

APARTMENT
MORATORIUM REPORT
Germantown Board of Mayor and Aldermen



**GERMANTOWN
TENNESSEE**



MAY 2019

Table of Contents

I. Executive Summary

II. Introduction

III. Key Areas of Concentration

Infrastructure

Police

Fire

GMSD

IV. Appendix

V. References

Executive Summary

At the beginning of calendar year 2018, the elected officials of Germantown instituted an 18-month Moratorium on apartment and apartment building developments within the City. With the exception of four specified development projects, the acceptance of all new applications within the City's three Smart Code Zoning Districts came to a temporary halt.

According to Resolution No. 18R03, the moratorium was initiated out of local public concern that "comparatively dense developments, such as apartments and apartment buildings, could result in disproportionate impacts on City resources and services (including water, utility, and sewer demands, traffic impacts, schools, public safety demands, etc.) compared to other forms of residential development." Consequently, the primary objective of the temporary moratorium was "to allow the City an opportunity to study, research, analyze and/or assess the likely impacts and nature of any future apartment and apartment building developments in each of the Smart Code Zoning Districts."

Although the stated, narrow purpose of the study was to research and analyze the likely impacts of apartments and apartment buildings on City services, an analysis of other forms of residential development within the City was completed concurrently by our research team. Thus, the scope of work was expanded to present apartment development findings within the greater context of an aggressive scenario for City-wide residential build-out through 2028. By doing so, the City now has a better understanding of how City services will likely be impacted by all residential development decisions going forward, is equipped with valuable information to aid in future development decision-making processes, and can be more effective in aligning today's policies and resources with the needs of tomorrow.

Consistent with the arrangement of the entire research report, this executive summary begins with a general overview of existing conditions and research methodologies before summarizing the likely, forecasted impacts of apartments and apartment buildings within each of the study's four key areas of concentration: Infrastructure, Police (GPD), Fire and Emergency Medical Services (GFD), and the Germantown Municipal School District (GMSD).

Existing Conditions

In order to best determine the likely impact future apartments and apartment buildings within the Smart Code zoning districts will have on City services, a number of recently completed, City-specific studies were referenced along with the retrieval of the most recent years of data relevant to each of the four key areas of concentration.

Infrastructure

- Three of the City's Key Commercial Areas, the Central Business District (CBD), the West Poplar Avenue District, and the Forest Hill Heights District have established Small Area Plans and fall under Smart Code zoning. Since 2006, the City has been proactively focused on maximizing the use of the limited land available within its borders as the community approaches build-out. The City has invested in a number of studies within these three districts to not only address current infrastructure and traffic demands, but to strategically plan for the greatest amount of potential impact as a result of anticipated commercial and residential development. These studies, which are referenced throughout the infrastructure report, analyze and make recommendations

regarding water distribution, sanitary sewer collection, traffic and intersections, bicycle and pedestrian improvements, and stormwater management.

Existing Dwelling Units

- Germantown currently has five apartment developments with a total of 1,014 apartment dwelling units within its City limits. The Bridges, Farmington Gates, The Retreat, The Vineyards, and Westminster were all built between 1973 and 1999. 6.3% of residential dwelling units within Germantown are apartments. Approximately 82% of the City's residential dwelling units are single-family homes, 7.4% are condominiums, and 4.5% are age-restricted, independent and assisted-living units.
- With only five apartment developments, the sample set is small and limited to a large extent. Variables such as the year the apartment was built, the average monthly rent per unit, the total number of units, and the number of calls per unit were accessible and therefore analyzed; however, other variables, such as age of the tenants, income, health status, number of residents per unit, and the length of occupancy are not public information and could not be obtained.

Police Department

- From the beginning of 2014 through the end of 2018, incidents originating from a Germantown residence have accounted for 22.5% of total annual incidents involving the services of the police department. The remaining 77.5% of incidents were from common areas, commercial properties, police-initiated traffic stops, and other non-residential locations within Germantown.
- During this same five-year period, incidents from existing apartments made up 0.9% of total incidents throughout the City. Of all incidents from residential locations within the City, 3.9% were from an existing apartment.
- For every 100 apartment dwelling units, there was an annual average of 31.8 incidents from apartments between 2014 and 2018. As shown in Table 1, this ratio is comparable to the 37 incidents per 100 condominium units and less than the 57.4 incidents per 100 single-family home dwelling units. There is not a statistically significant difference in the number of incident calls between apartments and condominiums, however, there a difference between those and both single-family homes and age-restricted, independent, and assisted living developments.
- Incidents will sometimes result in crimes. The incident-to-crime ratio for apartments during this most recent five-year time period was 5.76 incidents for every one crime. Condominiums were 6.45 incidents for every one crime; age-restricted, independent, and assisted-living units were 5.20 for every one crime; and single-family homes were 11.34 incidents for every one crime.

Fire Department

- From the beginning of 2014 through the end of 2018, 1.6% of total calls for service throughout the City were from existing apartments. Of all calls for service from residential locations within the City during this same time period, 2.9% were from an existing apartment.

- For every 100 apartment dwelling units, there was an annual average of 6.4 calls for service from apartments between 2014 and 2018. As shown in Table 1, this ratio is comparable to the 5.2 incidents per 100 condominium units and less than the 12.4 incidents per 100 single-family home dwelling units. There is not a statistically significant difference in the EMS and Non-EMS calls between these dwelling types.
- Although only 4.5% of the dwelling units within the community are classified as age-restricted, independent, and assisted living, a disproportionate 21.4% of calls for service from a Germantown residence are from an age-restricted, independent, or assisted living dwelling unit. There is a statistically significant difference in the number of EMS and Non-EMS calls to age-restricted, independent, and assisted living units versus the other dwelling units in Germantown.
 - The results of this analysis are bolstered by academic and fire and emergency medical services industry literature which shows that the age of the resident is a significant variable for EMS and Non-EMS calls for service. For Germantown, these age-restricted, independent, and assisted living units experience a much higher ratio of calls for service than their residential counterparts.

Germantown Municipal School District

- During the 2018-19 school year, 6.2% of total resident students in the Germantown Municipal School District resided in an existing Germantown apartment development.
- For the purpose of this study, analysis of the existing apartments, and the resulting student enrollment projections, are based on the ratio of GMSD resident students coming from two or more bedroom apartments, since an assumption was made that studios and one-bedroom apartments are unlikely to produce school-aged children. Our analysis for GMSD regarding student enrollment also assumed that all single-family homes in Germantown have two or more bedrooms.
- For every 100 two or more bedroom apartment units, there were 48.8 GMSD students for the 2018-19 school year. As shown in Table 1, this ratio is higher than the 17.7 GMSD students per 100 two or more bedroom condominium units, and higher than the 37.6 GMSD students per 100 single-family home dwelling units. There is a statistically significant difference in the number of GMSD students residing in apartments with two or more bedroom dwelling units compared to both condominiums and single-family homes in Germantown.
- There is a strong negative correlation between the amount of average monthly rent for an apartment and the ratio of students per 100 two or more bedroom apartment units. Higher rent amounts are associated with lower ratios of students per unit in our City-specific sample. The amount of monthly rent for an apartment is both a statistically significant and practically useful variable for predicting the ratio of students per 100 units from apartments.

	Number of Units	% of Total Units	Police		Fire		2+ Bedroom Units	% of Total Units	GMSD	
			Incidents*	% of Residential Impact	Calls for Service*	% of Residential Impact			Students*	% of Residential Impact
Apartments	1014	6.3%	31.8	3.9%	6.4	2.9%	694	4.6%	48.8	6.2%
Condominiums	1198	7.4%	37	5.3%	5.2	2.8%	1136	7.6%	17.7	3.7%
Age-Restricted, Independent and Assisted Living	721	4.5%	12.2	1.0%	69.5	21.4%	n/a	n/a	0	0.0%
Single-Family Homes	13148	81.8%	57.4	89.8%	12.4	72.8%	13148	87.8%	37.6	90.2%

*Results are shown per 100 units for each dwelling type. GMSD results only include 2 or more bedrooms in all multi-family dwelling types.

Table 1. Germantown Residential Comparisons 2014-2018

Table 1 includes a summary of results from existing dwelling units within the key areas of GFD, GPD, and GMSD. The resulting data from existing residential dwelling types is broken down by a ratio of incidents/calls for service/students for service per 100 units and the percentage of impact each dwelling type in relation to residential totals. This information was critical for estimation and forecasting models which quantify the likely impact of future development for each of these three key areas of concentration.

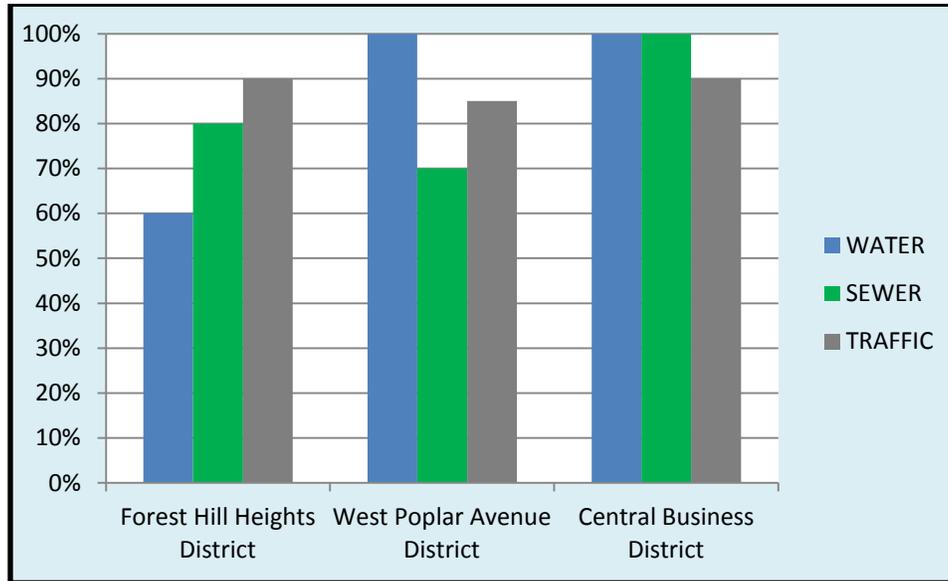
Forecasting New Residential Impact

The analysis of existing residential impact, specifically the impact per dwelling unit on each type of City service, is incorporated into the report’s ten-year projections of future utilization with the added impact of an aggressive, hypothetical residential build-out scenario. This scenario included properties that already have some level of development approval or have been considered as underdeveloped based on current zoning. For the purposes of projecting the likely impact on City services, based on the maximum number of dwelling units possible, this study assumes that all new multi-family development within Smart Code zoning districts will be applied for, approved, and developed as apartments over the next ten years. The total number of new residential dwelling units included by 2028 for each forecasting model was 3,642. This added residential unit count consists of 2,141 new apartment units, 1,202 new single-family homes, 137 new condominiums (single-family attached), and 162 new age-restricted, independent, and assisted living units.

Infrastructure

- The Small Area Plan for the Central Business District provided the framework for Germantown land use, transportation policy, and overall strategy for directing future Smart Growth development and decisions regarding the improvement of infrastructure within each of the three Key Commercial Areas. As a result of this planning work, the private and public investments made to date within the CBD took into consideration future development models that could cause the greatest impact to City infrastructure within this area. Included in those models were multi-family residential uses, such as apartments, one of the permitted use types of a mixed-use development within the Smart Code. As shown in Figure 1, infrastructure improvements in the CBD are near completion.

Figure 1: Percentage of Infrastructure Complete to Accommodate Development Impact



- Engineers and planners from the consulting firm of Kimley Horn & Associates surveyed the existing infrastructure within the West Poplar Avenue District and provided recommendations for improvements. Those recommendations included intersection and bicycle and pedestrian infrastructure improvements, many of which are currently included in the plans for the proposed redevelopment of the Carrefour at Kirby Woods location. Related improvements have already been accomplished at the TraVure development. The consultant’s work also identified the need for additional sewer capacity to meet the demand of future development, including multi-family use types, within this entire Small Area Plan. Design work for a new sewer main has been completed and Phase I of construction will take place in FY20. Upon the completion of this work, infrastructure improvements in the West Poplar Avenue District will be concluded.
- Engineers and planners from the consulting firm of Fisher Arnold provided the analysis and recommendations for infrastructure improvements in the Forest Hill Heights Small Area Plan. Their analysis suggested infrastructure improvements were needed in order to continue to provide existing customers with superior water and sanitary sewer service, as well as to plan for future development in accordance with Smart Growth design guidelines. A total of five capital improvement projects related to water distribution are either under construction or included in the FY20 capital budget. An upgrade of the sanitary sewer system is schedule for completion is also included in the FY20 capital budget. With these upgrades in place, the Forest Hill Height District should have sustainable infrastructure to meet the needs of any new apartment buildings that are constructed in compliance with existing Smart Growth guidelines.

Police Department

Existing Dwelling Units

- Over the next ten years, residential call volume from existing dwelling units alone is not projected to increase by 2028. Although deviations from the average will happen from year to year, the estimates from the past five years are expected to maintain relatively consistent. Apartments

averaging 31.8 incident calls per 100 units, Condominiums averaging 37; Single-family Homes averaged 57.4; and Independent and Assisted Living averaged 12.2 incident calls per 100 units per year.

Smart Code Zoned Districts

- Of the seven police districts, only Police Districts #1, #5 and #6 include Smart Code zoning. This study anticipates that these three districts will include new multi-family developments, specifically apartment developments, in order to project maximum residential calls for service based on current zoning, small area plans, and zoning overlays.

New Residential Development

- Based on the report's hypothetical, maximum residential build-out scenario of an added 3,642 dwelling units by 2028, daily residential call volume is estimated to increase from 22.84 incidents to 26.66 incidents. Of this added 3.81 daily incidents, 1.87 are estimated to come from 2,141 new apartment units, 1.76 are estimated to come from 1,202 new single-family homes, and the balance from a small number of new age-restricted, independent, and assisted living units and condominium-style attached homes.

Fire Department

Existing Dwelling Units

- Over the next ten years, residential call volume from existing dwelling units alone is projected to increase by 2.98 calls for service per day, from 6.59 to 9.57, a call volume increase of 45% by 2028. Significant increases in residential call volume are projected for Fire Districts #3 and #2 through 2028. This is due large in part to the increasing demand from the 565 age-restricted, independent, and assisted-living dwelling units located within their response territory. By 2028, calls for age-restricted, independent, and assisted living developments are projected to increase to 30.4% of the departments call volume.

Smart Code Zoned Districts

- Of the four fire districts, only Fire Districts #3 and #4 include Smart Code zoning. This study anticipates that these two districts will include new multi-family developments, specifically apartment developments, in order to project maximum residential calls for service based on current zoning, small area plans, and zoning overlays.

New Residential Development

- Based on the report's hypothetical, aggressive residential build-out scenario of an added 3,642 dwelling units by 2028, new residential development is projected to add 1.68 calls for service per day. Of these, 0.59 are projected to come from the new Avenida Senior Living apartment development, 0.58 are projected to come from 2,141 new apartment units (see Table xx below), 0.49 are projected to come from 1,202 new single-family homes, and the balance from a small number of condominium-style attached homes.

Germantown Municipal School District

Existing Dwelling Units

In the spring of 2017, GMSD hired a demographer to provide annual student enrollment percentage changes for each of the existing five schools through the 2026-27 school year. Based on these forecasted enrollment percentage changes, the total number of resident GMSD students coming from an existing dwelling unit will be relatively the same in ten years. GMSD resident student enrollment from an existing dwelling unit is forecasted to peak in the 2021-22 school year at 5,606 and then decline to 5,490 by the 2028-29 school year. Resident student enrollment in the fall of the 2018-19 school year was 5,489.

Smart Code Zoned Districts

The only school attendance zone that does not currently serve an existing apartment or include Smart Code zoning is Dogwood Elementary School. When Forest Hill Elementary School opens in the fall of 2019, it will initially serve 2,843 single-family homes. However, Smart Code zoning does apply within the Forest Hill attendance zone area.

In an attempt to simplify student enrollment projections from potential, future apartment developments, all future apartment development units within the City's Smart Code are assumed to be one of the following general apartment product types:

- **Apartment Type A.** A vertically mixed-use, multi-family residential building; or a multi-family residential building proposed as a component of a comprehensive mixed-use development application. These developments, similar in nature to Thornwood, are designed to incorporate a mix of residential and commercial uses. Based upon a higher average monthly rent, the study projects that this product type would result in 2.7 GMSD students per 100 two or more bedroom units. Type A apartments typically have a 50/50 ratio, split evenly between studio or one bedroom units, and two bedroom units.
- **Apartment Type B.** A stand-alone, single-use, multi-family residential complex. Similar in nature to the proposed Watermark and Viridian developments, these developments are garden style apartment complexes that typically have a higher percentage of multiple bedroom units and are not proposed as a component of a comprehensive mixed-use development application. Based upon the average monthly rent, the study projects that this product type would result in 15.3 GMSD students per 100 two or more bedroom units. Type B apartments typically have a 40/60 ratio, 40% one bedroom and 60% two or more bedrooms units.

New Residential Development

Based on the report's aggressive residential build-out scenario of an added 3,642 dwelling units by 2028, new residential development is projected to add 569 resident GMSD students. Of these added 569 resident students, 123 are projected to come from the included 2,141 new apartment units (see Table 2 below), 423 are projected to come from 1,202 new single-family homes, and the balance from a small number of condominium-style attached homes.

PROJECTED APARTMENT IMPACT (2028)				Incident and Crime		EMS and Non-EMS	Student Enrollment			
Project Name / Project Owner	Dwelling Type	# of units possible or approved	# of 2+ Bedroom Units	Calls per Year	Crimes per Year	Calls per Year	Elementary	Middle	High	Total
Developments in Process										
TW Residences & Market Row Lofts	APT A	276	138	88	15	27	2	1	1	4
Thornwood (Undeveloped Lot 5)	APT A	294	147	93	16	29	2	1	1	4
Viridian Apartments	APT B	299	179	95	17	30	13	7	7	27
Underdeveloped Properties										
Bank of Bartlett	APT A	20	10	6	1	2	0	0	0	0
Kirby Professional Buildings	APT A	40	20	13	2	4	0	0	0	0
Arthur Tract	APT A	302	151	96	17	30	2	1	1	4
Forest Hill Associates - Phase 19	APT B	310	190	99	17	31	14	8	8	30
Forest Hill Associates	APT B	300	180	95	17	30	13	7	7	27
Forest Hill Associates	APT B	300	180	95	17	30	13	7	7	27
Totals		2,141	1,195	680	118	212	59	32	32	123

Table 2. Summary of New Apartment Impact on GPD, GFD, and GMSD by 2028

Combined Existing and New Residential Impact Summary

As mentioned previously, this study has made the assumption that any and all new multi-family development within Smart Code zoning districts will be applied for, approved, and developed only as apartments over the next ten years. Under the aggressive residential build-out scenario presented in this study, the total number of residential dwelling units included by 2028 for all forecasting models was 19,723. This hypothetical total residential unit count consists of 14,350 single-family homes, 3,155 apartment units, 1,335 condominiums, and 883 age-restricted, independent, and assisted living units. Table 3 includes a summary of the likely projected impacts for all dwelling units as studied within the key areas of GFD, GPD, and GMSD. The resulting data is broken down by a ratio of incidents/calls for service/students per 100 units and the percentage of impact each dwelling type has in relation to the new residential totals.

	Number of Units	% of Total Units	Police		Fire		2+ Bedroom Units	% of Total Units	GMSD	
			Incidents*	% of Residential Impact	Calls for Service*	% of Residential Impact			Students*	% of Residential Impact
Apartments	3155	16.0%	31.8	10.2%	9.9	8.0%	1889	10.8%	24.5	7.6%
Condominiums	1335	6.8%	37	5.0%	4.7	1.6%	1273	7.3%	17.6	3.7%
Age-Restricted, Independent and Assisted Living	883	4.5%	12.2	1.1%	133.8	30.4%	n/a	n/a	0	0.0%
Single-Family Homes	14350	72.8%	57.4	83.7%	16.2	59.9%	14350	81.9%	37.4	88.7%

*Results are shown per 100 units for each dwelling type. GMSD results only include 2 or more bedrooms in all multi-family dwelling types.

Table 3. Germantown Residential Comparisons with Residential Build-Out by 2028

As shown in Table 3, apartments could hypothetically increase from 6.3% (see Table 1) of the City's residential dwelling types to 16% by 2028. This increase in apartment units also increases their residential demand for City services in both GPD and GFD to 10.2% and 8% respectively. The ratio of GMUSD students coming from apartments with two or more bedrooms has decreased from 48.8 per 100 units (see Table 1) to 24.5 per 100 units. This decrease is due to our deduction that any potential new apartments having a higher average monthly rent and a smaller proportion of two and three bedroom units will be unlikely to produce as many GMUSD students as the existing apartment developments, which are less expensive and have more multiple bedroom units. Another point worthy of mentioning is the exponential growth in the calls for service to age-restricted, independent, and assisted living units by the fire department. By 2028, this dwelling type will not increase from the current 4.5% of the total residential units within the City; however, between the new Avenida age-restricted apartment development and projected call volume increases, the age-restricted, independent, and assisted living dwelling type is forecasted to increase to 30.4% of departmental residential impact.

Introduction

On January 8, 2018, the Germantown, Tennessee Board of Mayor and Alderman instituted an 18-month moratorium on apartment and apartment building developments within the City, temporarily halting both the acceptance of new applications and the processing of applications for apartment and apartment building development in the Smart Code Zoning Districts. Per the resolution, the moratorium did not apply to multi-family applications in the Smart Code Zoning Districts that had already been approved at any stage of the development process by the City, including any of its boards, departments, or commissions. The resolution specifically excluded four developments, known as Thornwood, Watermark, Viridian, and Carter, from the moratorium. However, each of the four proposed development projects were to remain subject to all existing approval requirements of the City.

As stated in Resolution No. 18R03, the purpose of the temporary moratorium was “to allow the City an opportunity to study, research, analyze and/or assess the likely impacts and nature of any future apartment and apartment building development in the Smart Code Zoning Districts, including without limitation and as the City deems appropriate, development and demographic trends, aesthetic qualities, burdens upon and access to City services, resources, schools, infrastructure, utilities, parks, public areas/facilities, and emergency and police services, traffic congestion, public safety, and neighborhood characteristics.” The moratorium was initiated out of local public concern that “comparatively dense developments, such as apartments and apartment buildings, could result in disproportionate impacts on City resources and services (including water, utility, and sewer demands, traffic impacts, schools, public safety demands, etc.) compared to other forms of residential development.”

Scope and Methodology

This report fulfills the basic purpose of the moratorium by studying, researching, and analyzing past experience in order to determine the likely impact future apartment and apartment building development within the Smart Code Zoning Districts will have on City services. The study is arranged into four key areas of concentration:

1. Infrastructure and Transportation Systems
2. Public Safety: Fire and Emergency Medical Services (EMS)
3. Public Safety: Police
4. Germantown Municipal School District (GMSD)

The findings of this report are based on research conducted over the past 18 months, making use of all relevant and available data within each of the key areas of concentration. Although the stated, narrow purpose of the study was to research and analyze the likely impacts of apartments and apartment buildings on City services, our research team expanded the scope of work to present apartment development findings within the greater context of all dwelling categories and of a potential scenario for city-wide residential build-out over the next ten years. By doing so, the City will have a better understanding of how City services may be impacted by all residential development decisions going forward, will be equipped with valuable information to aid in future development decision-making processes, and will be more effective in aligning today's resources with the needs of tomorrow.

Our research team included several members from the City's public works, engineering, planning, and economic development departments who supplied invaluable information regarding zoning and district provisions, the elements of each small area plan, infrastructure studies, and the critical data from existing and proposed development projects. Additionally, several public safety staff members from both fire and

police departments were instrumental in gathering, reviewing, and organizing an extensive amount of incident data for statistical analysis. A point worthy of mention: a number of data analysts who took part in this study are Memphis Lean Six Sigma Institute Certified Lean Six Sigma Black and Green Belts. Their participation on the research team made the application of quantitative analysis techniques possible when applicable, thereby increasing the efficacy of the overall study.

Research Questions

Several questions that guided our research in each of the key areas of concentration included:

Germantown Municipal School District (GMSD). How many GMSD students currently reside in an apartment in Germantown? How does the number of students from apartments compare in relation to the number of GMSD students residing in other residence types, such as single-family homes or condominiums? Based on existing data, are there variables that influence the number of GMSD students coming from apartments? Are we able to estimate the number of GMSD students that will be added to the school system with each proposed apartment development; what will the proposed development's impact be for each individual school; and what could each school's total enrollment be ten years from now when considering the entirety of additional residential development? Which, if any, GMSD schools have capacity issues currently? Will any of the GMSD schools have capacity issues at any point through 2028?

Public Safety: Fire and Emergency Medical Services (EMS). How many Emergency Medical Services (EMS) and Non-Emergency Medical Services (Non-EMS) calls for service has the department historically responded to at each of the existing Germantown apartments? How does the number of calls for service from apartments compare to the number of calls for service to other residence types such as single-family homes or condominiums? Are we able to estimate the number of additional calls for service that will be added to the fire department's call volume with each proposed apartment development; what will the proposed development's impact be for each fire district; and can we estimate each fire district's total residential call volume ten years from now when considering the potential growth in new residential development?

Public Safety: Police. How many incidents has the department historically responded to at each of the existing Germantown apartments? How does the number of incidents from apartments compare to the number of incidents at other residence types, such as single-family homes, or condominiums? Based on existing data, are there variables that influence the number of incidents at apartments? Are we able to estimate the number of additional incidents that will be added to the police department's call volume with each proposed apartment development; what will the proposed development's impact be for each police district; and what will each police district's total residential call volume be ten years from now when considering all projected residential development?

Infrastructure and Transportation Systems. How will additional apartments/apartment building developments impact the City's water distribution, sanitary sewer collection, stormwater conveyance and traffic systems? What infrastructure impact reports, studies, Small Area Plans, etc. were used to inform the infrastructure decisions that were made over the years and that are planned for the future? What infrastructure improvement recommendations were provided in these impact reports, studies, Small Area Plans, etc.? Which of these recommendations have been completed and which ones are outstanding? How have these reports been used to inform infrastructure decisions? How have these reports been updated/modified as development moves forward in the City and are any in need of revisiting?

What is the status of existing City infrastructure in the three key commercial areas where Smart Code currently applies? What improvements have been made to existing City infrastructure over the years that have allowed for the City to accommodate greater development density in the City's three key commercial areas if these areas are developed in accordance with the Smart Code? Who made these improvements and how were these improvements funded? What investments, if any, will the City need to make in order to meet the future impact of additional apartments/apartment building developments if developed in accordance with the Smart Code? What are the main recommendations for policy changes that are needed in order for the City to manage the infrastructure impact?

General Research Methodology

While the moratorium focused solely on the impact apartments and apartment building developments will have on City services, it is also important to understand the impact other residential developments will have on those same services. Projections showing how future residential build-out will affect Smart Code zones, individual school attendance zones, and our public safety districts will aid all City services in planning for the future. Since the apartment analysis also considered the comparable analysis of single-family homes, condominiums, and age-restricted, independent, and assisted living facilities, the data gathered and analyzed was used to project the likely future impact for each of the residential development types mentioned as well.

Gathering of Data

Our research team relied upon the City's own historical data and empirical evidence to forecast the likely future impact for this study. This approach required an analysis of the City's residential development past, present, and future. The initial phases of the study, which lasted several months, were dedicated to planning the scope of the study, developing germane research questions, and then gathering as much data as possible to support the purpose of the study and the team's overall research efforts, including our expanded scope of work. Throughout the research process, our team collected relevant data, when and where it was available, such as the age of residential developments, average rent, and the number of bedrooms per apartment.

Our research team used internally sourced data pertaining to public safety from records management software programs used by the City's public safety departments to record and report incidents, crimes, and emergency calls for service. The GMSD administration made data, such as school enrollment and attendance zoning, available to the team. Also, multiple planning studies pertaining to traffic and infrastructure improvements within the Smart Code Zoning Districts contributed a significant amount of information for this report.

Data Analysis Methods

Using descriptive statistics to summarize the data (i.e. percentages, ratios, and measures of central tendency), correlational statistics to describe the relationship between two or more variables, and inferential statistics to determine our level of confidence in a data sample when a complete data set was unavailable, our research team relied upon a number of statistical techniques to quantify and rationalize the projected impact apartments and other residential dwelling types will have on City services for years to come. Where inferential statistics tests were used, a p-value of 0.05 was considered significant, meaning that there is an extremely low probability that the observation of a difference between two groups or the observation of a relationship between two variables is due to chance. In other words, a finding with a low p-value is one that is noteworthy.

Forecasting

Since the ultimate objective of the study is to determine the likely impact future apartment developments will have on City services, our research team made frequent use of forecasting models throughout the study. A projection is an estimate of future behavior based upon a statistical analysis of past behavior. Projection analysis utilizes the basic theory that the same factors and trends associated with past results will continue to hold true to for future results. Because our research team's ability to gather and measure all relevant variables was limited, and even restricted by law in certain circumstances (i.e. total number and age of occupants by dwelling unit), there were a limited number of variables that could be considered. Even though the data supplied by each of the various departments involved in this study was invaluable and provided insights into the relationships between the types of residences and the utilization of City services, the limitations affected the strength and precision of any projections.

Where possible, a general linear model was used so that the simultaneous effects of multiple variables including continuous and discrete variables could be incorporated into the analysis. For example, discrete variables included the dwelling category (apartment, condominium, single-family home, and assisted living), and the specific apartment, condominium, or assisted living facility. The continuous measurements included variables like the volume of calls for service, total call rates, the number of units in each dwelling category or specific development, and the year of the observed data. The general linear model enables the detection of significant differences, if there are any, between the discrete variables and the changes over time. The general linear model assesses repeated measures data by conducting all pairwise comparisons when there are more than two groups or levels for comparison. The p-value resulting from the analysis was used to determine a statistically significant finding, with a p-value at or below 0.05 considered to be significant.

Utilization Metrics

Three of the four key areas of concentration use forecasting models with differentiating impact measures, using "per unit" or "per 100 unit" ratios to describe the change in service utilization as the population changes. For example, the average number of GMSD students per apartment or the average annual number of EMS and Non-EMS calls for service per single-family home were used for the purposes of comparison among existing residential dwelling unit types. This study uses utilization metrics to understand the impact that existing residential dwelling units have on City services; projects the impact those existing units will have in coming years; and then projects the impact that potential, new residential development, including future apartments and apartment buildings, will have on City services through 2028.

Districts, Zones, and City-wide Impact

As stated previously, the expanded scope of this study seeks to understand how future apartment and apartment buildings will impact City services within the greater context of a potential, aggressive residential build-out through 2028. Because three of the four key areas of concentration strategically divide their services by capacity into zones and districts, our research team's approach to analyzing the impact of future apartments and other residential dwelling units was to consider the impact by respective zone or district within the City. For example, the number of students projected to come from the Thornwood apartment development will have a direct impact on Farmington Elementary School, Houston Middle School, and Houston High School because the location of the development is within each of their attendance zones. Furthermore, the same Thornwood apartment development will have a direct impact on Fire District #3 and Police District #5, given its location within the City. Because zone and district lines can be redrawn, each section that includes statistical analysis concludes with a city-wide, comprehensive impact analysis to assess the likely overall impact to the respective City service provider (i.e. GMSD, public safety departments).

Categorizing Future Development

A total of 60 properties were identified throughout the City for the potential of new residential development. These properties were identified using City development project files, the City's GIS database and Shelby County's Register of Deeds website. For projection purposes, only properties currently zoned to allow residential development were taken into consideration. Each of these properties were analyzed based on its current zoning designation or by using an existing, approved small area plan in designated areas of the City. These properties were then assigned to one of following three categories below to ascertain the timing and likelihood of a residential development project occurring at that location:

A. Developments in Process

Developments in Process are residential development projects that have been granted some level of development approval by the City of Germantown. Projects in this category may or may not already be under construction but are generally anticipated to commence with construction within the next three years. The maximum number of units listed for each property is the total amount of units or lots proposed and/or approved for that specific project, regardless of the current zoning designation, on the subject property.

B. Underdeveloped Properties

Underdeveloped Properties are those which have not been developed to their maximum capacity, per their current zoning designation. To be clear, no applications to redevelop these properties have been filed and there were no approved development plans at the time the moratorium was enacted. Properties in this category were included for development/redevelopment in the next three to ten years to assist in providing a maximum potential number of units/lots that could be proposed for development on that particular property based on its current zoning designation, if the property were to redevelop. For the purposes of this study, properties in the following zoning districts (currently vacant or with one dwelling unit/house) were considered underdeveloped:

- "R", "R-1," and "R-2" Single-Family Residential, "R-3" Two-Family Residential and "R-T" Residential Townhouse, which are 4 acres or greater. (Four acres is typically the minimum property area needed for a new housing development in these zoning districts, given the necessary infrastructure improvements that would have to be made to accommodate the project.)
- "RE" and "RE-1" Residential Estate, and "AG" Agricultural, which are 12 acres or greater. (Twelve acres is typically the minimum property area needed for a new housing development in these zoning districts, given the necessary infrastructure improvements that would have to be made to accommodate the project.)
- "T4" General Urban, "T5" Urban Center, "T6" Urban Core properties that are either vacant or are currently developed but have an adopted small area plan projecting future residential development.

Our research team has taken an aggressive residential build-out approach by planning for and including additional residential development at each of these locations by 2028. This was completed primarily to aid the City in better understanding the maximum potential impact on City services based on current zoning provisions. The actual timing of when projects within this category will be developed/redeveloped, if ever, is to be determined and subject to the property owner's discretion.

C. Unlikely to be Developed

While some properties listed in this category may fit the criteria for an underdeveloped property (i.e. a single-family lot zoned “RE-1” with one house that is greater than 12 acres), there are constraints on the property that make it unlikely to redevelop. Some examples of typical constraints are: family farm trust, severe drainage problems, semi-public land, and developed estate.

Key Commercial Areas

The City of Germantown has five major commercial centers that include a mix of uses: the Central Business District (CBD), West Poplar Gateway, East Poplar Gateway, Forest Hill Heights, and the Wolf River Medical District. Previously known as strategic nodes in the 2012/13 Economic Development Strategic Plan, the term “Key Commercial Area” was first used in the Germantown Forward 2030 Strategic Plan to describe major centers of activity within the City. Three of the five key commercial areas, the Central Business District, the West Poplar Gateway, and Forest Hill Heights, currently have Small Area Planning overlays which guide all future development within these centers of activity. Making use of the Smart Growth approach to community and economic development, these three activity centers encourage a mix of commercial and residential uses within each of these strategic areas. Through a number of ordinances, collectively referred to as the “Smart Code,” the strategic land use concepts and design features are implemented with each new proposed, approved, and constructed development or redevelopment.

Existing Residential Dwelling Unit Types

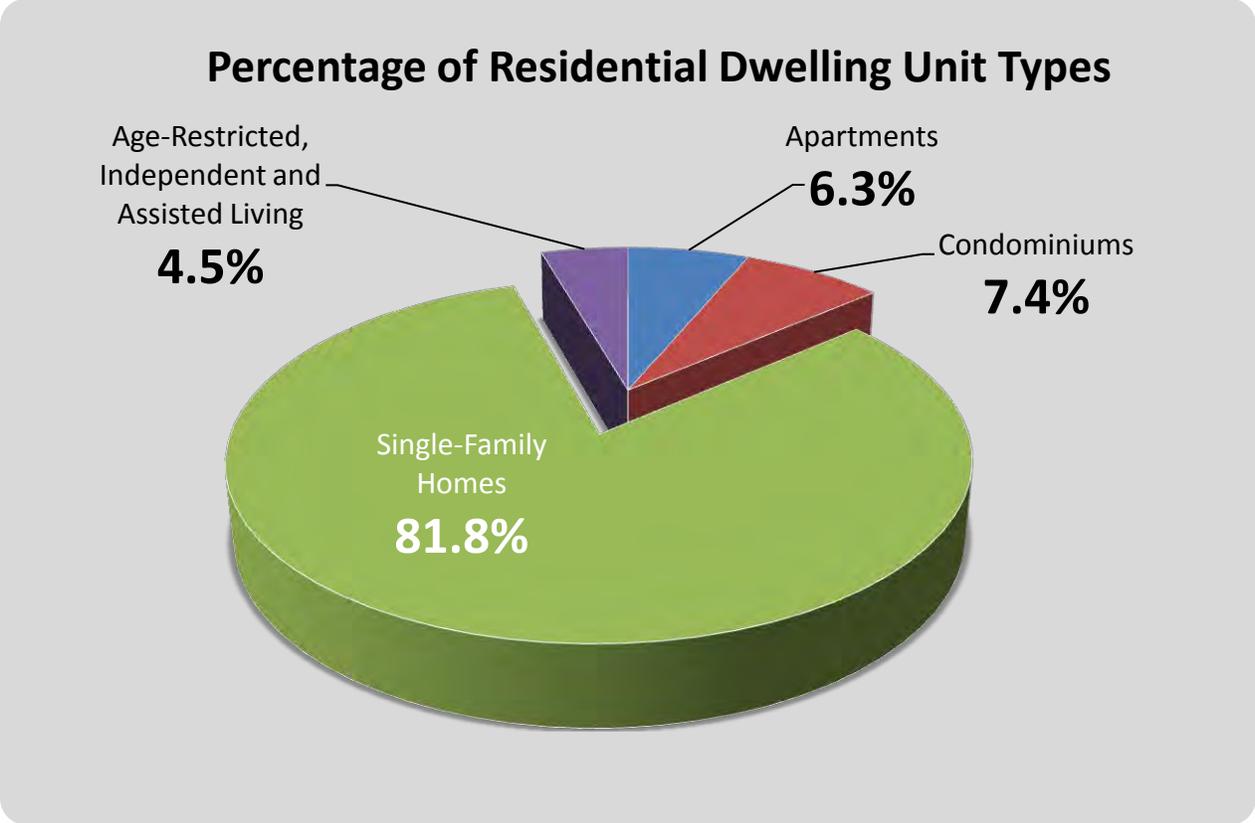
As of December of 2018, the total number of residential dwelling units in the City of Germantown was 16,081. This number includes all single-family homes, condominiums, apartments, and age-restricted, independent, and assisted living units. Table 1 below provides a breakdown of the number of units by residential dwelling type.

