
Cost per Person or Job	**$280.12**	**$149.16**

Source: Goochland County Fire and Rescue; TischlerBise analysis.

There is one fire station planned for the West Service Area. Figure 64, lists the apparatus needed to outfit the station and the corresponding capital impact costs.

Figure 64. Fire and Rescue Apparatus Cost Detail, West Service Area

Apparatus	# of Units	Unit Cost ($2017)	Total Cost ($2017)
Engine	1	$755,000	$755,000
Ambulance	1	$475,000	$475,000
Tanker	1	$425,000	$425,000
TOTAL	**3**		**$1,655,000**

Source: Goochland County 25-Year Capital Improvement Program, 2017

West	*Residential*	*Nonresidential*
Proportionate Share	*81%*	*19%*
Cost Allocation	**$2,681,100**	**$628,900**
Population or Jobs (2042)	**4,991**	**1,489**
Cost per Person or Job	**$537.15**	**$422.48**

Source: Goochland County Fire and Rescue; TischlerBise analysis.

Fire and Rescue Support Facilities Level of Service

Along with fire stations and fire apparatus, the CapIM Model includes a component for support facilities for Fire and Rescue services. The County's CIP includes a new fire training center which will be serving all fire service areas, so a countywide level of service is calculated in Figure 66. The countywide proportionate share of 63/37 (found in Figure 65) is used to allocate the square footage of the facilities to residential and nonresidential, respectively.

Figure 65. Countywide Proportionate Share Factors

Residential	*Demand Units in 2015*		*Demand Hours/Day^*	*Person Hours*
Population*	22,277			
55% Residents Not Working		12,195	20	243,900
45% Resident Workers**		10,082		
16% Worked in County**		1,663	14	23,282
84% Worked Outside of County**		8,419	14	117,866
			Residential Subtotal	385,048
			Residential Share ==>	**63%**
Nonresidential				
Non-Working Residents		12,195	4	48,780
Jobs Located in County**		17,466		
10% Residents Working in County**		1,663	10	16,630
90% Non-Resident Workers (Inflow Commuters)		15,803	10	158,030
			Nonresidential Subtotal	223,440
			Nonresidential Share ==>	**37%**
			TOTAL	608,488

** 2015 UVA - Weldon Cooper Center for Public Service*

*** 2015 Inflow/Outflow Analysis, OnTheMap Application, U.S. Census Bureau data for all jobs .*

^ Hours per day allocated to land use (residential or nonresidential).

Residential: 20 hours per day allocated to non-working residents; 14 hours allocated to employed residents.
Nonresidential: 4 hours allocated to non-working residents; 10 hours allocated to residents and non-residents working in the County

By dividing the allocated square footage by the projected population or jobs for 2042, the current level of service for support facilities is calculated. From Figure 66, the average cost per square foot of $443 is combined with the level of service to calculate the cost per person or job.

Figure 66. Fire and Rescue Support Facilities Level of Service Standards

		Residential	Nonresidential
Proportionate Share		**63%**	**37%**
Total Square Feet of Station Space	11,376	7,167	4,209
2042 Population or Jobs		42,956	28,773
Square Feet per Person or Job		0.17	0.15

Total Cost per Sq. Ft.	**$443.00**	**$443.00**	**$443.00**
Cost per Person or Job	**Countywide**	**$73.91**	**$64.80**

Fire and Rescue Facilities Input Variables and Capital Impacts

Level of service standards and cost factors for fire and rescue capital impact are summarized from above and shown in Figure 67 and Figure 68. Capital impacts for fire and rescue facilities are based on household size (i.e., persons per housing unit) for residential development and employees per 1,000 square feet of floor area for nonresidential development. (For further discussion on demand factors, see the chapter Land Use Assumptions.)

The top portion of the figure summarizes cost factors per demand unit by type of facility. In this case, there are three components in the capital impact calculation:

- Fire Stations (determined by Service Area)
- Fire Apparatus (determined by Service Area)
- Support Facilities (determined Countywide)

Fire services are provided on a Countywide and Service Area basis. Support Facilities' capital costs are determined on a Countywide level while fire stations and apparatuses' capital costs are determined on a Service Area level. Since the household sizes differ between Service Areas, the capital impact for each Service Area is listed in the lower portion of Figure 67.

Figure 67. Fire and Rescue Facilities Input Variables and Capital Impacts by Land Use, Residential

Infrastructure Cost	Demand Unit	COUNTYWIDE	REGIONS		
			East	Central	West
Fire Station	per capita	NA	$713.23	$780.85	$758.31
Fire Appratus	per capita	NA	$100.65	$280.12	$537.15
Support Facilities	per capita	$73.91	NA	NA	NA
GROSS COST PER PERSON		$73.91	$813.88	$1,060.97	$1,295.46
Debt Service Credit		$0.00	$0.00	$0.00	$0.00
NET CAPITAL COST		**$73.91**	**$813.88**	**$1,060.97**	**$1,295.46**

Residential Capital Impact per Housing Unit	*Service Area: East*	COUNTYWIDE	REGION East
Housing Unit Type	**Persons per Housing Unit**	**Capital Impact $**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**	**Per Housing Unit**
Single Family Housing Unit	2.39	**$176**	**$1,945**
Multifamily Housing Unit	1.72	**$127**	**$1,399**
Age-Restricted Single Family Housing Unit	1.73	**$127**	**$1,404**

Residential Capital Impact per Housing Unit	*Service Area: Central*	COUNTYWIDE	REGION Central
Housing Unit Type	**Persons per Housing Unit**	**Capital Impact $**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**	**Per Housing Unit**
Single Family Housing Unit	2.23	**$164**	**$2,365**
Multifamily Housing Unit	1.72	**$127**	**$1,824**
Age-Restricted Single Family Housing Unit	1.61	**$119**	**$1,708**

Residential Capital Impact per Housing Unit	*Service Area: West*	COUNTYWIDE	REGION West
Housing Unit Type	**Persons per Housing Unit**	**Capital Impact $**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**	**Per Housing Unit**
Single Family Housing Unit	2.22	**$164**	**$2,875**
Multifamily Housing Unit	1.72	**$127**	**$2,228**
Age-Restricted Single Family Housing Unit	1.60	**$118**	**$2,077**

Figure 68. Fire and Rescue Facilities Input Variables and Capital Impacts by Land Use, Nonresidential

Infrastructure Cost	Demand Unit	COUNTYWIDE	REGIONS		
			East	Central	West
Fire Station	per job	NA	$451.86	$494.70	$480.42
Fire Apparatus	per job	NA	$99.18	$149.16	$422.48
Support Facilities	per job	$64.80	NA	NA	NA
GROSS COST PER JOB		$64.80	$551.04	$643.86	$902.90
Debt Service Credit		$0.00	$0.00	$0.00	$0.00
NET CAPITAL COST		**$64.80**	**$551.04**	**$643.86**	**$902.90**

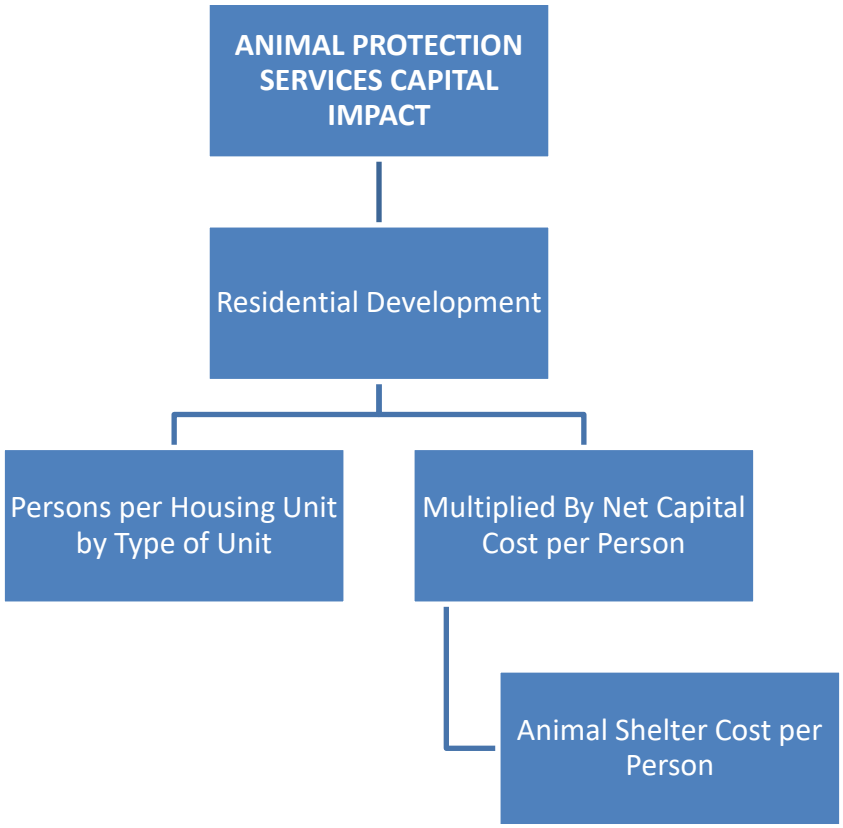
Nonresidential Capital Impact per 1,000 Square Feet		COUNTYWIDE	REGIONS		
			East	Central	West
Nonresidential Land Use	**Employees per 1,000 Sq. Ft.**	**Capital Impact $**	**Capital Impact $**	**Capital Impact $**	**Capital Impact $**
	Per 1,000 Sq.Ft.	**Per 1,000 Sq.Ft.**	**Per 1,000 Sq.Ft.**	**Per 1,000 Sq.Ft.**	**Per 1,000 Sq.Ft.**
Retail	2.38	**$154**	**$1,311**	**$1,532**	**$2,148**
Office and Other Services	3.31	**$214**	**$1,823**	**$2,131**	**$2,988**
Industrial	2.11	**$136**	**$1,162**	**$1,358**	**$1,905**
Institutional	0.67	**$43**	**$369**	**$431**	**$604**

PUBLIC SAFETY CAPITAL IMPACTS: ANIMAL PROTECTION

Animal Protection is the third subcategory under Public Safety capital impacts. Similar to the Sheriff facility type, there were no Animal Protection facilities included in the Goochland County's 25-Year Capital Improvement Program (CIP). This is a result of the current construction of an animal shelter which will have enough excess capacity to absorb projected growth for the next 25 years. Therefore, the CapIM Model uses an ***incremental methodology*** to calculate the capital impact, which reflects growth's share of the facility cost. Additionally, since the new animal shelter is oversized for the current demand, ***the capital impacts are not eligible for cash proffers***.

Figure 69 diagrams the incremental methodology used to calculate Animal Protection capital impacts. Costs are allocated 100 percent to residential development. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the components. The capital impact is derived from the product of persons per housing unit (by type of unit) multiplied by the net capital cost per person.

Figure 69. Animal Protection Services Capital Impacts Methodology Chart



Animal Shelter Facilities Inventory and Level of Service

Goochland County is constructing a new animal shelter that will replace a facility that was over capacity and did not meet state standards. The new shelter will have excess capacity and is anticipated to accommodate residential growth through 2042. The shelter is 14,000 square feet and cost the County $3,800,000 (the total construction cost is estimated at $5,300,000, but there was a donation of approximately $1,500,000). This results in a total cost of $378.57 per square foot, with local funding of $271.43 per square foot. In Figure 70, floor area is divided by the County's projected 2042 population to calculate the level of service of 0.33 square feet per person. This factor is multiplied by the average cost per square foot to calculate the cost per person of $89.57.

Figure 70. Animal Protection Services Facilities and Level of Service

Facility	Address	Use	Total Cost	County's Share of Cost	Sq. Ft.	Total $/Sq. Ft	County's $/Sq. Ft.
Animal Shelter	1900 Hidden Rock Lane	Animal Control	$5,300,000	$3,800,000	14,000	$378.57	$271.43
		SUBTOTAL	**$5,300,000**	**$3,800,000**	**14,000**	**$378.57**	**$271.43**

Source: Goochland County Facility List

Total Animal Protection Facility Sq. Ft.	**14,000**
Population (2042)	**42,956**
Square Feet per Person	**0.33**
County's Cost per Sq. Ft.	**$271.43**
Cost per Person	**$89.57**

Animal Protection Services Input Variables and Capital Impacts

Factors used to determine the Animal Protection services capital impacts are summarized below. Capital impacts for Animal Protection services are based on household size (i.e., persons per housing unit) and are only determined for residential development. (For further discussion on household size see the Land Use chapter.)