Residential Dwelling Unit Type	Number of Units
Apartments	1,014
Condominiums	1,198
Single Family Homes	13,148
Age-Restricted, Independent and Assisted Living	721
Total	16,081

Table 1. Residential Dwelling Unit Count in Germantown as of 12/2018

As shown in Figure 1, nearly 82% of all residences in the City are stand-alone, single-family home properties that do not share a common wall or a roof with any other dwelling unit; built on their own parcels of land; and have their own private and direct access to a street or thoroughfare. Condominiums, which account for 7.4% of dwelling units in the City, are multi-unit buildings that are individually-owned. Leased or rented apartment units within multi-unit buildings in Germantown account for 6.3% of all residential dwelling units in the City. Age-restricted, independent, and assisted living units are typically located within multi-unit complexes and buildings that provide housing for individuals age 55 and over. 4.5% of all residential dwelling units in Germantown are designated for senior living.

Figure 1. Percentage of Residential Dwelling Unit Types in Germantown



Existing Single-Family Homes

Early in the City’s history, Germantown was established as a bedroom community made up primarily of single-family homes. As shown in Figure 1, this trend continues today as 82% of Germantown dwelling units are classified as a single-family home.

Existing Apartment Developments

Since 1999, Germantown has had five apartment developments located within the City borders. With a total of 1,014 apartment units in the City, 6.3% of the all residential dwelling units in Germantown are apartments. As shown in Figure 2, these apartments are primarily clustered in the northwestern region of the City. The oldest apartment, Farmington Gates, was built in 1973 and Westminster was constructed one year later. The Retreat, The Bridges, and The Vineyards were all built in a four-year period between 1995 and 1999. Table 2 provides a summary of the average rents, assigned school zones, and public safety districts for each existing apartment development.

Apartment	Year Built	Total Units	Average Unit Rent	Public Safety		GMSD		
				Police District	Fire District	Elementary	Middle	High
Bridges	1996	252	\$1,400.85	1	3	Riverdale	Riverdale	Houston
Farmington Gates	1973	182	\$1,073.48	3	3	Farmington	Houston	Houston
Retreat	1995	280	\$1,447.31	3	3	Farmington	Houston	Houston
Vineyards	1999	200	\$1,270.60	1	3	Riverdale	Riverdale	Houston
Westminster	1974	100	\$1,141.50	1	3	Riverdale	Riverdale	Houston

Table 2. Listing of Existing Apartment Developments in Germantown

The Bridges at Germantown

7491 Wyndhurst Place, Germantown, TN 38138



- Built in 1996
- 27.68 acres fronting Wolf River Blvd.
- Average Unit Rent: \$1,400.85
- Average 2+ Bed Unit Rent: \$1,515.33
- 84 one-bedroom units
- 128 two-bedroom units
- 40 three-bedroom units
- 252 total dwelling units

Farmington Gates

2216 Brierbrook Road, Germantown, TN 38138



- Built in 1973
- 10.87 acres fronting Poplar Ave.
- Average Unit Rent: \$1,073.48
- Average 2+ Bed Unit Rent: \$1,177.58
- 44 one-bedroom units
- 102 two-bedroom units
- 36 three-bedroom units
- 182 total dwelling units

The Retreat at Germantown

7865 Grove Ct. West, Germantown, TN 38138



- Built in 1995
- 42.11 acres fronting Germantown Road
- Average Unit Rent: \$1,447.31
- Average 2+ Bed Unit Rent: \$1,607.94
- 108 one-bedroom units
- 108 two-bedroom units
- 64 three-bedroom units
- 280 total dwelling units

The Vineyards

7109 Vineyard Way, Germantown, TN 38138



- Built in 1999
- 27.21 acres fronting Wolf River Blvd.
- Average Unit Rent: \$1,270.60
- Average 2+ Bed Unit Rent: \$1,446.00
- 84 one-bedroom units
- 84 two-bedroom units
- 32 three-bedroom units
- 200 total dwelling units

Westminster Townhomes

6755 Poplar Avenue, Germantown, TN 38138



- Built in 1974
- 8.21 acres fronting Poplar Ave.
- Average Unit Rent: \$1,141.50
- Average 2+ Bed Unit Rent: \$1,141.50
- 30 two-bedroom units
- 70 three-bedroom units
- 100 total dwelling units

Existing Condominiums

There are 17 condominium developments in Germantown with 1,198 total units. West Rock, the oldest condominium at present, was originally constructed as apartments 1971 and converted to condominiums in 2005. Bavarian Village, Greenleaf, and Kimbrough Forest condominiums were the first developments built as condominiums in Germantown beginning in 1973. The last condominium development in Germantown took place in 1998.

Condominium	Year Built	Total Units	Public Safety		GMSD		
			Police District	Fire District	Elementary	Middle	High
Allenby Green	1982	30	3	3	Farmington	Houston	Houston
Bavarian Village	1973	76	1	3	Farmington	Houston	Houston
Farmington Blvd Townhomes	1998	8	3	3	Farmington	Houston	Houston
Farmington Glen	1980	67	3	3	Farmington	Houston	Houston
Fountain Square	1980	275	1	3	Riverdale	Riverdale	Houston
Galway Green	1987	42	3	3	Farmington	Houston	Houston
Greenleaf Condo	1973	54	2	1	Riverdale	Riverdale	Houston
Hobbits Glen	1974	93	3	3	Farmington	Houston	Houston
Kimbrough Farm	1981	7	3	3	Farmington	Houston	Houston
Kimbrough Forest	1973	72	3	3	Farmington	Houston	Houston
Kimbrough Green	1981	24	3	3	Farmington	Houston	Houston
Kimbrough Park	1983	44	3	3	Farmington	Houston	Houston
Park Place	1983	24	3	2	Farmington	Houston	Houston
Riverdale Farms	1974	82	1	3	Farmington	Houston	Houston
West Rock	1971	140	3	3	Farmington	Houston	Houston
Wicklow Way	1982	72	3	3	Farmington	Houston	Houston
Woodshire Townhomes	1976	88	3	3	Farmington	Houston	Houston

Table 3. Listing of Existing Condominium Developments in Germantown



Existing Age-Restricted, Independent and Assisted Living

At present, there are five age-restricted, independent, and assisted living developments operating within Germantown with a total of 721 units. In 2000, the 50 units at Brookdale-Poplar were the first senior-living dwelling units in the community. Five years later, the Village at Germantown and the Germantown Plantation opened with approximately 350 more dwelling units. In 2010, the Gardens of Germantown opened; near the end of 2012, Brookdale-Dogwood Creek (formally Solana) opened; and in 2016 and 2017, the Villages of Germantown opened new phases of their existing complex.



Brookdale-Poplar



Gardens of Germantown



Germantown Plantation

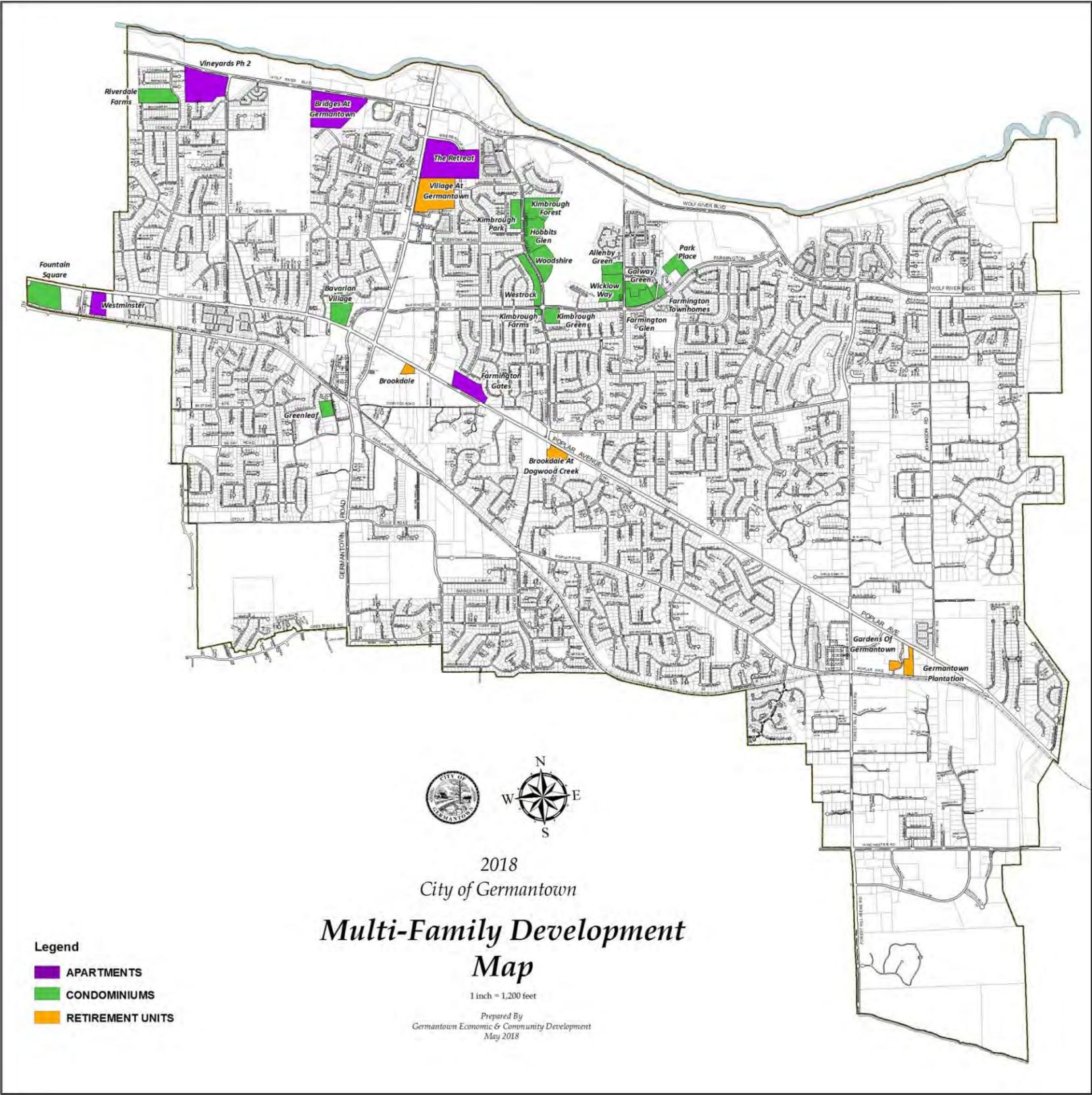


The Village at Germantown



Brookdale - Dogwood Creek

Figure 2. Multi-family Residential Development Map 2019



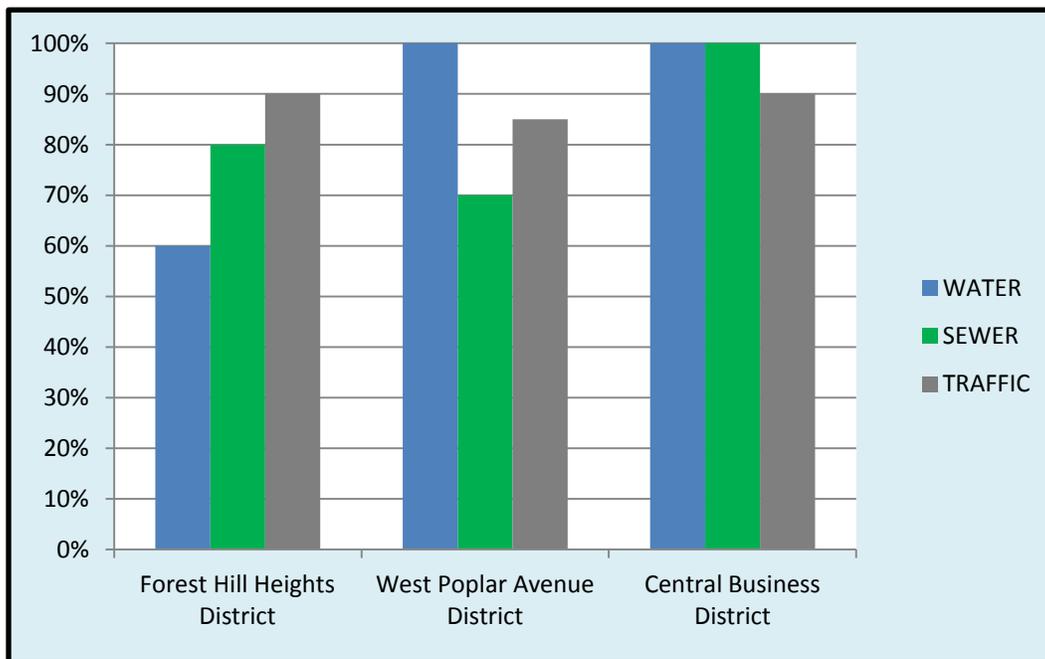
INFRASTRUCTURE IMPACT ANALYSIS



Project Scope

The purpose of this report is to provide an analysis of how both previous and future development has impacted and will impact the City of Germantown’s infrastructure and transportation systems in the three Key Commercial Areas (Central Business District, West Poplar Avenue District, and Forest Hill Heights District), and how the City has endeavored to mitigate this impact. Due to the conservative approach in how each district small area plan was formed, the greatest amount of infrastructure impact has been evaluated and mitigated for each of the three Key Commercial Areas. Through strategic planning and thoughtful design, Public Works, Engineering, Planning, and Economic Development have been able to meet both the present and future infrastructure needs of our residential and commercial areas. In order to continue superior service levels while also anticipating future impact from increased development density, infrastructure improvements such as upsizing main lines, increasing flow pressures by installing additional lift stations, widening roads, and installing new traffic control signals, have been planned and/or completed for all three Key Commercial Areas.

Figure 1: Percentage of Infrastructure Complete to Accommodate Development Impact



As you can see from Figure 1 above, Public Works, Engineering, Planning, and Economic Development have planned and implemented infrastructure upgrades in each of the subject areas to accommodate the residential and commercial developmental impact. This report will address all of these upgrades and more in detail for each Key Commercial Area.

Background

In order to provide a clear picture of the infrastructure improvements that have been completed and are planned for the three Key Commercial Areas discussed in this report, a brief background of how each Key Commercial Area was created and the regulations (Smart Code) that apply to them is needed. This provides the strategy and framework for how infrastructure decisions have been made over the past decade.

Smart Growth and the Smart Code

Beginning in the summer of 2006 and continuing through early 2007, citizens, business and property owners, elected officials, and City staff collaborated with planners and designers from The Lawrence Group, Rose & Associates, Southeast, Inc., Henson-Harrington, Inc., and Kimley-Horn & Associates, Inc. (KHA) to develop a plan for Germantown, Tennessee's 400-acre commercial core, also known as the City's Central Business District. The City commissioned the effort in fulfillment of Goal 7 of the Germantown Vision 2020 Plan: the Redevelopment of the Heart of Germantown. The Vision 2020 objectives called for mixed-use development, strong commercial services interspersed with residential uses in a pedestrian-friendly environment that would create "a sense of place" for the community - all characteristics of land use planning and design called Smart Growth. The plan was also part of the City's effort to continue to grow economically in a sustainable way.

Smart Growth principles aim to improve quality of life and community through: more common open space and public space within new and re-development projects; improving walkability/bikeability and convenience to buildings/destinations that have connectivity to the City's tree-lined sidewalks, streets, and neighborhoods which are placed within closer proximity of each other; minimizing parking fields instead of making them the site's primary visual element; and emphasizing placemaking/quality of place over allowing a site to be developed with the most convenient/inexpensive method. Furthermore, the Smart Growth approach promotes additional tax revenue over traditional development (and therefore more revenue for vital City services and amenities) because it yields more taxable area on the property, and in many cases, may also produce sales tax revenue depending on the use. Finally, from an infrastructure standpoint, Smart Growth can be more efficient by utilizing infrastructure located in one location for *multiple uses on one site* compared to providing infrastructure for *multiple uses on multiple sites* with traditional development.

In September 2006, the community participated in a seven-day public design workshop called a "charrette" to establish the community vision and develop the plan's primary recommendations. The plan established a design concept for future land use and redevelopment in the plan area over the next 20 years. The concept plan included nearly 2.5 million square feet of new commercial and mixed-use development and 1,200 housing units, more than double the amount of development in the plan area at the time of the study.

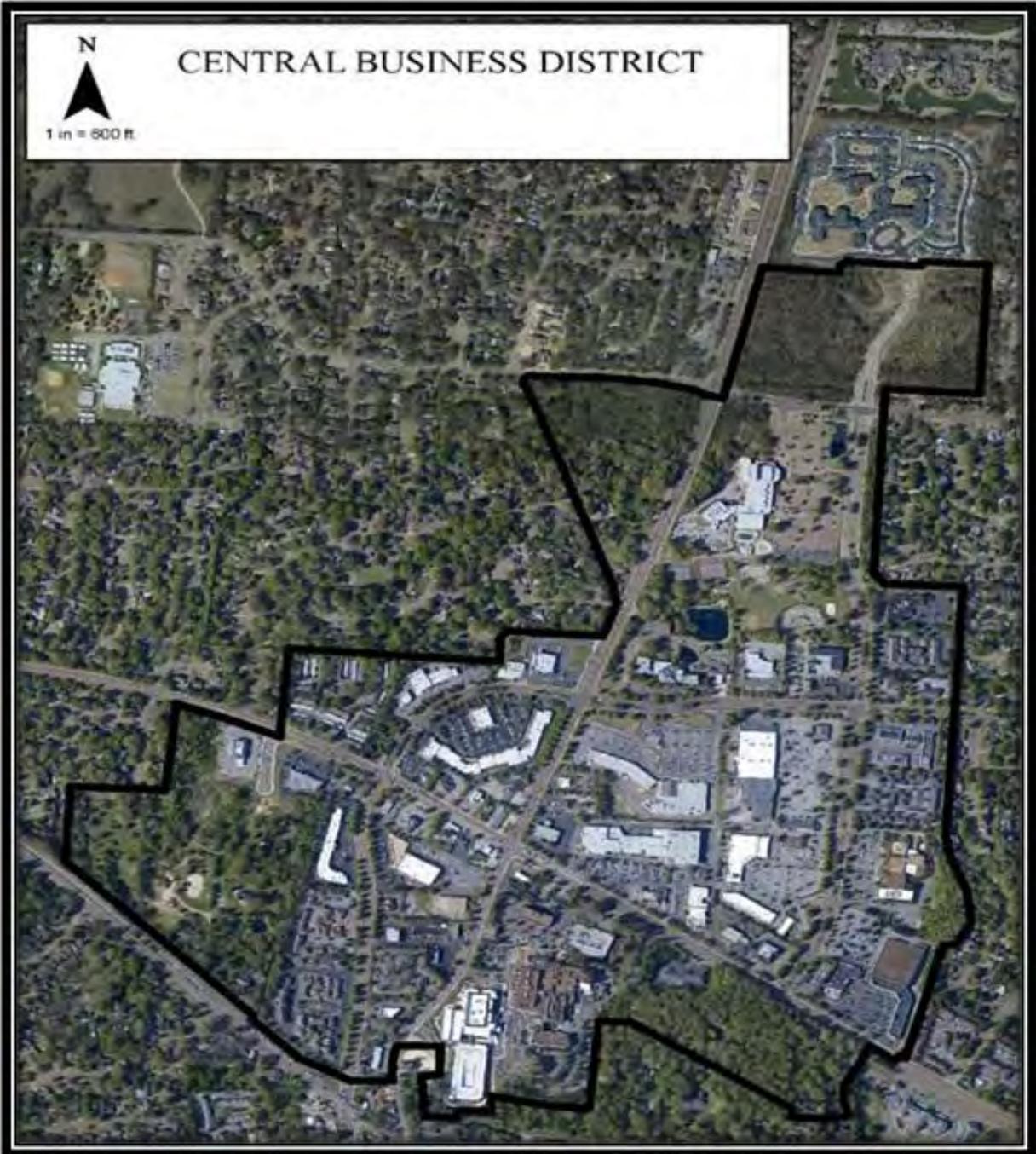
The plan included design schemes that sought to create viable mixed-use development, but also to respect the surrounding neighborhoods, provide open space, and to create unique mixed-use environments that are not currently available in the Germantown area. Finally, the concept plan proposed a number of smaller scale infill and redevelopment opportunities in the study area.

As a companion document to this plan, a Smart Growth and design-based development code called the Smart Code was created for the plan area and was adopted by the City in August 2007. The Smart Code served as the new development standard to ensure the community's vision for future land use and infrastructure laid out in the Smart Code was achieved. The Central Business District Small Area Plan was Germantown's land use and transportation policy and strategy plan for directing future development and infrastructure investment decisions within this 400-acre core. The process of conducting a Small Area Plan and applying the Smart Code to the final planning product was then repeated to establish the West Poplar Avenue District and Forest Hill Heights District. This report will address these Key Commercial Areas in the order in which they were accepted by the City and the infrastructure determinations that have been made with each.

Central Business District

The first Key Commercial Area that this report covers, which was also the first area where the Smart Code was applied, is the Central Business District (CBD) (see Figure 2 below). The CBD is the main hub for commercial development in the City of Germantown. This District spans from present day Thornwood (northeast), to Whole Foods (southeast), and to Saddle Creek (west and southwest).

Figure 2. Central Business District Map



The following paragraphs explain how Public Works, Engineering, Planning, and Economic Development have addressed infrastructure impacts stemming from greater development density in this area over the past decade. The direct infrastructure impact from additional apartment dwellings was incorporated into the Small Area Plan for this area by applying a development model that would yield the greatest impact in accordance with the Smart Code.

Water and Sanitary Sewer Analysis

Over the past decade, Public Works has received several utility impact reports from both private developers requesting to develop property in this area as well as public studies that were completed by private consulting firms in regards to the utility impact stemming from commercial and residential growth. Water distribution and sanitary sewer collection services have been upgraded as the developments in this predominantly commercial area have been constructed. Developers have shouldered the financial burden of upgrading these utilities internal to their specific developments, and Public Works has strategically planned to provide superior water distribution and sanitary sewer collection services by upsizing main lines and constructing lift stations in possible growth areas as there was need. This has allowed developments in this area to move forward with minimal disturbance to existing customer's utility services. As developments in this area have been constructed over the years, the City has endeavored to recoup the cost of these public infrastructure improvements by receiving funds from the developer for their share of the impacted public infrastructure through the signing of their development contract with the City.

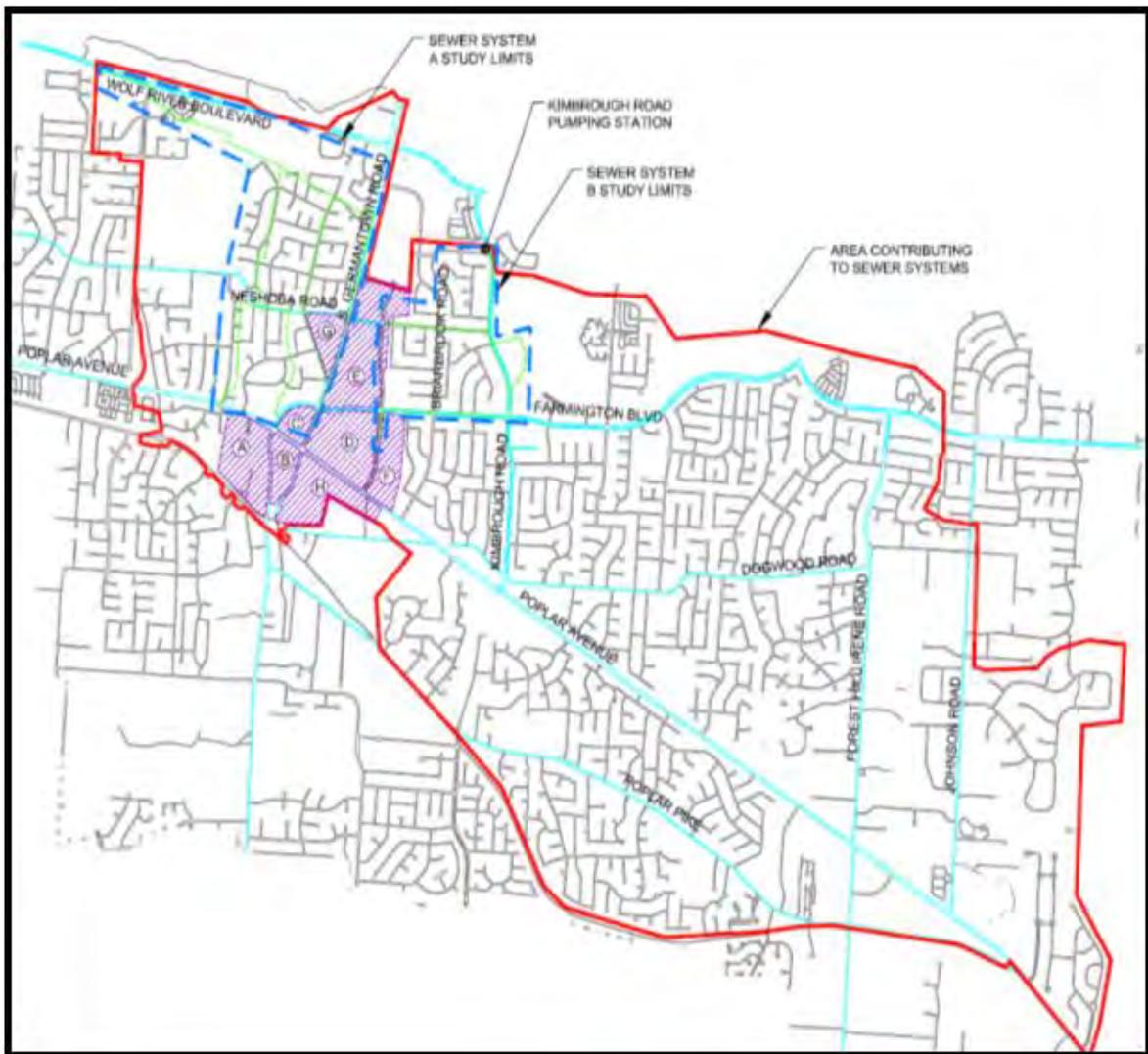
Water Distribution System

The main infrastructure improvements to the water distribution system for the CBD over the past decade have been performed by private developers with the upsizing of mains that are internal to or predominantly serve their developments. The public infrastructure surrounding these developments is adequate for serving this predominantly commercial area for the foreseeable future given that the system has been designed to sustain the greatest level of developmental impact for this area in accordance with the Smart Code. As has been the common practice of the City, future development (including multi-family residential) that necessitates an upgrade to the water distribution system has been/will be the responsibility of the developer.

Sanitary Sewer Collection System

In response to the approval of the Smart Code, the City endeavored to conduct a sanitary sewer evaluation of the public infrastructure in this area. Allen & Hoshall, Inc. (A & H) was hired as the City's consultant to conduct this study in June of 2008. The evaluation studied two of the main sewer system basins in this area and required improvements in both basins. Both basins are displayed in Figure 3 on the following page as Sewer System A and B. In Sewer System A, the recommended course of action consisted of constructing a new bypass sanitary sewer along a stretch of Miller Farms Road and upsizing the sewer main line. The estimated cost for these improvements was \$3,300,000. Design of the sanitary sewer bypass main was completed in 2010-2011 and construction was completed in March of 2012 for the budgeted amount. In Sewer System B, the recommended improvements included the construction of a new pumping station and force main. The estimated costs for these improvements were approximately \$767,300. Design and construction of the sewer pumping station was completed in 2012 for \$765,000. With these improvements additional sanitary sewer capacity has been provided that not only safeguards the service of existing customers, but should also fulfill the needs of future customers as well. Since the recommended sanitary sewer and water distribution improvements have already been designed and constructed in this area to serve the greatest level of allowable development, Public Works has no existing water and sanitary sewer infrastructure concerns for the CBD.

Figure 3: Central Business District Sanitary Sewer Basin Map



Traffic Analysis

Engineering, Planning, and Economic Development have endeavored to mitigate the impact of future development to the City's existing transportation systems by forecasting and planning for anticipated traffic impacts to the Central Business District. Over the years, funding has been budgeted to hire consultant engineering firms to study specific areas throughout the City, and to keep a traffic consultant on retainer for less detailed traffic analyses. This has allowed the City to anticipate future traffic needs as they develop and make infrastructure improvements as necessary.

Traffic Analysis Scope/Study

Kimley-Horn and Associates, Inc. (KHA) was contracted to perform a traffic analysis of the CBD in 2007 and provided an updated analysis in 2010. The study area is shown within the boundary of Figure 4 on the following page. In developing the traffic analysis, specific recommendations were taken into consideration from the 2007 Small Area Plan for increasing the efficiency and the walkability of the transportation network. The plan also included recommendations for new cross-sections for Exeter Road, Germantown Road, Poplar Avenue, and Farmington Boulevard to make them safer, more attractive, and

more pedestrian-friendly. As developments within the CBD are completed, they are added to the analysis model in order to maintain an up-to-date (up-to-development) level of analysis.

The purpose of the CBD Small Area Plan Traffic Study was to evaluate the ability of the planned roadway system to accommodate future traffic volumes upon ultimate build-out of the Smart Growth Area in accordance with the adopted Smart Growth Plan and Smart Code. This conservative approach planned for the greatest level of traffic impact to this area as it is developed in accordance with the Smart Code. The Study also identified capacity and intersection operational deficiencies in the study area, and proposed recommendations for improvements to mitigate anticipated traffic congestion resulting from redevelopment within this Key Commercial Area.

As a part of this study, a sub-area travel demand model and a set of traffic simulation models were developed to forecast traffic in future years and to analyze intersection operations based on the land use proposed by the CBD Small Area Plan. Traffic volumes for full build-out of the area were forecasted using these models. Deficiencies at both corridor and intersection operation levels were analyzed.

Figure 4: Central Business District Traffic Study Boundary Map



Recommended improvements were developed at the intersection level based on the operational deficiencies identified. Recommended intersection improvements were grouped into two priority sets based on their cost and ease of implementation. Corridor capacity improvements were also identified based on the capacity deficiencies. Opinions of probable construction costs for each improvement were developed. Implementation strategies for the identified improvements were also explored. These recommendations and the resulting status from these recommendations are shown in Table 1.

Assumptions made in the baseline scenario were also used for the full build-out scenario. In addition, new roadways conceptualized in the CBD Small Area Plan were included.

Traffic Analysis Results/Recommendations

TRAFFIC ANALYSIS RESULTS/RECOMMENDATIONS			
Location	Type	Recommendations	Status
Germantown Rd and Poplar Pike/St George Dr	Intersection (Priority 1)	<ul style="list-style-type: none"> Restripe WB to add a RT lane. Add “RL-Must Turn Right” sign. Add RT signal head for WB and overlap WBR with SBL. 	Completed in FY13 Enhanced in FY17 as Part of Old Germantown Streetscape
Poplar Pike and Germantown Road/Arthur Rd	Intersection (Priority 1)	<ul style="list-style-type: none"> Restripe WB to single through lane and a RT-Only lane. Add advance lane control sign and “RL Must Turn Right” sign Add RT signal head for WB and overlap WBR with SBL. 	CIP FY19-20
Germantown Rd and Poplar Pike/St George Dr	Intersection (Priority 2)	<ul style="list-style-type: none"> Add double LT lanes for SB 	CIP FY19-20
Germantown Rd and Wolf River Blvd	Intersection (Priority 2)	<ul style="list-style-type: none"> Add double LT lanes for SB Add double RT lanes for WB 	CIP FY19
Germantown Rd	Corridor	<ul style="list-style-type: none"> Monitor the corridor traffic patterns from Poplar Ave to Wolf River Blvd 	Future CIP TBD
Poplar Ave	Corridor	<ul style="list-style-type: none"> Monitor the corridor traffic patterns from Miller Farm Rd to Exeter Rd 	Future CIP TBD

Table 1: Central Business District Traffic Analysis Results/Recommendations

Intersection/Corridor Improvement Recommendations

- Under-utilized through lanes may be converted to exclusive right turn lanes, such as at Poplar Ave and West St and Poplar Pike and West St / Arthur Rd.
- For the intersection of Germantown Road and Poplar Pike, pavement width on the westbound approach is wide enough to be restriped with an additional right turn lane.
- Improvements in Priority 1 will help the traffic operations as soon as they are implemented, thus can be implemented as soon as the City makes funding available.
- Priority 2 intersection improvements require roadway construction to add turn lanes and would result in right-of-way acquisition. Higher cost intersection improvements recommended as Priority 2 could be implemented as redevelopment of adjacent property occurs. For intersections outside the Smart Growth Area, the improvements should be made as the majority of the redevelopment activity occurs.
- The corridor capacity improvement solutions require significant funding commitments. Therefore, the City may want to consider requesting some or all of these projects be added to the MPO's Long Range Transportation Plan so that they will be eligible for federal funding.

It must be emphasized that this study and the resulting recommendations are not static. Although included, since the study took place, projects such as the Wolf River Boulevard extension from Kimbrough Road to Farmington Boulevard and the Poplar Avenue widening to 6-lanes from Kirby Road to Dogwood Road have been completed. As the redevelopment activities in this Key Commercial Area continue to occur, the actual implementation of each tract is likely to deviate from the conceptual plan. There will be changes and exceptions to the CBD Small Area Plan and Smart Code that merit consideration. Because the transportation system and the land use must be compatible, it is imperative that the transportation impacts of those land use changes be considered before the decisions are made to accept these land use changes and exceptions. KHA developed the evaluation framework and models in this project in a manner to take this uncertainty into consideration in order to ease the evaluation of alternative land use scenarios. The main objective of the automation and integration of the models is to make the subsequent analyses more efficient with less repeated and manual adjustment effort. Although the study assumed full build-out for the CBD, the demographic and economic characteristics for the rest of the City and the region could deviate from the study.

Traffic Capital Improvement Projects (CIPs) FY19-20

Fiscal Year (FY) 19-20: Wolf River Boulevard/Germantown Road Improvements (\$7,000,000)

Project involves additional lanes to increase capacity and safety of the intersection.

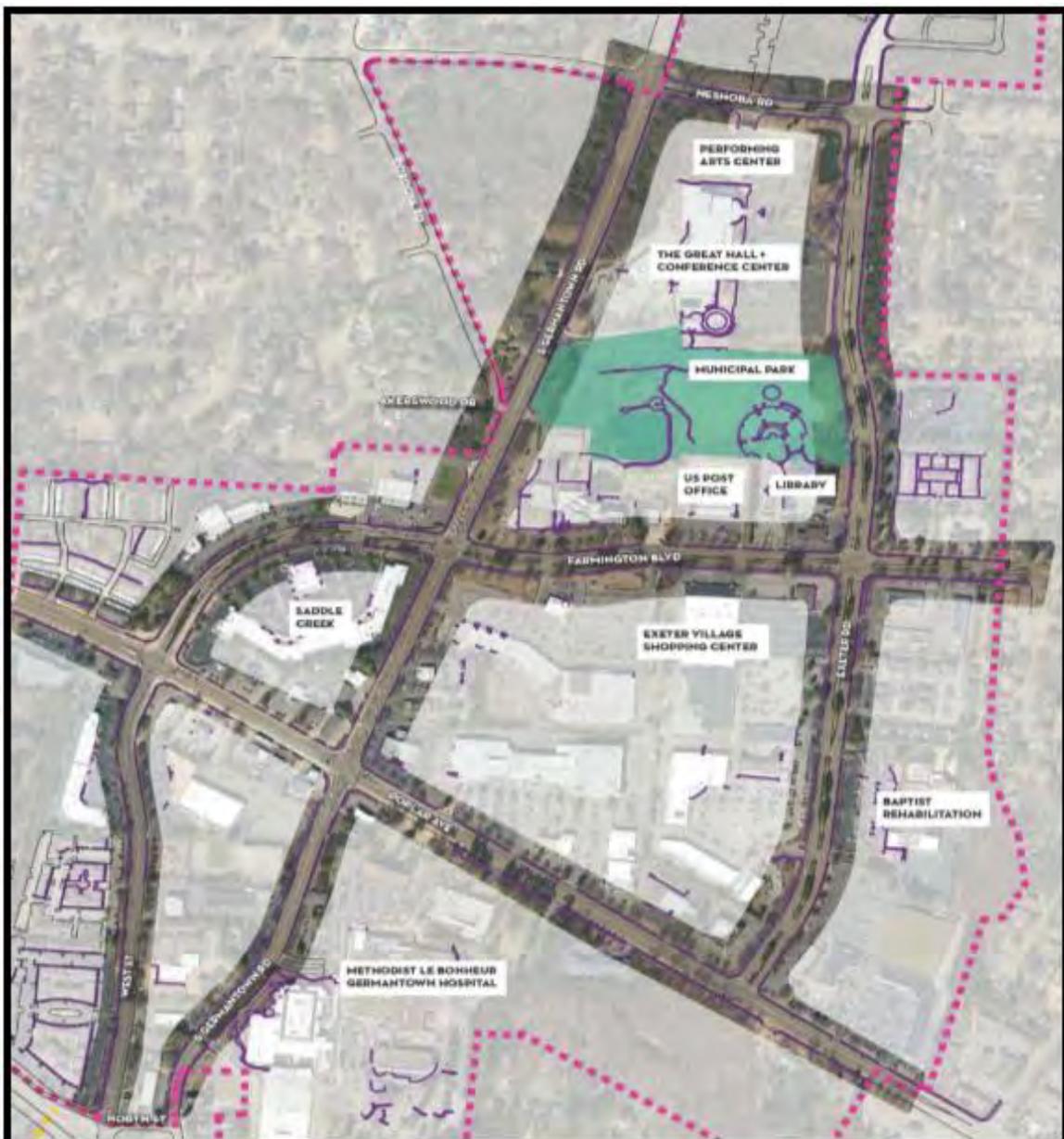
Bicycle and Pedestrian Analysis

In order to promote health and accommodate the growing number of cyclists and pedestrians in the City of Germantown, City Elected Officials and City Staff have created initiatives, projects, and groups to research and formulate a plan for addressing bicycle and pedestrian infrastructure needs throughout the City. This concerted effort by City Officials and City Staff to address bicycle and pedestrian needs has resulted in the expansion and improvement of bicycle and pedestrian facilities. This means ensuring that a network of infrastructure is in place to make bicycling or walking viable modes of travel. It also means ensuring that the infrastructure is safe and comfortable to use. Although the improvements that have been/will be constructed were not considered with the specific impact of future apartment developments in mind, the planned bicycle and pedestrian infrastructure improvements should accommodate the

greatest level of development activity in public rights of way within the three Key Commercial Areas designated in this report.

There have been several bicycle and pedestrian improvements that are at different stages within the design/construction/implementation process in the CBD that stem from the recommendations of City Officials, City Staff, and other bicycle/pedestrian initiatives driven by Capital Improvement Projects. By way of a FY17 Capital Improvement Project, the City hired consultants to study and provide a Streetscape Plan for the CBD and Old Germantown Area. This plan intended to rebalance the streets within the heart of Germantown to better facilitate the movement of people, and not just cars. The consultant set out to accomplish this goal by removing barriers to pedestrian and bicycle travel, while maintaining an appropriate level of vehicular mobility. The guidelines developed in this plan provided design guidance and specificity to the ideas originally proposed in Germantown's Smart Growth Plan (2007). Figure 5 indicates the CBD Area of study for the developed Streetscape Plan.

Figure 5: Central Business District Streetscape Plan Study Area



This plan focused on transportation infrastructure improvements to the major thoroughfares within the CBD. Recommendations were made for the following main routes: Exeter Road, Farmington Boulevard, Neshoba Road, Poplar Avenue, South Germantown Road, and a small portion of West Street. Some of these recommended improvements within this Key Commercial Area have been constructed, some are still being designed, and some are awaiting design completion and/or budget allocation for design before moving forward. These recommended improvements and their current status are denoted below along with the current status of bicycle/pedestrian infrastructure improvements that were initiated by City Officials and City Staff groups.

CBD BICYCLE & PEDESTRIAN INFRASTRUCTURE IMPROVEMENTS

Improvement	Location	Status	Recommending Body
Zagster Bike Share Program Improvements	Germantown Athletic Club	Construction Complete	Parks and Recreation Commission Parks Master Plan Parks and Recreation Department
Pedestrian Pathway	Exeter Road to Library through the Library Garden	Construction Complete	Beautification Commission Germantown Garden Club
Bicycle Lanes	Along Exeter Rd from Neshoba Road to Farmington Boulevard	Design	Bike/Pedestrian/Walkability Task Force
Expanded Median Pedestrian Walkways Benches and Lighting On-Street Parking	Exeter Road	TBD	Streetscape Plan
Protected Bike Lane Pedestrian Walkways Pedestrian Crossings On-Street Parking	Farmington Boulevard	TBD	Streetscape Plan
Protected Bike Lanes Pedestrian Refuge Islands	Neshoba Road	TBD	Streetscape Plan
On-Street Parking Shared Use Path Protected Walkway	South Germantown Road	TBD	Streetscape Plan
Pedestrian Refuge Islands Intermittent Medians Expanded Sidewalks	Poplar Avenue	TBD	Streetscape Plan
Sidewalk Separation Pedestrian Refuge Islands	West Street	TBD	Streetscape Plan

Table 2: Central Business District Bicycle & Pedestrian Improvements

Stormwater Analysis

There are currently no stormwater infrastructure issues in the CBD from a volume standpoint. There are several areas of existing stormwater infrastructure that need to be reviewed and inspected due to potential structural concerns. The City's development policy requires that new developments release stormwater into the storm drainage system at the same rate or lower than the current development's stormwater release rate. The policy ensures that the existing stormwater infrastructure operates as designed regardless of the type, or density, of future developments. These new developments will primarily utilize underground detention systems, since this method preserves the development potential at the ground level.

Apartment Impact

Central Business District

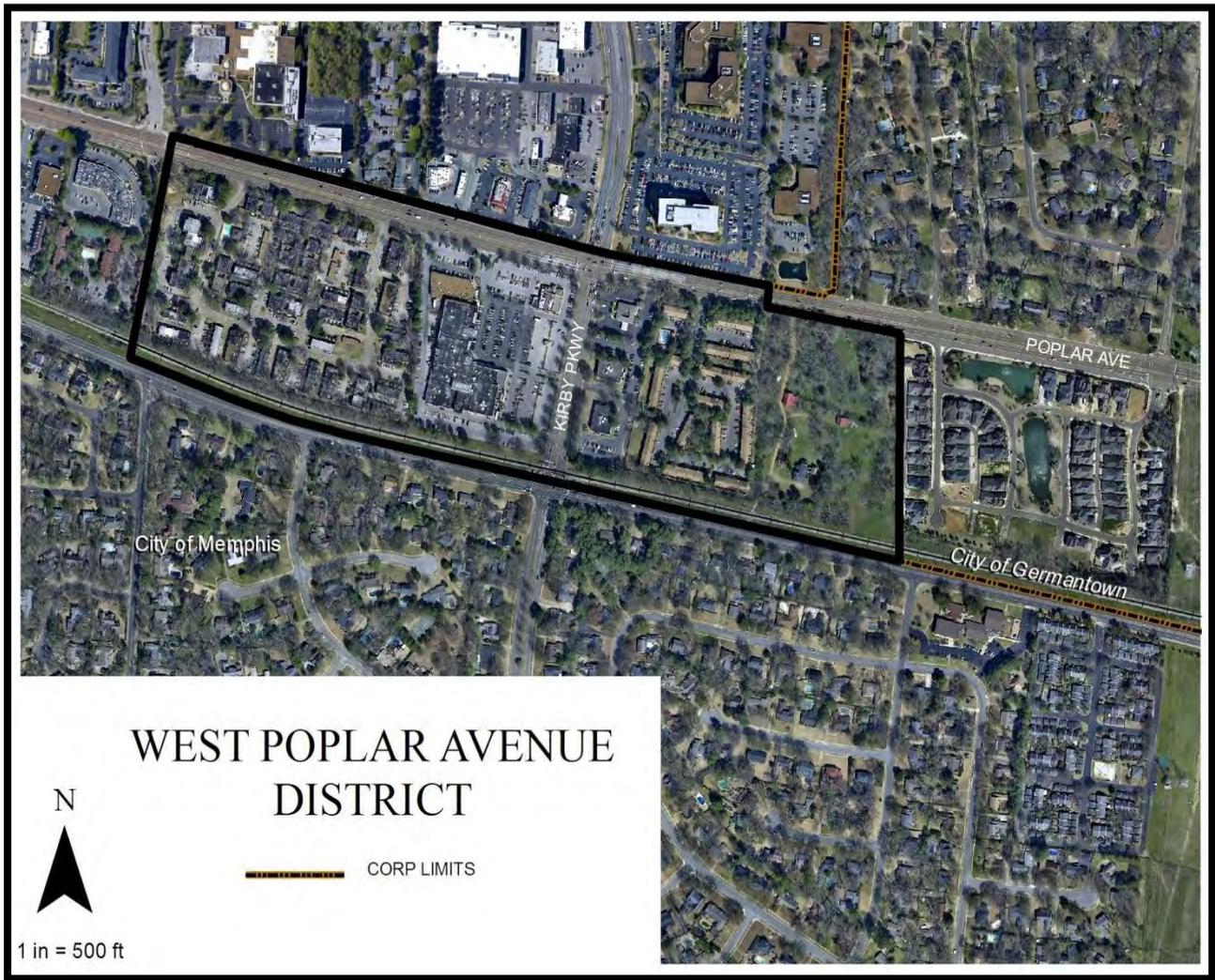
The Central Business District Small Area Plan along with several engineering and planning studies and reports assessed and provided recommendations for addressing all the infrastructure needs for this area to develop in accordance with Smart Code guidelines. In summary, the informed infrastructure decisions made from previous research and planning efforts allows our research team to confidently state that if the Central Business District is developed in accordance with the previously stated conservative development model, then all future public infrastructure impact caused by mixed-use/multi-family development, such as apartments, will be mitigated and existing services will be able to operate at current levels.

West Poplar Avenue District

The second Key Commercial Area that staff and consultants have studied to mitigate both short and long term infrastructure impacts is the West Poplar Avenue District (Figure 6). This approximately 58 acre District is considered the City of Germantown’s Western Gateway, consisting of both residential and commercial properties.

A Small Area Plan for the West Poplar Avenue District was completed in November 2013. As with the Central Business District Small Area Plan, the West Poplar Avenue District Small Area Plan was developed based on community input through a charrette process. This Small Area Plan identified three development scenarios, provided a market overview and fiscal analysis, and developed recommendations to improve mobility. Also consistent with the Central Business District small area planning process, the specific impact of just apartment buildings was not considered, but a conservative development model was considered in all infrastructure impact reports that took into account the greatest level of developmental impact that could be approved in accordance with the Smart Code.

Figure 6: West Poplar Avenue District



Water and Sanitary Sewer Analysis

The City provides water distribution and sanitary sewer collection services to several types of customers in the West Poplar Avenue District. Single-family residential, multi-family residential, and commercial business customers all enjoy City services in this relatively small district. With the completion of the TraVure development that is currently under construction, no undeveloped land will remain in this area. Therefore, any future impact from additional multi-family, mixed/multi-use developments in the West Poplar Avenue District will occur in the form of redevelopment of existing property. Public Works strategically planned and executed infrastructure improvements to upgrade the water distribution system in this area in 2001-2002 that allowed for improved fire flows and a looping of the water supply system. These improvements safeguarded the water consumption needs of the existing residential and commercial customers at that time, and also mitigated any future impact of potential increased density from subsequent commercial and residential development.

Figure 7: West Poplar Avenue District Three Largest Properties

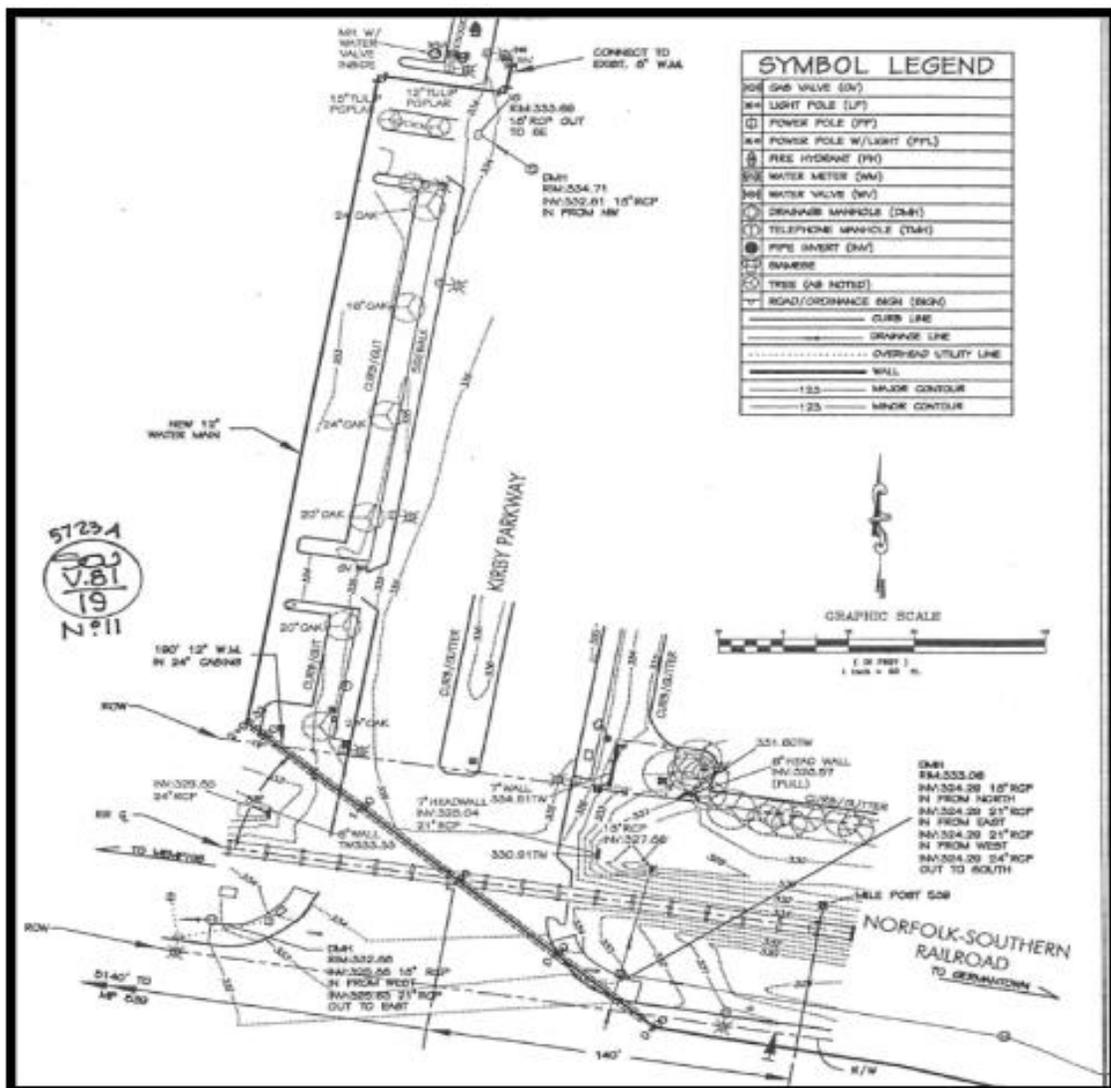


In May of 2016, A & H were contracted to provide a Sewer Basin Study for this area. The findings of this report indicated that the existing sanitary sewer collection system will adequately serve current developments, but the capacity of this system would be inadequate if one of the developed properties were redeveloped in concurrence with the Smart Code. Therefore, in order to diligently plan for possible growth in this area, a Capital Improvement Project was requested and was approved at the April 8, 2019 Board of Mayor and Alderman meeting. Although the City has committed the funding to construct this Capital Improvement Project, each developer that is provided service off of this sewer main will be required to pay for their share of impacted City infrastructure when they sign a development contract with the City. This will allow for the City's Utility Fund to recoup a portion of the amount invested in constructing this infrastructure. More details in regards to the previous water distribution infrastructure improvements and the planned sanitary sewer improvements for this area are on the following pages.

Water Distribution System and Water CIP

In the early 2000's, problems arose in providing the necessary fire flows and water distribution capacity to the West Poplar Avenue District. In the 1990's, many developments in this area were constructed by only having one access point to a City water main to serve the entire development as opposed to having a looped water system. In order to address this issue, A & H was contracted in 2001 to design a 12-inch water main extension that would run from Poplar Pike under the railroad tracks along Kirby Parkway and extend north to Poplar Avenue (See Figure 8 for the design drawing of this project). This water main extension improved fire flows and water supply in this area by looping the water distribution system. ARGO Construction, LLC. was the lowest qualified bidder accepted to perform this work and finished the project in early November 2002. With this improvement in place, the existing water distribution system in this area will be able to meet the future water demand if the Western Gateway redevelops in accordance with the West Poplar Avenue District Small Area Plan.

Figure 8: Water Main Extension West Poplar Ave



Sanitary Sewer Collection System and Sewer CIP

The Small Area Plan for the West Poplar Avenue District and revisions to the Smart Code for this area were approved by the Board of Mayor and Aldermen on November 11, 2013. This approval laid the groundwork for the rezoning of the Western Gateway. The Western Gateway Rezoning, approved on third reading by the Board of Mayor and Aldermen on October 13, 2014, created the potential for a new development pattern of the 58 acres near the Kirby Parkway / Poplar Avenue intersection. The existing sanitary sewer collection system that supports the Western Gateway Area consists of a complex network of sewer mains that predominately extend northward from this rezoned area to serve the residential subdivisions of Kirby Hills and Poplar Estates. These sewer mains collect and transport sanitary sewer from these residences to the Memphis sewer outfall located near Poplar Estates Park. According to construction drawings, the existing sewers in this area were constructed in the 1960's and early 1970's and have not been upgraded since original construction.

During the consideration for this rezoning, some questions arose about the need for additional sewer capacity to accommodate new development. In order to address these questions, the Board approved a Professional Services Agreement (PSA) with A & H on October 25, 2015, totaling \$184,000.00, for a Sewer Basin Study and Asset Evaluation (both dry and rainy conditions) that included hydraulic modeling, full build-out flow projections, and the resulting options for future sewer improvements. From the model generated in this study, the data indicated that the existing "corridor" sewers can carry the future flows from properties developed east of Kirby Parkway without overloading these existing sewers; however, some of the pipes would be at maximum capacity. Therefore, due to the age of the existing sewer system and the future maximum loading of the system with a conservative growth model in place, it was recommended that the sanitary sewer collection system in this area be upgraded.

The original recommendations from A & H were to upgrade a small portion of the existing sanitary sewer collection system in this area and direct the additional flows from future development to the City of Memphis Sanitary Sewer System across Poplar Avenue and under the railroad to Poplar Pike. After several meetings with City of Memphis officials, it became apparent that this was not a mutual solution. Although sewer capacity was available, the City of Memphis indicated that no additional sewer effluent could impact their current system at this location beyond what was currently being discharged in this area. The City of Memphis desired to retain the capacity in their existing sewer mains in anticipation of future development in this area. As such, the City of Germantown would have to construct a new sanitary sewer main northbound to carry the additional flows.

On August 14, 2017, the Board approved a PSA with A & H totaling \$189,000.00 for engineering services for the Western Gateway Sanitary Sewer Basin Design. This PSA allowed for construction drawings for the project to be designed and developed, construction documentation, and construction administration for the Western Gateway Sanitary Sewer System. In order to provide minimal disruption of sanitary sewer services and the least amount of pavement disturbance possible in the Kirby Hills and Poplar Estates Subdivisions, A & H developed a sewer design that incorporated a new sanitary sewer main that utilized non-invasive boring technology. Providing a new sanitary sewer main to carry the existing and future flows from the Western Gateway Area would allow for not only minimal disturbance to existing residential sanitary sewer service but also alleviate existing sanitary sewer capacity on the aged sanitary sewer infrastructure that supports these residential customers.

Public Works brought the proposed project before the Board of Mayor and Aldermen as a CIP for funding approval in the FY19 Budget Cycle. The Board approved the funding of this project with the approval of the FY19 Budget. Memphis Road Boring Company, Inc. was the lowest qualified bidder to construct the project in the amount of \$1,518,719.00. This contract was approved by the Board to construct the Western Gateway Sanitary Sewer at the April 8, 2019 Board Meeting.

Traffic Analysis

Traffic Analysis Scope/Study

In addition to water and sanitary sewer infrastructure, it is imperative that the roadway network is sufficient to support increased vehicle demand. Providing the necessary roadway system is critical to the continued success of the West Poplar Avenue District. Following the West Poplar Avenue District Small Area Plan, in 2016, Kimley-Horn and Associates, Inc. was hired by the City to develop a conservative growth model to form a traffic study to identify the future transportation infrastructure necessary to support the phased development of the Western Gateway.

The study looked at the ultimate build-out, in accordance with Smart Code, for the area around the intersection of Poplar Avenue and Kirby Parkway, and identified the roadway system required to accommodate future traffic volumes, capacity and intersection operational deficiencies in the study area, and the proposed recommendations for improvements to mitigate projected traffic congestion as the area redevelops.

The Western Gateway study area included the area surrounding the intersection of Poplar Avenue and Kirby Parkway, as illustrated in Figure 10. The boundaries of the Western Gateway and this study generally consist of Poplar Pike, Poplar Avenue, Aaron Brenner Drive, and Poplar Estates Parkway.

The following intersections were analyzed as part of the traffic study:

- #1 – Poplar Avenue at Aaron Brenner Drive (signalized)
- #2 – Poplar Avenue at Carrefour Drive (West) (two-way Stop)
- #3 – Poplar Avenue at Kirby Parkway (signalized)
- #4 – Poplar Avenue at TraVure (signalized)
- #5 – Poplar Avenue at Poplar Estates (signalized)
- #6 – Kirby Parkway at Poplar Pike (signalized)
- #7 – Kirby Parkway at Carrefour Drive (South) (two-way stop)

The study expanded upon the work completed by Kimley-Horn for the CBD Traffic Study. The Western Gateway used the subarea travel demand model developed and used for the Germantown Smart Growth Sub-Area Model as a base to forecast volume for the study area. The study also applied the 2040 regional travel demand model so the projected demographics and economic forecasts could be incorporated. The 2040 regional travel demand model utilized a 2008 base year and 2030 horizon year. Projections of future traffic volumes from the model were used to estimate operational conditions and the potential impacts on the roadways and intersections within the study area. Transportation alternatives were developed based on the future growth and land use development phases of the West Poplar Avenue District Small Area Plan in addition to the projected growth already determined as part of the CBD Small Area Plan.

Figure 10: Intersections Analyzed as Part of the West Poplar Avenue District Small Area Plan



The traffic impacts of three build phases were evaluated. All the phases were modeled in year 2030 and incorporated the same area as the 2030 No-Build phase. The following phases were analyzed and are displayed in Figure 11 on the following page:

- Phase 1- Block 5 - TraVure has developed as a mixed use development with 17,500 square feet of retail, 168,100 square feet of office building, two hotels, and a parking garage to support the development.
- Phase 2- Block 4 - Currently contains Westminster Townhomes and (by concept) will be redeveloped to contain a mix of office, retail, and residential uses. Block 3 currently contains medical office and a bank which (by concept) will be replaced with a mix of office and residential land use. Block 2 is currently the location of the Carrefour Shopping Center which (by concept) will be redeveloped into an urban lifestyle center containing a mixed-use development.
- Full Build-Out Phase- The full build phase will include the completion of both previous phases along with the redevelopment of the residential units at Fountain Square into a mixed-use residential and office land use.

Figure 11: Traffic Study Build Phases and Blocks



Traffic Analysis Results/Recommendations

Table 3 on the following page provides a summation of the results/recommendations from the West Poplar Avenue Traffic Study and presents a status for the completion of each recommendation.

The study noted that with the full build out of the Western Gateway land use and no on-street improvements, the study area intersections' Level of Service (LOS) will degrade, with unacceptable delays. Also, the intersection of Poplar Avenue at Kirby Parkway is projected to experience an overall reduction in vehicle delay during the AM and PM peak hours when comparing the future No-Build scenario to the implementation of all three phases with the recommended improvements. Other study area intersections are expected to see operational improvements with the recommended improvements as well.

TRAFFIC ANALYSIS RESULTS/RECOMMENDATIONS			
Phase (Blocks)	Description	Recommendations	Status
Phase 1 (Block 5)	TraVure - a mixed use development with 17,500 square feet of retail, 168,100 square feet of office building, two hotels, & a parking garage	<ul style="list-style-type: none"> • Install a traffic signal at Poplar Avenue and the TraVure driveway • Adjustments to the traffic signal timing on Poplar Avenue at Kirby Parkway and at Poplar Estates 	<ul style="list-style-type: none"> • Completed April 2018 • Completed in May of 2018, but continuous monitoring/adjustments are on-going)
Phase 2 (Blocks 2,3,4)	<p>Block 2 is currently the location of the Carrefour Shopping Center which (by concept) will be redeveloped into an urban lifestyle center containing a mix of uses</p> <p>Block 3 is currently medical office condos and a bank which (by concept) will be replaced with a mix of uses</p> <p>Block 4 is currently Westminster Townhomes and (by concept) will be redeveloped to contain a mix of uses</p>	<ul style="list-style-type: none"> • Recommended improvements for Phase 1 also apply to Phase 2 • Intersection at Poplar Avenue and Kirby Parkway modified to include a double left turn at all approaches • Southbound Kirby Parkway at Poplar Avenue changed from two through and one right turn lane to three through lanes with a shared right turn lane • Traffic signal installation at Carrefour West Drive and Poplar Avenue 	<ul style="list-style-type: none"> • At time of redevelopment
Phase 3 (Full Build Out: Blocks 1-5)	The full build phase will include the completion of both previous phases along with their development of the residential units at Fountain Square into a mixed of uses	<ul style="list-style-type: none"> • The recommended improvements for Phase 1 and 2 are applicable for Phase 3 • It is recommended that a third eastbound lane be provided on Poplar Avenue from west of Kirby to Poplar Estates Parkway 	<ul style="list-style-type: none"> • At time of redevelopment • With the completion of TraVure and TDOT's mill/overlay of Poplar Avenue in July 2018, a third EB Poplar lane is in place from Kirby to Poplar Estates

Table 3. Central Business District Traffic Analysis Results/Recommendations

Traffic Capital Improvement Projects (CIPs) FY19-21

Fiscal Year (FY) 19: Kirby Road/Poplar Avenue Mast Arms and Signal Upgrades (\$400,000)

This project involves demolition of existing span wires at this signalized intersection and replacement with standard Germantown black mast arms, video detection, and emergency pre-emption and bike/pedestrian countdowns. This project is 100% funded by state and federal funds.

Bicycle and Pedestrian Analysis

One of the primary factors that the Western Gateway Small Area Plan focused on was mobility and urban design. This meant producing a well configured plan for non-motorized travel in this area. The Plan went as far to say that this key area of infrastructure was paramount in order to fully realize the potential of future development, “balancing the needs of commuters with the needs of existing and future local residents.” Similar to the CBD Small Area Plan, the West Poplar Avenue District Small Area Plan did not specifically focus on the impact of apartments in its analysis of non-motorized forms of travel, but used a conservative development model that would address the greatest infrastructure impact to all modes of travel that could be constructed in accordance with the Smart Code.

The recommendations for non-motorized modes of travel stemming from the West Poplar Avenue District Small Area Plan can only be accomplished by means of establishing partnerships between several public and private entities in this area. The recommendations focused on the major thoroughfares in the subject area: Poplar Avenue, Kirby Parkway, and Poplar-Pike. Poplar Avenue (US-72) is owned and maintained by the Tennessee Department of Transportation (TDOT) and Kirby Parkway crosses Norfolk Southern Railroad to the south and is owned and maintained by the City of Memphis to the north of Poplar Avenue. Due to all of the public and private entities overlapping in this area, the recommendations proposed require a concerted effort by all parties in order for the Plan recommendations to move forward. Plan recommendations denoted below in Table 4 were presented in three phases for each major thoroughfare.

WESTERN GATEWAY BICYCLE & PEDESTRIAN INFRASTRUCTURE IMPROVEMENTS

Improvement	Location	Phase	Recommending Body
Spot Medians in Center Turn Lane MATA Transit Shelters Sidewalk Network Completion	Poplar Avenue	Phase I	Western Gateway Small Area Plan
Modify Street Cross-Section Widen Sidewalks Walkable Frontage for Businesses On-Street Parking Shared Use Pathway	Poplar Avenue	Phase II	Western Gateway Small Area Plan
Bus Rapid Transit Lane	Poplar Avenue	Phase III	Western Gateway Small Area Plan
Repurpose Outside Travel Lanes to be One-Way Bike Lanes	Kirby Parkway	Phase I	Western Gateway Small Area Plan
On-Street Parking Separate Bike Lanes Widen Sidewalks Street Fronting Redevelopment	Kirby Parkway	Phase II	Western Gateway Small Area Plan

Two-Way Bicycle Track Widen Sidewalks Future Light Rail Corridor Frontage Road with Redevelopment	Poplar Pike	Option 1	Western Gateway Small Area Plan
One-Way Bicycle Track Widen Sidewalks Future Light Rail Corridor Frontage Road with Redevelopment	Poplar Pike	Option 2	Western Gateway Small Area Plan

Table 4: Western Gateway Bicycle & Pedestrian Improvements

Stormwater Analysis

There are currently no known stormwater infrastructure issues in the West Poplar Avenue District. Furthermore, the City’s development policy requires that new developments release stormwater into the storm drainage system at the same rate or lower than the current development’s stormwater release rate. The policy ensures that the existing stormwater infrastructure operates as designed regardless of the type, or density, of future developments. These developments will primarily utilize underground detention systems since this method preserves the development potential at the ground level.

Stormwater Capital Improvement Projects (CIPs) FY19-21

None required

Apartment Impact

West Poplar Avenue District

The engineers and planners from the consulting firm of Kimley Horn & Associates, Inc. surveyed the existing infrastructure and gave recommendations for improvements in the West Poplar Avenue District Small Area Plan. The plan recommended some bicycle and pedestrian infrastructure improvements and intersection improvements. Most of these suggestions are currently being planned for construction through the redevelopment of the CarreFour at Kirby Woods site and some improvements have already been accomplished at the TraVure development.

A sanitary sewer basin study for the West Poplar Avenue District was performed by the engineering consulting firm of Allen & Hoshall. This study promoted the need for additional sewer capacity in this area. A Capital Improvement Project (CIP) has been approved for the construction of a new sewer main in this area which should address this recommendation. With these infrastructure improvements either recently completed or planned for the future, all infrastructure impact from new development, including apartments, that follows the West Poplar Avenue District Small Area Plan will be alleviated.

Forest Hill Heights District (Extended)

The final Key Commercial Area of the report is also the area with the most undeveloped land, the Forest Hill Heights District. In 2016, a Small Area Plan was prepared for Forest Hill Heights. The consulting engineers for the study team were Fisher Arnold, Inc. There are some developments proposed within this district and the area north of this district. There is also a new elementary school being constructed to the north of this district. In order to consider all impacts on the City's infrastructure in this report, the study area was extended beyond the original scope of the Forest Hill Heights Small Area Plan northward along Forest Hill Irene Road to Poplar Pike. See Figure 12 below for a map of the Forest Hill Heights Extended District.

Figure 12: Forest Hill Heights Extended District Map



Water and Sanitary Sewer Analysis

Water Distribution System

Most of the water in the Forest Hills Heights area is provided by MLG&W. This includes most of the commercial businesses along Crestwyn Hills Drive and the residential areas north of Winchester Road; whereas, Germantown water is provided to the Circle K gas station located at the southeast corner of Forest Hill Irene Road and Winchester Road, as well as the First Tennessee Bank along Tyndale Drive. Furthermore, the hydrants on the south side of Winchester Road are owned by the City of Germantown. The MLG&W supply consists of a 24-inch water main running north and south on Forest Hill Irene Road, a 30-inch water main running east and west on the north side of Winchester Road, and a 10-inch water main along Crestwyn Hills Drive. This system provides a significant amount of flow to the Forest Hill Heights area, but the static pressure in the line ranges from 50-60 psi. This is not an optimum pressure range, but with the significant flows available, there is not a considerable variance in the residual pressure. The Germantown supply consists of a 12-inch water main running east and west on the south side of Winchester Road. The pressure and flow in this line is not recommended for large developments without some improvements to the supply distribution. Please see the water distribution map below in Figure 13 that shows existing City of Germantown and MLG&W water mains.

Figure 13: Forest Hill Heights Water Distribution Map



As a part of the Forest Hill Heights Small Area Plan, the proposed water demand was modeled by Fisher Arnold to determine if the existing water supply was sufficient for the maximum development pattern allowed under the existing zoning for this area. Based on the analysis and the data provided in the Small

Area Plan, the model reports that the existing system on the MLG&W lines is sufficient without the addition of a booster station. Although this is the case for the existing system, the study states that it is likely certain types of development (multi-story, high occupancy, etc.) will require special fire protection measures which may include booster pumps or tanks.

Therefore, in order to meet the future fire and domestic demand from the new elementary school and the maximum development pattern in the area, Public Works strategically planned water distribution upgrades through the City's Capital Improvement Program over fiscal years 2019 and 2020. These projects will provide the needed capacity, flow, and pressure to meet the needs of the City's new customers, while preserving the service of existing customers in this area. The descriptions on the following pages, along with a detailed map (Figure 14), denote five different Capital Improvement Projects in this area that should adequately mitigate the impact of the full build-out of the Forest Hill Heights Extended Area in accordance with the maximum development pattern indicated in the Small Area Plan. A short synopsis of each CIP and how each improvement will mitigate the impact to the City's water distribution system is shown on the following pages.

As with infrastructure construction in the previous Key Commercial Areas mentioned, a portion of the investment the City has made and will make in the Forest Hill Heights District will be recouped. Each developer will be responsible for paying for their share of the impacted infrastructure improvements. The main mechanism that the City currently uses for this to occur is through the development contract each developer engages in with the City. This contract allows the City to recoup a portion of the amount invested by placing the funds back into the Utility Fund.

Water Capital Improvement Projects (CIPs) FY19-20

Fiscal Year (FY) 19: Annexation Area Water Main Construction Phase I (\$1,140,000)

This project consists of construction of a 12-inch water main from just north of the Poplar Pike intersection, under the RR tracks down to the north school drive of the new Forest Hill Elementary (approximately 1,350 feet) then stub a 24-inch main to the road ROW at the north school drive. From that point, a 12-inch water main is currently being installed down (approximately 4,500 feet) Forest Hill Irene Road from the north school drive to Winchester Road. This will provide adequate water supply and pressure to serve the new elementary school and all of the annexed area including those properties south of Winchester Road.

Fiscal Year (FY) 19: Water Main Supply for Forest Hill Elementary and Proposed Elevated Water Tower (\$243,100)

Approximately 1,350 feet of new 24-inch main was constructed in late December 2018 to serve as the main water supply line for the new Forest Hill Elementary School that is set to open in the fall of 2019. This 24-inch main is proposed to also serve as the supply line for a 250,000 gallon elevated water tower east of the new school.

Fiscal Year (FY) 20: Elevated Water Tower (\$2,357,000)

In order to have a resilient and redundant system, the City needs two elevated towers so that one tower can be taken out of service for maintenance or in the event of an emergency while the other tower could keep the City under normal operations. The existing 75,000 gallon tower located across the railroad tracks from the Southern Avenue Water Treatment Plant is 67 years old and cannot adequately hold the static pressure on the system. This small tower also does not meet seismic standards.

A new 250,000 gallon elevated tower is proposed that would mainly be supported by the Johnson Road Water Treatment Plant. This tower is proposed to be located just east of the new school site where the previously mentioned 24-inch supply main has been constructed. With the construction of a new elevated tower at the proposed location on the east side of the new school site, the City can have two separately served elevated water tanks to supply needed system pressure and support maintenance and emergency activities. With this action, the City can remove the 67 year old, 75,000 gallon water tower at the Southern Avenue Water Treatment Plant.

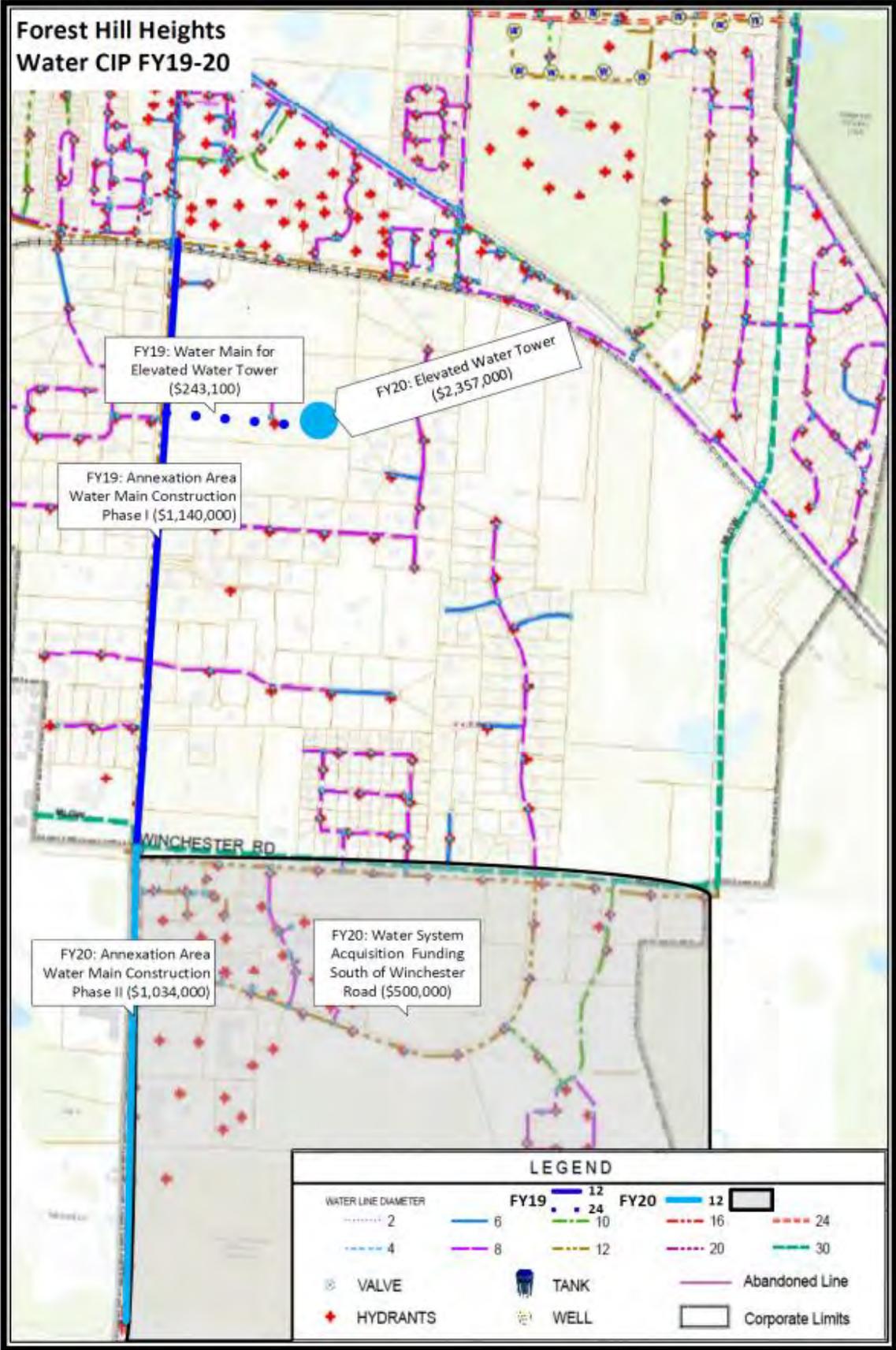
Fiscal Year (FY) 20: Water System Acquisition Funding South of Winchester Road (\$500,000)

With the exception of two businesses, the water distribution system south of Winchester Road in the Forest Hill Heights District is currently served by MLG&W. Two subdivisions north of Winchester Road are served by MLG&W; however, City of Germantown Public Works reads their meters and pays MLG&W for this water supply. Having these properties served by City of Germantown Water would allow for the City to have all Germantown residents on our water supply while generating additional revenues from this area in perpetuity. Funding is needed to purchase the water assets for the Forest Hill Heights District from MLG&W. The amount requested is an estimate stemming from some preliminary conversations with MLG&W. Once approval has been given to move forward with the acquisition of these assets, negotiations between MLG&W and the City of Germantown can take place in order to establish a more concrete cost estimate.