The top portion of the figure summarizes cost factors per demand unit by type of facility. In this case, there is one component in the capital impact calculation, Animal Shelter. Animal Protection services are provided on a countywide basis. Since the household sizes differ between Service Areas, the capital impact for each Service Area is listed in the lower portion of Figure 71.

Figure 71. Animal Protection Services Input Variables and Capital Impacts by Type of Housing Unit

Infrastructure Cost	Demand Unit	COUNTYWIDE
Animal Shelter	per capita	$89.57
GROSS COST PER PERSON		$89.57
Debt Service Credit		$0.00
NET CAPITAL COST		**$89.57**

Residential Capital Impact per Housing Unit	*Service Area: East*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.39	**$214**
Multifamily Housing Unit	1.72	**$154**
Age-Restricted Single Family Housing Unit	1.73	**$154**

Residential Capital Impact per Housing Unit	*Service Area: Central*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.23	**$199**
Multifamily Housing Unit	1.72	**$154**
Age-Restricted Single Family Housing Unit	1.61	**$144**

Residential Capital Impact per Housing Unit	*Service Area: West*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.22	**$198**
Multifamily Housing Unit	1.72	**$154**
Age-Restricted Single Family Housing Unit	1.60	**$143**

Animal Protection Cash Proffer Eligibility

To be eligible for a cash proffer, the facility must be for Public Schools, Parks and Recreation, Public Safety (Sheriff, Fire, and Animal Services), or Transportation and a development requires additional capacity in excess of capacity available in current facilities. For Animal Protection, there is both a current facility that is being constructed that will have excess capacity and there are no other facilities listed in the CIP, therefore, the capital impacts found in Figure 71 are ***not included in the cash proffer calculation*** at this time.

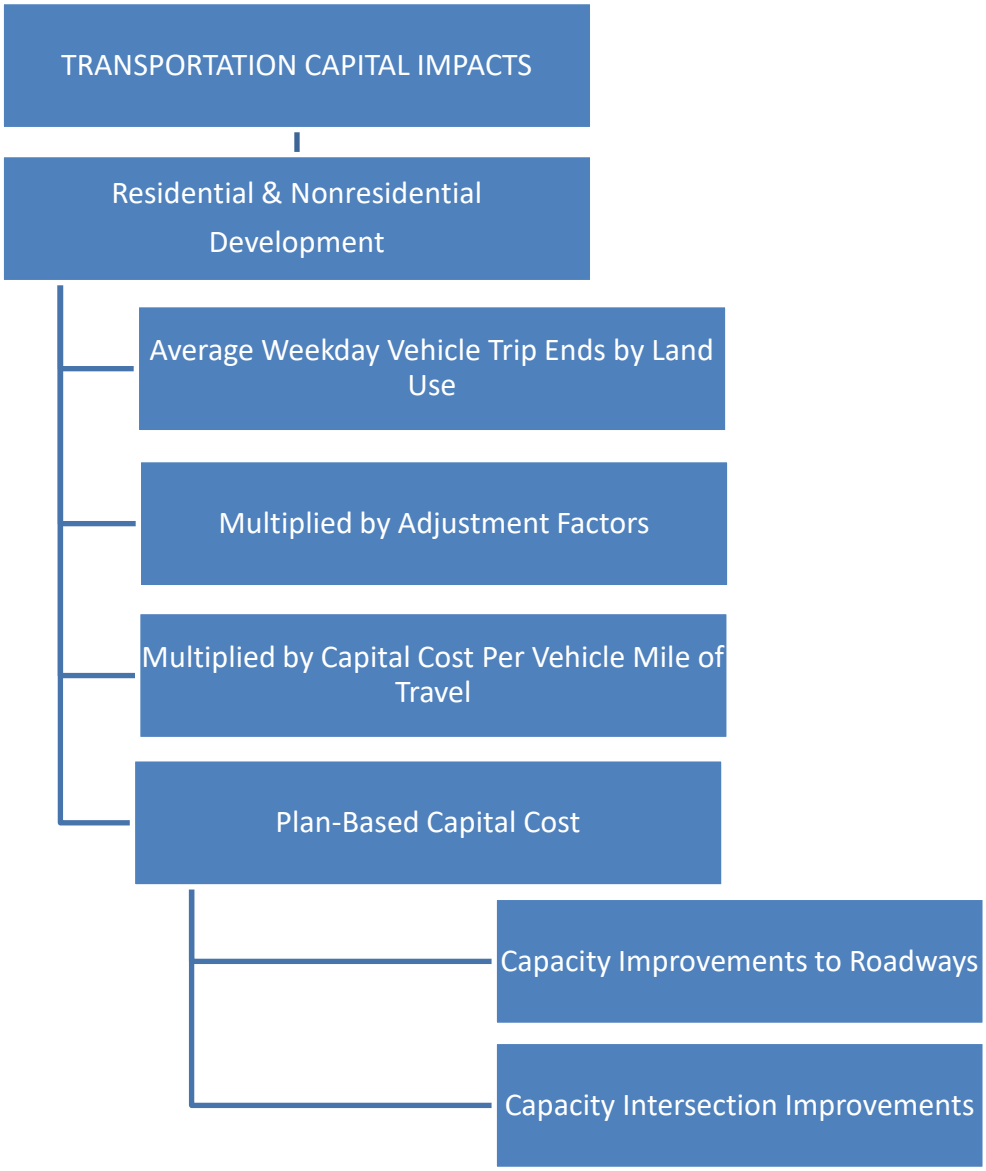
TRANSPORTATION CAPITAL IMPACTS

To calculate Goochland County transportation capital impacts, a ***plan-based methodology*** is used. The methodology for transportation capital impacts is shown in Figure 72. To calculate the impact amounts for residential and nonresidential development, trip generation rates by type of development are multiplied by the capital cost per vehicle miles of travel (VMT). The methodology includes trip adjustment factors for pass-by trips and average trip length variation by type of land use. The diagram reads like an outline, with lower levels providing a more detailed breakdown of the capital impact components. For example, the capital cost of road improvements is based on two components—capacity improvements to roadways and intersection improvements. Planned costs for those projects needed within the next 25 years are allocated to total vehicle miles of travel at the end of a 25-year planning horizon. Thus, VMT from existing development are included in the demand base and new development will only pay its proportionate share.

The County's recently published 25-Year Capital Improvement Program (CIP) identifies priority transportation capital improvement projects from the existing County Major Thoroughfare Plan, Regional Long Range Transportation Plans, and the Secondary Six Year Plan. These projects will provide additional capacity as well as address safety improvements needed to accommodate future growth and that are anticipated to require local funding. These projects include roadway improvements, new roads, and intersection improvements with projects in all three Service Areas. The CapIM Model uses the total cost to the County of these projects to determine new residential and nonresidential development's fair share of the cost for additional capacity.

The CapIM Model determines the level of service and capital impact based on the three Service Areas. Although there may be some roadways that are used by all residents of the County, it is assumed that the majority of traffic is generated locally within the Service Area. Additionally, Goochland County has recently hired Kimley-Horn and Associates, Inc. to complete a Thoroughfare Plan. When published, results from the Thoroughfare Plan may be entered into the CapIM Model as an update.

Figure 72. Transportation Capital Impact Methodology Chart



Average Weekday Vehicle Trip Ends & Adjustment Factors

Average vehicle trip rates by type of housing unit can be obtained from the Institute for Transportation Engineers (ITE). However, as an alternative to simply using the national average trip generation rate, the ITE publishes regression curve formulas that may be used to derive custom trip generation rates using local demographic data. Key independent variables needed for the analysis (i.e. vehicles available, housing units, households, and persons) are available from the U.S. Census Bureau. TischlerBise used American Community Survey data for Goochland County to derive custom average weekday trip generation rates by type of housing. The model does use national averages from the Institute for Transportation Engineers' (ITE) 2017 Trip Generation Manual to determine nonresidential vehicle trip ends.

Vehicle Trip Generation

Vehicle trip generation for nonresidential land uses is calculated by using the Institute of Transportation Engineers' (ITE) average daily trip end rates and adjustment factors found in their recently published 10th edition of *Trip Generation*. TischlerBise calculated the employee per demand unit by dividing the employee trip factor by the demand unit trip factor. The square feet per employee factor is calculated by dividing the demand unit (1,000 square feet) by the employee per demand unit factor. Highlighted in Figure 73 are the trip rates used for Industrial, Institutional, Officer/Services, and Retail.

Figure 73. Nonresidential Trip End Rates

ITE Code	Land Use	Demand Unit	Wkdy Trip Ends Per Dmd Unit	Wkdy Trip Ends Per Employee	Emp Per Dmd Unit	Sq Ft Per Emp
110	Light Industrial	1,000 Sq Ft	4.96	3.05	1.63	615
130	Industrial Park	1,000 Sq Ft	3.37	2.91	1.16	864
140	Manufacturing	1,000 Sq Ft	3.93	2.47	1.59	628
150	Warehousing	1,000 Sq Ft	1.74	5.05	0.34	2,902
254	Assisted Living	bed	2.60	4.24	0.61	na
320	Motel	room	3.35	25.17	0.13	na
520	Elementary School	1,000 Sq Ft	19.52	21.00	0.93	1,076
530	High School	1,000 Sq Ft	14.07	22.25	0.63	1,581
	Institutional Average	1,000 Sq Ft	16.80	21.63	0.78	1,288
540	Community College	student	1.15	14.61	0.08	na
550	University/College	student	1.56	8.89	0.18	na
565	Day Care	student	4.09	21.38	0.19	na
610	Hospital	1,000 Sq Ft	10.72	3.79	2.83	354
620	Nursing Home	1,000 Sq Ft	6.64	2.91	2.28	438
710	General Office (avg size)	1,000 Sq Ft	9.74	3.28	2.97	337
760	Research & Dev Center	1,000 Sq Ft	11.26	3.29	3.42	292
770	Business Park	1,000 Sq Ft	12.44	4.04	3.08	325
820	Shopping Center (avg size)	1,000 Sq Ft	37.75	16.11	2.34	427

Source: Trip Generation, Institute of Transportation Engineers, 10th Edition (2017).

A customize trip rate is calculated for the single family and multifamily units in Goochland County. As a result of approximating the persons per household factor for multifamily units in Goochland County with the western subcounty areas in Henrico County, two separate tables were necessary. In Figure 74, the most recent data from the US Census, 2015, is inputted into equations provided by ITE to calculate the trip ends per single family housing unit factor. Single Family housing units are considered to have 10.93 daily vehicle trip ends.

Figure 74. Customized Single Family Trip End Rate

		Households (2)			Vehicles per
	Vehicles Available (1)	Single Family Units*	Multifamily Units	Total Households	Household by Tenure
Owner-occupied	17,334	7,078	10	7,088	2.45
Renter-occupied	2,021	1,014	46	1,060	1.91
TOTAL	**19,355**	**8,092**	**56**	**8,148**	**2.38**
Housing Units (6) =>		8,751	56	8,807	

	Persons (3)	Trip Ends (4)	Vehicles by Type of Housing	Trip Ends (5)	Average Trip Ends	**Trip Ends per Housing Unit**
Single Family	20,127	65,178	19,243	126,187	95,682	**10.93**
Multifamily Units	282	565	112	735	650	11.61
TOTAL	**20,409**	**65,743**	**19,355**	**126,922**	**96,333**	**10.94**

** Includes Single Family Detached, Attached, and Manufactured Homes*
(1) Vehicles available by tenure from Table B25046, 2011-2015 American Community Survey 5-Year Estimates.
(2) Households by tenure and units in structure from Table B25032, American Community Survey, 2011-2015.
(3) Persons by units in structure from Table B25033, American Community Survey, 2011-2015.
(4) Vehicle trips ends based on persons using formulas from Trip Generation (ITE 2017). For single family housing (ITE 210), the fitted curve equation is EXP(0.89*LN(persons)+1.72). To approximate the average population of the ITE studies, persons were divided by 286 and the equation result multiplied by 286. For multifamily housing (ITE 221), the fitted curve equation is (2.29*persons)-81.02.
(5) Vehicle trip ends based on vehicles available using formulas from Trip Generation (ITE 2017). For single family housing (ITE 210), the fitted curve equation is EXP(0.99*LN(vehicles)+1.93). To approximate the average number of vehicles in the ITE studies, vehicles available were divided by 485 and the equation result multiplied by 485. For multifamily housing (ITE 220), the fitted curve equation is (3.94*vehicles)+293.58 (ITE 2012).
(6) Housing units from Table B25024, American Community Survey, 2011-2015.

A separate table using data for the Tuckahoe and Three Chopt subcounty areas of Henrico is calculated to find the trip end rate for multifamily units. Shown in Figure 75, multifamily housing units generate 4.38 daily trip ends.

Figure 75. Customized Multifamily Trip End Rate

	Vehicles Available (1)	Households (2) Single Family Units*	Households (2) Multifamily Units	Total Households	Vehicles per Household by Tenure
Owner-occupied	67,540	30,549	889	31,438	2.15
Renter-occupied	26,242	5,530	13,663	19,193	1.37
TOTAL	**93,782**	**36,079**	**14,552**	**50,631**	**1.85**
Housing Units (6) =>		37,691	16,815	54,506	

	Persons (3)	Trip Ends (4)	Vehicles by Type of Housing	Trip Ends (5)	Average Trip Ends	**Trip Ends per Housing Unit**
Single Family	102,313	302,964	73,191	476,777	389,871	10.34
Multifamily Units	28,863	66,015	20,591	81,422	73,718	**4.38**
TOTAL	**131,176**	**368,980**	**93,782**	**558,199**	**463,589**	**8.51**

** Includes Single Family Detached, Attached, and Manufactured Homes*
(1) Vehicles available by tenure from Table B25046, 2011-2015 American Community Survey 5-Year Estimates.
(2) Households by tenure and units in structure from Table B25032, American Community Survey, 2011-2015.
(3) Persons by units in structure from Table B25033, American Community Survey, 2011-2015.
(4) Vehicle trips ends based on persons using formulas from Trip Generation (ITE 2017). For single family housing (ITE 210), the fitted curve equation is EXP(0.89*LN(persons)+1.72). To approximate the average population of the ITE studies, persons were divided by 286 and the equation result multiplied by 286. For multifamily housing (ITE 221), the fitted curve equation is (2.29*persons)-81.02.
(5) Vehicle trip ends based on vehicles available using formulas from Trip Generation (ITE 2017). For single family housing (ITE 210), the fitted curve equation is EXP(0.99*LN(vehicles)+1.93). To approximate the average number of vehicles in the ITE studies, vehicles available were divided by 485 and the equation result multiplied by 485. For multifamily housing (ITE 220), the fitted curve equation is (3.94*vehicles)+293.58 (ITE 2012).
(6) Housing units from Table B25024, American Community Survey, 2011-2015.

A vehicle trip end represents a vehicle either entering or exiting a development, as if a traffic counter were placed across a driveway. A trip rate adjustment is needed to reflect half of trips because of the out-commuting, a standard 50 percent trip adjustment factor is applied to Office/Other Services, Industrial, and Institutional. A lower vehicle trip adjustment factor is used for Retail because this type of development attracts vehicles as they pass-by on arterial and collector roads. For example, when someone stops at a convenience store on their way home from work, the convenience store is not their primary destination.

For residential units, the trip adjustment factor includes several components, see Figure 76. According to the National Household Travel Survey (2009), home-based work trips are typically 31 percent of "production" trips, out-bound trips (which are 50 percent of all trip ends). Also, utilizing the most recent data from the Census Bureau's web application "OnTheMap", 84 percent of the workers in Goochland County travel outside the County for work. In combination, these factors account for 13 percent of additional production trips (0.31 x 0.50 x 0.84 = 0.13). The total adjustment factor for residential housing units includes attraction trips (50 percent of trip ends) plus the journey-to-work commuting adjustment (13 percent of production trips) for a total of 63 percent.

Figure 76. Trip Adjustment Factor for Commuters

Employed Goochland County Residents (2015)	10,082
Goochland County Residents Working in County (2015)	1,663
Goochland County Residents Commuting Outside County for Work	8,419
Percent Commuting out of the County	**84%**
Additional Production Trips	**13%**
Residential Trip Adjustment Factor	**63%**

Source: U.S. Census, OnTheMap Application

Additionally, because of the characteristics of the Age-Restricted Single Family housing units, the vehicle trip ends are adjusted based on 60 percent of the trips generated by non-age restricted single family units. Figure 77 lists the daily vehicle trip ends, the adjustment factors, and the adjusted average daily vehicle trip rate for the land uses.

Figure 77. Average Daily Vehicle Trip Rate (Adjusted) for Residential and Nonresidential Land Uses

Land Use	Vehicle Trip Ends	Trip Adj. %	Avg. Daily Vehicle Trip Rate (Adj.)
Residential (per housing unit)			
Single Family	10.93	63%	**6.89**
Age-Restricted Single Family	6.56	63%	**4.13**
Multifamily	4.38	63%	**2.76**
Nonresidential (per 1,000 square feet)			
Retail	37.75	38%	**14.35**
Office/Other Services	9.74	50%	**4.87**
Industrial	3.93	50%	**1.97**
Institutional	16.80	50%	**8.40**

Current Daily Vehicle Trips

By combining the base year assumptions for housing units and nonresidential floor area with the adjusted average daily vehicle trip rate in Figure 77, the Countywide vehicle trip total is calculated. Shown in Figure 78, there is a total of 98,488 average daily vehicle trips in Goochland County. Of the total, 66 percent of the trips are generated from housing units and 34 percent from nonresidential land uses.

Figure 78. Base Year Daily Vehicle Trip Total

Land Use	Housing Units/ 1,000 Sq. Ft.	Avg. Daily Vehicle Trip Rate (Adj.)	Total Vehicle Trips
Residential			
Single Family	9,188	6.89	63,290
Multifamily	766	2.76	2,116
Nonresidential			
Retail	409	14.35	5,870
Office/Other Services	3,514	4.87	17,112
Industrial	1,129	1.97	2,219
Institional	939	8.40	7,881
		Residential Subtotal	**65,406**
		Nonresidential Subtotal	**33,082**
		Total Trips	**98,488**

Roads Inventory

The Virginia Department of Transportation, Traffic Engineering Division's database of Goochland County Maintained roads is used to determine the County's inventory of non-local roadways. Total lane miles in the County is used to determine the average vehicle miles traveled per trip. In total there are 242.1 non-local lane miles in Goochland County (see Figure 79).

Figure 79. Goochland County Inventory of Non-Local Lane Miles

Road Name	Length	Current Lanes	Lane Miles
SR 649 - Blair Rd	1.0	2	2.0
SR 741 - Capital One Dr	0.8	2	1.7
SR 670 - Cardwell Rd	5.2	2	10.4
SR 610 - Community House Rd	5.7	2	11.4
SR 614 - Dogtown Rd	4.0	2	7.9
SR 632 - Fairground Rd	5.1	2	10.3
SR 606 - Hadensville-Fife Rd	9.1	2	18.3
SR 676 - Hermitage Rd	4.7	2	9.3
SR 623 - Hockett Rd	5.1	2	10.3
SR 634 - Maidens Rd	6.8	2	13.6
SR 621 - Manakin Rd	9.7	2	19.3
SR 648 - Matthews Rd	2.0	2	4.0
SR 644 - Miller Lane	4.6	2	9.2
SR 617 - Oilville Rd	1.5	2	3.0
SR 629 - Old Fredericksburg Rd	3.1	2	6.2
SR 1000 - Plaza Dr	0.7	2	1.4
SR 650 - River Rd	4.4	2	8.7
SR 6 - River Road West	1.7	2	3.5
SR 622 - Rockville Rd	2.3	2	4.7
SR 522 - Sandy Hook Rd	6.6	2	13.2
SR 654 - Shallow Well Rd	3.6	2	7.3
SR 605 - Shannon Hill Rd	7.7	2	15.4
SR 622 - Three Chopt Rd	6.1	2	12.2
SR 740 - Tuckahoe Creek Pkwy	1.3	4	5.0
SR 672 - Turner Rd	2.1	2	4.2
SR 1250 - West Creek Pkwy	3.0	4	11.9
SR 673 - Whitehall Rd	6.9	2	13.8
Wilkes Ridge Pkwy	1.0	4	4.0
Grand Total	115.8		242.1

Source: VDOT, Traffic Engineering Division, 2016

Vehicle Miles of Travel

Vehicle Miles of Travel (VMT) is the product of the number of vehicle trips multiplied by the average trip length. To derive average trip length in Goochland County, the inventory of non-local lane miles of (242.1 miles) and a lane capacity standard (5,000 ADT) is used. The basic formula for calculating the average trip length is to multiply the lane miles by the capacity and divide by the number of trips (242.1 miles x 5,000 ADT / 98,488 trips). This results in a simple average trip length of 12.3 miles.

However, average trip lengths can be weighted to account for trip length variation by type of land use. As documented by the National Personal Transportation Survey, vehicle trips from residential development—for home-based work trips and social and recreational purposes—are approximately 122 percent of the average trip length. Conversely, shopping trips associated with commercial development are roughly 68 percent of the average trip length while other nonresidential development typically account for trips that are 75 percent of the average trip length. Figure 80 illustrates the calculations to find vehicle miles traveled by land use. For example, a single family housing unit generates 103.31 vehicles miles (6.89 trips x 12.3 miles x 122% = 103.31 VMT).

Figure 80. Vehicle Miles of Travel by Land Use

Land Use	Avg. Daily Vehicle Trip Rate (Adj.)	Ave. Trip Length (mi.)	Trip Length Adj.	Vehicle Miles Traveled (VMT)
Residential - Per Housing Unit				
Single Family	6.89	12.3	122%	103.31
Multifamily	2.76	12.3	122%	41.42
Age Restricted Single Family	4.13	12.3	122%	61.98
Nonresidential - Per 1,000 Square Feet				
Retail	14.35	12.3	68%	119.91
Office/Other Services	4.87	12.3	75%	44.90
Industrial	1.97	12.3	75%	18.12
Institional	8.40	12.3	75%	77.42

By combining the adjusted vehicle trip rate generated by residential and nonresidential land uses, the corresponding trip length adjustment factor, and average trip length, the total VMT on Goochland County non-local roads is calculated. Shown in Figure 81, there are approximately 1.3 million vehicle miles of travel from development in Goochland County on non-local roads. By 2042, total VMT from development is projected to increase to 2.6 million. Majority of the vehicle miles traveled in Goochland County comes from trips in the East Service Area, where residential land uses account for two-thirds of the subtotal.

Figure 81. Vehicle Miles of Travel on Non-Local Roads

						5-Year Increments				
	2017	2018	2019	2020	2021	2022	2027	2032	2037	2042
COUNTYWIDE										
Residential										
Trips	65,406	68,318	70,387	72,457	74,526	76,595	86,942	97,710	108,478	119,246
Vehicle Miles Traveled	980,910	1,024,587	1,055,621	1,086,655	1,117,688	1,148,722	1,303,892	1,465,383	1,626,874	1,788,365
Nonresidential										
Trips	33,082	38,031	42,981	47,930	52,879	57,828	82,574	84,768	86,963	89,157
Vehicle Miles Traveled	299,955	343,948	387,941	431,934	475,926	519,919	739,884	759,546	779,208	798,870
Total										
Trips	98,488	106,350	113,368	120,386	127,405	134,423	169,516	182,478	195,440	208,403
Vehicle Miles Traveled	**1,280,865**	**1,368,535**	**1,443,561**	**1,518,588**	**1,593,615**	**1,668,642**	**2,043,775**	**2,224,929**	**2,406,082**	**2,587,235**
EAST SERVICE AREA										
Residential										
Trips	30,716	33,243	34,927	36,611	38,295	39,979	48,399	57,241	66,082	74,924
Vehicle Miles Traveled	460,658	498,557	523,812	549,068	574,324	599,579	725,857	858,457	991,056	1,123,656
Nonresidential										
Trips	24,634	27,619	30,604	33,588	36,573	39,558	54,483	55,931	57,379	58,827
Vehicle Miles Traveled	224,609	251,317	278,026	304,735	331,444	358,153	491,697	504,764	517,830	530,897
Subtotal										
Trips	55,350	60,862	65,531	70,200	74,869	79,538	102,882	113,172	123,461	133,751
Vehicle Miles Traveled	**685,267**	**749,874**	**801,839**	**853,803**	**905,768**	**957,732**	**1,217,554**	**1,363,220**	**1,508,887**	**1,654,553**
CENTRAL SERVICE AREA										
Residential										
Trips	22,187	22,453	22,719	22,985	23,251	23,517	24,846	26,176	27,505	28,835
Vehicle Miles Traveled	332,750	336,738	340,726	344,713	348,701	352,689	372,627	392,565	412,503	432,441
Nonresidential										
Trips	6,419	7,970	9,521	11,073	12,624	14,175	21,932	22,515	23,098	23,680
Vehicle Miles Traveled	56,978	70,568	84,158	97,748	111,338	124,928	192,879	198,004	203,130	208,256
Subtotal										
Trips	28,606	30,423	32,240	34,058	35,875	37,692	46,778	48,690	50,603	52,515
Vehicle Miles Traveled	**389,729**	**407,306**	**424,884**	**442,462**	**460,039**	**477,617**	**565,505**	**590,569**	**615,633**	**640,697**
WEST SERVICE AREA										
Residential										
Trips	12,502	12,622	12,741	12,861	12,980	13,099	13,696	14,293	14,890	15,487
Vehicle Miles Traveled	187,501	189,292	191,083	192,873	194,664	196,455	205,408	214,361	223,314	232,268
Nonresidential										
Trips	2,030	2,443	2,856	3,269	3,681	4,094	6,159	6,322	6,486	6,650
Vehicle Miles Traveled	18,368	22,062	25,756	29,450	33,144	36,838	55,308	56,778	58,248	59,718
Subtotal										
Trips	14,532	15,065	15,597	16,129	16,661	17,194	19,855	20,616	21,376	22,137
Vehicle Miles Traveled	**205,870**	**211,354**	**216,839**	**222,324**	**227,808**	**233,293**	**260,716**	**271,139**	**281,562**	**291,985**

Planned Transportation Projects

From the County's 25-Year CIP, the following three figures list the transportation capital improvements planned for each Service Area. By combining the projected vehicle miles traveled (VMT) in 2042 and the total road improvement capital cost, the capital cost per VMT is calculated.