Fiscal Year (FY) 20: Annexation Area Water Main Construction Phase II (\$1,034,000)

The purpose of this CIP is to continue the water main extension to the annexation area by connecting to the recently laid 12-inch water main (an FY 19 project) and extending it southward down Forest Hill Irene Road to the West Tennessee Veteran's Cemetery Services. This will provide adequate water supply and pressure to serve all of the annexed area, including the entire Forest Hill Heights District. With this action, and the purchase of all water assets from MLG&W (an FY 20 proposed project), the City will be able to provide all water distribution services to the annexation area.

Figure 14: Forest Hill Heights Extended Water CIP's FY19-20



Sanitary Sewer Collection System

The existing sanitary sewer collection system in the Forest Hill Heights District is adequate for current development, but will require extensions to serve future development. It mainly serves commercial development near Crestwyn Hills Drive, nearly 150 homes north of Winchester Road as well as the shopping center at Winchester Road and Houston Levee Road. Much of the existing sewer system consists of 8-inch sewer lines, which flows to a 36-inch sewer interceptor that runs to and alongside the Nonconnah Creek and crosses Forest Hill Irene Road. Since much of the area has not been developed to final conditions, high peak flows are not expected in the pipes serving the study area.

Sanitary sewer flows for future development were estimated from the Concept Master Plan within the Forest Hill Heights Small Area Plan. With the addition of the flows from future development, the analysis shows that the existing system will need improvements in certain pipes. In the eastern portion of the study area, there is a 15-inch pipe which runs from a manhole on the north side of Winchester Road south about 5,400 feet which will need to be upgraded to a 21-inch pipe. At that point, it will flow into an existing 21-inch pipe which then runs to the 36-inch interceptor. Furthermore, Fisher Arnold, Inc. recommends that future flows in the western and central portions of the study area should be connected directly to the 36-inch interceptor whenever possible to avoid adding flow to the existing collector lines, some of which are near capacity. Fisher Arnold, Inc. also recommends upgrading the size of the 8-inch line that runs from north to south through the cemetery on the western edge of the study area. This recommended upgrade is denoted below in a proposed CIP.

The descriptions below along with a detailed map on the following page (Figure 15) denote the future CIPs that are proposed for this area that should adequately mitigate the impact to the City's sanitary sewer collection system.

Sanitary Sewer Capital Improvement Projects (Future CIPs)

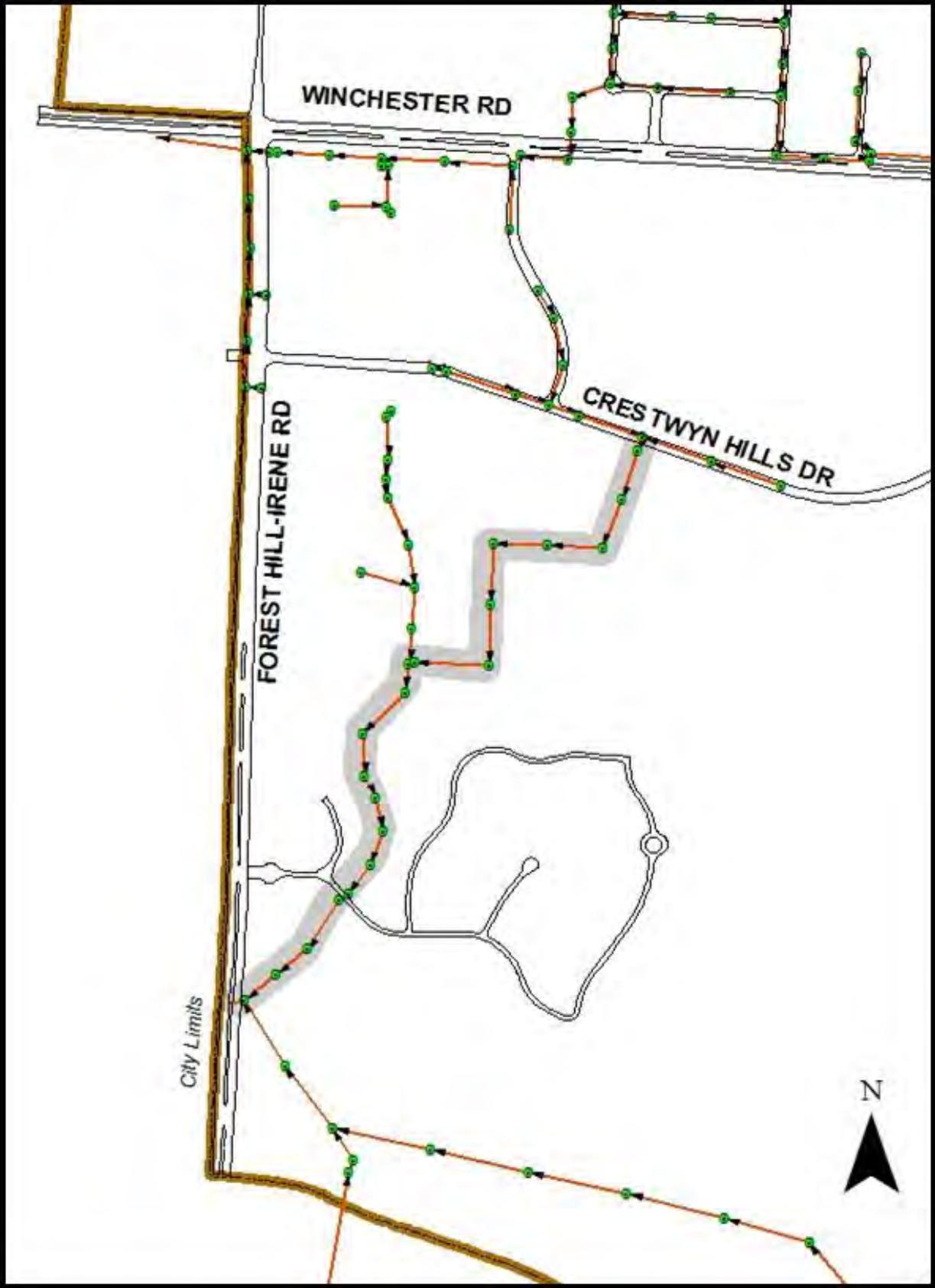
Fiscal Year (FY) 22: Sanitary Sewer Upgrade Design – Forest Hill Heights District (\$100,000)

The Forest Hill Heights Small Area Plan identified approximately one mile of 8-inch diameter sanitary sewer main that would not adequately serve this area if the area were to develop in accordance with the development pattern in the Forest Hill Heights Small Area Plan. Therefore, a project was planned in the outer years of the CIP Budget to upsize this portion of the existing 8-inch main to a 12-inch sanitary sewer main. This CIP is for the engineering design that is required in order to produce plans to upsize the main.

Fiscal Year (FY) 23: Sanitary Sewer Upgrade Construction and Inspection – Forest Hill Heights District (\$900,000)

This CIP is for the construction and construction engineering and inspection for the upgrading of the previously designed 12-inch sanitary sewer main for the Forest Hill Heights District. This main upsizing is required for this area in order to maintain capacity in providing adequate sanitary sewer service.

Figure 15: Forest Hill Heights Sanitary Sewer Collection FY22-23



Traffic Analysis

Traffic Analysis Scope/Study

The Forest Hill Heights District and the extended area previously described to the north of this district have the most undeveloped land and, thereby, have significant potential for growth. Traffic conditions in the Forest Hill Heights Small Area Plan were evaluated Fisher and Arnold using existing and future scenario models to determine the impact to the adjacent street network with future full development of this area. The area intersections included Winchester Road and Forest Hill Irene Road, Winchester Road and Tyndale Drive, Winchester Road and Crestwyn Hills Drive, Crestwyn Hills Drive and Tyndale Drive, and Forest Hill Irene Road and Crestwyn Hills Drive. Existing 12-hour traffic counts were taken at each of the five intersections. An evaluation of the intersections including a Level of Service (LOS) Analysis was then performed using existing traffic volumes. This traffic model is also incorporated into the overall traffic model of the City.

Traffic Analysis Results/Recommendations

The results from the analyses showed that all five intersections currently operate at an acceptable Level of Service (LOS). The future traffic that could be generated from the implementation of concepts within the Small Area Plan was then added to the existing volumes, along with an increase in “non-site” traffic from the area. An analysis was then performed under these future conditions using the same (existing) intersection geometry. The results indicated that the LOS would decrease at all the intersections with two operating at unacceptable LOS.

The decrease in LOS was especially true at the Forest Hill Irene Road and Crestwyn Hills Drive intersection. The Winchester Road and Crestwyn Hills Drive/Crestwyn Drive intersection also experienced excessive delays. The other three intersections, although they had increased delays and even some undesirable LOS for certain movements at peak times, generally operated at an acceptable LOS for the future conditions.

In order to mitigate the undesirable LOS at Forest Hill Irene Road and Crestwyn Hills Drive, the recommendation is to provide a traffic signal in the future at this location. An analysis was performed at this intersection under future conditions as a signalized intersection and an acceptable LOS was obtained. The signalization of this intersection should occur well before full build-out when signal warrants are met. See the CIP projects below.

Traffic Capital Improvement Projects (CIPs) FY19-21

Signalization of Forest Hill Irene Road at Crestwyn Hills Drive

Developers are required to contribute to the cost of the design and construction of a signalized intersection at Forest Hill Irene Road and Crestwyn Hills Drive. The developers’ monetary contribution is based on the percentage of traffic an individual site is anticipated to generate compared to the overall anticipated traffic volumes of the full build-out conditions of the entire Forest Hill Heights area. The future signalized intersection will include the City’s standard black mast arms, video detection, emergency pre-emption, and bike and pedestrian countdown clocks. Also, fiber optics will be installed in order to communicate with other future and existing signalized intersections in the area: Winchester Road at Forest Hill Irene Road and Winchester Road at Crestwyn Drive.

Fiscal Year (FY) 20: Forest Hill Irene Road at Crestwyn Hills Drive Signalization - Design (\$100,000)

This proposed CIP is for the engineering design and plan development for the proposed intersection signalization.

Fiscal Year (FY) 21: Forest Hill Irene Road at Crestwyn Hills Drive Signalization - Construction (\$400,000)

This project involves demolition of existing span wires at this signalized intersection and replacement with standard black mast arms, video detection, and emergency pre-emption and bike/pedestrian countdowns. This project is 100% funded by state and federal funds.

Bicycle/Pedestrian Analysis

The Small Area Plan studies for the three Key Commercial Areas in this report only considered capacity and intersection operational deficiencies for vehicular traffic. Consistent with the Smart Growth Plan objectives, a pedestrian and bicycle friendly multi-modal transportation system is desired for the future. Multimodal solutions and context sensitive designs should be incorporated into individual site redevelopment projects and transportation improvement projects as they occur.

Stormwater Analysis

There are currently no stormwater infrastructure issues in the Forest Hill Heights District. The Small Area Plan study recommended that stormwater for future developments should be addressed by incorporating regional detention basins into the plan area. Based upon topography and existing drainage basins, two regional detention areas would be needed south of Crestwyn Hills Drive. Future developments could also utilize underground detention systems on-site. These methods, especially the use of regional detention basins, will sufficiently manage stormwater in the area as the basin size is designed for the areas maximum development potential. Furthermore, the City's development policy requires that new developments release stormwater into the storm drainage system at the same rate or lower than the current development's stormwater release rate. Apart from routine maintenance, the policy ensures that the existing stormwater infrastructure operates as designed regardless of the type, or density, of future developments.

Stormwater Capital Improvement Projects (CIPs) FY19-21

None required

Apartment Impact

Forest Hill Heights District

The consulting engineers from Fisher Arnold provided the analysis and recommendations for infrastructure improvements in the Forest Hill Heights Small Area Plan. This plan suggested some infrastructure improvements were needed in order to continue to provide existing customers with superior water and sanitary sewer service, as well as to plan for future development in accordance with Smart Code guidelines. A few of these infrastructure improvements are currently under construction. One such improvement is an FY19 CIP project to construct a 12-inch water main southward down Forest Hill Irene Rd from Poplar Pike to Winchester Road. The second phase of this project is to continue this construction down Forest Hill Irene Road to the southern City limits. This project is a proposed FY20 CIP.

In total, there are five different CIPs either currently under construction or submitted for FY20 to improve the water distribution system in this area. An upgrade of the sanitary sewer system was also proposed by the Forest Hill Heights Small Area Plan. The design work for this upgrade will be submitted in the CIP for FY22 and the construction and construction engineering and inspection services in the FY23 CIP. With all of these upgrades and new construction in place, this area should have sustainable infrastructure to meet the needs of any new apartment that is constructed in compliance with existing Smart Code guidelines.

POLICE SERVICES IMPACT ANALYSIS



Project Scope

The purpose of this departmental study is to determine the impact future apartment and apartment building developments within the Smart Code Zoning Districts will have on services provided by the Germantown Police Department (GPD). This report is based on research conducted over the past 18 months, including a review and analysis of GPD incidents and reported crimes from 2014 to 2018. The report examines the current state and most recent trends in the Germantown Police Department's incident and crime volume for residential dwelling units, including existing apartments, and uses the information to project the potential impact proposed apartments and apartment building developments within the Smart Code Zoning Districts will have on Police Department resources by respective district.

Although the report is apartment-centric, our research included an analysis of data from all residential dwelling types within the City for the purposes of context and to better understand the existing and future impact of each on the services of the GPD. This report may be used to inform policy decisions related to future apartment development as well as provide insights into other future residential development applications going forward.

Background

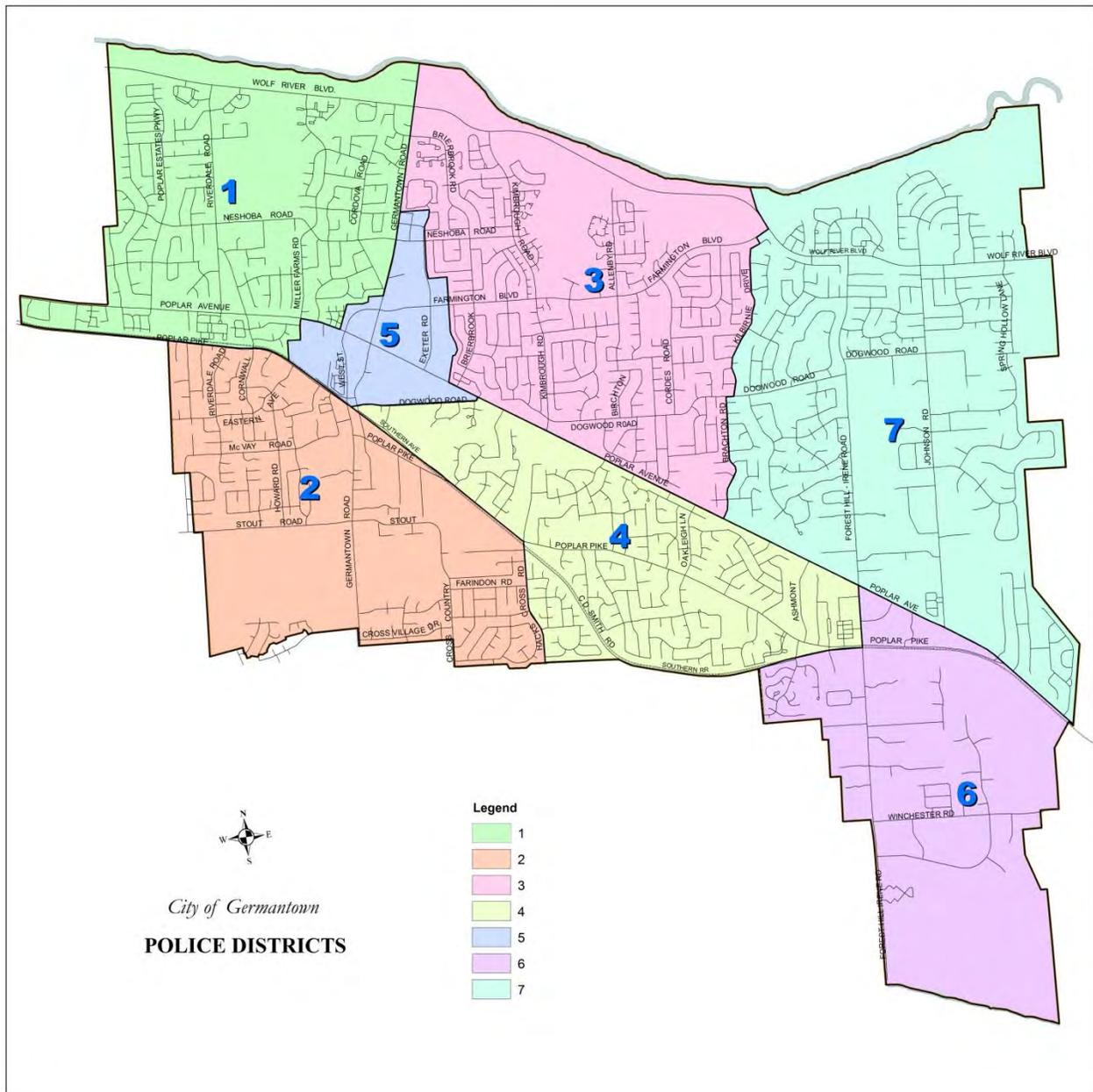
Established in 1955, Germantown Police Department is an accredited, progressive law enforcement organization committed to serving the citizens of Germantown with excellence every day. The GPD provides the professional services of protection of life and property, prevention of unlawful activities, safety education for citizens, response to calls for service, and support of safe community activities and events. For the purposes of this report, all calls for police response in any of the aforementioned categories are referred to as "calls for service" or "calls" throughout the remainder of this report. The mission of the Germantown Police Department is to maintain a peaceful and orderly environment that ensures the protection of life and property through equitable enforcement of laws, rapid response and community education.

The department currently has an authorized strength of 102 officers, 22 public safety dispatchers, and a contingent of civilian administrative support staff. The GPD benefits from outstanding community support and civic involvement, made evident by the dedicated volunteers of the Reserve Officer Corps and the alumni of its Citizen Police Academy program. The department is divided into three divisions: patrol, investigations, and police services.

Patrol Division. Currently allocated among seven district zones (see Figure 1), the patrol division provides proactive police services, responds to calls for service, and conducts traffic enforcement and traffic crash investigation. Specialized units within the patrol division include S.W.A.T., Crisis Negotiation Team, Crash Investigation Unit, Crisis Intervention Team, and the School Resource Officer Program. The patrol division also provides community support in the form of vacation checks, child safety seat installation, and active shooter training throughout the area.

Investigations Division. The investigations division conducts follow-up on every criminal report. Detectives are certified as specialists in a variety of investigative disciplines such as crime scene investigation, computer forensics, interview and interrogation, and domestic violence. The investigations division participates in multi-agency initiatives such as Internet Crimes Against Children, Area Law Enforcement and Retailers Team, and the Memphis Area Fraud Investigators Association to name a few. Additionally, the investigations division has detectives assigned, on a full-time basis, to The Attorney

Figure 1. City of Germantown Police Department District Map



General’s Drug and Violent Crimes Task Force, the DEA task Force, the Safe Streets Task Force, the Joint Terrorism Task Force, and the Secret Service Task Force. Our participation in these units provides expertise, training, and equipment to Germantown and serves as a force multiplier for many investigations here and in the surrounding communities.

Police Services Division. Responsible for administering and coordinating several key work units, department programs, and functions, this division includes Community Relations, Training, the Communications Center, Jail, Reserve Officer Program, Citizen Police Academy Program, Community Emergency Response Team, employee hiring and recruitment, Neighborhood Watch, and Special Events. The Reserve Officer program is comprised of volunteers who assist in providing traffic control and security for numerous special events, such as the Germantown Charity Horse Show, the Mayor’s Cup 5K, the Germantown Festival, the 4th of July Fireworks Extravaganza, the Germantown Half Marathon, and

the annual Holiday Parade. The men and women of the Germantown Police Department are dedicated to providing quality police services to the community.

Major Accomplishments

The Germantown Police Department is dedicated to a continuous review of policy and practices to achieve its mission. Through relationships with the Tennessee Association of Chiefs of Police and the International Association of Chiefs of Police, the department strives to adhere to accepted best practices while making full use of community partnerships, benchmarking measures, and other forms of industry analytics to maximize outcomes. This high-performance methodology has proven effective, resulting in numerous department achievements through the years. Having earned the long-standing reputation of being an exemplary police department, both regionally and nationally, the following are a number of GPD's most recent accomplishments and recognitions:

Accreditation. In 2014 and again in 2018, the GPD received accreditation through the Tennessee Association of Chiefs of Police. The department met 164 standards which include the use of state and national best practices in the field of law enforcement.

Response Times. The department maintains emergency response times which consistently measure less than four minutes and non-emergency response times of less than eight minutes.

Crime Rate. The department maintains one of the lowest crime rates for cities of similar size in Tennessee and throughout the southeast.

Approval rating. The department maintains a citizen approval rating of greater than 90% in city-wide annual surveys.

School Resource Officers. As of 2016, every school within Germantown is staffed with a full-time Germantown Police Officer in partnership with the Germantown Municipal School District (GMSD) and Shelby County Schools (SCS).

CIT Program. The department maintains a staff of specially trained officers who respond to calls for service involving emotionally disturbed persons (EDP). Crisis Intervention Team (CIT) officers complete an extensive, hands-on, practical training program offered by the Memphis Police Department. These officers work with mental health providers and mental health consumer groups to provide evaluation and treatment for those in need. In 2018, officers responded to 145 emotionally disturbed persons calls for service.

Reserve Police Officer Program. Reserve officers are required to attend a twelve-week basic training class, as well as annual in-service training. Since its inception, the program has provided the department with dedicated volunteers who assist with normal patrol duties and special events. In 2018, reserve officers worked 6,761 volunteer hours.

On the Beat. In 2017, Deputy Chief Rodney Bright and the staff of Germantown Municipal Television at Houston High School created On the Beat. This monthly television show, hosted by Deputy Chief Bright, serves to provide information regarding our agency, our partners, and tips for staying safe.

Research Methodology

In order to best determine the impact future apartment and apartment building developments in the Smart Code Zoning Districts will have on the GPD, our research team's analysis focused on the use of Germantown-specific incident and crime volume experience from existing Germantown apartments to project future call volume related to potential future apartment developments based on current land use zoning. This methodical, data-driven approach was also applied to the other types of residential dwelling units within the City by police district.

A few of the questions that guided our research for the GPD report included:

- What are the total residential incident and crime volume trends over the last five years?
- What are the call volume trends for apartments; single-family homes; condominiums; and age-restricted, independent, or assisted living facilities over the last five years?
- How many times a year on average per dwelling unit have we made an incident or crime report for an apartment, a single-family home, a condominium, and an age-restricted, independent, or assisted living facility over the last five years?
- Has there been a change in the average number of total incident and crime reports made annually by dwelling unit for apartments, single-family homes, condominiums, and age-restricted, independent living or assisted living facilities over the last five years?
- Based on the empirical evidence, is there a statistical difference between the average number of incident and crime reports per unit for each of the five existing apartments in Germantown?
- Over the next ten years, what will be the likely call volume impact of any potential, future apartment development on its respective police district? What will be the likely impact of other new residential development within their respective police district? What will be the likely impact to the department as a whole?

Incident Tracking and Data Gathering

The GPD uses a traditional district model in which geographic areas are assigned to designated officers. The use of districts ensures prompt response to calls for service and efficient distribution of patrol services. The department captures data related to calls for service, crimes, traffic stops, and motor vehicle crashes within each of the districts. These data are stored in the Law Enforcement Record Management System (LERMS), which was adopted in 2013, and can be filtered for searches by address, street, intersection, entry type, and date. Due to the transfer of data from AS400, an earlier record-keeping application, to the new LERMS system, reliable single- and multi-family data collected prior to 2014 could not be filtered for this project.

The LERMS system does not filter reports by dwelling type, so the information was retrieved using address locations. To assess the impact of multi-family residences on department services, a review of data specific to those address locations was completed. The data was broken down into two categories: incidents and crimes. Given the manageable number of apartments, condominiums, and age-restricted,

independent, and assisted living dwelling units within the City, the actual numbers of incidents and crimes were gathered dating back to 2014.

Because the number of single-family homes in Germantown is over 13,000, the research team retrieved comparable incident and crime data using the addresses of a single-family home sample set for each district. Each district's single-family home sample set, typically over 500 homes, included a representation of homes on multiple streets, evenly dispersed throughout the district.

Call Categorization

To best determine the likely impact future apartments and apartment buildings will have on the services of the Police Department, our department leadership team researched and then categorized each call for service in the following areas:

(1) Nature of the Call for Service

A call for service requiring the response of the GPD has been defined and categorized as an incident and/or a crime.

- **Incidents.** An "incident" is recorded into the computer-aided dispatch system (CAD) any time a call for police service is received from the public via dispatch or an officer initiates an activity such as a traffic stop, is flagged down, or discontinues routine patrol to further investigate a suspicious or safety-related circumstance and notifies dispatch of this action. Whether a call for police services is initiated from a member of the public or initiated directly from a police officer, a call for service has been made. For this reason, and for the purposes of this study, incidents and "calls for service" or "calls" are used interchangeably. The location of every incident is recorded into the CAD system and must include a physical address or roadway intersection. Incidents include everything from alarm calls to civil matters to felony crimes. Incidents require some action by both dispatch and at least one officer.
- **Crimes.** Crimes are incidents that are ultimately classified under the Tennessee Code as criminal violations, such as trespassing, theft, assault, and drug offenses. These crimes may be reported at the location of a corresponding "incident" in the CAD system, however, on occasion, an incident location will not match the location of the reported crime. For example, if an individual came to police headquarters to report a crime which occurred at his or her Germantown residence, the CAD "incident" would reflect 1930 S. Germantown Rd. (City Hall/Police Department), but the offense (crime) report would reflect the victim's address. In some circumstances, an "incident" may involve the reporting of multiple crimes. For example, if an officer responded to a theft complaint at a retail store where the suspect had drugs in his or her possession upon arrest, two crimes would be reported but only one incident recorded.

It is important to remember that both the incident data and the crime data are address-specific, not resident-specific. In other words, the resident may or may not be involved with the incident or crime associated with his or her address. Resident involvement could fall into several categories, including complainant/witness, victim, suspect, or no involvement whatsoever.

(2) Annual Totals by Calendar Year

To allow for the forecasting of future call volume by using past call volume data to assess our most recent experience, data for incidents and crimes have been aggregated and totaled by calendar year dating back to 2014.

(3) Type of Dwelling Unit

Although our primary focus of this report is on how apartments and apartment buildings will impact the services of the GPD, our research team determined it was necessary to provide apartment-specific information in the greater context of incidents and crimes for all residential units. Therefore, incidents and crimes have also been aggregated by the type of residential dwelling/housing unit:

- Apartments
- Condominiums
- Single-Family Homes
- Age-Restricted, Independent, and Assisted Living Facilities

(4) Commercial Properties and Common Areas

Because calls for service often do not originate at a Germantown residential property, all calls for service that do not fall within the residential categories listed above are considered commercial properties and/or “common area” calls. Examples of these are all other incidents requiring the services of the department, such as vehicular accidents, traffic stops and traffic control, incidents at retail stores and within our parks and public spaces.

(5) Police District

The GPD monitors and tracks total call volume city-wide to identify trends and request and/or allocate resources between police districts accordingly. Because the services of the GPD are currently divided into seven strategic districts, the impact to the department has also been considered by police district.

Statistical Analysis

Total Incident Call Volume

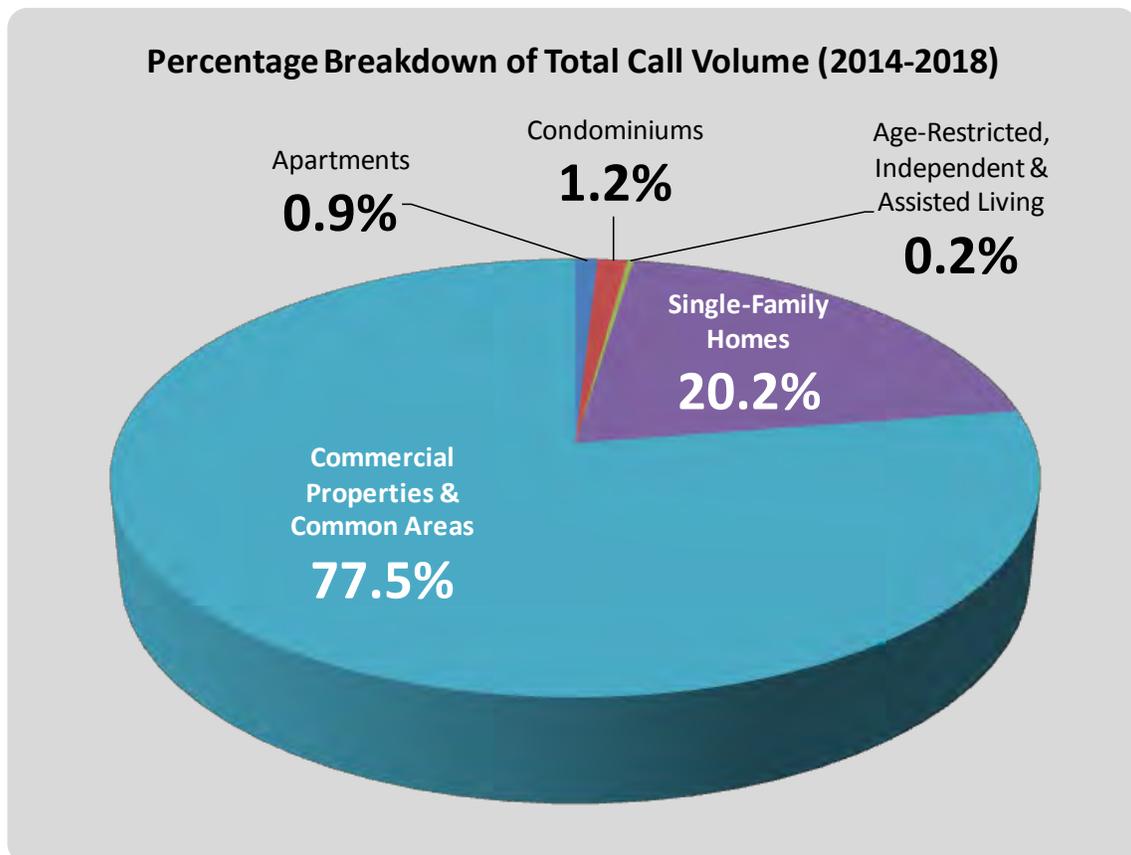
From the beginning of calendar year 2014 through the end of 2018, the GPD had a total of 185,324 calls for service within the City (see Table 1). The average estimated annual call volume over these five years was 37,065. On average, there have been an approximately 102 incidents each day since 2014. As illustrated in Figure 2, 77.5% of these incidents took place in commercial and common areas and 22.5% were assigned to a residential address. The large majority of these residential calls for service originated from a single-family home. Less than 1% of the total calls for police services were assigned to a Germantown apartment address.

Call for Service Origination	2014	2015	2016	2017	2018	5-Year Totals
Apartments	278	360	384	306	284	1,612
Condominiums	380	534	439	458	407	2,218
Single-family Homes*	7,063	8,411	7,733	7,582	6,655	37,444
Age-Restricted, Independent & Assisted Living	69	81	98	88	80	416
Commercial Properties & Common Areas	26,635	25,315	33,358	28,905	29,421	143,634
Total Calls	34,425	34,701	42,012	37,339	36,847	185,324

* District incident calculations for the total single-family home population was estimated using findings from the sample set

Table 1. Total Incidents Call Volume from 2014-2018

Figure 2. Total Police Incident Call Volume Percentages within Germantown (2014-2018)



Residential Calls for Service

Incident Analysis

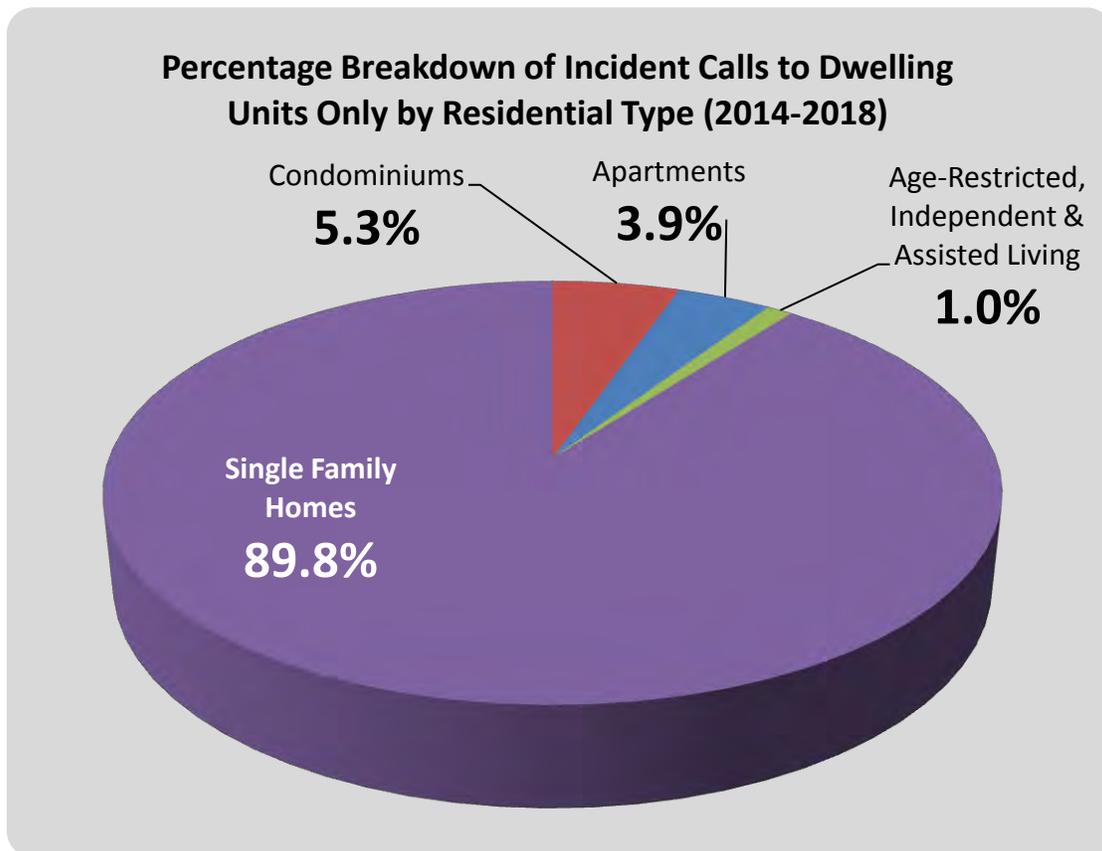
During this same five-year period, 22.5% of total calls for police services were assigned to a Germantown residential address. The GPD responded to an estimated 41,690 residential incidents within City limits. Over five years, the average annual number of residential incidents per year for all districts was 8,338 (see Table 2). This average annual number of residential incidents equates to 22.8 residential incidents per day during this five-year period. As illustrated in Figure 3, nearly nine out of every ten calls for service originated from a single-family home.