Figure 82. Planned Capital Improvements on Non-Local Roads, East Service Area

Road	Segment	Project Description	Cost	Location
Hockett Road Realignment	Holly Lane to Broad Street Road	New Road Segment	$561,000	East
Oilville Concept Road #1	Oilville Road to Landis Road	New Road Segment	$5,250,000	East
Route 288 Bridge/Three Chopt Rd	Route 288	New Bridge	$1,500,000	East
Wilkes Ridge Parkway Extension	Route 288	New Bridge	$1,500,000	East
Centerville Concept Road 7	Plaza Drive to Manakin Town	New Road Segment	$235,000	East
Ashland Road	Broad Street to Hanover County	Road Widening	$7,425,000	East
Rockville Road	Ashland Road to Hanover County	Road Widening	$1,201,500	East
Blair Road	Blair Road	Reconstruction	$278,500	East
Hockett Road	Tuckahoe Creek Parkway to Holly Lane	Road Widening	$4,169,500	East
Hockett Road	Patterson Avenue to Tuckahoe Creek Parkway	New Road Segment	$6,389,000	East
Broad Street Road	Tuckahoe Creek Parkway to Ashland Road	Road Widening	$9,678,000	East
Broad Street Road	Manakin Road to Cardwell Road	Road Widening	$27,785,000	East
Broad Street Road	Cardwell Road to Fairground Road	Road Widening	$3,309,500	East
		Total	**$69,282,000**	

Source: Goochland County 25-Year Capital Improvement Program, 2017

Road Improvement Capital Cost	**$69,282,000**
Total Vehicle Miles Traveled (VMT), 2042	**1,654,553**
Capital Cost per VMT	**$41.87**

Figure 83. Planned Capital Improvements on Non-Local Roads, Central Service Area

Road	Segment	Project Description	Cost	Location
Fairground Road Extension	Sandy Hook Road to River Road West	New Road Segment	$1,950,000	Central
Bulldog Way	Sandy Hook Road to River Road West	New Turn Lanes	$125,000	Central
Fairground Road	Sandy Hook Road to Maidens Road	Road Widening	$1,241,500	Central
Fairground Road	Maidens Road to Broad Street Road	Road Widening	$4,221,500	Central
Sandy Hook Road	Sandy Hook Village to Louisa County	Road Widening	$4,678,500	Central
Broad Street Road	Fairground Road to Hadensville Village - Western Portion	Road Widening	$14,190,250	Central
Broad Street Road	Fairground Road to Hadensville Village - Eastern Portion	Road Widening	$14,190,250	Central
		Total	**$40,597,000**	

Source: Goochland County 25-Year Capital Improvement Program, 2017

Road Improvement Capital Cost	**$40,597,000**
Total Vehicle Miles Traveled (VMT), 2042	**640,697**
Capital Cost per VMT	**$63.36**

Figure 84. Planned Capital Improvements on Non-Local Roads, West Service Area

Road	Segment	Project Description	Cost	Location
Hadensville-Fife Road	River Road West to Old Fredericksburg Rd	Road Widening	$5,980,000	West
Old Fredericksburg Road	Broad Street Road to I-64	Road Widening	$535,000	West
		Total	**$6,515,000**	

Source: Goochland County 25-Year Capital Improvement Program, 2017

Road Improvement Capital Cost	**$6,515,000**
Total Vehicle Miles Traveled (VMT), 2042	**291,985**
Capital Cost per VMT	**$22.31**

Planned Intersection Improvement Projects

There are two intersection projects listed in the County's 25-Year CIP. In similar fashion to the roadways, the intersections improvements' capital costs are calculated at the Service Area level. In Figure 85, the planned intersection improvement in the East Service Area equates to a capital cost of $0.05 per VMT. In Figure 86, the planned intersection improvement in the Central Service Area equates to a capital cost of $0.78.

Figure 85. Intersection Capital Improvements, East Service Area

Road	Segment	Project Description	Cost	Location
Patterson Avenue	River Road Intersection	New Turn Lanes	$85,000	East
		Total	$85,000	

Source: Goochland County 25-Year Capital Improvement Program, 2017

Intersection Improvement Capital Cost	**$85,000**
Total Vehicle Miles Traveled (VMT), 2042	**1,654,553**
Capital Cost per VMT	**$0.05**

Figure 86. Intersection Capital Improvements, Central Service Area

Road	Segment	Project Description	Cost	Location
Fairground Road	Maidens Road Intersection	New Turn Lanes	$500,000	Central
		Total	$500,000	

Source: Goochland County 25-Year Capital Improvement Program, 2017

Intersection Improvement Capital Cost	**$500,000**
Total Vehicle Miles Traveled (VMT), 2042	**640,697**
Capital Cost per VMT	**$0.78**

Transportation Input Variables and Capital Impacts

Level of service standards and cost factors for transportation capital impacts are summarized from above and shown in Figure 87. Capital impacts for roadway facilities are based on vehicle miles traveled (VMT) per housing unit for residential development and VMT per 1,000 square feet of floor area for nonresidential development.

The top portion of the figure summarizes cost factors per demand unit by type of facility. In this case, there are two components in the capital impact calculation, Road and Intersection Improvements. Roadway services are provided on a Service Area basis and it is recommended that the three Service Areas be used to determine the capital impact on roadway facilities. *Note: more localized road impacts from a development that are identified in a Traffic Impact Analysis should be seen as an additional impact to this CapIM model, unless the analysis identifies a roadway that has been included in the County's CIP.*

Figure 87. Transportation Service Input Variables and Capital Impacts by Land Use

Residential

Infrastructure Cost	Demand Unit	REGIONS East	Central	West
Road Improvements	per VMT	$41.87	$63.36	$22.31
Intersection Improvements	per VMT	$0.05	$0.78	$0.00
GROSS COST PER VMT		$41.92	$64.14	$22.31
Debt Service Credit		$0.00	$0.00	$0.00
NET CAPITAL COST		**$41.92**	**$64.14**	**$22.31**

Residential Capital Impact per Housing Unit		REGIONS East	Central	West
Housing Unit Type	**Vehicle Miles Traveled**	**Capital Impact $**	**Capital Impact $**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**	**Per Housing Unit**	**Per Housing Unit**
Single Family Housing Unit	103.3	**$4,330**	**$6,626**	**$2,304**
Multifamily Housing Unit	41.4	**$1,736**	**$2,656**	**$924**
Age-Restricted Single Family Housing Unit	62.0	**$2,598**	**$3,975**	**$1,382**

Nonresidential

Infrastructure Cost	Demand Unit	REGIONS East	Central	West
Road Improvements	per VMT	$41.87	$63.36	$22.31
Intersection Improvements	per VMT	$0.05	$0.78	$0.00
GROSS COST PER VMT		$41.92	$64.14	$22.31
Debt Service Credit		$0.00	$0.00	$0.00
NET CAPITAL COST		**$41.92**	**$64.14**	**$22.31**

Infrastructure Cost	Demand Unit	REGIONS East	Central	West
Nonresidential Land Use	**Vehicle Miles Traveled**	**Capital Impact $**	**Capital Impact $**	**Capital Impact $**
	Per 1,000 Sq.Ft.	**Per 1,000 Sq.Ft.**	**Per 1,000 Sq.Ft.**	**Per 1,000 Sq.Ft.**
Retail	119.9	**$5,026**	**$7,691**	**$2,675**
Office and Other Services	44.9	**$1,882**	**$2,879**	**$1,001**
Industrial	18.1	**$759**	**$1,161**	**$404**
Institutional	77.4	**$3,245**	**$4,965**	**$1,727**

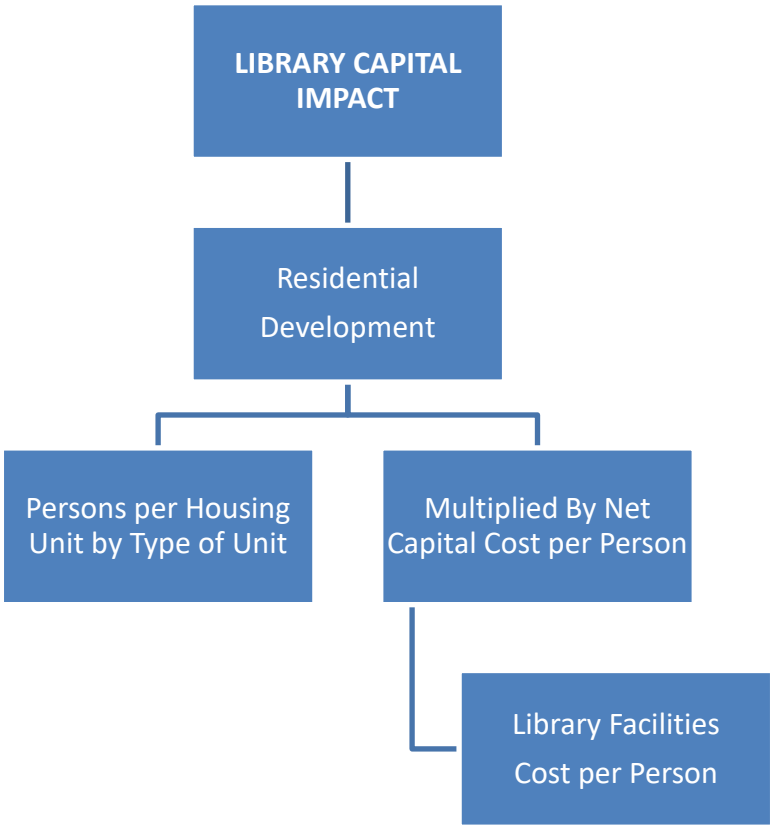
II. Non-Cash Proffer Categories

LIBRARY CAPITAL IMPACTS

Goochland County has a library system that currently includes one Central Library with two capacity projects in the County's Capital Improvement Program (CIP). One project will expand the current library and the other project constructs a second Countywide library. A ***plan-based methodology*** will be used to determine the capital impact and is analyzed on a Countywide basis. Only residential developments will be included in the impact calculations.

Figure 88 diagrams the methodology used to determine Library capital impacts. Costs are allocated 100 percent to residential development. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the components. Library capital impact is derived from the product of persons per housing unit (by type of unit) and the net capital cost per person. The level of service standard is calculated using the County's planned facilities and projected population. The level of service is combined with the cost per square foot of the new facilities to calculate the net capital cost per person.

Figure 88. Library Capital Impacts Methodology Chart



Library Facilities Inventory and Level of Service

As shown in Figure 89, the current Central Library square footage is 6,563 square feet. The current level of service for the Central Library is based on countywide population and is .29 square feet per person. However, per Goochland County's Public Facilities Master Plan (2017), the County aims to serve the County at 0.6 square feet per person, which reflects the Virginia Library Planning Standards. By multiplying the current population by the level of service of 0.6 square feet per person, it is found that there is a deficit of 7,062 square feet of library facilities.