	Dwelling Unit Count		Residential INCIDENTS						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	1014	1014	278	360	384	306	284	1612	322
Condominium	1198	1198	380	534	439	458	407	2218	444
Single-Family*	2929	13148	7063	8411	7733	7582	6655	37444	7489
Assisted Living	721	721	69	81	98	88	80	416	83
APPROX Totals	5862	16081	7790	9386	8654	8434	7426	41690	8338

* Incident calculations for the total single family home population was estimated using findings from the sample set

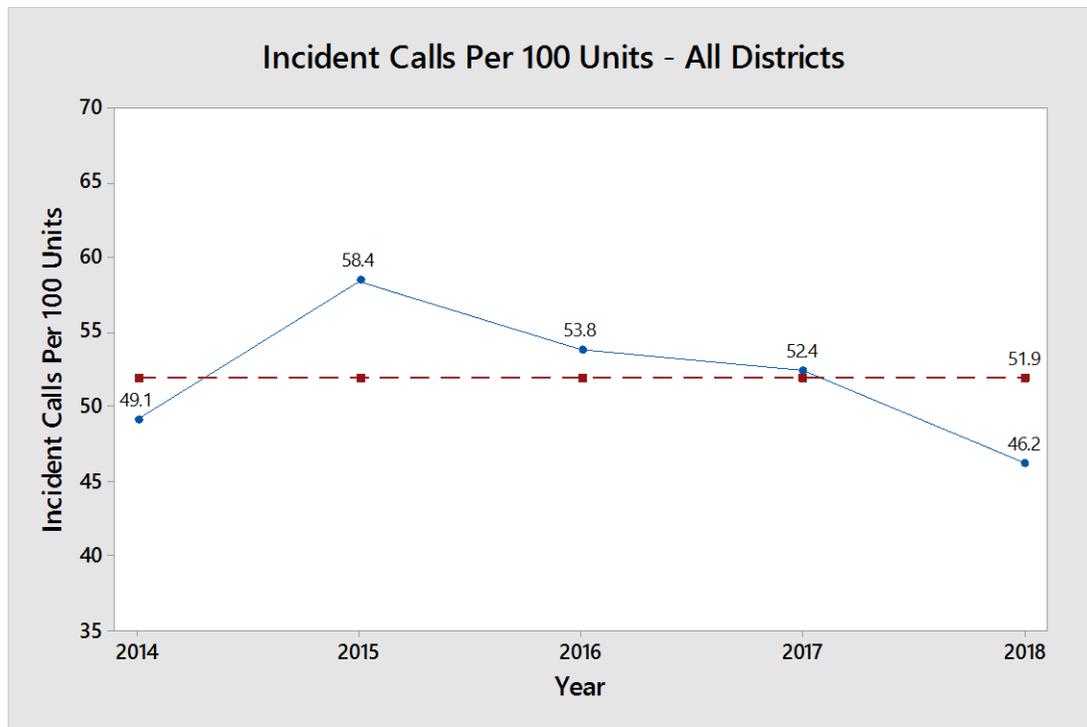
Table 2. Total Residential Incident Call Volume from 2014-2018

Figure 3. Total Residential Police Incident Call Volume Percentages within Germantown (2014-2018)



For every 100 dwelling units throughout the City, police officers have responded to a call for service an average of 51.9 times per year. The estimated average annual number of residential incidents for this five-year period was between 46 and 59 for every 100 units.

Figure 4. All Police Districts: Annual Incidents per 100 Units (2014-2018)



Residential Incident Analysis highlights:

- **Single-family Homes.** Due to the complexity of and reporting limitations in how police incident data are recorded and stored, a sample set of single-family homes from each district was analyzed. The results and findings from the sample set were then applied to each district's single-family population. 89.8% of calls for service from a Germantown residence have been made from a single-family home dwelling unit. Since 2014, the GPD has responded to a Germantown single-family home dwelling unit an average of 7,489 times per year, or approximately 624 calls per month.
- **Apartment Calls.** 3.9% of calls for service from a Germantown residence have been made from an apartment dwelling unit. Since 2014, the GPD has responded to a Germantown apartment dwelling unit an average of 322 times per year, or approximately 27 calls per month.
- With only the past five years of police data available, it is inadvisable to project any future call trends either from the districts or from the individual dwelling types. This limited sample size was insufficient to make useful projections. Additionally, incident and crime rates are highly responsive to the activities of the police department and new initiatives or modifications of existing programs may cause significant variation in calls for service. With these limitations on our data, our research team looked at the number of incident calls per 100 units each year within each dwelling type over the past five-year period. The resulting five-year average of each dwelling type was used as an estimation for the next 10 years. Based on historical experience, there will likely be variation both above and below the estimated average incident call numbers in

the future. As new developments are projected to be constructed and occupied, the average call-to-unit ratio associated with that dwelling type has been used to estimate additional increases in overall call volume for GPD services. If more data is collected in coming years, a forecast analysis might be utilized to project out future demand for services.

Crime Analysis

The Police Department responded to an estimated 4,006 residential crimes associated with all dwelling types from 2014-2018.

	Dwelling Unit Count		Residential CRIMES						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	1014	1014	36	51	71	59	63	280	56
Condominium	1198	1198	48	82	77	74	63	344	69
Single-Family*	2929	13148	553	629	652	767	700	3302	660
Assisted Living	721	721	10	23	23	10	14	80	16
APPROX Totals	5862	16081	647	785	823	910	840	4006	801

* Crime calculations for the total single family home population was estimated using findings from the sample set

Table 3. Total Residential Crime Call Volume from 2014-2018

Residential Incident to Crime statistics/ratio (2014 - 2018):

Dwelling Type	Calls for Service		Approx # of incidents for 1 crime
	Incidents	Crimes	
Apartments	1612	280	5.76
Condominiums	2218	344	6.45
Single-family Homes*	37444	3302	11.34
Assisted Living	416	80	5.20

*Crime calculations for the total single-family home population was estimated using findings from the sample set

Table 4. Incident to Crime Ratio from 2014-2018

Residential Call Volume highlights (2014 - 2018):

- **Apartments.** 6.9% of estimated residential crimes during this period were associated with an apartment dwelling unit address. Of the 1,612 apartment incidents, 280 were classified as crimes. The incident-to-crime ratio for apartments during this most recent five-year period is 5.76 incidents for every one crime (5.76:1).
- **Condominiums.** 8.5% of estimated residential crimes during this period were associated with a condominium's dwelling unit address. Of the 2,218 condominium incidents, 344 were classified as crimes. The incident-to-crime ratio for condominiums during this most recent five-year period is 6.45 incidents for every one crime (6.45:1).

- **Single-Family Homes.** 82.4% of estimated residential crimes during this period were associated with a single-family home dwelling unit address. Of the 37,444 estimated single-family home incidents, 3,302 were classified as crimes. The incident-to-crime ratio for single-family homes during this most recent five-year period is 11.34 incidents for every one crime (11.34:1).
- **Assisted Living.** 1.9% of estimated residential crimes during this period were associated with an age-restricted, independent and assisted living dwelling unit address. Of the 416 age-restricted, independent and assisted living incidents, 80 were classified as crimes. The incident-to-crime ratio for age-restricted, independent and assisted living dwelling units during this most recent five-year period is 5.20 incidents for every one crime (5.20:1). The Assisted Living dwelling type experienced the highest number of crimes to incidents during this five-year period.

As new developments are projected to be constructed and occupied, the incident to crime ratio associated with that dwelling type has been used to estimate additional increases in overall call volume for GPD services.

Dwelling Unit Type Analysis

Research question:

Is there a statistical difference between the numbers of calls for service per unit by dwelling type?

By taking the number of incident calls and dividing them out by the number of units that the respective dwelling type had in that calendar year, we can average the number of incident calls per 100 units.

As shown, Apartments averaged 31.8 incident calls per 100 units over the past five years. Respectively, Condominiums averaged 37; Single-family Homes averaged 57.4; and Independent and Assisted Living averaged 12.2 incident calls per 100 units.

The general linear model was used so that the simultaneous effects of multiple variables including continuous and discrete variables could be incorporated into the analysis. In the case of the Police Department analyses, discrete variables included the dwelling category (apartment, condominium, single-family home, and assisted living), the specific apartment, condominium, or assisted living facility, and the Police District. The continuous variables included the incident and crime call rates, the number of units in each dwelling category or specific development, and the year of the observed data. The general linear model allows us to observe significant differences, if there are any, between the discrete variables in terms of the calls per 100 units, and the change in those rates over time. The general linear model assesses repeated measures data by conducting all pairwise comparisons when there are more than two groups or levels for comparison. The p-value resulting from the analysis was used to determine a statistically significant finding, with a p-value at or below 0.05 considered to be significant.

Using the General Linear Model to test for statistical significance between dwelling types, it is evident by the resulting p-values that there is not a statistical significance between the dwelling types of Apartments and Condominiums, however, there is a difference between the other dwelling types. Single-family homes being higher and Independent and Assisted Living being lower.

Dwelling Type	Year	Calls for Service		Incident Calls per 100 Units	Avg. Incident Calls per 100 Units
		Incidents	# of Units		
Apartments	2014	278	1014	27.4	31.8
	2015	360	1014	35.5	
	2016	384	1014	37.9	
	2017	306	1014	30.2	
	2018	284	1014	28.0	
Age-Restricted, Independent, and Assisted Living	2014	69	636	10.8	12.2
	2015	81	636	12.7	
	2016	98	689	14.2	
	2017	88	721	12.2	
	2018	80	721	11.1	
Condominiums	2014	380	1198	31.7	37.0
	2015	534	1198	44.6	
	2016	439	1198	36.6	
	2017	458	1198	38.2	
	2018	407	1198	34.0	
Single Family Homes*	2014	7063	12956	54.5	57.4
	2015	8411	13002	64.7	
	2016	7733	13047	59.3	
	2017	7582	13120	57.8	
	2018	6655	13148	50.6	

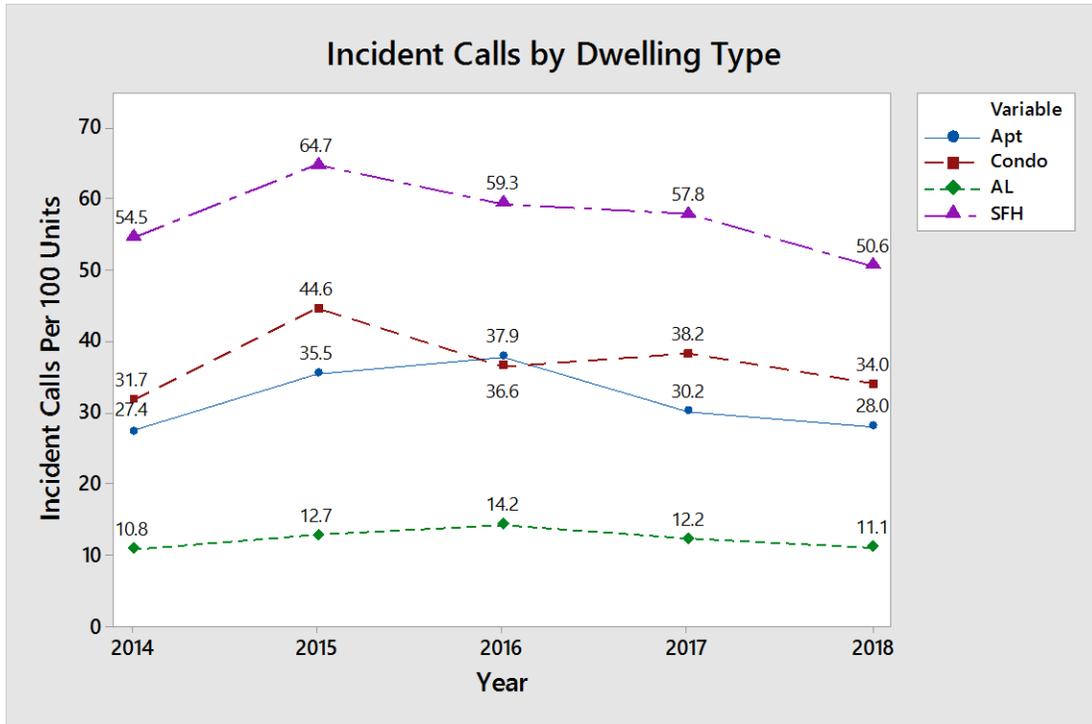
* Incident calculations for the total single-family home population was estimated using findings from the sample set

Table 5. Incident Calls per 100 Units by Dwelling Type

Police Incident Comparisons by Dwelling Type			
Dwelling Type	Compared To	Result	p-value
Apartments	Assisted Living	Apartments higher	<.0001
Apartments	Condominiums	No difference	0.073
Apartments	Single Family Homes	Single Family Homes higher	<.0001
Assisted Living	Condominiums	Condominiums higher	<.0001
Assisted Living	Single Family Homes	Single Family Homes higher	<.0001
Condominiums	Single Family Homes	Single Family Homes higher	<.0001

Table 6. Incident Calls per Unit by Dwelling Type

Figure 5. Annual Incident Calls per Unit: All Dwelling Types (2014-2018)



Apartment Historical Analysis

While an extensive amount of data was gathered and analyzed for each of the existing apartment developments to support the research team’s analysis, a limited number of variables were identified as potential factors in relation to incidents and crimes. Variables, such as age of the tenants, income, health status, number of residents per unit, and the length of occupancy are not public information and could not be obtained. Without enough data to accurately assess all possible variables and their effect on the number of calls for service by apartment development, our estimation models used the historical five year call volume averages for all apartments to make call volume estimations for each potential apartment development included in the study.

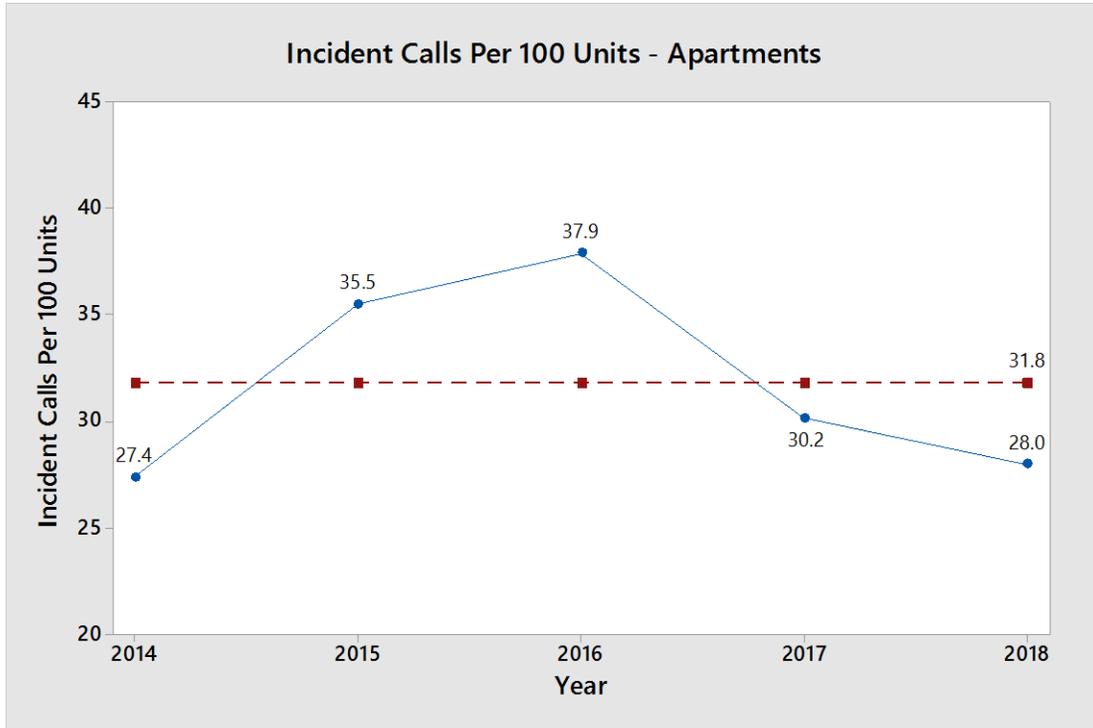
Research Question:

What is the average annual number of incidents from apartments for the past five years?

The total number of incidents from all five apartment developments was gathered. The data was broken down by year as well as development.

Between 2014 and 2018 there was an average of 322 yearly incident calls related to all five of the apartment developments. Since the number of apartments has remained the same during this five-year period, we estimate that there will be approximately 322 calls from them moving forward as well. For any future apartment developments, the calculated 31.8 incident calls per 100 units will be used to estimate any future call volume.

Figure 6. Annual Incident Calls per Unit: Apartments (2014-2018)



Apartment Incidents			
Year	Number of Calls To Apartments	Total Number of Apartment Units	Annual Calls per 100 Units
2014	278	1014	27.4
2015	360	1014	35.5
2016	384	1014	37.9
2017	306	1014	30.2
2018	284	1014	28.0
Apartment Estimates			
Avg.	322	1014	31.8

Table 7. Annual Incident Calls per 100 Units: Apartment Estimates

Research Question:

Is there a statistical difference in the incident calls by Apartment Development?

Table 8 shows the total number of incident and crime calls by year and in their respective apartment developments. By taking the number of incident and crime calls and dividing them out by the number of units that the apartment development has, we can average the number of calls per 100 units.

Apartment	Calls for Service		# of Units	Incident Avg. per location
	Incidents	Crimes		
Farmington Gates	61	9	182	34.5
Farmington Gates	79	12	182	
Farmington Gates	68	17	182	
Farmington Gates	68	12	182	
Farmington Gates	38	10	182	
The Retreat	58	10	280	25.5
The Retreat	58	7	280	
The Retreat	99	20	280	
The Retreat	74	9	280	
The Retreat	68	12	280	
The Bridges	24	3	252	19.5
The Bridges	65	9	252	
The Bridges	65	7	252	
The Bridges	49	17	252	
The Bridges	43	11	252	
The Vineyards	42	5	200	29.7
The Vineyards	91	13	200	
The Vineyards	60	8	200	
The Vineyards	39	7	200	
The Vineyards	65	15	200	
Westminster	93	9	100	79.6
Westminster	67	10	100	
Westminster	92	19	100	
Westminster	76	14	100	
Westminster	70	15	100	

Table 8. Annual Incident Calls per 100 Units: Apartment Estimates

The Bridges averaged 19.5 total calls for service per 100 units over the past five years. Respectively, Farmington Gates averaged 34.5, Retreat 25.5, Vineyards 29.7, and Westminster averaged 79.6 calls per 100 units.

To account for change over time, a general linear model analysis was applied, using both the specific apartment development and year as analysis variables. This model compared each apartment development against each of the other apartment developments.

Total Call Rate Comparisons by Apartment Development			
Development	Compared To	Result	p-value
Bridges	Farmington Gates	Farmington Gates higher	0.0167
Bridges	Retreat	No difference	0.3101
Bridges	Vineyard	No difference	0.0914
Bridges	Westminster	Westminster higher	<.0001
Farmington Gates	Retreat	No difference	0.1323
Farmington Gates	Vineyard	No difference	0.4123
Farmington Gates	Westminster	Westminster higher	<.0001
Retreat	Vineyard	No difference	0.4727
Retreat	Westminster	Westminster higher	<.0001
Vineyard	Westminster	Westminster higher	<.0001

Table 9. Incident Calls per Unit for Existing Apartments (2014-2018)

While there are observed differences between the call to unit ratios of each of the apartment developments, there are statistical differences between a few of the apartment development comparisons as seen above by the resulting p-value. An analysis based on a richer data set that included variables such as those described above might yield different results. Because this is not possible, our research team was unable to continue our analysis of incident calls for service by apartment development beyond this point. Therefore, all analysis for future apartment developments, regardless of apartment type or classification, will be based upon the five-year call volume average referenced in Figure 6 and Table 7.

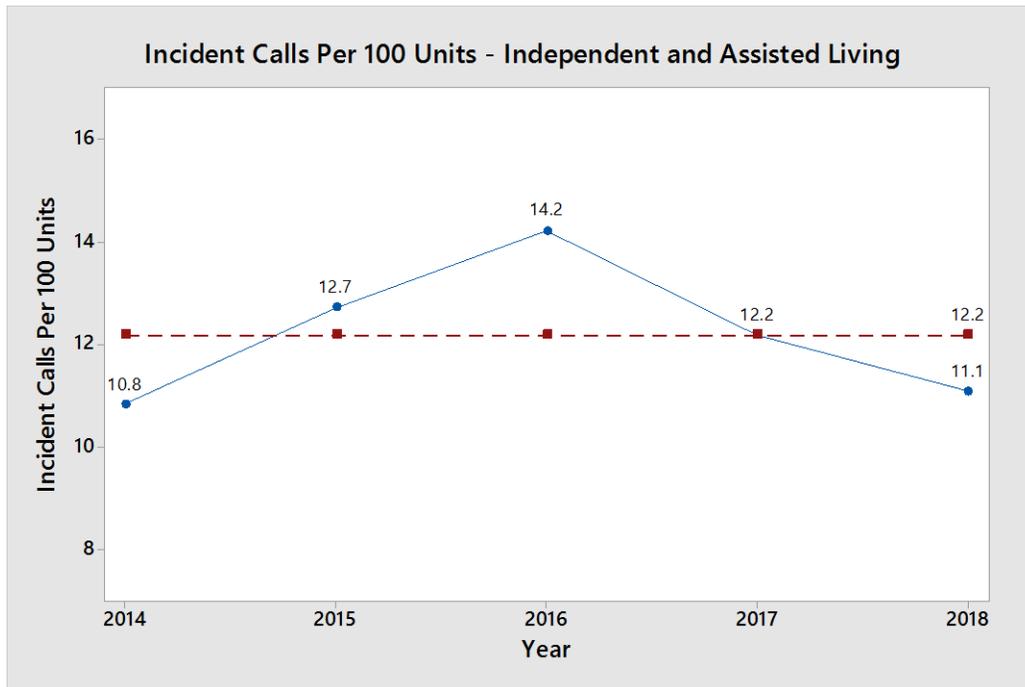
Age-Restricted, Independent, and Assisted Living Historical Analysis

Research Question:

What is the average annual number of incidents from age restricted, independent, and assisted living developments for the past five years?

Age restricted, independent, and assisted living developments saw the lowest number of incident calls compared to the other dwelling unit types. On average there were 88 incident calls which resulted in a five-year average of 12.2 incident calls per 100 units.

Figure 7. Annual Incident Calls per Unit: Independent and Assisted Living (2014-2018)



Independent & Assisted Living Incidents			
Year	Number of Calls to Assisted Living	Total Number of Assisted Living Units	Annual Calls per 100 Units
2014	69	636	10.8
2015	81	636	12.7
2016	98	689	14.2
2017	88	721	12.2
2018	80	721	11.1
Independent & Assisted Living Estimates			
Avg.	88	721	12.2

Table 10. Annual Incident Calls per 100 Units: Independent and Assisted Living Estimates

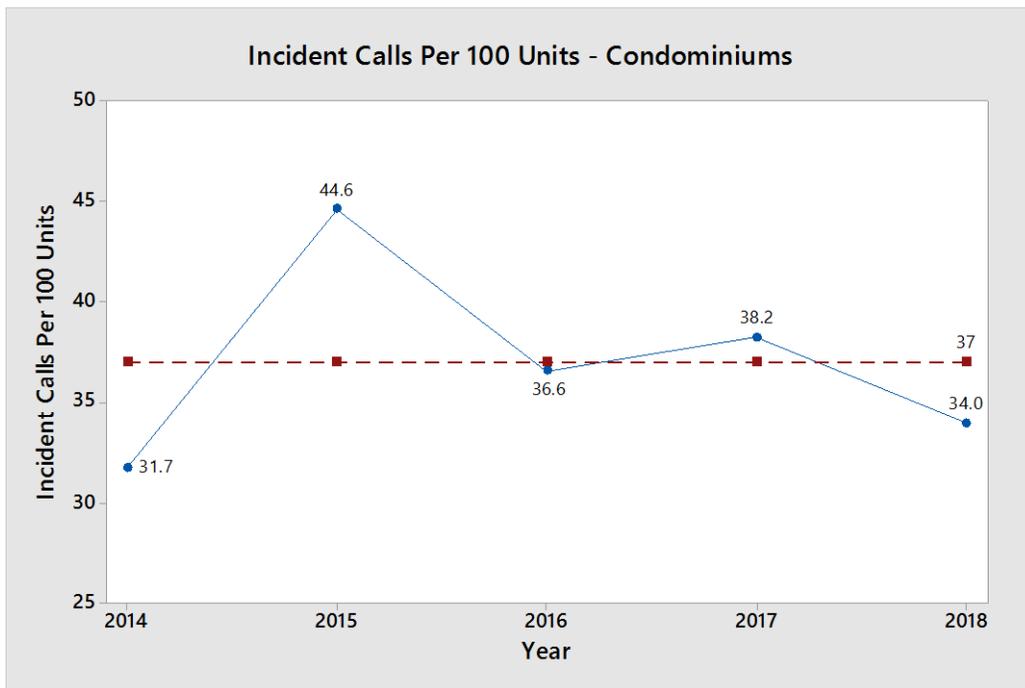
Condominium Trend Analysis

Research Question:

What is the average annual number of incidents from condominiums for the past five years?

There was an average of 443 yearly incident calls recorded to a condominium address during the five-year period and there has been no change to the number of condominium units during that time either. The average total calls for service per unit was 37 for service for every 100 condominium units. For any future condominium developments, the calculated 37.0 incident calls per 100 units will be used to estimate any future call volume.

Figure 8. Annual Incident Calls per Unit: Condominiums (2014-2018)



Condominium Incidents			
Year	Number of Calls to Condos	Total Number of Condo Units	Annual Calls per 100 Units
2014	380	1198	31.7
2015	534	1198	44.6
2016	438	1198	36.6
2017	458	1198	38.2
2018	407	1198	34.0
Condominium Estimates			
2020	443	1198	37.0

Table 11. Annual Incident Calls per 100 Units: Condominium Estimates

Single-Family Home Trend Analysis

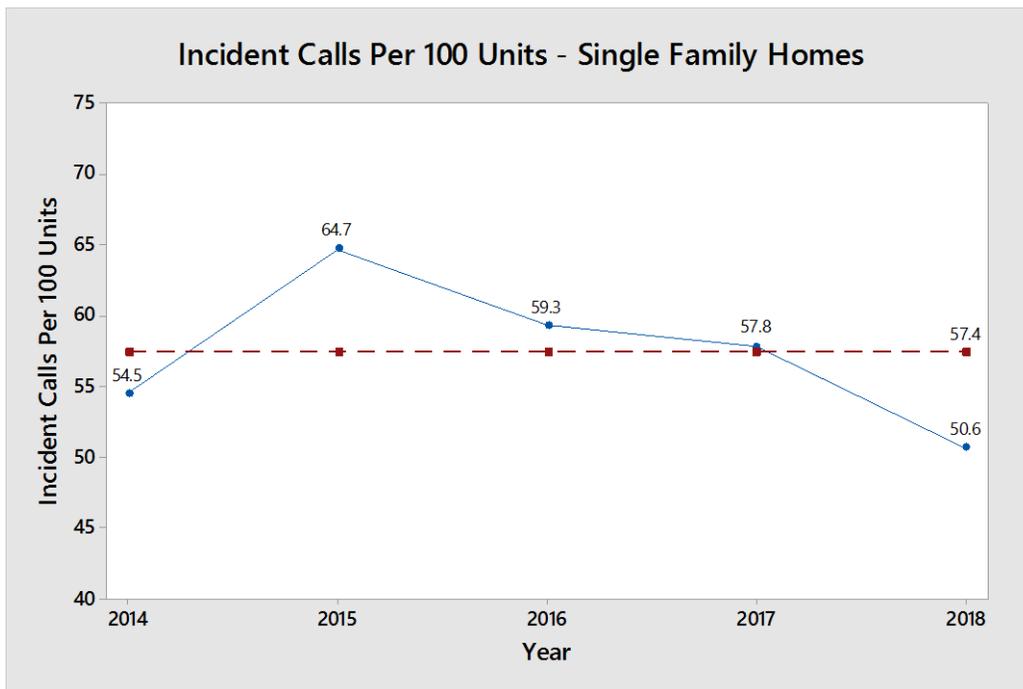
Research Question:

What is the average annual number of incidents from single-family homes for the past five years?

As stated earlier, only a sample set of single-family homes from each district could be obtained with the exception of district 5 where there are only 15 single-family homes currently and all 15 homes were selected. The city-wide sample set of 2,929 homes is 22.3% of the 13,148 homes within the City and significant enough for the research team to apply the resulting sample set findings to the population at large.

Although there has been growth in the number of single-family homes to areas in Germantown, the houses selected for the purpose of this analysis were all built prior to 2014 so a full five years of data could be studied.

Figure 9. Annual Incident Calls per Unit: Single-family homes (2014-2018)



Between 2014 and 2018 there was an estimated 37,444 incidents resulting from a single-family home dwelling type. This is an estimated annual average of 7,489 incidents or 57.4 incidents for every 100 single-family home units. For any future single-family home developments, the calculated 57.4 incident calls per 100 units will be used to estimate any future call volume.

Single-family Home Incidents			
Year	Number of Calls to Single-family Homes	Total Number of Single-Family Homes	Annual Calls per 100 Units
2014	7063	12956	54.5
2015	8411	13002	64.7
2016	7733	13047	59.3
2017	7582	13120	57.8
2018	6655	13148	50.6
Single-family Home Estimates			
2020	7489	13148	57.4

Table 12. Annual Incident Calls per 100 Units: Single-family Home Estimates

Police District Impact Analysis

The Police District Impact Analysis for each of the seven districts begins with a brief profile summary, including a basic description of the number of existing dwelling units by district. After this general orientation, an analysis of historical data, dating back to 2014, from each of the district’s existing dwelling unit types has been completed to establish district-specific, five-year annual incident and crime volume averages. These averages will serve as the starting point (or “baseline”) before considering added call volume numbers from new residential developments. Each district analysis section concludes with a summary of the forecasted information, including an analysis of expected apartment impact.

Residential Dwelling Units by Police District

Table 13 provides a breakdown of the distribution of existing dwelling units among police districts. Constructed before the Smart Code zoning districts were established, the City’s existing 1,014 apartment dwelling units are patrolled by officers from Districts #1 and #3. District #3, the only district to include all four residential dwelling types, has the highest number of total dwelling units at 4,705.

POLICE DISTRICT	SmartCode Zoning	Apartments	Condominiums	Single Family Homes	Independent & Assisted Living	Dwelling Unit Totals by District
1	Yes	552	433	2,360	0	3,345
2	No	0	54	1,828	0	1,882
3	No	462	711	3,199	333	4,705
4	No	0	0	2,110	182	2,292
5	Yes	0	0	15	50	65
6	Yes	0	0	414	156	570
7	No	0	0	3,222	0	3,222
Dwelling Unit Totals by Type		1,014	1,198	13,148	721	16,081

Table 13. Existing Residential Dwelling Unit Count by Police District as of 8/2018

Smart Code Zoned Districts

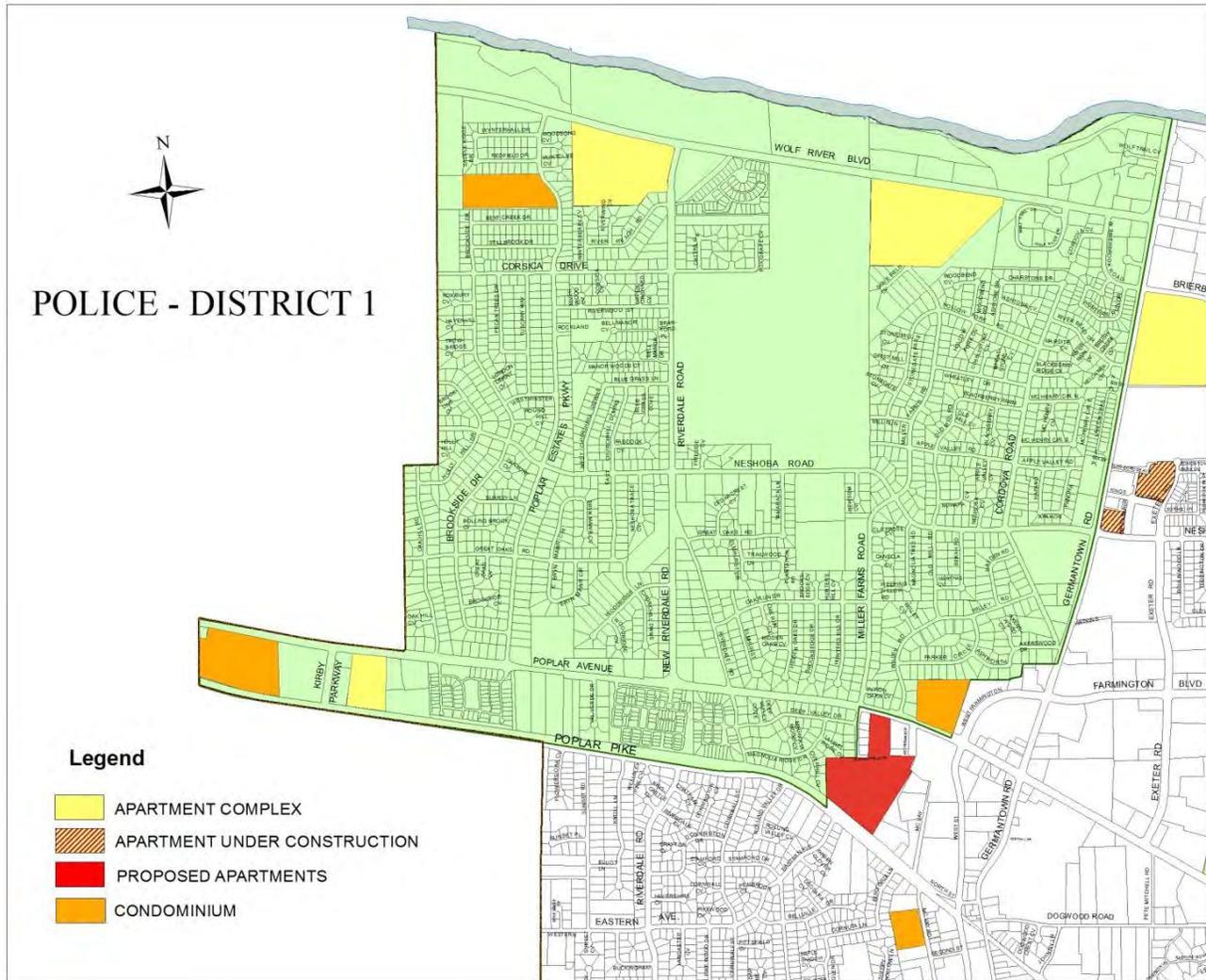
At present, three of the City’s seven police districts include Smart Code zoning: Police Districts #1, #5, and #6. This study anticipates that these three districts will include new multi-family developments, specifically apartment developments, based on the current land-use zoning.

Districts #2, #3, #4, and #7 are not expected to include new multi-family development, unless re-zoning applications are submitted and are approved after a thorough review process. Assuming the City’s current land use zoning does not change, there should be no direct impact to Districts #2, #3, #4, and #7 from new apartment development through 2028.

POLICE DISTRICT #1

Located in the upper northwest section of the City, Police District #1 includes the second largest number of existing dwelling units within its boundaries. In addition to a high residential unit count when compared to other police districts, the City's thriving Wolf River Medical District is also located at the northern edge of the district. The district is bordered by Memphis to the north and west, Poplar Pike to the south, and Germantown Road to the east. One of the City's Key Commercial Areas, Poplar Avenue West, is also located within this district's boundaries and includes Smart Code zoning.

Figure 10. Police District #1 Territory Map



Existing Dwelling Unit Analysis

Apartments

The 552 apartment dwelling units at the Vineyards, The Bridges, and Westminster account for just over 16% of all dwelling units within the district.

Figure 11. Police District #1 Total Dwelling Unit Count



Condominiums & Townhomes

Three of the City’s seventeen existing condominium developments are located within the boundaries of this district. The 433 units at Bavarian Village, Fountain Square, and Riverdale Farms account for 13% of all dwelling units within the district.

Single-Family Homes

The 2,360 single-family homes account for nearly 71% of all dwelling units within this district.

Age-Restricted, Independent and Assisted Living

There are no age-restricted dwelling units or assisted living units within the district’s boundaries and no age-restricted dwelling units or assisted living units are currently proposed or are being considered at this time.

Residential Calls for Service

Incident Analysis

The residential incident analysis for this district gathered incident data by dwelling type dating back to 2014. For apartment, condominium, and age-restricted, independent, and assisted living dwelling units, data was available using the actual number of dwelling units within the district. Given the number of single-family homes within the district, incident data was retrieved by address from a sample set of the district’s single-family homes (see Appendix D). A collection of more than 500 single-family homes was selected in the district sample. This sample included a representation of homes on multiple streets, evenly dispersed throughout the district. The sample’s incidents per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of incidents for all single-family homes. Total annual incidents and five-year averages were

calculated by dwelling type to provide an approximation of annual residential incidents for the five-year period.

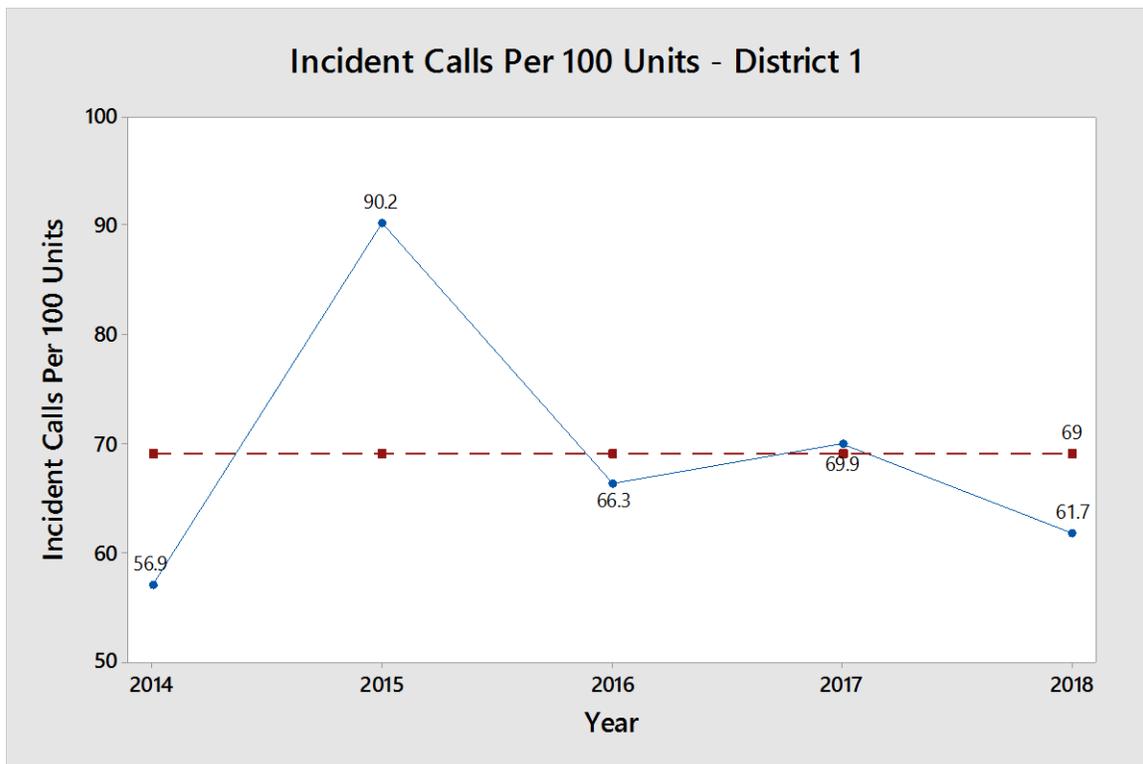
	Dwelling Unit Count		Residential INCIDENTS						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	552	552	159	223	217	164	178	941	188
Condominium	433	433	228	341	258	272	241	1340	268
Single-Family*	581	2360	1515	2453	1743	1901	1645	9257	1851
Assisted Living	-	-	-	-	-	-	-	-	-
APPROX Totals	1566	3345	1902	3017	2218	2337	2064	11538	2308

* District incident calculations for the total single family home population was estimated using findings from the sample set

Table 14. Residential Incidents: Police District #1 (2014-2018)

From the beginning of 2014 through the end of 2018, the average annual number of residential incidents in Police District #1 is 2,308 (see Table 14). This average annual number of residential incidents equates to approximately six residential incidents per day during this five-year period. At an estimated annual average of 69.0 residential incidents per 100 dwelling units (see Figure 12), this district makes requests for the services of the police department at a higher rate than all other police districts, and the 51.9 average for the entire City. The estimated average annual number of residential incidents for this five-year period is between 56 and 91 for every 100 units.