Figure 89. Library Facilities Level of Service Standards and Cost Factors

Service Area	Population	Value	Sq. Ft.	Current LOS (Sq. Ft./Capita)	Sq. Ft. Reqd at Countywide LOS	Sq. Ft. Surplus (Deficit)	Cost per Sq. Ft.
CENTRAL LIBRARY							
Countywide	22,708	$1,556,600	6,563	0.29	6,563	(7,062)	$237

Source: Goochland County 25-Year Capital Improvement Program, 2017; Virginia Library Planning Standards

Planned Library Facility

To address the current square footage deficit and future growth, the County plans to build a second library in eastern Goochland and expand the current library facility. According to the County's 25-Year CIP, it is anticipated that the projects are to serve current and future population. The square footage of the projects is estimated in Figure 90. The new library's floor area is estimated by using the total cost and the cost per square foot of the current library, $237. The library is estimated to be 11,257 square feet. The expansion of the current facility is 1,625 square feet.

By summing the current and future library's square footage (6,563 + 11,257 + 1,625 = 19,445) and dividing by the projected population in 2042, the level of service is calculated. Despite aiming to serve at 0.6 square feet per person, the level of service with the planned facility and expansion is 0.45 square feet. To not assess a higher level of service than is anticipated to be provided by the County, the planned level of service of 0.45 square feet per person is used when calculating the capital cost. Multiplying the level of service and cost per square foot equals the cost per person of $103.75 for library facilities.

Figure 90. Planned Library Facility Level of Service Standards and Cost Factors

Facility	Address	Service Area [East, Central, West]	Cost	Sq. Ft.	$/Sq. Ft
Library - New	Eastern Goochland	Countywide	$2,670,000	11,257	$237
Library - Expansion	3075 River Rd W	Countywide	$300,000	1,625	$185
SUBTOTAL			**$2,970,000**	**12,882**	**$231**

Source: Goochland County 25-Year Capital Improvement Program, 2017

Total Library Facility Sq. Ft.	**19,445**
2042 Countywide Population	**42,956**
Square Feet per Person	**0.45**
Total Cost per Sq. Ft.	**$231**
Cost per Person	**$103.75**

Library Input Variables and Capital Impacts

Factors used to determine library capital impacts are summarized in Figure 91. Capital impacts for libraries are based on household size (i.e., persons per housing unit) and are only determined for residential development. (For further discussion on household size see the Land Use Assumptions Chapter.) The top portion of the figure summarizes cost factors per demand unit by type of facility. In this case, there is one main component to the capital impact calculation, Library Facilities (Countywide)

Library capital impacts are the product of persons per housing unit multiplied by the total net capital cost per person. An example of the calculation for a single family detached unit in the East Service Area is: the net capital cost per person for Central Library ($103.75) multiplied by the persons per housing unit (2.39) to arrive at the capital impact for the Central Library for a single family unit of $247 (truncated). Since the household sizes differ between Service Areas, the capital impact for each Service Area is listed in the lower portion of Figure 91.

Figure 91. Library Input Variables and Capital Impacts by Type of Housing Unit

Infrastructure Cost	Demand Unit	COUNTYWIDE
Library Facilities	per capita	$103.75
GROSS COST PER PERSON		$103.75
Debt Service Credit		$0.00
NET CAPITAL COST		**$103.75**

Residential Capital Impact per Housing Unit	*Service Area: East*	COUNTYWIDE
Unit Type	Persons per Housing Unit	Capital Impact $
	Per Housing Unit	Per Housing Unit
Single Family Housing Unit	2.39	**$247**
Multifamily Housing Unit	1.72	**$178**
Age-Restricted Single Family Housing Unit	1.73	**$179**

Residential Capital Impact per Housing Unit	*Service Area: Central*	COUNTYWIDE
Unit Type	Persons per Housing Unit	Capital Impact $
	Per Housing Unit	Per Housing Unit
Single Family Housing Unit	2.23	**$231**
Multifamily Housing Unit	1.72	**$178**
Age-Restricted Single Family Housing Unit	1.61	**$167**

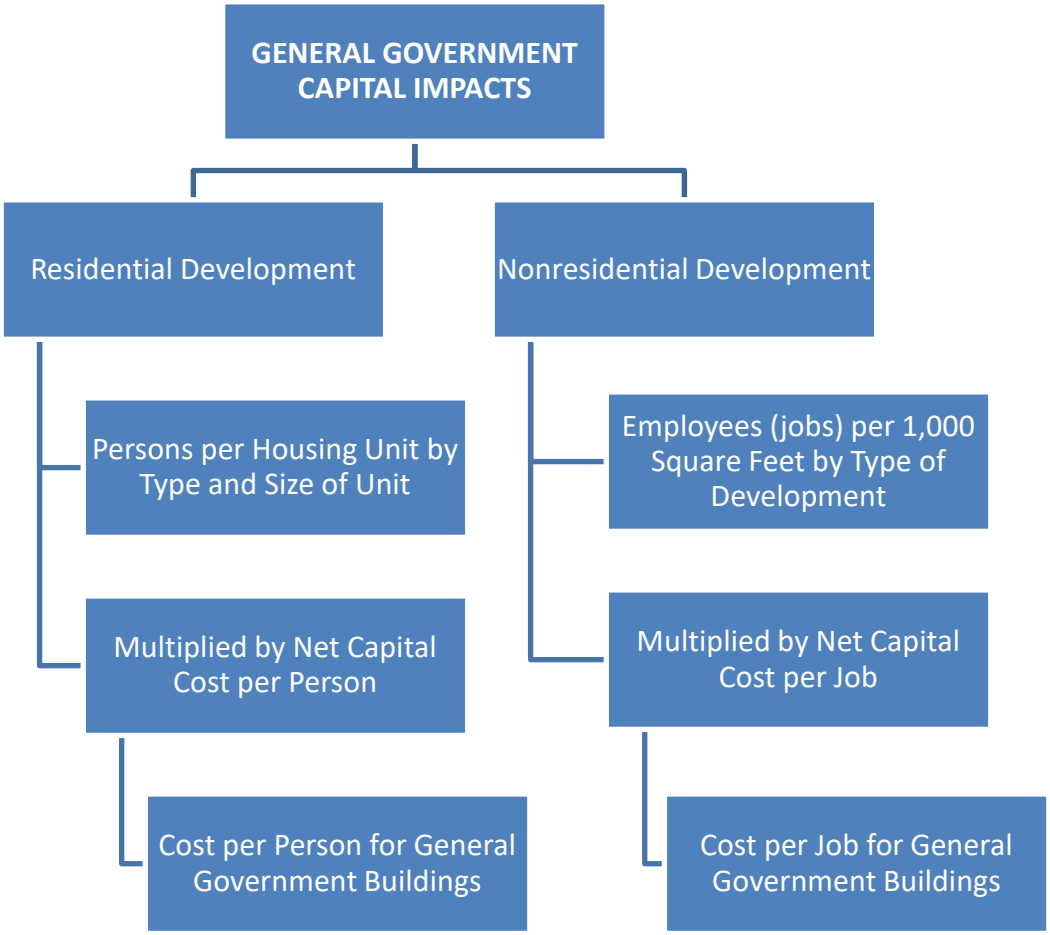
Residential Capital Impact per Housing Unit	*Service Area: West*	COUNTYWIDE
Unit Type	Persons per Housing Unit	Capital Impact $
	Per Housing Unit	Per Housing Unit
Single Family Housing Unit	2.22	**$230**
Multifamily Housing Unit	1.72	**$178**
Age-Restricted Single Family Housing Unit	1.60	**$166**

GENERAL GOVERNMENT CAPITAL IMPACTS

General Government facilities capital impacts are based on the County's current level of service and the cost to expand those facilities to serve growth. This is the ***incremental methodology***. A plan-based approach is not used because the County did not include any capital improvements to General Government facilities in the 25-Year Capital Improvement Program (CIP).

General Government Facilities Capital Impact is calculated on a per capita basis for residential development and a per employee basis for nonresidential development. Figure 92 illustrates the methodology used to determine the capital impact. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the components. The residential portion of the General Government Facilities capital impact is derived from the product of persons per housing unit (by type) multiplied by the net capital cost per person. The nonresidential portion is derived from the product of employees per 1,000 square feet of nonresidential space multiplied by the net capital cost per employee (job).

Figure 92. General Government Facilities Capital Impact Methodology Chart



Cost Allocation for General Government Facilities

Proportionate share factors are used to allocate demand to residential and nonresidential development where appropriate. For facilities that serve both residential and nonresidential development, TischlerBise recommends using a proportionate share allocation based on a functional population approach. The functional population approach estimates the residential and nonresidential activity in the county by using the hours in a day. For the residents that are not working, their day is estimated to be split with 20 hours attributed to residential purposes and 4 hours to nonresidential purposes. For resident workers, 14 hours are attributed to residential purposes and 10 hours to nonresidential purposes. For non-resident workers in the county, 10 hours are attributed to nonresidential purposes in Goochland County. Figure 93 provides detail on the approach and results, which indicate that approximately 63 percent of demand in Goochland County is from residential development and 37 percent from nonresidential.

Figure 93. Goochland County Proportionate Share Factors (Countywide)

		Demand Units in 2015		Demand Hours/Day^	Person Hours
Residential					
	Population*	22,277			
55%	Residents Not Working		12,195	20	243,900
45%	Resident Workers**		10,082		
16%	Worked in County**		1,663	14	23,282
84%	Worked Outside of County**		8,419	14	117,866
				Residential Subtotal	385,048
				Residential Share ==>	**63%**
Nonresidential					
	Non-Working Residents		12,195	4	48,780
	Jobs Located in County**		17,466		
10%	Residents Working in County**		1,663	10	16,630
90%	Non-Resident Workers (Inflow Commuters)		15,803	10	158,030
				Nonresidential Subtotal	223,440
				Nonresidential Share ==>	**37%**
				TOTAL	608,488

** 2015 UVA - Weldon Cooper Center for Public Service*

*** 2015 Inflow/Outflow Analysis, OnTheMap Application, U.S. Census Bureau data for all jobs .*

^ Hours per day allocated to land use (residential or nonresidential).

Residential: 20 hours per day allocated to non-working residents; 14 hours allocated to employed residents.

Nonresidential: 4 hours allocated to non-working residents; 10 hours allocated to residents and non-residents working in the County

General Government Facilities Inventory and Level of Service

General government capital impacts are based on current levels of service, which are derived from the current inventory of square footage and replacement value of current County office buildings. General government services serve a countywide base and it is recommended that one service area be used to determine the capital impact on general government facilities.

Shown in Figure 94, current general government office square footage is 52,148 square feet. Facilities' square footage and replacement costs are allocated to residential or nonresidential based on the countywide proportionate share found in Figure 93.

In total, 32,853 square feet of General Government Facilities are allocated to residential development and 19,295 square feet are allocated to nonresidential development. As a result, there is 1.45 square feet per person and 1.24 square feet per job.

Figure 94. General Government Facilities Level of Service Standards and Cost Factors

Facility	Departments /Use	Sq.Ft.	Res %	Nonres %	Res SF	Nonres SF	Value	$/Sq. Ft.	Res. Value $	Nonres. Value $	Total Value $
Historic Clerks	Welcome Center	738	63%	37%	465	273	$79,696	$107.99	$50,209	$29,488	$79,697
Admin Building	General Govt Use	48,610	63%	37%	30,624	17,986	$7,703,400	$158.47	$4,853,033	$2,850,194	$7,703,227
General Services	Ground/Facilites	2,800	63%	37%	1,764	1,036	$70,000	$25.00	$44,100	$25,900	$70,000
	GRAND TOTAL	52,148			32,853	19,295	$7,853,096	$150.59	$4,947,342	$2,905,582	$7,852,923

Source: Goochland County Building Inventory

	Residential	Nonresidential	Total
Total Square Feet	**32,853**	**19,295**	**52,148**
Base Year Population or Jobs	**22,708**	**15,614**	
Square Feet per Person or Job	**1.45**	**1.24**	
Total Cost per Sq. Ft.	**$150.59**	**$150.59**	
Cost per Person or Job	**$218.36**	**$186.73**	

General Government Facilities Input Variables and Capital Impacts

Level of service standards and cost factors for the General Government capital impact are summarized from above and shown in Figure 95. Capital impacts for general government facilities are based on household size (i.e., persons per housing unit) for residential development and employees per 1,000 square feet of floor area for nonresidential development. (For further discussion on demand factors, see the chapter Land Use Assumptions.)

The top portion of the figure summarizes cost factors per demand unit by type of facility. In this case, there is only one component in the capital impact calculation, General Government Facilities.

An example of the calculation for a single family housing unit in the East Service Area is: the net capital cost per person ($218.36) multiplied by the persons per housing unit (2.39) to arrive at the capital impact per single family detached unit of $521 (truncated). Since the household sizes differ between Service Areas, the capital impact for each Service Area is listed in the lower portion of Figure 95.

Figure 95. General Govt. Facilities Input Variables and Capital Impacts by Land Use, Residential

Residential

Infrastructure Cost	Demand Unit	COUNTYWIDE
General Government Facilities	per capita	$218.36
GROSS COST PER PERSON		$218.36
Debt Service Credit		$0.00
NET CAPITAL COST		**$218.36**

Residential Capital Impact per Housing Unit	*Service Area: East*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.39	**$521**
Multifamily Housing Unit	1.72	**$374**
Age-Restricted Single Family Housing Unit	1.73	**$376**

Residential Capital Impact per Housing Unit	*Service Area: Central*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.23	**$487**
Multifamily Housing Unit	1.72	**$374**
Age-Restricted Single Family Housing Unit	1.61	**$351**

Residential Capital Impact per Housing Unit	*Service Area: West*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.22	**$485**
Multifamily Housing Unit	1.72	**$374**
Age-Restricted Single Family Housing Unit	1.61	**$350**

For nonresidential land uses, the number of employees per 1,000 square feet for the respective type of land use is multiplied by the net cost per job. For example, the capital impact for a retail development is calculated as follows: 2.38 x $186.73 to yield an amount of $444 per 1,000 square feet (truncated).

Figure 96. General Govt. Facilities Input Variables and Capital Impacts by Land Use, Nonresidential

Infrastructure Cost	Demand Unit	COUNTYWIDE
General Government Facilities	per job	$186.73
GROSS COST PER JOB		$186.73
Debt Service Credit		$0.00
NET CAPITAL COST		**$186.73**

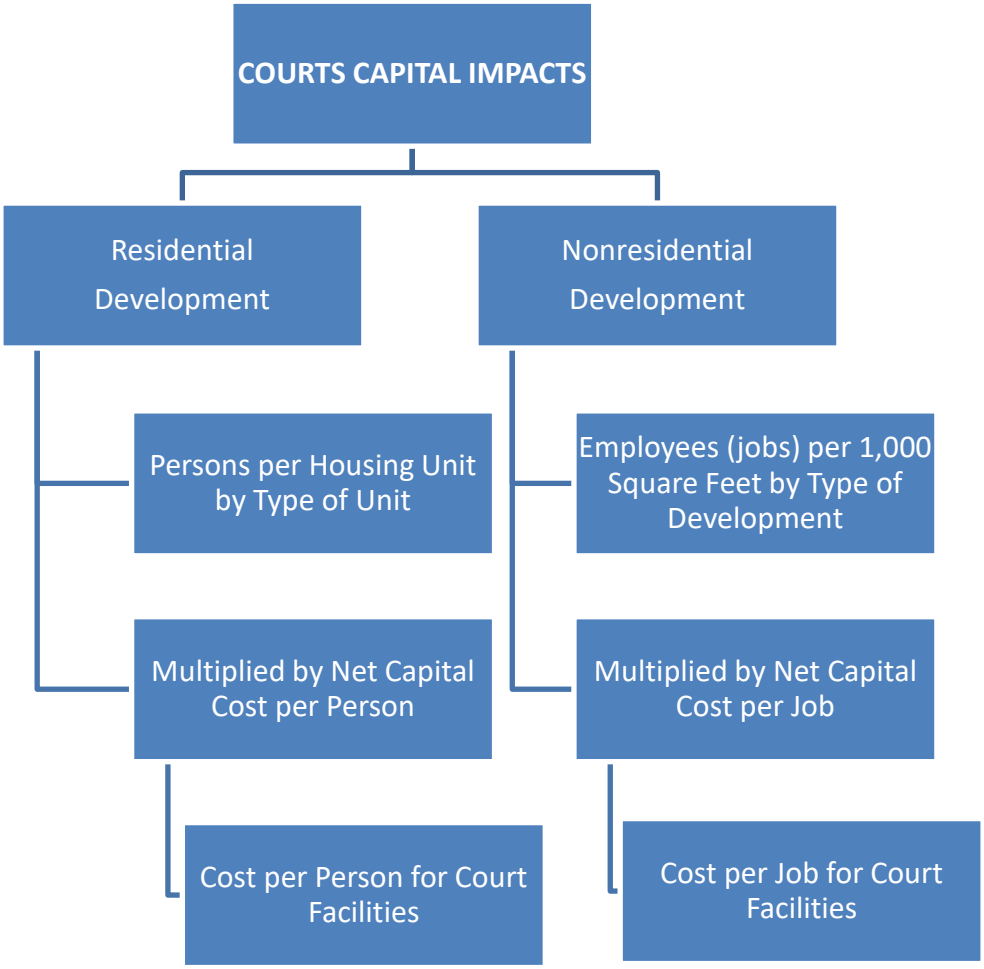
Nonresidential Capital Impact per 1,000 Square Feet		COUNTYWIDE
Nonresidential Land Use	**Employees per 1,000 Sq. Ft.**	**Capital Impact $**
	Per 1,000 Sq.Ft.	**Per 1,000 Sq.Ft.**
Retail	2.38	**$444**
Office and Other Services	3.31	**$618**
Industrial	2.11	**$394**
Institutional	0.67	**$125**

COURTS CAPITAL IMPACTS

Goochland County's 25-Year Capital Improvement Program (CIP) includes a new Circuit Court Building and parking lot that will increase the County's court facility capacity. This facility will serve the entire County and impacts are calculated for residential and nonresidential development. Courts' capital impacts are calculated on a per capita basis for residential development and a per employee basis for nonresidential development. A ***plan-based methodology*** is used in the CapIM Model.

In Figure 97, the methodology used to determine the capital impact is illustrated. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the components. The residential portion of the Courts capital impact is derived from the persons per housing unit (by type) multiplied by the net capital cost per person. The nonresidential portion is derived from the product of employees per 1,000 square feet of nonresidential space multiplied by the net capital cost per employee (job).

Figure 97. Courts Capital Impact Methodology Chart



Cost Allocation for Court Facilities

Proportionate share factors are used to allocate demand to residential and nonresidential development where appropriate. For facilities that serve both residential and nonresidential development, TischlerBise recommends using a proportionate share allocation based on a functional population approach. The functional population approach estimates the residential and nonresidential activity in the county by using the hours in a day. For the residents that are not working, their day is estimated to be split with 20 hours attributed to residential purposes and 4 hours to nonresidential purposes. For resident workers, 14 hours are attributed to residential purposes and 10 hours to nonresidential purposes. For non-resident workers in the county, 10 hours are attributed to nonresidential purposes in Goochland County. Figure 98 provides detail on the approach and results, which indicate that approximately 63 percent of demand in Goochland County is from residential development and 37 percent from nonresidential.

Figure 98. Goochland County Proportionate Share Factors (Countywide)

		Demand Units in 2015		Demand Hours/Day^	Person Hours
Residential					
	Population*	22,277			
55%	Residents Not Working		12,195	20	243,900
45%	Resident Workers**		10,082		
16%	Worked in County**		1,663	14	23,282
84%	Worked Outside of County**		8,419	14	117,866
				Residential Subtotal	385,048
				Residential Share ==>	**63%**
Nonresidential					
	Non-Working Residents		12,195	4	48,780
	Jobs Located in County**		17,466		
10%	Residents Working in County**		1,663	10	16,630
90%	Non-Resident Workers (Inflow Commuters)		15,803	10	158,030
				Nonresidential Subtotal	223,440
				Nonresidential Share ==>	**37%**
				TOTAL	608,488

** 2015 UVA - Weldon Cooper Center for Public Service*

*** 2015 Inflow/Outflow Analysis, OnTheMap Application, U.S. Census Bureau data for all jobs .*

^ Hours per day allocated to land use (residential or nonresidential).

Residential: 20 hours per day allocated to non-working residents; 14 hours allocated to employed residents.

Nonresidential: 4 hours allocated to non-working residents; 10 hours allocated to residents and non-residents working in the County

Court Facilities Included in CIP and Level of Service

Court facilities capital impacts are based on the projects in the County's 25-Year CIP to address needs to serve current development and future growth. The new Circuit Court building, which is planned for 2022, will replace the current Circuit Court building while expanding its capacity by 60 percent. The facility is anticipated to serve growth through 2042, therefore the level of service is based on projected population and job growth for 2042 (25-year period). The square footage and value of the new Circuit Court building and parking lot is allocated to residential and nonresidential development based on the proportional share found above in Figure 99. The cost per person or job is derived using the total cost per square foot and projected level of service in 2042.

Figure 99. Court Facilities in Goochland County CIP

Facility	Location	Departments / Use	Sq.Ft.	Res %	Nonres %	Res SF	Nonres SF	Value	$/Sq. Ft.	Res. Value $	Nonres. Value $	Total Value $
New Circuit Court Building	2938 River Road West	Circuit Court	41,800	63%	37%	26,334	15,466	$25,120,000	$600.96	$15,825,600	$9,294,400	$25,120,000
		GRAND TOTAL	41,800			26,334	15,466	$25,120,000	$600.96	$15,825,600	$9,294,400	$25,120,000

Source: Goochland County 25-Year Capital Improvement Program, 2017

Note: the cost of the parking lot project for the Court House Complex listed in the County's CIP has been included above

BASED ON TOTAL SPACE	Residential	Nonresidential	Total
Total Square Feet	**26,334**	**15,466**	**41,800**
Population or Jobs (2042)	**42,956**	**28,773**	
Square Feet per Person or Job	**0.61**	**0.54**	
Total Cost per Sq. Ft.	**$600.96**	**$600.96**	
Cost per Person or Job	**$366.59**	**$324.52**	

Court Facilities Input Variables and Capital Impacts

Level of service standards and cost factors for courts capital impact are summarized from above and shown in Figure 100. Capital impacts for court facilities are based on household size (i.e., persons per housing unit) for residential development and employees per 1,000 square feet of floor area for nonresidential development. (For further discussion on demand factors, see the Land Use Assumptions Chapter.)

The top portion of the figure summarizes cost factors per demand unit by type of facility. In this case, there is only one component in the capital impact calculation, Court Facilities. Court services are provided on a countywide base and it is recommended that one service area be used to determine the capital impact on court facilities. Since the household sizes differ between Service Areas, the capital impact for each Service Area is listed in the lower portion of Figure 100.

Figure 100. Court Facilities Input Variables and Capital Impacts by Land Use, Residential

Infrastructure Cost	Demand Unit	COUNTYWIDE
Courts Facilities	per capita	$366.59
GROSS COST PER PERSON		$366.59
Debt Service Credit		$0.00
NET CAPITAL COST		**$366.59**

Residential Capital Impact per Housing Unit	*Service Area: East*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.39	**$876**
Multifamily Housing Unit	1.72	**$630**
Age-Restricted Single Family Housing Unit	1.73	**$632**

Residential Capital Impact per Housing Unit	*Service Area: Central*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.23	**$817**
Multifamily Housing Unit	1.72	**$630**
Age-Restricted Single Family Housing Unit	1.61	**$590**

Residential Capital Impact per Housing Unit	*Service Area: West*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.22	**$813**
Multifamily Housing Unit	1.72	**$630**
Age-Restricted Single Family Housing Unit	1.60	**$587**

Figure 101. Court Facilities Input Variables and Capital Impacts by Land Use, Nonresidential

Infrastructure Cost	Demand Unit	COUNTYWIDE
Courts Facilities	per job	$324.52
GROSS COST PER JOB		$324.52
Debt Service Credit		$0.00
NET CAPITAL COST		**$324.52**