Figure 12. Police District #1: Annual Incidents per 100 Units (2014-2018)



Crime Analysis

As mentioned previously, incidents can sometimes result in criminal violations. Crimes associated with the dwelling unit sample sets, and corresponding incidents, were also collected for the five-year period (see Table 15). The sample's crime per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of crimes. Total annual crimes and five-year averages were calculated by dwelling type to provide an approximation of annual residential crimes for the five-year period. The estimated average annual number of residential crimes within this district is 2014 is 267.

	Dwelling Unit Count		Residential CRIMES						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	552	552	17	32	34	38	41	162	32
Condominium	433	433	39	57	50	55	45	246	49
Single-Family*	581	2360	130	191	154	256	195	926	185
Assisted Living	-	-	-	-	-	-	-	-	-
APPROX Totals	1566	3345	186	280	238	349	281	1334	267

* District crime calculations for the total single family home population was estimated using findings from the sample set

Table 15. Residential Crimes: Police District #1 (2014-2018)

The future incident and crime estimation model for this district assumes the annual incident and crime rates from existing dwelling units will remain consistent based upon the five-year history, and any fluctuations that will occur over the next ten years will ultimately follow the average of the past five years. These five-year average figures for residential incidents and crimes, in Tables 14 and 15, will serve as the 'baseline' call volume data from existing dwelling units within the district. New residential development constructed during the ten-year projection period will be assessed the appropriate incidents and resulting crime ratio associated with the dwelling type and the respective year. The estimated incident and crime numbers from new residential development will then be added to the appropriate year's baseline data (see Table 16).

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included four (4) properties that are either in the process of being developed or have been categorized as "underdeveloped" for the purposes of assisting in making residential incident projections for Police District #1. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 13 and Table 16 for identification purposes. While there is no guarantee that the "underdeveloped" properties will ever be redeveloped, they have been included in our ten-year projection for the purposes of forecasting maximum residential incidents.

Developments in Process:

#1A	Carrefour at the Gateway	Partially-zoned “T6” for Urban Core Zone and “T5” for Urban Center Zone within the Smart Code district, the property owners at this 10.12, two-acre location have submitted an application to redevelop the existing site. The approved outline plan calls for a mix of retail, commercial and office uses. If apartments were subsequently proposed and approved for this location, 31.8 annual incidents for every 100 units would need to be added to the incident forecasting model.
-----	--------------------------	--

Underdeveloped Properties:

#1B	Bank of Bartlett	Zoned “T6” for Urban Core Zone within the Smart Code district, our research team included 20 apartment dwelling units on this one-acre property for the purposes of forecasting maximum residential incident figures. If redeveloped in this manner, an additional six incidents per year can be expected from this location.
-----	------------------	---

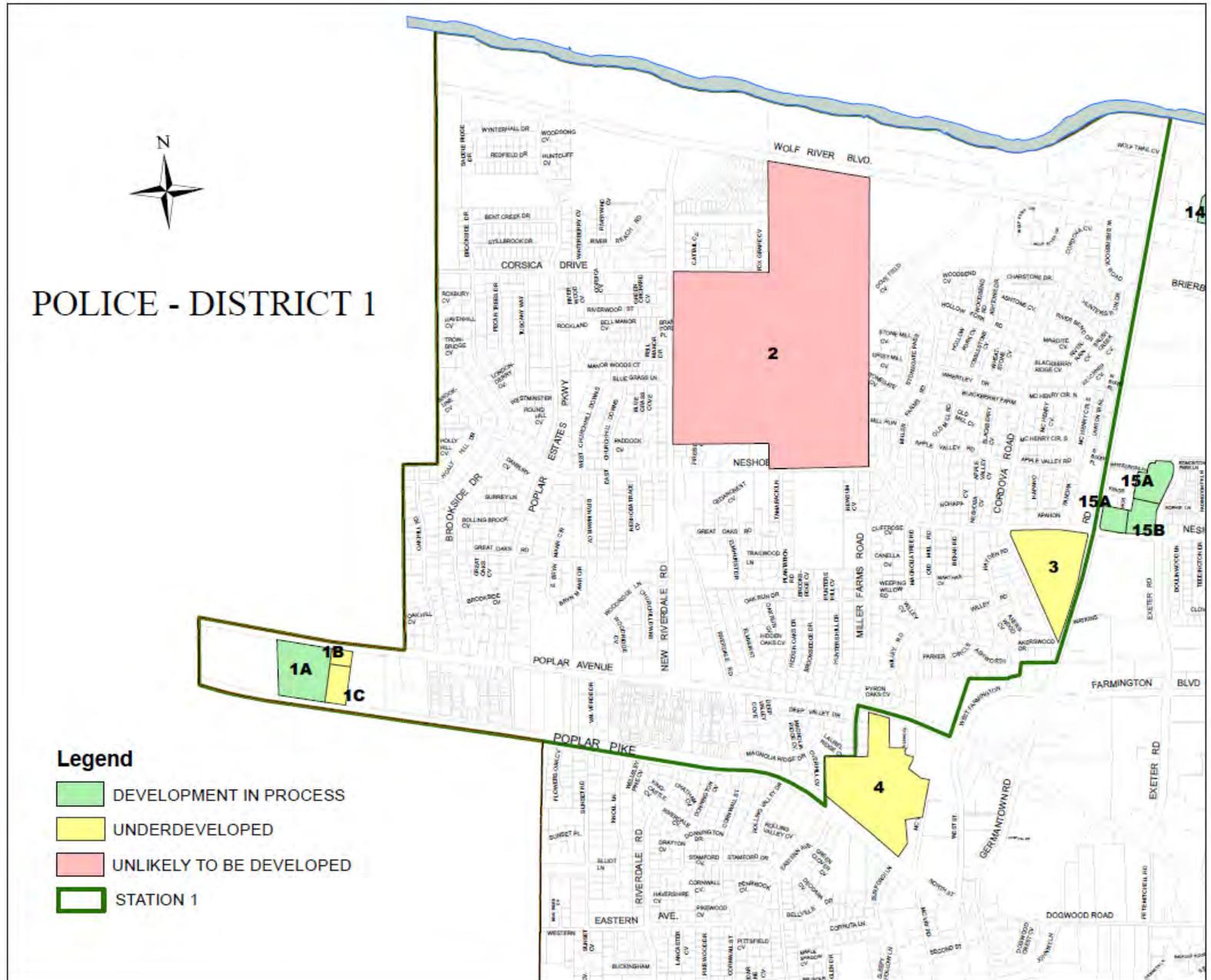
#1C	Kirby Professional Buildings	Partially-zoned “T6” for Urban Core Zone and “T5” for Urban Center Zone within the Smart Code district, our research team included 40 apartment dwelling units on this 2.64-acre property for the purposes of forecasting maximum residential incident figures. If redeveloped in this manner, an additional 13 incidents per year can be expected from this location.
-----	------------------------------	--

#3	Owen Jack R Revocable Trust	Zoned “R” for Residential, this 13.6-acre property was rezoned to Residential from its previous “T4” Smart Code zoning classification in 2018. Our research team included the addition of 39 single-family homes around 2023. If proposed and approved, the district can anticipate another 22 incidents per year from this location.
----	-----------------------------	---

Properties Unlikely To Be Developed < 10 Years:

Although categorized as “unlikely to be developed,” one (1) property (#2) has been recognized within the study; however, development or redevelopment of this property is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owner at this location, listed in red on Figure 13 and Table 16, desires or intends to change the current land use of this site at any point in the immediate future. This property was included because its total acreage fell within the general parameters established by the research team and its redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted this property does not fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 13. Police District #1: Property Analysis Map



POLICE DISTRICT #1	Calendar Year									
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Estimated Annual INCIDENTS From Existing Dwelling Units Within District	2308	2308	2308	2308	2308	2308	2308	2308	2308	2308
Estimated Annual CRIMES From Existing Dwelling Units Within District	267	267	267	267	267	267	267	267	267	267

Projected Annual Incidents Per 100 Units By Dwelling Type	Apartments	APT	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	
	Single Family Homes	SFH	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4
	Condominiums	CO	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
	Age-Restricted, Ind. & Asst. Living	AL	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2

Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type	Additional Annual Incidents from New Residential Development											
Developments in Process																		
1A	Carrefour	T5/T6	10.12	20	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0
Underdeveloped Properties																		
1B	Bank of Bartlett	T6	1	20	20	APT	0	0	0	0	6	6	6	6	6	6	6	6
1C	Kirby Professional Buildings	T5/T6	2.64	15	40	APT	0	0	0	0	13	13	13	13	13	13	13	13
3	Owen Jack R Revocable Trust	R	13.6	2.904	39	SFH	0	0	0	0	22	22	22	22	22	22	22	22
Properties Unlikely To Be Developed < 10 Yrs																		
2	Fulmer Estate	R	190.62	2.904	554	SFH	0	0	0	0	0	0	0	0	0	0	0	0

Estimated Annual Residential INCIDENT Totals: District #1	2308	2308	2308	2308	2349	2349	2349	2349	2349	2349
Estimated Annual Residential CRIME Totals: District #1	267	267	267	267	272	272	272	272	272	272

By New Residential Development Type											
Apartments	Annual Incidents	0	0	0	0	19	19	19	19	19	19
	Annual Crimes (5.76:1)	0	0	0	0	3	3	3	3	3	3
Single Family Homes	Annual Incidents	0	0	0	0	22	22	22	22	22	22
	Annual Crimes (11.34:1)	0	0	0	0	2	2	2	2	2	2
Condominiums	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (6.45:1)	0	0	0	0	0	0	0	0	0	0
Age-Restricted, Ind. & Asst. Living	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (5.20:1)	0	0	0	0	0	0	0	0	0	0

Table 16. Police District #1: Future Residential Incident and Crime Estimations

Residential Call Volume Projection Summary: Police District #1

If the five-year average annual number of residential incidents for existing dwelling units continues and new residential development/redevelopment were to take place as assumed, total residential incidents within Police District #1 are estimated to increase from an annual average of 2,308 to 2,349 by 2028. The average number of annual crimes committed within this district as a result of development/redevelopment of three properties is estimated to increase by five, from 267 to 272 by 2028 (see bottom of Table 16).

As shown in Table 17 below, the average daily incident number from residential dwelling units within the district is estimated to increase from 6.32 to 6.44.

POLICE DISTRICT #1: Residential Call Volume Analysis		Total Unit Count	Estimated Annual Call Volume (2028)	Residential Call Volume per Day
EXISTING DWELLING UNITS		3,345	2,308	6.32
Apartments*	Developments In Process	0	0	0.00
	Underdeveloped Properties	60	19	0.05
Condominiums	Developments In Process	0	0	0.00
	Underdeveloped Properties	0	0	0.00
Single-Family Homes	Developments In Process	0	0	0.00
	Underdeveloped Properties	39	22	0.06
Age-Restricted, Independent & Assisted Living	Developments In Process	0	0	0.00
	Underdeveloped Properties	0	0	0.00
Totals		3,444	2,349	6.44

*For the purposes of projecting call volume impact based on the maximum number of dwelling units possible, this study makes the assumption that all new multi-family development within Smart Code zoning districts will be applied for, approved, and developed as apartments over the next ten years.

Table 17. Police District #1: Residential Call Volume Projection Analysis

Apartment Impact

Police District #1

What are the likely impacts of future apartments and apartment building development on Police District #1?

APARTMENTS - Police District #1 (2028)				Year	2028			
Projected Annual Call Volume per 100 Apartment Units					31.8			
Property #	Project Name / Project Owner	Zoning Designation	# of units possible or approved	Calls per Year	Calls per Month	Calls per Day	Crimes per Year	
Underdeveloped Properties								
1B	Bank of Bartlett	T6	20	6	0.5	0.02	1	
1C	Kirby Professional Buildings	T5/T6	40	13	1.1	0.04	2	
Totals				60	19	1.6	0.05	3

Table 18. Police District #1: Apartment Call Volume Summary for 2028

At the time of this study, there are no pending applications for developments that include apartments within the Police District #1 territory. The rezoning of the 13.6-acre Owen Jack R Revocable Trust property (#3) to Residential (R) in 2018 removed the likelihood of a mixed-use development with multi-family housing at this location.

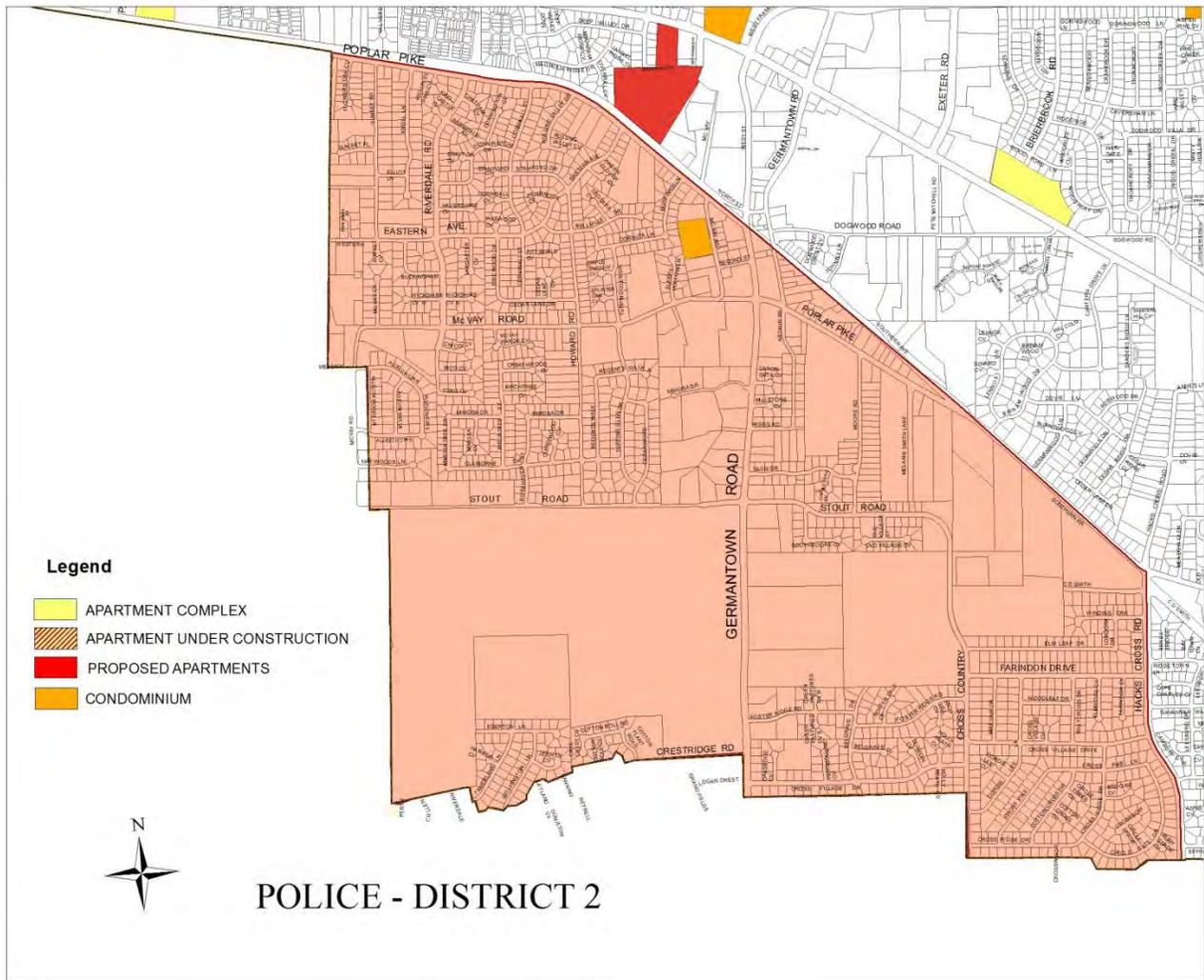
The Germantown Small Area Plan for the Poplar Avenue West gateway includes 58 acres that currently fall under Smart Code zoning. The Carrefour at the Gateway development project currently has an approved outline plan that calls for a mix of retail, commercial, and office uses and there are no other developments in process that include multi-family residential, including apartments, at the present time. If apartments were subsequently proposed and approved for this location, 31.8 annual incidents for every 100 units would need to be added to the incident forecasting model. For every 5.76 incidents, one incident would be categorized as a crime.

If the 60 possible multi-family dwelling units were to be proposed and approved as apartments for the Bank of Bartlett and Kirby Professional Buildings locations (as shown above in Table 18), an approximate amount of 19 incidents (.05 calls for service per day) and 3 crimes would be estimated annually by 2028.

POLICE DISTRICT #2

Located in the southwest corner of the City, Police District #2 is a relatively quiet district compared to the other seven districts. With only 1,882 total dwelling units and a significant amount of undeveloped property, residential development over the years in this district has predominantly been limited to single-family homes. The district is bordered by Memphis to the west and south, the Norfolk Southern railroad line to the north, and is split down the middle by Germantown Road. There are no Key Commercial Areas within this district and no areas are under the Smart Code zoning.

Figure 14. Police District #2 Territory Map



Existing Dwelling Unit Analysis

Apartments

There are no apartments currently located within the boundaries of this district and no apartment developments are currently proposed or are being considered at this time.

Figure 15. Police District #2 Total Dwelling Unit Count



Condominiums & Townhomes

One of the City’s seventeen existing condominium developments is located within the boundaries of this district. The 54 units at Greenleaf Condominiums account for 3% of all dwelling units within the district.

Single-Family Homes

Ninety-seven percent of all residential dwelling units within this district are single-family homes.

Age-Restricted, Independent and Assisted Living

There are no age-restricted dwelling units or assisted living units within the district’s boundaries and no age-restricted dwelling units or assisted living units are currently proposed or are being considered at this time.

Residential Calls for Service

Incident Analysis

The residential incident analysis for this district gathered incident data by dwelling type dating back to 2014. For apartment, condominium, and age-restricted, independent, and assisted living dwelling units, data was collected using the actual number of dwelling units within the district. Given the number of single-family homes within the district, incident data was retrieved by address from a sample set of the district’s single-family homes (see Appendix D). A collection of more than 500 single-family homes was selected in the district sample. This sample included a representation of homes on multiple streets, evenly dispersed throughout the district. The sample’s incidents per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of incidents for all single-family homes. Total annual incidents and five-year averages were

calculated by dwelling type to provide an approximation of annual residential incidents for the five-year period.

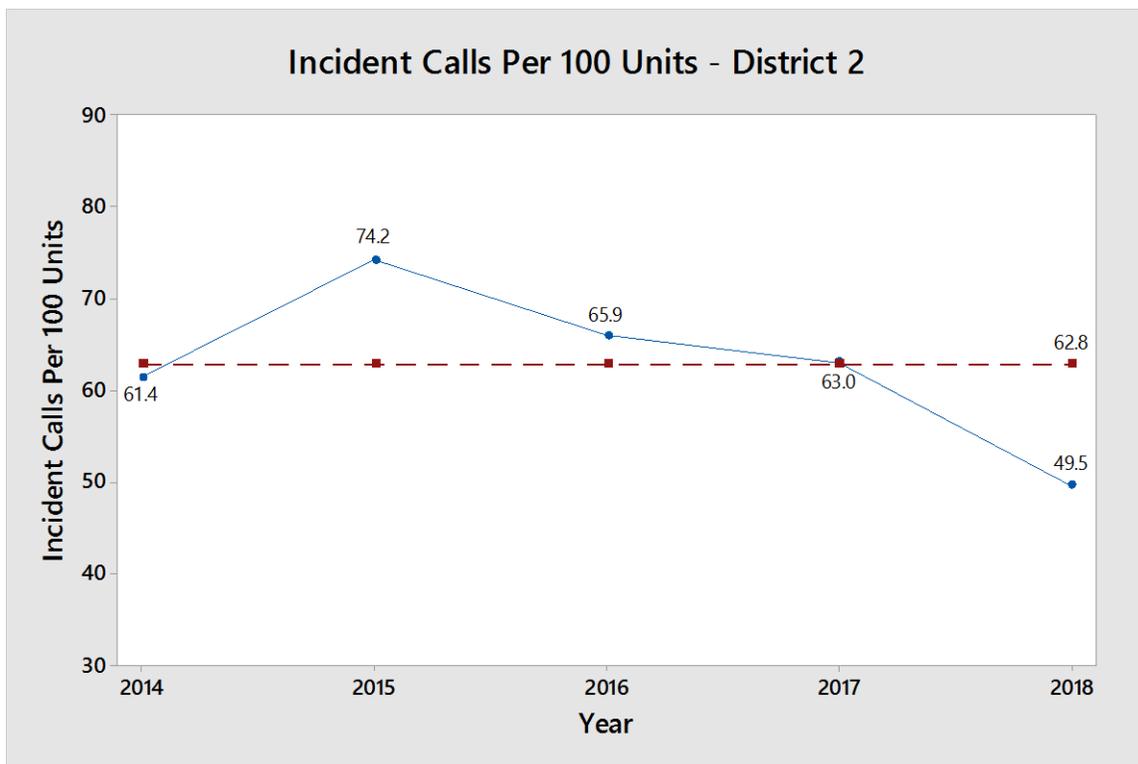
	Dwelling Unit Count		Residential INCIDENTS						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	54	54	20	23	15	11	21	90	18
Single-Family*	546	1828	1135	1373	1225	1175	911	5819	1164
Assisted Living	-	-	-	-	-	-	-	-	-
APPROX Totals	600	1882	1155	1396	1240	1186	932	5909	1182

* District incident calculations for the total single family home population was estimated using findings from the sample set

Table 19. Residential Incidents: Police District #2 (2014-2018)

From the beginning of 2014 through the end of 2018, the average annual number of residential incidents in Police District #2 is 1,182 (see Table 19). This average annual number of residential incidents equates to approximately three residential incidents per day during this five-year period. At an estimated annual average of 62.8 residential incidents per 100 dwelling units (see Figure 16), this district makes requests for the services of the police department at a higher rate than the 51.9 average for the entire City. The estimated average annual number of residential incidents for this five-year period has been between 49 and 74 for every 100 units.

Figure 16. Police District #2: Annual Incidents per 100 Units (2014-2018)



Crime Analysis

As mentioned previously, incidents can sometimes result in criminal violations. Crimes associated with the dwelling unit sample sets, and corresponding incidents, were also collected for the five-year period (see Table 20). The sample's crime per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of crimes. Total annual crimes and five-year averages were calculated by dwelling type to provide an approximation of annual residential crimes for the five-year period. The estimated average annual number of residential crimes within this district since 2014 is 129.

	Dwelling Unit Count		Residential CRIMES						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	54	54	1	1	2	1	2	7	1
Single-Family*	546	1828	167	141	100	117	110	636	127
Assisted Living	-	-	-	-	-	-	-	-	-
APPROX Totals	600	1882	168	142	102	118	112	643	129

* District crime calculations for the total single family home population was estimated using findings from the sample set

Table 20. Residential Crimes: Police District #2 (2014-2018)

The future incident and crime estimation model for this district assumes the annual incident and crime rates from existing dwelling units will remain consistent based upon the five-year history and any fluctuations that will occur over the next ten years will ultimately follow the average of the past five years. These five-year average figures for residential incidents and crimes, in Tables 19 and 20, will serve as the 'baseline' call volume data from existing dwelling units within the district. New residential development constructed during the ten-year projection period will be assessed the appropriate incidents and resulting crime ratio associated with the dwelling type and the respective year. The estimated incident and crime numbers from new residential development will then be added to the appropriate year's baseline data (see Table 21).

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included three (3) properties that are either in the process of being developed or have been categorized as "underdeveloped" for the purposes of assisting in making residential call volume projections for Police District #2. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 17 and Table 21 for identification purposes. While there is no guarantee that the "underdeveloped" properties will ever be redeveloped, they have been included in our ten-year projection for the purposes of forecasting maximum residential calls for service.

Developments in Process:

#7	Allelon Subdivision	Zoned "R" for Residential, these 50 single-family homes currently under development on this 25.68-acre site are estimated to be completed by calendar year 2020. Upon the completion of the development, these 50 single-family homes are estimated to add 29 incidents per year.
----	---------------------	---

Underdeveloped Properties:

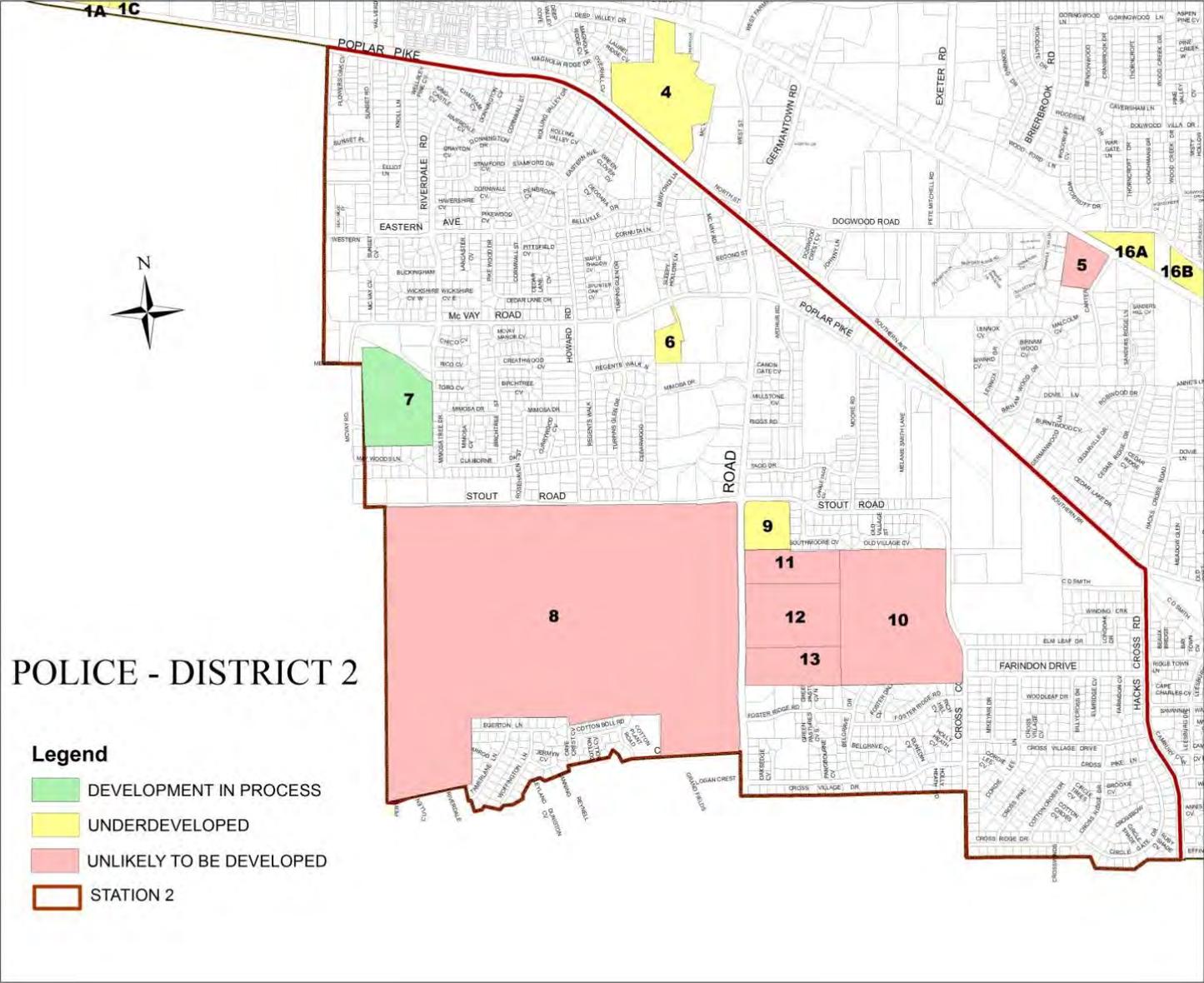
#6	Klycie Walters B. Jr.	Zoned "R" for Residential, the 4.1 acres at this location could have a maximum of 12 dwelling units. If the property were to be developed/redeveloped, another seven incidents can be expected per year.
----	-----------------------	--

#9	Montesi Letitia D. Living Trust	Zoned "R" for Residential, the 9.5 acres at this location could have a maximum of 28 dwelling units. If the property were to be developed/redeveloped, another 16 incidents can be expected per year.
----	---------------------------------	---

Properties Unlikely To Be Developed < 10 Years:

Although categorized as "unlikely to be developed," five (5) additional properties (#8, #10, #11, #12, and #13) have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these locations, listed in red on Figure 17 and Table 21, desire or intend to change the current land use of these sites at any point in the immediate future. These properties were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the properties fall within one of the Smart Code zoning districts, where apartments are currently permitted.

Figure 17. Police District #2: Property Analysis Map



POLICE DISTRICT #2			Calendar Year												
			2019	2020	2021	2022	2023	2024	2025	2026	2027	2028			
Estimated Annual INCIDENTS From Existing Dwelling Units Within District			1182	1182	1182	1182	1182	1182	1182	1182	1182	1182			
Estimated Annual CRIMES From Existing Dwelling Units Within District			129	129	129	129	129	129	129	129	129	129			
Projected Annual Incidents Per 100 Units By Dwelling			Apartments	APT	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8			
			Single Family Homes	SFH	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4		
			Condominiums	CO	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0		
			Age-Restricted, Ind. & Asst. Living	AL	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2		
Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type	Additional Annual Incidents from New Residential Development								
Developments in Process															
7	Allelon Subdivision	R	25.68	2.904	50	SFH	0	29	29	29	29	29	29	29	29
Underdeveloped Properties															
6	Klycie Walters B Jr.	R	4.1	2.904	12	SFH	0	0	0	0	0	0	7	7	7
9	Montesi Letitia D Living Trust	R	9.5	2.904	28	SFH	0	0	0	0	0	0	16	16	16
Properties Unlikely To Be Developed < 10 Yrs															
8	Melanie Taylor Marital Trust	R	310	2.904	900	SFH	0	0	0	0	0	0	0	0	0
10	Andrew McFadden	R	60.8	2.904	177	SFH	0	0	0	0	0	0	0	0	0
11	James McFadden	R	12.89	2.904	37	SFH	0	0	0	0	0	0	0	0	0
12	Nancy McFadden	R	25.39	2.904	74	SFH	0	0	0	0	0	0	0	0	0
13	John McFadden	R	14.3	2.904	42	SFH	0	0	0	0	0	0	0	0	0
Estimated Annual Residential INCIDENT Totals: District #2			1182	1211	1211	1211	1211	1211	1234	1234	1234	1234			
Estimated Annual Residential CRIME Totals: District #2			129	132	132	132	132	132	134	134	134	134			

By New Residential Development Type											
Apartments	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (5.76:1)	0	0	0	0	0	0	0	0	0	0
Single Family Homes	Annual Incidents	0	29	29	29	29	29	52	52	52	52
	Annual Crimes (11.34:1)	0	3	3	3	3	3	5	5	5	5
Condominiums	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (6.45:1)	0	0	0	0	0	0	0	0	0	0
Age-Restricted, Ind. & Asst. Living	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (5.20:1)	0	0	0	0	0	0	0	0	0	0

Table 21. Police District #2: Future Residential Incident and Crime Estimations

Residential Call Volume Projection Summary: Police District #2

If the five-year average annual number of residential incidents for existing dwelling units continues and new residential development were to take place as assumed, total residential incidents within Police District #2 are estimated to increase from an annual average of 1,182 to 1,234 by 2028. The average daily incident number from residential dwelling units within the district would increase from 3.2 to 3.4. The average number of annual crimes committed within this district as a result of new residential development is estimated to increase by five (see Table 21).

Apartment Impact

Police District #2

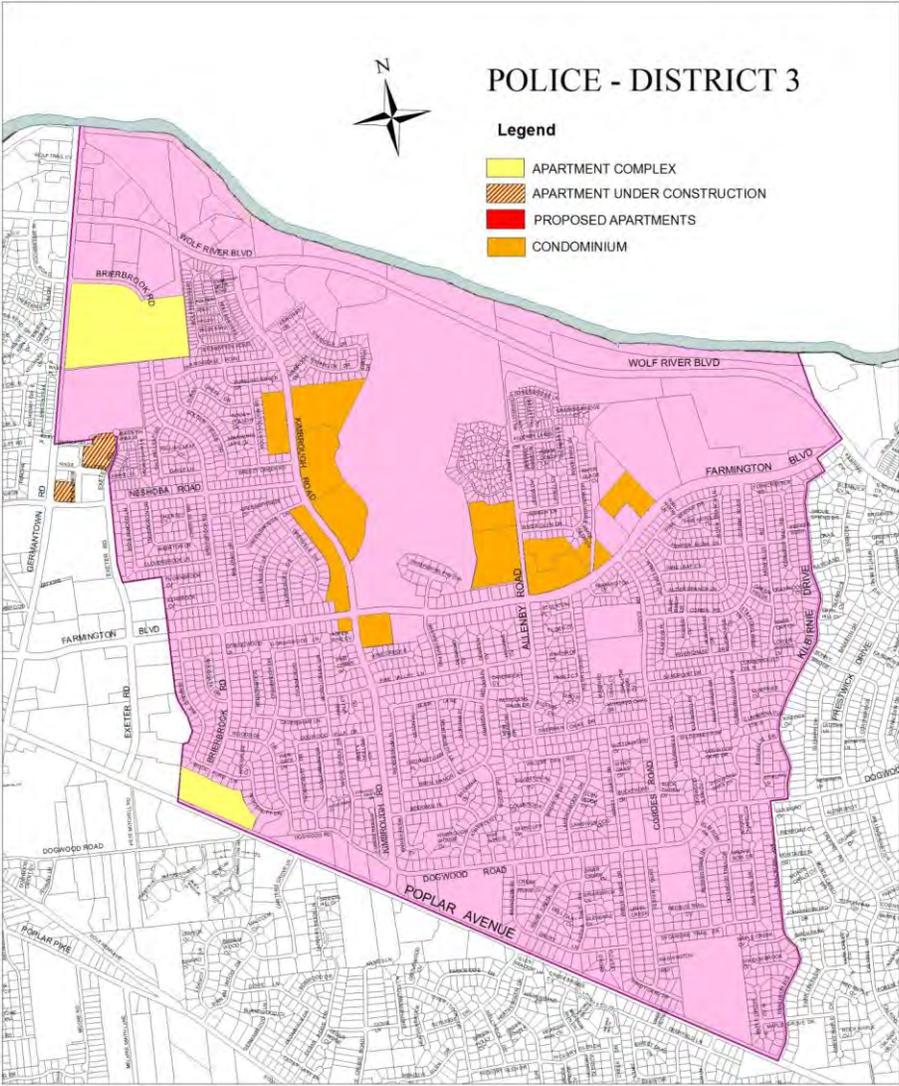
What are the likely impacts of future apartments and apartment building development on Police District #2?

Future apartment developments are currently not being considered within the Police District #2 territory and there are no Smart Code Zoning Districts within this district's boundaries. Also, as previously mentioned, there are no existing apartments located within the boundaries of Police District #2. Therefore, based on the current zoning, there should be no direct impact to this district from apartments in general through 2028.

POLICE DISTRICT #3

Located in the upper northern mid-section of the City, Police District #3 includes the largest number of existing dwelling units within its boundaries. All classifications of residential dwelling types are represented within this district. In addition to a high concentration of single-family homes, the majority of the City's condominiums are also located in this district. The district is bordered by the Wolf River to the north and Poplar Avenue to the south. There are no Key Commercial Areas within this district and no areas are under the Smart Code zoning.

Figure 18. Police District #3 Territory Map



Existing Dwelling Unit Analysis

Apartments

Two of the City's five existing apartment developments are located within the boundaries of Police District #3. The 462 apartment dwelling units at The Retreat and Farmington Gates account for nearly ten percent of all dwelling units within the district.

Figure 19. Police District #3 Total Dwelling Unit Count



Condominiums & Townhomes

Thirteen of the City’s seventeen existing condominium developments are located within the boundaries of this district. These 711 condominium dwelling units make up 15% of all dwelling units within the district.

Single-Family Homes

The 3,199 single-family homes make up 68% of all residential dwelling units within this district.