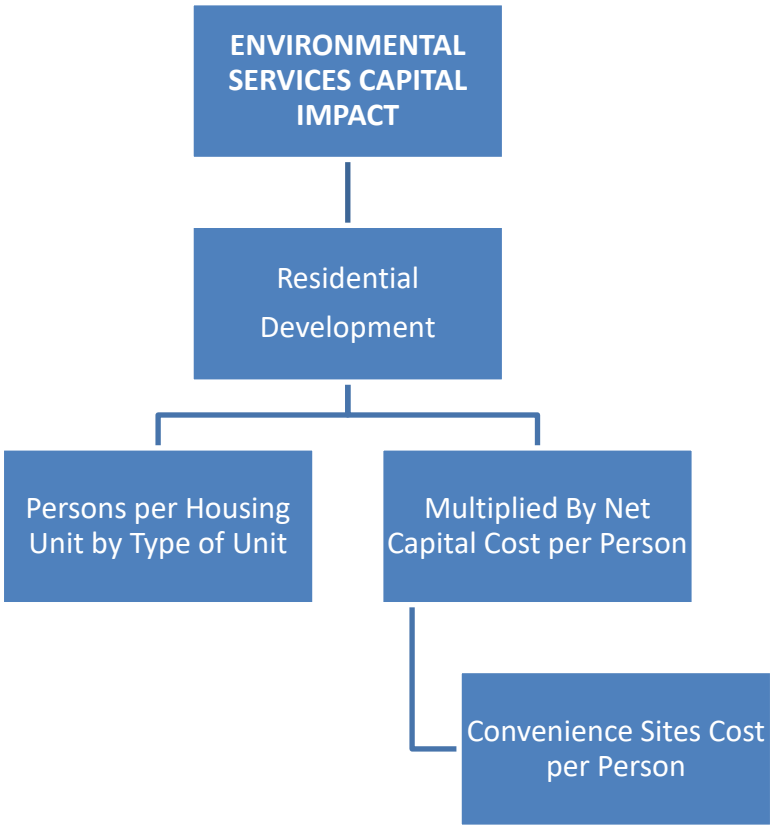
Nonresidential Capital Impact per 1,000 Square Feet		COUNTYWIDE
Nonresidential Land Use	**Employees per 1,000 Sq. Ft.**	**Capital Impact $**
	Per 1,000 Sq.Ft.	**Per 1,000 Sq.Ft.**
Retail	2.38	**$772**
Office and Other Services	3.31	**$1,074**
Industrial	2.11	**$684**
Institutional	0.67	**$217**

ENVIRONMENTAL SERVICES/SOLID WASTE CAPITAL IMPACTS

Included in Goochland County's Capital Improvement Program is a new Environmental Services/Solid Waste facility: Mini-Convenience Center. The new convenience site will be serving both the current and future populations of Goochland County. The inclusion of the facility indicates that the current facilities do not have the capacity to absorb future growth. As such, the ***plan-based methodology*** is used in the CapIM Model to determine the capital impact.

Figure 102 diagrams the general methodology used to calculate environmental services capital impact. Costs are allocated 100 percent to residential development. It is intended to read like an outline, with lower levels providing a more detailed breakdown of the components. The capital impact is derived from the product of persons per housing unit (by type of unit) multiplied by the net capital cost per person. Goochland County provides convenience sites at a Countywide basis, thus, the CapIM Model will a calculate the level of service and capital impact based at a Countywide level.

Figure 102. Environmental Services Capital Impacts Methodology Chart



Environmental Services Facilities in CIP and Level of Service

In Goochland County's 25-Year CIP there is one convenience center listed which will add to the capacity of the Countywide service. Since the County's Environmental Services/Solid Waste services are on a countywide basis, the CapIM model will calculate the level of service and capital impact at a Countywide level. The planned Convenience Center will provide additional capacity to accommodate future growth. Level of service is based on the Countywide population projection for 2042 and allocated to residential development. Figure 103 lists Environmental Services facility included in the CIP and the level of service standard that is used to calculate the capital impact.

Figure 103. Environmental Services Facilities in CIP and Countywide Level of Service

Facility	Service Area	Purpose	Square Feet	Value	$/Sq. Ft.
Mini-Convenience Center	Countywide	Waste Management	1,657	$550,000	$332
		TOTAL	1,657	$550,000	$332

Note: Center's area has been estimated based on Central's $/Sq. Ft.
Source: Goochland County 25-Year Capital Improvement Program, 2017

	Countywide
Population (2042)	42,956
Total Square Feet	1,657
Square Feet per Capita	0.04
Cost per Square Feet	$332
Cost per Capita	$13.28

Environmental Services Input Variables and Capital Impacts

Factors used to determine environmental services capital impacts are summarized below. Capital impacts for environmental services are based on household size (i.e., persons per housing unit) and are only determined for residential development. (For further discussion on household size see the Land Use Assumptions Chapter.)

The top portion of the figure summarizes cost factors per demand unit by type of facility. In this case, there is one component in the capital impact calculation, Convenience Sites. Environmental Services are provided on a countywide basis. Since the household sizes differ between Service Areas, the capital impact for each Service Area is listed in the lower portion of Figure 104.

Figure 104. Environmental Services Input Variables and Capital Impacts by Type of Housing Unit

Infrastructure Cost	Demand Unit	COUNTYWIDE
Convenience Sites	per capita	$13.28
GROSS COST PER PERSON		$13.28
Debt Service Credit		$0.00
NET CAPITAL COST		**$13.28**

Residential Capital Impact per Housing Unit	*Service Area: East*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.39	**$31**
Multifamily Housing Unit	1.72	**$22**
Age-Restricted Single Family Housing Unit	1.73	**$22**

Residential Capital Impact per Housing Unit	*Service Area: Central*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.23	**$29**
Multifamily Housing Unit	1.72	**$22**
Age-Restricted Single Family Housing Unit	1.61	**$21**

Residential Capital Impact per Housing Unit	*Service Area: West*	COUNTYWIDE
Unit Type	**Persons per Housing Unit**	**Capital Impact $**
	Per Housing Unit	**Per Housing Unit**
Single Family Housing Unit	2.22	**$29**
Multifamily Housing Unit	1.72	**$22**
Age-Restricted Single Family Housing Unit	1.60	**$21**

SUMMARY OF CAPITAL IMPACTS

This chapter provides a summary of the **capital impacts** by type of land use for each Service Area in Goochland County. The capital impacts represent new growth's fair share of the cost for capital facilities. Please see applicable chapter for detail on factors, values, and calculations used to calculate the amounts shown in Figure 105 - Figure 107.

The capital impacts for residential development are per housing unit. For nonresidential development, the capital impacts are shown per 1,000 square feet of floor area. Noted below, the totals listed in the Cash Proffer Eligible Capital Impacts column do not necessary list the actually cash proffer impacts. In the CapIM Model, triggers have been established that involve the current capacity of facilities. To comply with Virginia 2016 Cash Proffer Law, a cash proffer cannot be charged if there is existing capacity to absorb the demands from residential growth. Nonresidential growth is not eligible for cash proffers.

Figure 105. Summary of Capital Impacts by Land Use, East Service Area

CAPITAL COST IMPACTS

				Public Safety										
	infra category>>	PUBLIC SCHOOL	PARKS & REC	SHERIFF	FIRE & RESCUE	ANIMAL PRO.	PUBLIC SAFETY	TRANS.	Cash Proffer Eligible Capital Impacts*	LIBRARIES	GEN. GOVT	COURTS	ENV. SRVCS.	Total Capital Impact*
		Total All Grade Levels	Total All Service Areas	Countywide	Total All Service Areas	Countywide	Grand Total	Countywide		Countywide	Countywide	Countywide	Countywide	
Residential	**Development Unit**	Per Housing Unit												Total
Single Family	Housing Unit	$8,607	$1,801	$1,026	$2,121	$214	$3,361	$4,330	**$18,099**	$247	$521	$876	$31	**$19,774**
Multifamily	Housing Unit	$1,155	$1,296	$738	$1,526	$154	$2,418	$1,736	**$6,605**	$178	$375	$630	$22	**$7,810**
Age-Restricted Single Family	Housing Unit	$0	$1,304	$743	$1,535	$154	$2,432	$2,598	**$6,334**	$179	$377	$634	$22	**$7,546**
Nonresidential	**Development Unit**	Per 1,000 Square Feet												Total
Retail	1,000 Square Feet	n/a	n/a	$367	$1,465	n/a	$1,832	$5,026	**$0**	n/a	$444	$772	n/a	**$8,074**
Office and Other Services	1,000 Square Feet	n/a	n/a	$511	$2,037	n/a	$2,548	$1,882	**$0**	n/a	$618	$1,074	n/a	**$6,122**
Industrial	1,000 Square Feet	n/a	n/a	$325	$1,298	n/a	$1,623	$759	**$0**	n/a	$394	$684	n/a	**$3,460**
Institutional	1,000 Square Feet	n/a	n/a	$103	$412	n/a	$515	$3,245	**$0**	n/a	$125	$217	n/a	**$4,102**

** Potential cash proffer amounts will vary based on case by case analysis where Service Area amounts may or may not be triggered due to existing capacity as well as the categories eligible to be collected.*

Figure 106. Summary of Capital Impacts by Land Use, Central Service Area

CAPITAL COST IMPACTS

	infra category>>	PUBLIC SCHOOL	PARKS & REC	Public Safety: SHERIFF	Public Safety: FIRE & RESCUE	Public Safety: ANIMAL PRO.	Public Safety: PUBLIC SAFETY	TRANS.	Cash Proffer Eligible Capital Impacts*	LIBRARIES	GEN. GOVT	COURTS	ENV. SRVCS.	Total Capital Impact*
		Total All Grade Levels	Total All Service Areas	Countywide	Total All Service Areas	Countywide	Grand Total	Countywide		Countywide	Countywide	Countywide	Countywide	
Residential	**Development Unit**	Per Housing Unit												Total
Single Family	Housing Unit	$19,119	$1,681	$957	$2,529	$199	$3,685	$6,626	**$31,111**	$231	$486	$817	$29	**$32,674**
Multifamily	Housing Unit	$1,031	$1,296	$738	$127	$154	$1,019	$2,656	**$6,002**	$178	$375	$630	$22	**$7,207**
Age-Restricted Single Family	Housing Unit	$0	$1,213	$691	$118	$144	$953	$3,975	**$6,141**	$167	$351	$590	$21	**$7,270**
Nonresidential	**Development Unit**	Per 1,000 Square Feet												Total
Retail	1,000 Square Feet	n/a	n/a	$367	$1,686	n/a	$2,053	$7,691	**$0**	n/a	$444	$772	n/a	**$10,960**
Office and Other Services	1,000 Square Feet	n/a	n/a	$511	$2,345	n/a	$2,856	$2,879	**$0**	n/a	$618	$1,074	n/a	**$7,427**
Industrial	1,000 Square Feet	n/a	n/a	$325	$1,494	n/a	$1,819	$1,161	**$0**	n/a	$394	$684	n/a	**$4,058**
Institutional	1,000 Square Feet	n/a	n/a	$103	$474	n/a	$577	$4,965	**$0**	n/a	$125	$217	n/a	**$5,884**

** Potential cash proffer amounts will vary based on case by case analysis where Service Area amounts may or may not be triggered due to existing capacity as well as the categories eligible to be collected.*

Figure 107. Summary of Capital Impacts by Land Use, West Service Area

CAPITAL COST IMPACTS

	infra category>>	PUBLIC SCHOOL	PARKS & REC	Public Safety: SHERIFF	Public Safety: FIRE & RESCUE	Public Safety: ANIMAL PRO.	Public Safety: PUBLIC SAFETY	TRANS.	Cash Proffer Eligible Capital Impacts*	LIBRARIES	GEN. GOVT	COURTS	ENV. SRVCS.	Total Capital Impact*
		Total All Grade Levels	Total All Service Areas	Countywide	Total All Service Areas	Countywide	Grand Total	Countywide		Countywide	Countywide	Countywide	Countywide	
Residential	**Development Unit**	Per Housing Unit												Total
Single Family	Housing Unit	$18,546	$1,673	$953	$3,039	$198	$4,190	$2,304	**$26,713**	$230	$484	$813	$29	**$28,269**
Multifamily	Housing Unit	$1,162	$1,296	$738	$127	$154	$1,019	$924	**$4,401**	$178	$375	$630	$22	**$5,606**
Age-Restricted Single Family	Housing Unit	$0	$1,206	$687	$118	$143	$948	$1,382	**$3,536**	$166	$349	$586	$21	**$4,658**
Nonresidential	**Development Unit**	Per 1,000 Square Feet												Total
Retail	1,000 Square Feet	n/a	n/a	$367	$2,302	n/a	$2,669	$2,675	**$0**	n/a	$444	$772	n/a	**$6,560**
Office and Other Services	1,000 Square Feet	n/a	n/a	$511	$3,202	n/a	$3,713	$1,001	**$0**	n/a	$618	$1,074	n/a	**$6,406**
Industrial	1,000 Square Feet	n/a	n/a	$325	$2,041	n/a	$2,366	$404	**$0**	n/a	$394	$684	n/a	**$3,848**
Institutional	1,000 Square Feet	n/a	n/a	$103	$647	n/a	$750	$1,727	**$0**	n/a	$125	$217	n/a	**$2,819**

** Potential cash proffer amounts will vary based on case by case analysis where Service Area amounts may or may not be triggered due to existing capacity as well as the categories eligible to be collected.*

APPENDIX A: EXAMPLE OF DEVELOPMENT RESULTS

To illustrate the Capital Impact Model (CapIM Model), the following figures provide the results from a hypothetical development project of 50 single family housing units in each Service Area. Results show projected residential growth and corresponding capital impacts for cash proffer eligible infrastructure. The results also capture the capacity triggers included in the model that reflect where excess capacity currently exists in County infrastructure. The figures are merely provided to illustrate the results of a hypothetical development and do not reflect an actual development. However, they do reflect a legally supportable and reasonable cash proffer amount for these hypothetical developments.

Figure 108. East Service Area CapIM Test Results

Project Name	East Service Area Test Project

CAPITAL COST IMPACTS FOR DEVELOPMENT PROPOSAL

	RESIDENTIAL	NONRESIDENTIAL	TOTAL
Housing Units	50	-	50
Projected Population	120	-	120
Projected Students			
Elementary School Students	5	-	5
Middle School School Students	3	-	3
High School Students	3	-	3
Projected Total Students	10	-	10
Nonresidential Sq. Ft.	-	0	0
Projected Jobs	-	0	0

CASH PROFFER ELIGIBILE INFRASTRUCTURE CATEGORIES, RESIDENTIAL

	Total Housing Units	Capital Impact	Capital Impact per
Schools	50	$251,213	$5,024
Parks and Recreation	50	$55,477	$1,110
Public Safety	50	$106,090	$2,122
Transportation	50	$216,530	$4,331
Total	50	$629,310	$12,586

Figure 109. Central Service Area CapIM Test Results

SUMMARY OF PROJECT OUTPUTS

Project Name	Central Service Area Test Project

CAPITAL COST IMPACTS FOR DEVELOPMENT PROPOSAL

	RESIDENTIAL	NONRESIDENTIAL	TOTAL
Housing Units	50	-	50
Projected Population	112	-	112
Projected Students			
Elementary School Students	11	-	11
Middle School School Students	8	-	8
High School Students	8	-	8
Projected Total Students	27	-	27
Nonresidential Sq. Ft.	-	0	0
Projected Jobs	-	0	0

CASH PROFFER ELIGIBILE INFRASTRUCTURE CATEGORIES, RESIDENTIAL

	Total Housing Units	Capital Impact	Capital Impact per
Schools	50	$478,181	$9,564
Parks and Recreation	50	$30,690	$614
Public Safety	50	$126,538	$2,531
Transportation	50	$331,304	$6,626
Total	50	$966,713	$19,334

Figure 110. West Service Area CapIM Test Results

Project Name	West Service Area Test Project

CAPITAL COST IMPACTS FOR DEVELOPMENT PROPOSAL

	RESIDENTIAL	NONRESIDENTIAL	TOTAL
Housing Units	50	-	50
Projected Population	111	-	111
Projected Students			
Elementary School Students	9	-	9
Middle School School Students	5	-	5
High School Students	7	-	7
Projected Total Students	21	-	21
Nonresidential Sq. Ft.	-	0	0
Projected Jobs	-	0	0

CASH PROFFER ELIGIBILE INFRASTRUCTURE CATEGORIES, RESIDENTIAL

	Total Housing Units	Capital Impact	Capital Impact per
Schools	50	$509,283	$10,186
Parks and Recreation	50	$30,551	$611
Public Safety	50	$8,204	$164
Transportation	50	$115,238	$2,305
Total	50	$663,276	$13,266

APPENDIX B: CASH PROFFER BACKGROUND

Definition

A proffer is an offer by a landowner during the rezoning process to mitigate the impacts of the rezoning. It is a form of *conditional zoning*, which applies additional conditions, or requirements, in addition to existing requirements and regulations. A proffer can include the acceptance of cash payments to mitigate the impacts of a rezoning, called *cash proffers,* and are allowed under Virginia Code §15.2-2303 and §15.2-2298. Goochland County meets the requirement under 15.2-2298 of a decennial growth rate of 5 percent or more.[3]

Cash proffers are voluntary one-time payments used to fund capital improvements necessitated by new growth. Cash proffers are akin to *impact fees,* which have been utilized by local governments in various forms for at least fifty years.[4] However, unlike impact fees, cash proffers only apply during the rezoning process and do not apply to "by-right" development. Cash proffers are not to be used to correct existing deficiencies but to provide additional capacity to serve new growth. Because cash proffers do not apply to by-right development and only apply during the rezoning process, only a portion of the impacts from new growth can be mitigated with a cash proffer system. *Cash proffers therefore have limitations for infrastructure funding and should not be regarded as the total solution for capital improvement needs. Rather, they should be considered one component of a comprehensive portfolio to ensure adequate provision of public facilities with the goal of maintaining current levels of service in a community.* Limitations are:

- Cash proffers only apply to rezonings and are not collected on any by-right development.
- Cash proffers can only be used to finance capital infrastructure that provides additional capacity and cannot be used to finance ongoing operations and/or maintenance and rehabilitation costs. Virginia law restricts the infrastructure categories to **public transportation facilities, public safety facilities, public school facilities, and public parks.**[5]
- Cash proffers cannot be deposited in the local government's General Fund. The funds must be accounted for separately and earmarked for the capital expenses for which they were collected.

[3] However, 15.2-2298 provides authority to localities that meet the growth criteria in 15.2-2298 to utilize the conditional zoning authority under 15.2-2303. This study meets the stricter requirements of 15.2-2298.

[4] Other than Transportation Impact Fees, localities in the Commonwealth of Virginia are not authorized to implement impact fees.

[5] See Virginia Code §15.2-2303.4.

- Cash proffers cannot be used to correct existing infrastructure deficiencies unless negotiated apart from the cash proffer system presented herein, or if there is a funding plan in place to correct the deficiency for all current residents and businesses in the community.
- Because cash proffers reflect a point in time, the calculations and study should be updated periodically (typically 3 to 5 years). Costs reflect the direct impact of new development on the need for new facilities and infrastructure and do not reflect secondary or indirect impacts.

Approach

To ensure a reasonable relationship to new development and rezonings in particular, the cash proffer study focuses on three elements: "impact or need," "benefit," and "proportionality."

Demonstrating an Impact. All new development in a community creates additional demands on some, or all, public facilities provided by local government. If the supply of facilities is not increased to satisfy that additional demand, the quality or availability of public services for the entire community will deteriorate. Cash proffers are calculated in a manner to determine what the applicable cost of development-related facilities, to the extent that the need for facilities is a consequence of development that is subject to the cash proffers. In this study, the impact of development on improvement needs is analyzed in terms of quantifiable relationships between various types of development and the demand for specific facilities, based on applicable level-of-service standards.

Demonstrating a Benefit. A sufficient benefit relationship requires that cash proffer funds be segregated from other funds and expended only for the categories for which the proffers were collected. Cash proffers must be expended in a timely manner[6] and the facilities funded by the proffers must benefit the development paying the proffers. However, this does not require that facilities funded with cash proffer revenues be available *exclusively* to development paying the proffers. In other words, existing development may use and benefit from these improvements as well.

Procedures for the earmarking and expenditure of revenues are outlined in Virginia Code (see specifically §15.2303.2(B)). These requirements are intended to ensure that developments benefit from the cash proffers paid. Thus, an adequate showing of benefit must address procedural as well as practical issues.

Demonstrating Proportionality. Proportionality is established through the procedures used to identify development-related facility costs, and in the methods used to calculate the cash proffers for various types of facilities and categories of development. The demand for facilities is measured in terms of

[6] Virginia Code §15.2-2303.2(A) states: "*The governing body of any locality accepting cash payments voluntarily proffered on or after July 1, 2005, shall, within twelve (12) years of receiving full payment of all cash proffered pursuant to an approved rezoning application, begin, or cause to begin (i) construction, (ii) site work, (iii) engineering, (iv) right-of-way acquisition, (v) surveying, or (vi) utility relocation on the improvements for which the cash payments were proffered.*"

relevant and measurable attributes of development. For example, the need for school improvements is measured by the number of public school-age children generated by development.

The above requirements are further reinforced in the Code of Virginia under §15.2-2303.4 (effective July 1, 2016). Specifically, Section 15.2-2303.4(B) states that localities cannot request or accept an *unreasonable* proffer or deny a rezoning application or proffer condition amendment due to applicant's failure or refusal to submit an unreasonable proffer.

The implementation of the proffer changes hinges on defining an unreasonable proffer, or more positively, defining a reasonable proffer. The figure below provides further detail on the approach to meet requirements of the law.

REASONABLE PROFFERS

VA Code Section	VA Code Text	Interpretation	How to Meet the Requirement
15.2-2303.4 (C)	*addresses an impact that is specifically attributable to a proposed new residential development or other new residential use applied for*	The demand from the residential land use creates a need for additional capacity in the infrastructure category for which the cash proffer is being requested or offered	Establish a nexus between types of residential development and specific impacts on infrastructure in locality. (E.g., student generation rates by type of housing unit.)
	addresses an impact to an offsite public facility	The need for the capital improvement must be for a system-level facility, provided to a larger geographic area than the project site	Use system-level infrastructure to establish current levels of service in cash proffer calculations.
	the new residential development or new residential use creates a need, or an identifiable portion of a need, for one or more public facility improvements in excess of existing public facility capacity at the time of the rezoning or proffer condition amendment	The impact from the residential development causes a need for additional capacity above what is available to the applicant. The additional capacity can be for a single facility or a portion of a facility improvement. Available capacity is determined by analyzing the current and projected levels of service provided in specific categories of infrastructure in the locality.	Define current levels of service / available capacities in cash proffer analysis and identify when capacities are reached. Identify incremental impact on facilities from residential development in cash proffer analysis.
	each such new residential development or new residential use applied for receives a direct and material benefit from a proffer made with respect to any such public facility improvements.	Entity/applicant paying the cash proffer receives a benefit in the form of a facility or portion of a facility being built or purchased.	Localities use cash proffer funding to build or purchase additional capacity in the infrastructure categories for which a cash proffer is collected. Separate funds established. Collection and expenditure areas may be necessary to ensure "direct" benefit.

Source: TischlerBise

Cash Proffer Implementation and Administration Considerations

While cash proffers are voluntary contributions, there are procedures that must followed per Virginia law and to ensure payers receive benefit from the proffer.

Accounting

Monies received are placed in a separate fund and accounted for separately and expenditures should be indicated in the capital improvement plan. Within twelve (12) years of receiving full payment of committed cash proffers, a locality must begin construction or relevant improvement for which the proffer was made. Localities that do not begin construction or other authorized alternative improvement must pay the amount to the Commonwealth Transportation Board for allocation to the secondary system construction program or the urban system construction program for the locality in which the proffered cash payments were collected (VA § 15.2-2303.2).

Cost Updates

All costs in the cash proffer calculations are given in current dollars with no assumed inflation over time. Necessary cost adjustments can be made as part of the recommended annual evaluation and update of the cash proffer using consumer price index (CPI) or Marshall and Swift Building Cost Index. TischlerBise recommends using the Marshall Swift, which is specific to construction and accounts for geographic differences. The index can be applied against the calculated cash proffers. If cost estimates or other factors change significantly, calculations should be revisited. As cash proffer calculations are based on a snapshot in time, an adopted Cash Proffer policy should be periodically reviewed and updated. A full update is recommended no later than 5 years to reflect changes in development trends, infrastructure capacities, costs, funding formulas, etc.

Credits and Reimbursements

Future Revenue Credits

Credits for outstanding and future debt payments have been calculated and integrated into the cash proffer calculations where applicable in this study. A credit is not necessary for interest payments because interest costs are not included in the proffer amounts.

Site-Specific Credits

A site-specific credit could be provided to a developer (or applicant) for contributions of system improvements that have been included in the cash proffer calculations. If a developer constructs the type of system improvements included in the calculations, there could be a possible reduction in the cash proffer for the relevant portion. For Goochland County, this is most applicable to Transportation projects in the County's Capital Improvement Program (CIP). For example, if a developer is required to make road improvements based on a Traffic Impact Study and that improvement is listed in the CapIM Model, by removing that project from the CIP list in the model will allow for a reduced capital impact and cash proffer amount to be calculated.

Written Policies

Written policies and implementation practices should be established to cover the items identified in this section to provide consistency in the process.