Age-Restricted, Independent and Assisted Living

The 333 dwelling units at The Villages of Germantown make up seven percent of all dwelling units within this district.

Residential Calls for Service

Incident Analysis

The residential incident analysis for this district gathered incident data by dwelling type dating back to 2014. For apartment, condominium, and age-restricted, independent, and assisted living dwelling units, data was collected using the actual number of dwelling units within the district. Given the number of single-family homes within the district, incident data was retrieved by address from a sample set of the district’s single-family homes (see Appendix D). A collection of more than 500 single-family homes was selected in the district sample. This sample included a representation of homes on multiple streets, evenly dispersed throughout the district. The sample’s incidents per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of incidents for all single-family homes. Total annual incidents and five-year averages were

calculated by dwelling type to provide an approximation of annual residential incidents for the five-year period.

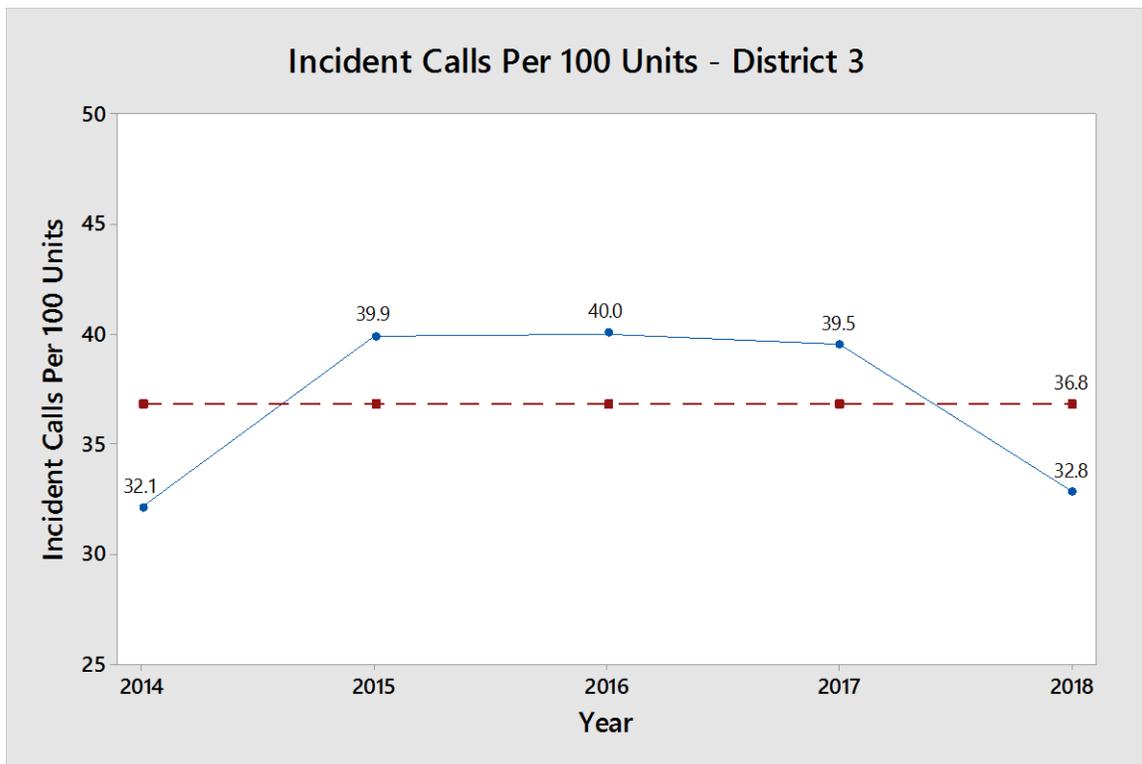
	Dwelling Unit Count		Residential INCIDENTS						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	462	462	119	137	167	142	106	671	134
Condominium	711	711	132	170	166	175	145	788	158
Single-Family*	534	3199	1246	1534	1516	1504	1270	7069	1414
Assisted Living	333	333	13	33	34	37	23	140	28
APPROX Totals	2040	4705	1510	1874	1883	1858	1544	8668	1734

* District incident calculations for the total single family home population was estimated using findings from the sample set

Table 22. Residential Incidents: Police District #3 (2014-2018)

From the beginning of 2014 through the end of 2018, the average annual number of residential incidents in Police District #3 is 1,734 (see Table 22). This average annual number of residential incidents equates to approximately five (4.8) residential incidents per day during this five-year period. At an estimated annual average of 36.8 residential incidents per 100 dwelling units (see Figure 20), this district makes requests for the services of the police department at a lower rate than the 51.9 average for the entire City. The estimated average annual number of residential incidents for this five-year period is between 32 and 40 for every 100 units.

Figure 20. Police District #3: Annual Incidents per 100 Units (2014-2018)



Crime Analysis

As mentioned previously, incidents can sometimes result in criminal violations. Crimes associated with the dwelling unit sample sets, and corresponding incidents, were also collected for the five-year period (see Table 23). The sample's crime per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of crimes. Total annual crimes and five-year averages were calculated by dwelling type to provide an approximation of annual residential crimes for the five-year period. The estimated average annual number of residential crimes within this district since 2014 is 172.

	Dwelling Unit Count		Residential CRIMES						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	462	462	19	19	37	21	22	118	24
Condominium	711	711	8	24	25	18	16	91	18
Single-Family*	534	3199	84	114	180	162	78	617	123
Assisted Living	333	333	4	9	10	3	8	34	7
APPROX Totals	2040	4705	115	166	252	204	124	860	172

* District crime calculations for the total single family home population was estimated using findings from the sample set

Table 23. Residential Crimes: Police District #3 (2014-2018)

The future incident and crime estimation model for this district assumes the annual incident and crime rates from existing dwelling units will remain consistent based upon the five-year history and any fluctuations that will occur over the next ten years will ultimately follow the average of the past five years. These five-year average figures for residential incidents and crimes, in Tables 22 and 23, will serve as the 'baseline' call volume data from existing dwelling units within the district. New residential development constructed during the ten-year projection period will be assessed the appropriate incidents and resulting crime ratio associated with the dwelling type and the respective year. The estimated incident and crime numbers from new residential development will then be added to the appropriate year's baseline data (see Table 24).

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included six (6) properties that are either in the process of being developed or have been categorized as "underdeveloped" for the purposes of assisting in making residential call volume projections for Police District #3. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 21 and Table 24 for identification purposes. While there is no guarantee that the "underdeveloped" properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum residential calls for service.

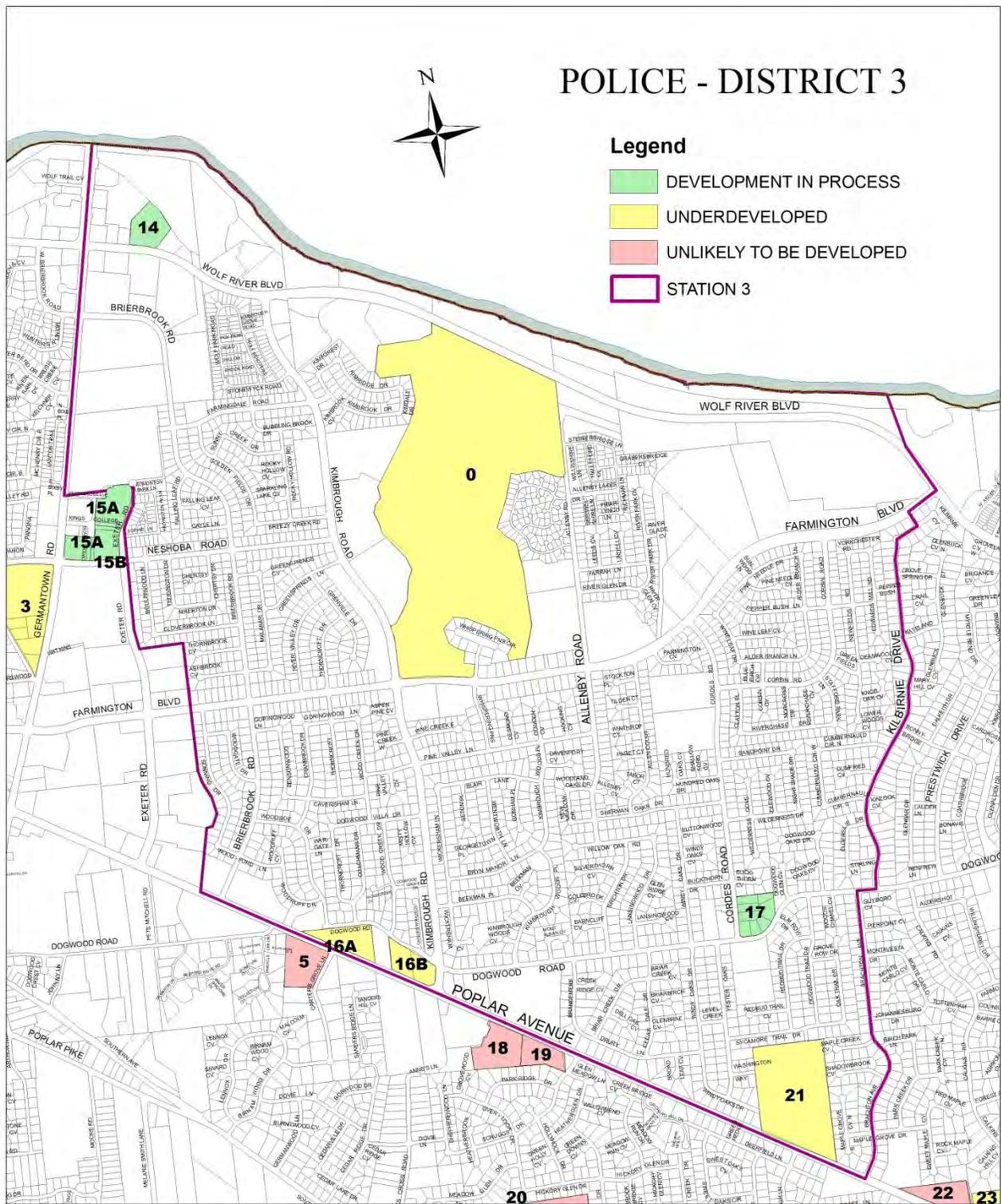
Developments in Process:

#14	Avenida Senior Living Apartments	Zoned "R-H" for Retirement Housing, this 5.3-acre site has been scheduled to be constructed and occupied in late 2019. The addition of 162 senior living apartments is estimated to increase the annual number of incidents within the district by 20 in 2020. Because Avenida is an age-restricted, independent living development for seniors, our research team categorized this residential dwelling unit type as an age-restricted, independent, and assisted living facility within our incident volume forecasting models.
#17	Piper's Gardens	Zoned "R" for Residential, this 5.58-acre site has been placed in our forecasting worksheet to be constructed and occupied as early as calendar year 2020. Although there is an approved subdivision on this property, no building permits have been issued. The addition of eight single-family homes at this location could increase the annual number of incidents within the district by five annually through 2028.

Underdeveloped Properties:

#0	Germantown Country Club	Zoned "R" for Residential, this 178.6-acre property was placed on the market for sale in March of 2019. Of the total 178.6 acres, approximately 90 acres fall outside of the flood zone and flood way. In order for development to occur in flood zone areas, significant cut and fill work would need to be approved and completed by various agencies. For this reason, 90 acres were included in all forecasting models in determining development impact calculations. An additional 261 single-family homes could increase the number of annual incidents by 149 upon completion.
#16A	Patel	Zoned "R" for Residential, the 6.46 acres at this location could have a maximum of 18 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property could add another ten incidents annually through 2028.
#16B	Dogwood Manor	Zoned "R" for Residential, the 4.88 acres at this location could have a maximum of 14 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property could add another eight incidents annually through 2028.
#21	Warlick Sandra H and Hulon O	Zoned "R" for Residential, the 30.07 acres at this location could have a maximum of 87 dwelling units. One single-family home is currently located on this property. If the property were to be developed/redeveloped, another 50 incidents should be expected annually through 2028.

Figure 21. Police District #3: Property Analysis Map



POLICE DISTRICT #3							Calendar Year											
							2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Estimated Annual INCIDENTS From Existing Dwelling Units Within District							1734	1734	1734	1734	1734	1734	1734	1734	1734	1734		
Estimated Annual CRIMES From Existing Dwelling Units Within District							172	172	172	172	172	172	172	172	172	172		
Projected Annual Incidents Per 100 Units By Dwelling Type							Apartments	APT	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	
							Single Family Homes	SFH	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4
							Condominiums	CO	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
							Age-Restricted, Ind. & Asst. Living	AL	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2
Property #	Project Name / Project Owner	Zoning Designation	Acreege	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type	Additional Annual Incidents from New Residential Development											
Developments in Process																		
14	Avenida Senior Living Apartments	R-H	5.3	31	162	AL	0	20	20	20	20	20	20	20	20	20		
17	Piper's Gardens	R	5.58	2.904	8	SFH	0	5	5	5	5	5	5	5	5	5		
Underdeveloped Properties																		
0	Germantown Country Club	R	178.6/90	2.904	261	SFH	0	0	15	30	45	60	75	90	104	119		
16A	Patel	R	6.46	2.904	18	SFH	0	0	10	10	10	10	10	10	10	10		
16B	Dogwood Manor	R	4.88	2.904	14	SFH	0	0	8	8	8	8	8	8	8	8		
21	Warlick Sandra H and Hulon O	R	30.07	2.904	87	SFH	0	0	0	0	50	50	50	50	50	50		
Estimated Annual Residential INCIDENT Totals: District #3							1734	1758	1792	1807	1871	1886	1901	1916	1931	1946		
Estimated Annual Residential CRIME Totals: District #3							172	176	179	180	186	187	189	190	191	193		

By New Residential Development Type											
Apartments	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (5.76:1)	0	0	0	0	0	0	0	0	0	0
Single Family Homes	Annual Incidents	0	5	38	53	118	133	148	162	177	192
	Annual Crimes (11.34:1)	0	0	3	5	10	12	13	14	16	17
Condominiums	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (6.45:1)	0	0	0	0	0	0	0	0	0	0
Age-Restricted, Ind. & Asst. Living	Annual Incidents	0	20	20	20	20	20	20	20	20	20
	Annual Crimes (5.20:1)	0	4	4	4	4	4	4	4	4	4

Table 24. Police District #3: Future Residential Incident and Crime Estimations

Residential Call Volume Projection Summary: Police District #3

If the five-year average annual number of residential incidents for existing dwelling units continues and new residential development were to take place as hypothetically studied and presented, total residential incidents within Police District #3 are estimated to increase from an annual average of 1,734 to 1,946 by 2028. The average daily incident number from residential dwelling units within the district would increase from 4.8 to 5.3. The average number of annual crimes committed within this district as a result of new residential development is estimated to increase from 172 to 193 by 2028 (see Table 24). Points worthy of repeating are that under this scenario, the 90 acres that fall outside of the flood zone at the Germantown Country Club were included as a single-family home development and the Avenida Senior Living development was categorized as age-restricted, independent, and assisted living facility.

Apartment Impact

Police District #3

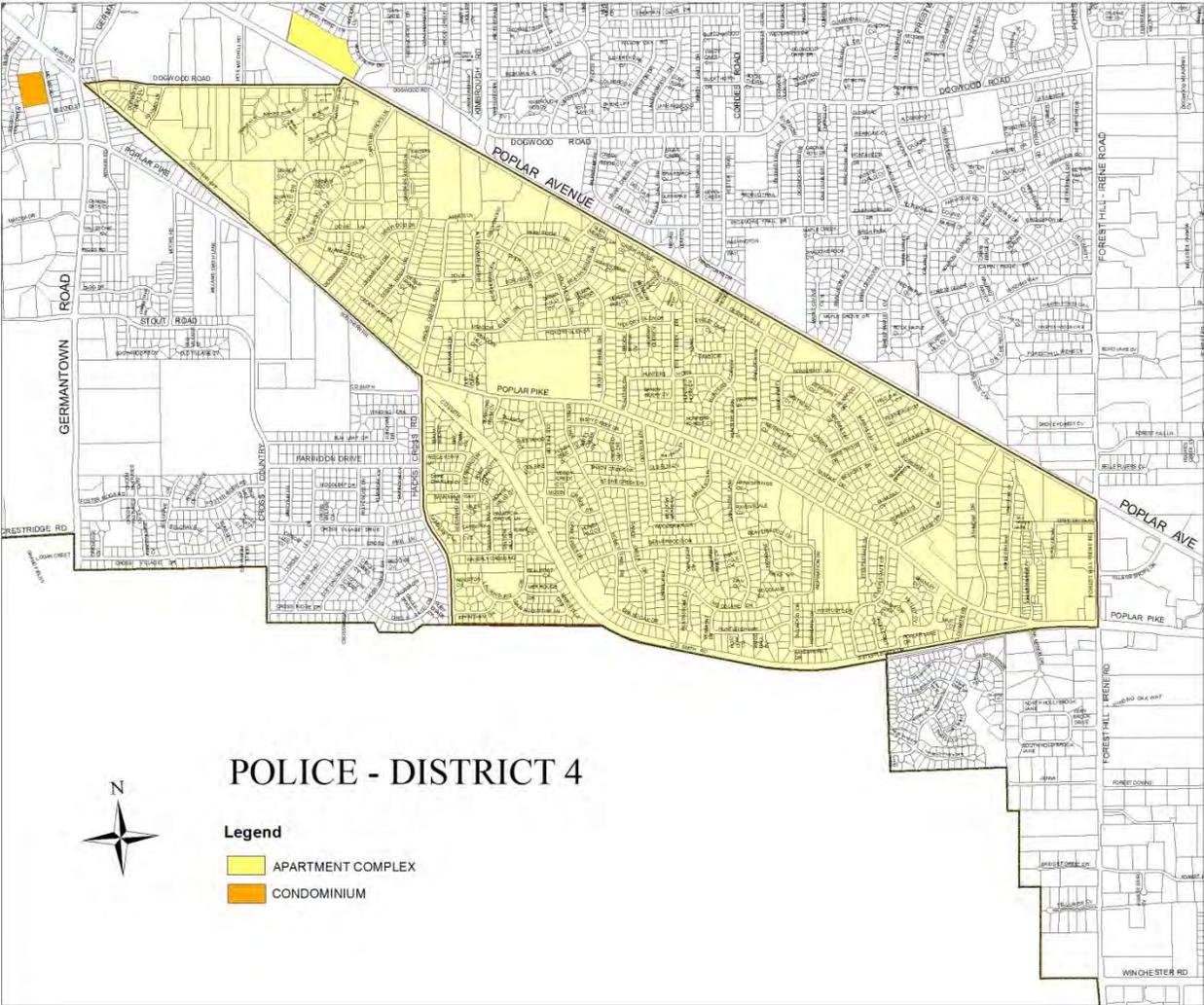
What are the likely impacts of future apartments and apartment building development on Police District #3?

Future apartment developments are currently not being considered within the Police District #3 territory and there are no Smart Code Zoning Districts within this district's boundaries. Therefore, based on the current zoning, there should be no direct impact to this district from the development of future apartments through 2028.

POLICE DISTRICT #4

Located in the lower southern mid-section of the City, Police District #4 covers a large majority of the residential area in the City south of Poplar Avenue. With 2,292 total dwelling units, residential development over the years in this district has predominantly been limited to single-family homes. There are no apartments or condominiums located within this district. The district is bordered by Memphis to the south and Poplar Avenue to the north. There are no Key Commercial Areas within this district and no areas are under the Smart Code zoning.

Figure 22. Police District #4 Territory Map



Existing Dwelling Unit Analysis

Apartments

There are no apartments currently located within the boundaries of this district and no apartment developments are currently proposed or are being considered at this time.

Figure 23. Police District #4: Total Dwelling Unit Count



Condominiums & Townhomes

There are no condominiums currently located within the boundaries of this district and no condominium developments are currently proposed or are being considered at this time.

Single-Family Homes

The 2,110 single-family homes account for nearly 92% of all dwelling units within this district.

Age-Restricted, Independent and Assisted Living

The 182 dwelling units at Brookdale – Dogwood Creek make up the remaining eight percent of all dwelling units within this district.

Residential Calls for Service

Incident Analysis

The residential incident analysis for this district gathered incident data by dwelling type dating back to 2014. For apartment, condominium, and age-restricted, independent, and assisted living dwelling units, data was retrieved using the actual number of dwelling units within the district. Given the number of single-family homes within the district, incident data was retrieved by address from a sample set of the district’s single-family homes (see Appendix D). A collection of more than 500 single-family homes was selected in the district sample. This sample included a representation of homes on multiple streets, evenly dispersed throughout the district. The sample’s incidents per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of incidents for all single-family homes. Total annual incidents and five-year averages were calculated by dwelling type to provide an approximation of annual residential incidents for the five-year period.

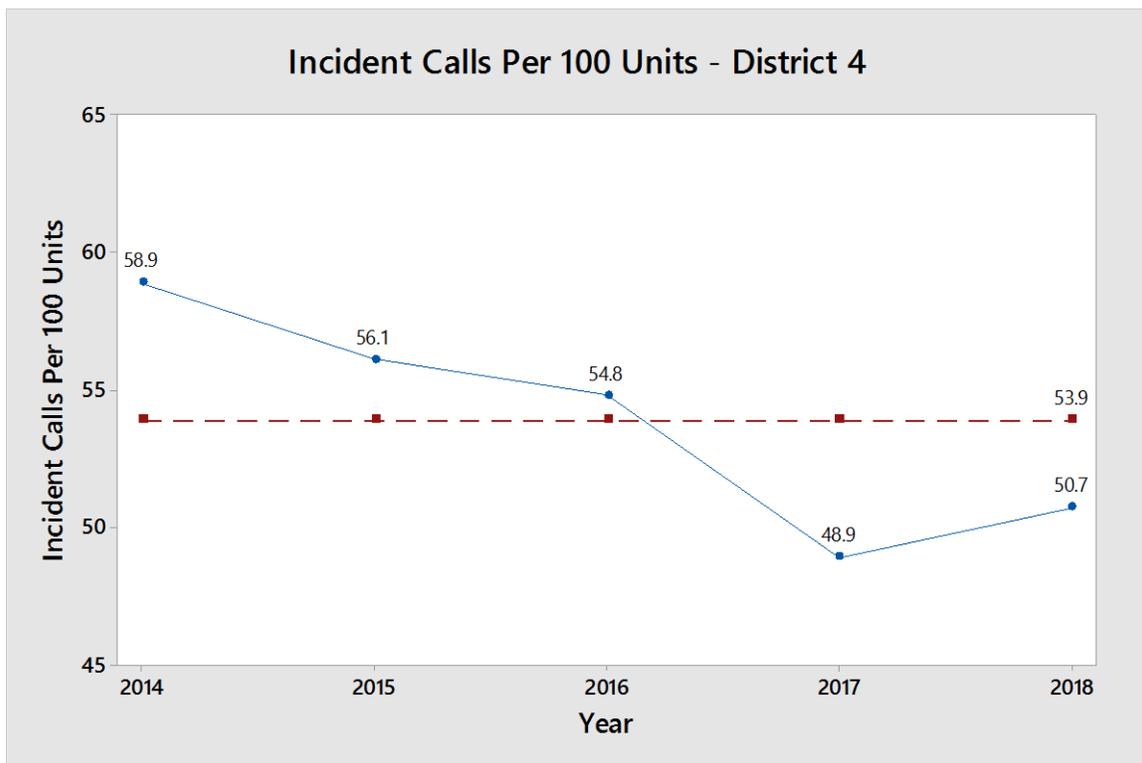
	Dwelling Unit Count		Residential INCIDENTS						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	-	-	-	-	-	-	-	-	-
Single-Family*	505	2110	1316	1258	1228	1086	1132	6021	1204
Assisted Living	182	182	33	28	29	35	31	156	31
APPROX Totals	687	2292	1349	1286	1257	1121	1163	6177	1235

* District incident calculations for the total single family home population was estimated using findings from the sample set

Table 25. Residential Incidents: Police District #4 (2014-2018)

From the beginning of 2014 through the end of 2018, the average annual number of residential incidents in Police District #4 is 1,235 (see Table 25). This average annual number of residential incidents equates to approximately three (3.4) residential incidents per day during this five-year period. At an estimated annual average of 53.9 residential incidents per 100 dwelling units (see Figure 24), this district makes requests for the services of the police department at a rate that is slightly higher than the 51.9 average for the entire City. The estimated average annual number of residential incidents for this five-year period is between 48 and 59 for every 100 units.

Figure 24. Police District #4: Annual Incidents per 100 Units (2014-2018)



Crime Analysis

As mentioned previously, incidents can sometimes result in criminal violations. Crimes associated with the dwelling unit sample sets, and corresponding incidents, were also collected for the five-year period (see Table 26). The sample's crime per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of crimes. Total annual crimes and five-year averages were calculated by dwelling type to provide an approximation of annual residential crimes for the five-year period. The estimated average annual number of residential crimes within this district since 2014 is 88.

	Dwelling Unit Count		Residential CRIMES						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	-	-	-	-	-	-	-	-	-
Single-Family*	505	2110	58	63	75	100	121	418	84
Assisted Living	182	182	3	9	8	3	0	23	5
APPROX Totals	687	2292	61	72	83	103	121	441	88

* District crime calculations for the total single family home population was estimated using findings from the sample set

Table 26. Residential Crimes: Police District #4 (2014-2018)

The future incident and crime estimation model for this district assumes the annual incident and crime rates from existing dwelling units will remain consistent based upon the five-year history and any fluctuations that will occur over the next ten years will ultimately follow the average of the past five years. These five-year average figures for residential incidents and crimes, in Tables 25 and 26, will serve as the 'baseline' call volume data from existing dwelling units within the district. New residential development constructed during the ten-year projection period will be assessed the appropriate incidents and resulting crime ratio associated with the dwelling type and the respective year. The estimated incident and crime numbers from new residential development will then be added to the appropriate year's baseline data (see Table 27).

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included one (1) property that has been categorized as "underdeveloped" for the purposes of assisting in making call volume projections for Police District #4. This property is listed below in yellow and the number in the left hand column (below) corresponds with the number in Figure 25 and Table 27 for identification purposes. While there is no guarantee that this "underdeveloped" property will ever be redeveloped, it has been included in our ten-year projection calculations for the purposes of projecting maximum calls for residential service.

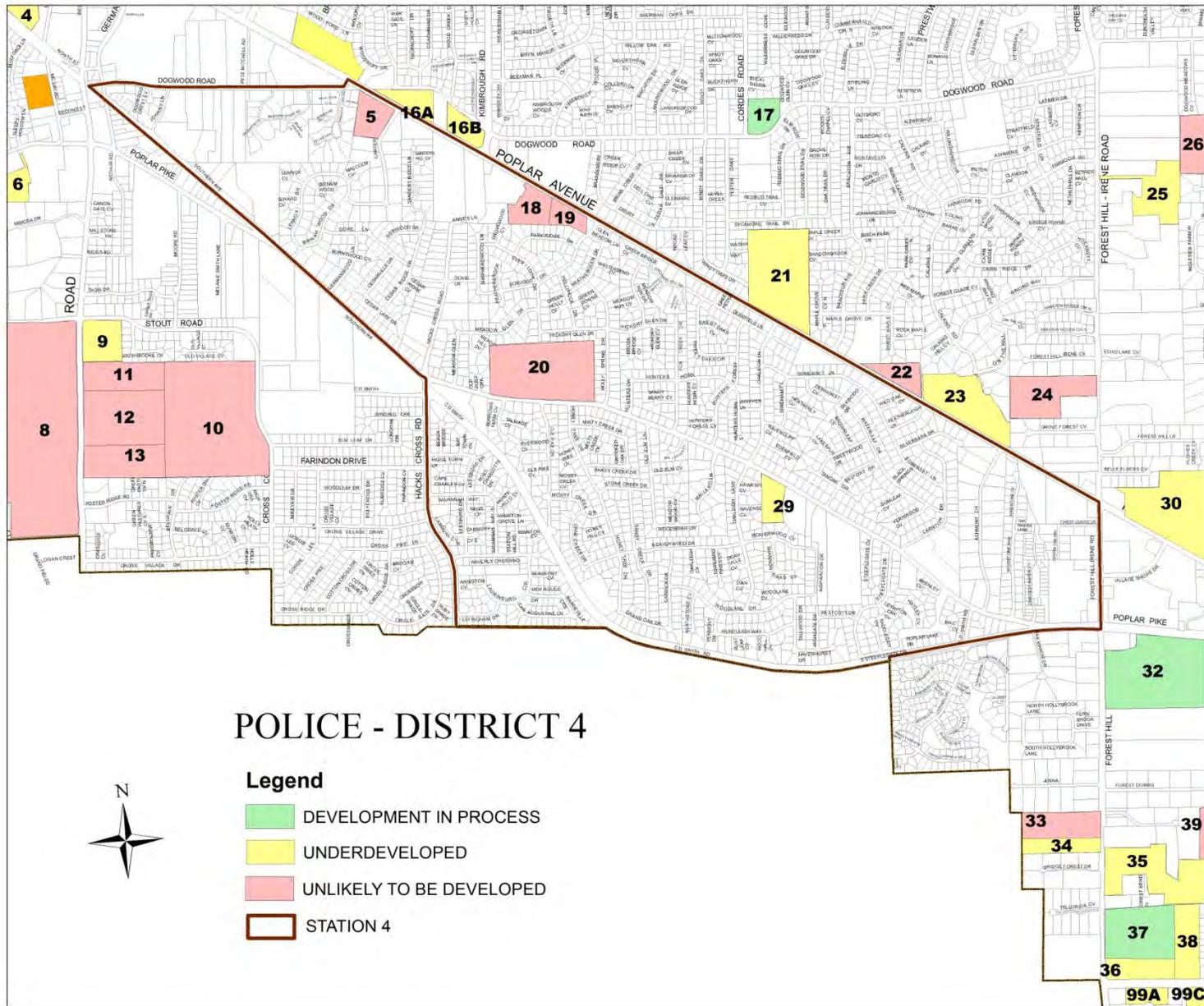
Underdeveloped Properties:

#29	Leike Richard H Living Trust	Zoned "R" for Residential, the 5.9 acres at this location could have a maximum of 17 single-family homes. If developed, the property is estimated to add another ten incidents annually by 2028.
-----	------------------------------	--

Properties Unlikely To Be Developed < 10 Years:

Although categorized as "unlikely to be developed," four (4) additional properties (#5, #18, #19, and #20) have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these locations, listed in red on Figure 25 and Table 27, desire or intend to change the current land use of these sites at any point in the immediate future. These properties were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the properties fall within one of the Smart Code zoning districts, where apartments are currently permitted.

Figure 25. Police District #4: Property Analysis Map



POLICE DISTRICT #4							Calendar Year											
							2019	2020	2021	2022	2023	2024	2025	2026	2027	2028		
Estimated Annual INCIDENTS From Existing Dwelling Units Within District							1235	1235	1235	1235	1235	1235	1235	1235	1235	1235		
Estimated Annual CRIMES From Existing Dwelling Units Within District							88	88	88	88	88	88	88	88	88	88		
Projected Annual Incidents Per 100 Units By Dwelling Type							Apartments	APT	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	
							Single Family Homes	SFH	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4
							Condominiums	CO	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
							Age-Restricted, Ind. & Asst. Living	AL	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2
Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type	Additional Annual Incidents from New Residential Development											
Underdeveloped Properties																		
29	Leike Richard H Living Trust	R	5.9	2.904	17	SFH	0	0	0	0	10	10	10	10	10	10		
Properties Unlikely To Be Developed < 10 Yrs																		
5	Bowman	R	7.32	2.904	21	SFH	0	0	0	0	0	0	0	0	0	0		
18	Barzizza	R	7.01	2.904	20	SFH	0	0	0	0	0	0	0	0	0	0		
19	Fite	R	4	2.904	12	SFH	0	0	0	0	0	0	0	0	0	0		
20	Smith Sarah S Family Trust	R	178.6	2.904	99	SFH	0	0	0	0	0	0	0	0	0	0		
Estimated Annual Residential INCIDENT Totals: District #4							1235	1235	1235	1235	1245	1245	1245	1245	1245	1245		
Estimated Annual Residential CRIME Totals: District #4							88	88	88	88	89	89	89	89	89	89		

By New Residential Development Type															
Apartments	Annual Incidents	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (5.76:1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single Family Homes	Annual Incidents	0	0	0	0	10	10	10	10	10	10	10	10	10	10
	Annual Crimes (11.34:1)	0	0	0	0	1	1	1	1	1	1	1	1	1	1
Condominiums	Annual Incidents	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (6.45:1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Age-Restricted, Ind. & Asst. Living	Annual Incidents	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (5.20:1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 27. Police District #4: Future Residential Incident and Crime Estimations

Residential Call Volume Projection Summary: Police District #4

If the five-year average annual number of residential incidents for existing dwelling units continues and new residential development were to take place as hypothetically studied and presented, total residential incidents within Police District #4 are estimated to increase from an annual average of 1,235 to 1,245 by 2028. The average daily incident number from residential dwelling units within the district would remain relatively the same at 3.4. The average number of annual crimes committed within this district as a result of new residential development is estimated to increase by one (see Table 27). Again, the City has no reason to believe that property #24 will ever be developed/redeveloped. The Leike Richard H. Living Trust property has been included in our ten-year projection calculations due the size of the property and included only for the purposes of forecasting maximum potential residential incident volume.

Apartment Impact

Police District #4

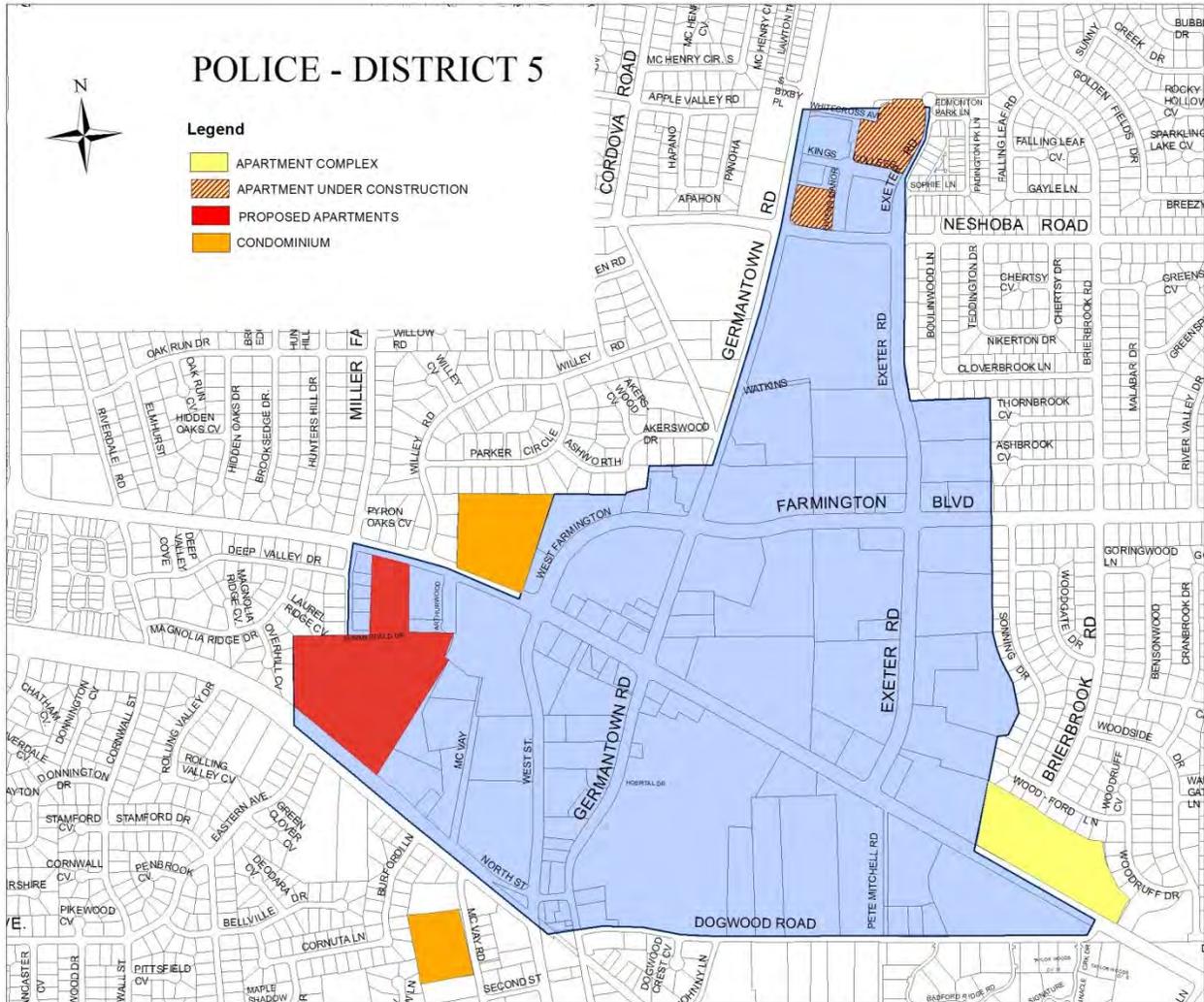
What are the likely impacts of future apartments and apartment building development on Police District #4?

Future apartment developments are currently not being considered within the Police District #4 territory and there are no Smart Code Zoning Districts within this district's boundaries. Also, as previously mentioned, there are no existing apartments located within the boundaries of Police District #4. Therefore, based on the current zoning, there should be no direct impact to this district from apartments in general through 2028.

POLICE DISTRICT #5

Located in the mid-section of the City, Police District #5 includes the lowest number of existing dwelling units within its boundaries at 15. Created specifically to cover the Central Business District (CBD) in 2016, this district includes the City’s main Key Commercial Area and the Municipal Campus. Regional attractions, such as the Shops of Saddle Creek and Methodist Hospital, are located in this district, which also includes the use of Smart Code zoning.

Figure 26. Police District #5 Territory Map



Existing Dwelling Unit Analysis

Apartments

At the time of the apartment moratorium, there were no apartments located within this district. The 276 units at Thornwood are under construction and will be included as in the study as a development in process.

Figure 27. Police District #5: Total Dwelling Unit Count



Condominiums & Townhomes

There are no condominiums currently located within the boundaries of this district and no condominium developments are currently proposed or are being considered at this time.

Single-Family Homes

There are 15 single-family homes scattered throughout this primarily commercial district.

Age-Restricted, Independent and Assisted Living

The 50 dwelling units at Brookdale-Poplar account for the majority of dwelling units located in the district.

Residential Calls for Service

Incident Analysis

The residential incident analysis for this district gathered incident data by dwelling type dating back to 2014. For apartment, condominium, and age-restricted, independent, and assisted living dwelling units, data was retrieved using the actual number of dwelling units within the district. Given the number of single-family homes within the district, incident data was retrieved by address for all 15 single-family homes (see Appendix D). Total annual incidents and five-year averages were determined by dwelling type to provide an actual number of annual residential incidents for the five-year period.

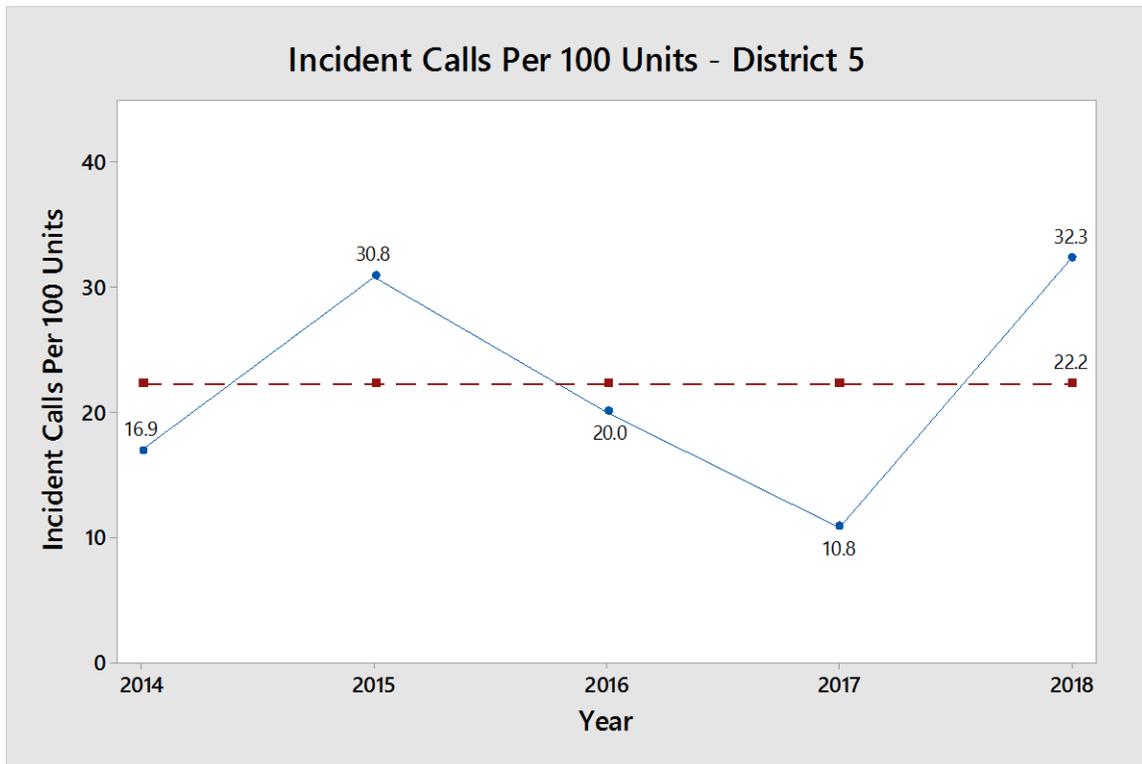
	Dwelling Unit Count		Residential INCIDENTS						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	-	-	-	-	-	-	-	-	-
Single-Family*	15	15	7	12	6	3	13	41	8
Assisted Living	50	50	4	8	7	4	8	31	6
Totals	65	65	11	20	13	7	21	72	14

* District incident calculations for the total single-family home population was estimated using findings from the sample set

Table 28. Residential Incidents: Police District #5 (2014-2018)

From the beginning of 2014 through the end of 2018, the annual average number of residential incidents in Police District #5 is 14 (see Table 28). This annual average number of residential incidents equates to approximately one residential incident per month during this five-year period. At an estimated annual average of 22.2 residential incidents per 100 dwelling units (see Figure 28), this district makes requests for the services of the police department at the lowest rate among the seven police districts. The estimated annual average number of residential incidents for this five-year period has been between 10 and 33 for every 100 units.

Figure 28. Police District #5: Annual Incidents per 100 Units (2014-2018)



Crime Analysis

As mentioned previously, incidents can sometimes result in criminal violations. Crimes associated with the actual dwelling units, and corresponding incidents, were also collected for the five-year period (see Table 29). Total annual crimes and five-year averages were calculated by dwelling type to provide the number of annual residential crimes for the five-year period. The estimated annual average number of residential crimes within this district since 2014 is been one.

	Dwelling Unit Count		Residential CRIMES						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	-	-	-	-	-	-	-	-	-
Single-Family*	15	15	0	1	0	1	1	3	1
Assisted Living	50	50	0	0	0	0	4	4	1
Totals	65	65	0	1	0	1	5	7	1

* District crime calculations for the total single family home population was estimated using findings from the sample set

Table 29. Residential Crimes: Police District #5 (2014-2018)

The future incident and crime estimation model for this district assumes the annual incident and crime rates from existing dwelling units will remain consistent based upon the five-year history and any fluctuations that will occur over the next ten years will ultimately follow the average of the past five years. These five-year average figures for residential incidents and crimes, in Tables 28 and 29, will serve as the ‘baseline’ call volume data from existing dwelling units within the district. New residential development constructed during the ten-year projection period will be assessed the appropriate incidents and resulting crime ratio associated with the dwelling type and the respective year. The estimated incident and crime numbers from new residential development will then be added to the appropriate year’s baseline data (see Table 30).

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included three (3) properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making residential call volume projections for Police District #5. These properties are listed below in green and yellow and the numbers in the left hand column (below) correspond with the numbers in Figure 29 and Table 30 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum residential calls for service.

Developments in Process:

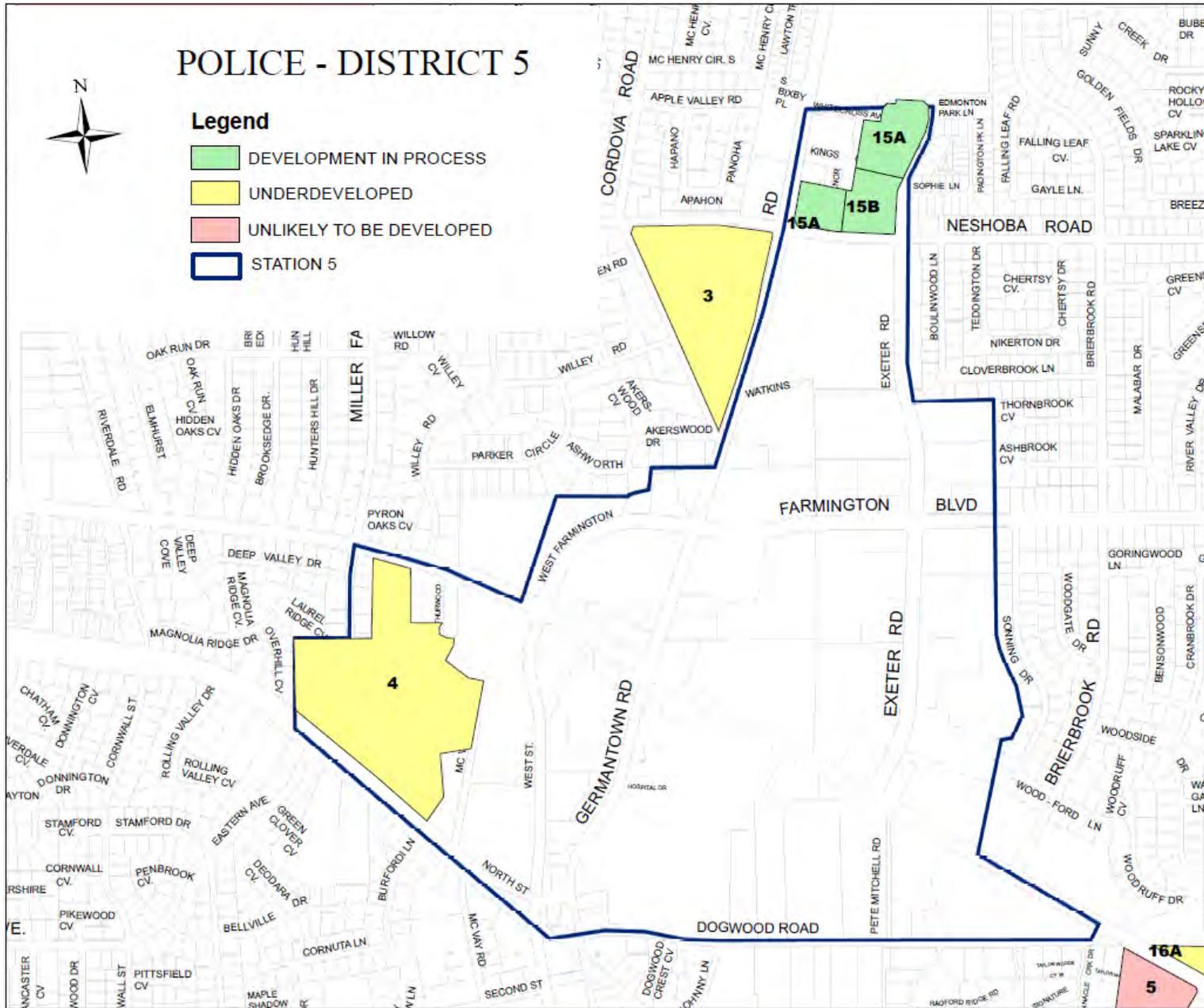
#15A	The Residences at Thornwood and Market Row Lofts	Zoned "T5" for Urban Center Zone within the Smart Code district, the fourth and fifth phases of Thornwood are scheduled for completion in 2019. The addition of 276 apartments on 7.09 acres is projected to increase the annual number of incidents within the district by 88 annually upon the leasing of all units.
------	--	--

#15B	Thornwood - Phase 6 (Undeveloped Lot 5)	Zoned "T5" for Urban Center Zone within the Smart Code, these 2.98 acres on Lot 5 are the last phase of the Thornwood development project. As part of the development's Outline Plan approval in 2014, a maximum of 294 multi-family units were included. If the developer were to propose and receive final approval for apartments at this location, 93 incidents could be expected from this location once all units are leased. Final site plan approval by both the Planning Commission and BMA would be required.
------	---	---

Underdeveloped Properties:

#4	Arthur Tract (Carter)	Zoned "T5" for Urban Center Zone within the Smart Code district, these 32.86 acres to the west/southwest of Saddle Creek have been identified as a location for mixed use development. Although their project approval has expired, Carter received preliminary approval from the Planning Commission to include 302 apartment dwelling units at this location. If the property were to be developed in this manner, an additional 96 incidents per year could be expected from this location upon the leasing of all units.
----	-----------------------	--

Figure 29. Police District #5: Property Analysis Map



POLICE DISTRICT #5							Calendar Year									
							2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Estimated Annual INCIDENTS From Existing Dwelling Units Within District							14	14	14	14	14	14	14	14	14	14
Estimated Annual CRIMES From Existing Dwelling Units Within District							1	1	1	1	1	1	1	1	1	1
Projected Annual Incidents Per 100 Units By Dwelling Type		Apartments		APT	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	
		Single Family Homes		SFH	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	
		Condominiums		CO	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	
		Age-Restricted, Ind. & Asst. Living		AL	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	
Property #	Project Name /Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	#of units possible or approved	Dwelling Type	Additional Annual Incidents from New Residential Development									
Developments in Process																
15A	TW Residences & Market Row Lofts	T5	7.09	39	276	APT	88	88	88	88	88	88	88	88	88	
15B	Thornwood (Undeveloped Lot 5)	T5	2.98	99	294	APT	0	0	93	93	93	93	93	93	93	
Underdeveloped Properties																
4	Arthur Tract	T5	32.86	15	302	APT	0	0	0	0	96	96	96	96	96	
Estimated Annual Residential INCIDENT Totals: District #5							102	102	195	195	291	291	291	291	291	291
Estimated Annual Residential CRIME Totals: District #5							16	16	32	32	49	49	49	49	49	49

By New Residential Development Type											
Apartments	Annual Incidents	88	88	181	181	277	277	277	277	277	277
	Annual Crimes (5.76:1)	15	15	31	31	48	48	48	48	48	48
Single Family Homes	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (11.34:1)	0	0	0	0	0	0	0	0	0	0
Condominiums	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (6.45:1)	0	0	0	0	0	0	0	0	0	0
Age-Restricted, Ind. & Asst. Living	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (5.20:1)	0	0	0	0	0	0	0	0	0	0

Table 30. Police District #5: Future Residential Incident and Crime Estimations

Residential Call Volume Projection Summary: Police District #5

If the five-year average annual number of residential incidents for existing dwelling units continues and new residential development/redevelopment were to take place as assumed, total residential incidents within Police District #5 are estimated to increase from an annual average of 14 to 291 by 2028. The average number of annual crimes committed within this district as a result of development/redevelopment of three properties is estimated to increase from 1 to 49 by 2028 (see bottom of Table 30).

As shown in Table 31 below, the average daily incident number from residential dwelling units within the district is estimated to increase from 0.04 to 0.80.

POLICE DISTRICT #5: Residential Call Volume Analysis		Total Unit Count	Estimated Annual Call Volume (2028)	Residential Call Volume per Day
EXISTING DWELLING UNITS		65	14	0.04
Apartments*	Developments In Process	570	181	0.50
	Underdeveloped Properties	302	96	0.26
Condominiums	Developments In Process	0	0	0.00
	Underdeveloped Properties	0	0	0.00
Single-Family Homes	Developments In Process	0	0	0.00
	Underdeveloped Properties	0	0	0.00
Age-Restricted, Independent & Assisted Living	Developments In Process	0	0	0.00
	Underdeveloped Properties	0	0	0.00
Totals		937	291	0.80

*For the purposes of projecting call volume impact based on the maximum number of dwelling units possible, this study assumes that all new multi-family development within Smart Code zoning districts will be applied for, approved, and developed as apartments over the next ten years.

Table 31. Police District #5: Residential Call Volume Projection Analysis

Apartment Impact

Police District #5

What are the likely impacts of future apartments and apartment building development on Police District #5?

Central Business District

APARTMENTS - Police District #5 (2028)				Year	2028			
Projected Annual Call Volume per 100 Apartment Units				31.8				
Property #	Project Name / Project Owner	Zoning Designation	# of units possible or approved	Calls per Year	Calls per Month	Calls per Day	Crimes per Year	
Developments in Process								
15A	TW Residences & Market Row Lofts	T5	276	88	7.3	0.24	15	
15B	Thornwood (Undeveloped Lot 5)	T5	294	93	7.8	0.26	16	
Underdeveloped Properties								
4	Arthur Tract	T5	302	96	8.0	0.26	17	
			Totals	872	277	23.1	0.76	48

Table 32. Police District #5: Apartment Call Volume Summary for 2028

#15A: Beginning in 2019, the 276 dwelling units at The Residences at Thornwood and Market Row Lofts are forecasted to eventually add an approximate 88 incidents to the district upon full occupancy. Of those 88 annual incidents, approximately 15 are forecasted to be classified as crimes. Of the four multi-family developments that were exempted from the moratorium, the Thornwood development is the only project that has moved through the approval process to the construction phase.

#15B: As of December 2018, a final proposed use for the remaining 2.98-acres of Lot 5 (Phase 6) of the Thornwood development has yet to be submitted by the developer. The Outline Plan for Phase 6, as originally submitted and approved, includes a possible 294 multi-family units for this location. However, final site plan approval by the Planning Commission and the BMA is still required. For the purposes of understanding the maximum potential impact apartments could have on City services, these 294 units were included as apartments in future call volume projection calculations. Using this number of dwelling units, a forecasted number of 93 incidents per year would be anticipated from this location by 2028. Of those 93 annual incidents, 16 are forecasted to be classified as crimes.

#4: Although the Carter development was referenced in the moratorium, as of December 2018, representatives for the Carter project have not proceeded past an initial Planning Commission Outline Plan approval and the Planning Commission approval has expired. However, because it was specifically listed within the moratorium as a development that had received some form of approval during the development consideration process, the incident numbers from these 32.86 acres were included in our forecasting model. If a developer were to propose and receive approval of a project that was consistent with the Carter proposal, a forecasted number of 96 incidents per year would be anticipated from this location by 2028. Of those 96 annual incidents, 17 are forecasted to be classified as crimes.

Figure 31. Police District #6: Total Dwelling Unit Count



Existing Dwelling Unit Analysis

Apartments

There are no apartments currently located within the boundaries of this district.

Condominiums & Townhomes

There are no condominiums currently located within the boundaries of this district.

Single-Family Homes

The 414 single-family homes account for 73% of all dwelling units within this district.

Age-Restricted, Independent and Assisted Living

The combined 156 dwelling units at Germantown Plantation and the Gardens of Germantown make up 27% of all dwelling units within this district.

Residential Calls for Service

Incident Analysis

The residential incident analysis for this district gathered incident data by dwelling type dating back to 2014. For apartment, condominium, and age-restricted, independent, and assisted living dwelling units, data was retrieved using the actual number of dwelling units within the district. Given the number of single-family homes within the district, incident data was retrieved by address from a sample set of the district’s single-family homes (see Appendix D). A collection of more than 200 single-family homes was

selected in the district sample. This sample included a representation of homes on multiple streets, evenly dispersed throughout the district. The sample's incidents per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of incidents for all single-family homes. Total annual incidents and five-year averages were calculated by dwelling type to provide an approximation of annual residential incidents for the five-year period.

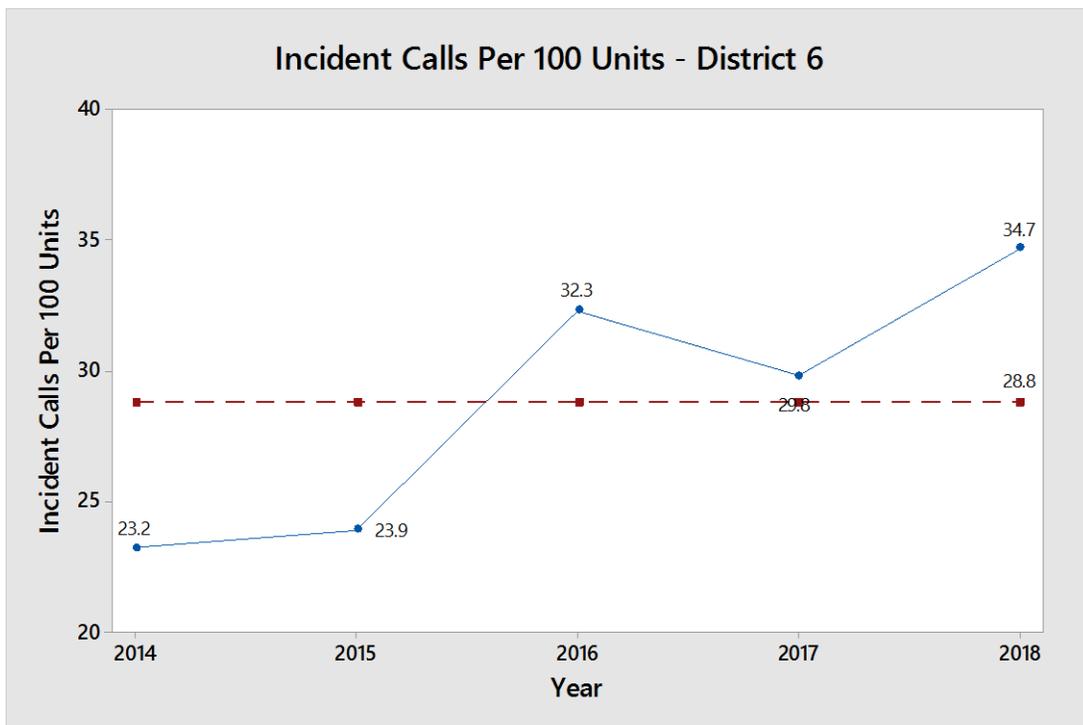
	Dwelling Unit Count		Residential INCIDENTS						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	-	-	-	-	-	-	-	-	-
Single-Family*	223	414	113	124	156	158	180	731	146
Assisted Living	156	156	19	12	28	12	18	89	18
APPROX Totals	379	570	132	136	184	170	198	820	164

* District incident calculations for the total single family home population was estimated using findings from the sample set

Table 33. Residential Incidents: Police District #6 (2014-2018)

From the beginning of 2014 through the end of 2018, the average annual number of residential incidents in Police District #6 is 164 (see Table 33). This average annual number of residential incidents equates to 0.45 residential incidents per day during this five-year period. At an estimated annual average of 28.8 residential incidents per 100 dwelling units (see Figure 32), this district makes requests for the services of the police department at a rate that is significantly lower than the 51.9 average for the entire City. The estimated average annual number of residential incidents for this five-year period is between 23 and 35 for every 100 units.

Figure 32. Police District #6: Annual Incidents per 100 Units (2014-2018)



Crime Analysis

As mentioned previously, incidents can sometimes result in criminal violations. Crimes associated with the dwelling unit sample sets, and corresponding incidents, were also collected for the five-year period (see Table 34). The sample's crime per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of crimes. Total annual crimes and five-year averages were calculated by dwelling type to provide an approximation of annual residential crimes for the five-year period. The estimated average annual number of residential crimes within this district since 2014 is 20.

	Dwelling Unit Count		Residential CRIMES						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	-	-	-	-	-	-	-	-	-
Single-Family*	223	414	9	22	7	20	22	82	16
Assisted Living	156	156	3	5	5	4	2	19	4
APPROX Totals	379	570	12	27	12	24	24	101	20

* District crime calculations for the total single family home population was estimated using findings from the sample set

Table 34. Residential Crimes: Police District #6 (2014-2018)

The future incident and crime estimation model for this district assumes the annual incident and crime rates from existing dwelling units will remain consistent based upon the five-year history and any fluctuations that will occur over the next ten years will ultimately follow the average of the past five years. These five-year average figures for residential incidents and crimes, in Tables 33 and 34, will serve as the 'baseline' call volume data from existing dwelling units within the district. New residential development constructed during the ten-year projection period will be assessed the appropriate incidents and resulting crime ratio associated with the dwelling type and the respective year. The estimated incident and crime numbers from new residential development will then be added to the appropriate year's baseline data (see Table 35).

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included 22 properties that are either in the process of being developed or have been categorized as "underdeveloped" for the purposes of assisting in making residential call volume projections for Police District #6. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 33 and Table 35 for identification purposes. While there is no guarantee that the "underdeveloped" properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum residential calls for service.

Developments in Process:

#32	Reaves – John Duke	Zoned “R” for Residential, this 36.4-acre site was rezoned in 2018 from RE-1 in anticipation of a 77-lot planned development. The addition of a maximum of 77 single-family homes is estimated to increase the annual number of incidents within this district by 44.
#37	Cheatham Property	Zoned “R” for Residential, this 18.05-acre site has been placed in our forecasting model to be constructed and occupied in 2021. The addition of 34 single-family homes are estimated to increase the annual number of incidents within this district by 19.
#44	Goodwin Farms	Zoned “R” for Residential, this 101.3-acre site has been placed in our forecasting model to be constructed and occupied beginning in 2020. The addition of 232 single-family homes over a period of ten years (ten phases) will gradually increase the annual number of incidents within the district from an initial 13 to an eventual 118 near project completion.
#46	Viridian Apartments	Zoned “T4” for General Urban Zone within the Smart Code, the 24.45 acres at this location, the site of the proposed Viridian development project, has Outline Plan approval for a maximum number of 299 apartment units (12 units per acre). If this location is to be developed according to the approved and recorded Outline Plan, the property is estimated to add another 95 incidents annually upon completion.

Underdeveloped Properties:

#34	Bobo	Zoned “RE-1” for Residential Estate – 1 Acre, these 6.78 acres adjacent to Forest-Hill Irene Road could have a maximum of six single-family homes based on current zoning. If developed, the property could add another three incidents annually.
#35	Forest Bend Properties	Zoned “RE-1” for Residential Estate – 1 Acre, these 22 lots on 47.24 acres to the east of Forest Hill Irene Road has been subdivided to include a total of 22 single-family homes (18 new single-family homes). These new homes have been placed in our forecasting model to be constructed and occupied by 2025. If developed, the property could add another ten calls annually.

#36	Skoutakis Property, Estate Home	Zoned "R" for Residential, the 9.26 acres at this location could have a maximum of 26 single-family homes. If developed, the property could add another 15 incidents annually.
#38	Forest Bend Properties	Zoned "R" for Residential, the 10.27 acres at this location could have a maximum of 29 single-family homes. If developed, the property could add another 17 incidents annually.
#40	Banks	Zoned "RE-1" for Residential – 1 Acre, the 15.24 acres at this location could have a maximum of 15 single-family homes. If developed, the property could add another nine incidents annually.
#41	Miller	Zoned "RE-1" for Residential – 1 Acre, the 19.86 acres at this location could have a maximum of 19 single-family homes. If developed, the property could add another 11 incidents annually.
#42	King Family Trust	Zoned "RE-1" for Residential, the 25 acres at this location could have a maximum of 25 single-family homes. If developed, the property could add another 14 incidents annually.
#43	Grant Property	Zoned "RE-1" for Residential, the 24.87 acres at this location could have a maximum of 24 single-family homes. If developed, the property could add another 14 incidents annually.
#45	Micaten Inc.	Zoned "T3" for Sub-Urban Zone within the Smart Code, the 7.4 acres on this site could have a maximum of seven dwelling units per acre. Apartment buildings, row houses, or duplexes are not permitted residential uses. If developed with single-family homes, the property could add 30 incidents annually.
#47	Forest Hill Associates Phase 19 FHH	Zoned "T5" for Urban Center Zone within the Smart Code, the 17.52 acres at this location, the former site of the proposed Watermark development project, had Final Plan approval for a maximum number of 310 apartment units. If this location were to be developed according to the approved and recorded Outline Plan, the property could add 99 incidents annually.

#99A	SHG Germantown	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 5.57-acre site. For 99A, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
-------------	----------------	---

#99B	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.63-acre site. For 99B, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
-------------	------------------------	---

#99C	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 34.02-acre site. For 99C, the plan called for commercial, office, and residential uses designated as part of the conceptual land use plan. 300 multi-family units were proposed on this 34.02-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, with apartments as the proposed and approved multi-family use, the property could add 95 incidents annually.
-------------	------------------------	---

#99D	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 44.06-acre site. For 99D, the plan called for office, single-family attached, and multi-family uses designated as part of the conceptual land use plan. 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) were proposed on this 44.06-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan with apartments as the proposed and approved multi-family use, the property could add 95 incidents annually to the apartment development, and 28 incidents annually to the single-family attached homes (condominium-type development).
-------------	------------------------	--

#99E	Willmar	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.86-acre site. For 99E, the plan called for retail, office (medical), and approximately 31 attached single-family structures (e.g. row houses similar to condominiums). If this location were to be developed in accordance with the small area plan, the property could add 11 incidents annually to the single-family attached homes (condominium-type development).
-------------	---------	---

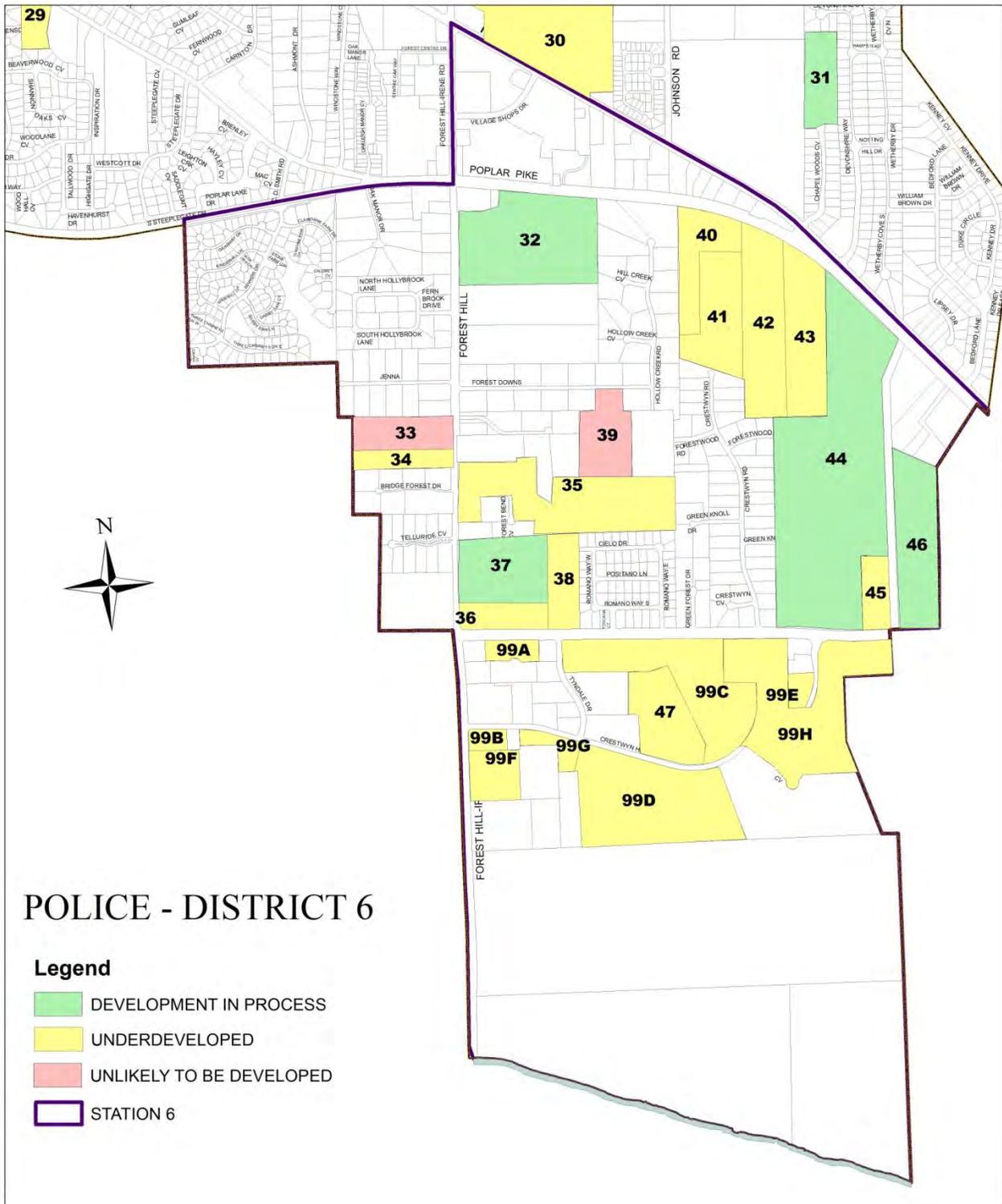
#99F	Mascom	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 8.97-acre site. For 99F, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
-------------	--------	---

#99G	Valenti Mid-South Realty	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 3.1-acre site. For 99G, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99H	Baptist Memorial	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 41.07-acre site. For 99H, the plan called for commercial, office, and 31 single-family attached homes (e.g. row houses similar to condominiums) uses as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, the property could add 11 incidents annually to the single-family attached homes (condominium-type development).

Properties Unlikely To Be Developed < 10 Years:

Although categorized as "unlikely to be developed," two (2) additional properties (#33 and #39) have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these two locations desire or intend to change the current land use of these sites at any point in the immediate future. These properties, listed in red on Figure 33 and Table 35, were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of these two properties fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 33. Police District #6: Property Analysis Map



POLICE DISTRICT #6		Calendar Year																
		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028							
Estimated Annual INCIDENTS From Existing Dwelling Units Within District		164	164	164	164	164	164	164	164	164	164							
Estimated Annual CRIMES From Existing Dwelling Units Within District		20	20	20	20	20	20	20	20	20	20							
Projected Annual Incidents Per 100 Units By Dwelling Type		Apartments	APT	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8						
		Single Family Homes	SFH	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4						
		Condominiums	CO	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0						
		Age-Restricted, Ind. & Asst. Living	AL	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2						
Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type	Additional Annual Incidents from New Residential Development											
Developments in Process																		
32	Reaves-John Duke	R	36.4	2.904	77	SFH	0	44	44	44	44	44	44	44	44	44	44	44
37	Cheatham Property	R	18.05	2.904	34	SFH	0	0	20	20	20	20	20	20	20	20	20	20
44	Goodwin Farms	R	101.3	2.904	232	SFH	0	13	26	40	53	66	79	92	106	119		
46	Viridian Apartments	T4	24.45	12	299	APT	0	0	95	95	95	95	95	95	95	95	95	95
Underdeveloped Properties																		
34	Bobo	RE-1	6.78	1	6	SFH	0	0	0	0	3	3	3	3	3	3	3	3
35	Forest Bend Properties	RE-1	47.24	1	18	SFH	0	0	0	0	0	0	10	10	10	10	10	10
36	Skoutakis Property, Estate Home	R	9.26	2.904	26	SFH	0	0	0	0	15	15	15	15	15	15	15	15
38	Forest Bend Properties (Vacant)	R	10.27	2.904	29	SFH	0	0	0	0	17	17	17	17	17	17	17	17
40	Banks	RE-1	15.24	1	15	SFH	0	0	0	0	9	9	9	9	9	9	9	9
41	Miller	RE-1	19.86	1	19	SFH	0	0	0	0	11	11	11	11	11	11	11	11
42	King Family Trust	RE-1	25	1	25	SFH	0	0	0	0	14	14	14	14	14	14	14	14
43	Grant Property	RE-1	24.87	1	24	SFH	0	0	0	0	14	14	14	14	14	14	14	14
45	Micaten Inc.	T3	7.4	7	52	SFH	0	0	0	0	30	30	30	30	30	30	30	30
47	Forest Hill Associates - Phase 19	T5	17.69	17.52	310	APT	0	0	0	0	99	99	99	99	99	99	99	99
99A	SHG Germantown	T5	5.57	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0
99B	Forest Hill Associates	T5	2.63	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0
99C	Forest Hill Associates	T5	34.02	0	300	APT	0	0	0	0	95	95	95	95	95	95	95	95
99D	Forest Hill Associates	T5	44.06	0	300	APT	0	0	0	0	95	95	95	95	95	95	95	95
		T5		0	75	CO	0	0	0	0	28	28	28	28	28	28	28	
99E	Willmar	T5	2.86	0	31	CO	0	0	0	0	11	11	11	11	11	11	11	11
99F	Mascom	T5	8.97	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0
99G	Valenti Mid-South Realty	T5	3.1	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0
99H	Baptist Memorial	T5	41.07	0	31	CO	0	0	0	0	11	11	11	11	11	11	11	11
Properties Unlikely To Be Developed < 10 Yrs																		
33	Monsarrat	RE-1	11.5	1	11	SFH	0	0	0	0	0	0	0	0	0	0	0	0
39	Bruns	RE-1	13.94	1	13	SFH	0	0	0	0	0	0	0	0	0	0	0	0
Estimated Annual Residential INCIDENT Totals: District #6		164	221	349	362	828	841	865	878	891	905							
Estimated Annual Residential CRIME Totals: District #6		20	25	44	46	115	116	118	119	120	122							

By New Residential Development Type											
Apartments	Annual Incidents	0	0	95	95	384	384	384	384	384	384
	Annual Crimes (5.76:1)	0	0	17	17	67	67	67	67	67	67
Single Family Homes	Annual Incidents	0	57	90	103	229	242	266	279	292	305
	Annual Crimes (11.34:1)	0	5	8	9	20	21	23	25	26	27
Condominiums	Annual Incidents	0	0	0	0	51	51	51	51	51	51
	Annual Crimes (6.45:1)	0	0	0	0	8	8	8	8	8	8
Age-Restricted, Ind. & Asst. Living	Annual Incidents	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (5.20:1)	0	0	0	0	0	0	0	0	0	0

Table 35. Police District #6: Future Residential Incident and Crime Estimations

Residential Call Volume Projection Summary: Police District #6

If the five-year average annual number of residential incidents for existing dwelling units continues and new residential development/redevelopment were to take place as assumed, total residential incidents within Police District #6 are estimated to increase from an annual average of 164 to 905 by 2028. The average number of annual crimes committed within this district as a result of development/redevelopment of three properties is estimated to increase from 20 to 122 by 2028 (see bottom of Table 35).

As shown in Table 36 below, the average daily incident number from residential dwelling units within the district is estimated to increase from 0.45 to 2.48.

POLICE DISTRICT #6: Residential Call Volume Analysis		Total Unit Count	Estimated Annual Call Volume (2028)	Residential Call Volume per Day
EXISTING DWELLING UNITS		570	164	0.45
Apartments*	Developments In Process	299	95	0.26
	Underdeveloped Properties	910	289	0.79
Condominiums	Developments In Process	0	0	0.00
	Underdeveloped Properties	137	51	0.14
Single-Family Homes	Developments In Process	343	183	0.50
	Underdeveloped Properties	214	123	0.34
Age-Restricted, Independent & Assisted Living	Developments In Process	0	0	0.00
	Underdeveloped Properties	0	0	0.00
Totals		2,473	905	2.48

*For the purposes of projecting call volume impact based on the maximum number of dwelling units possible, this study assumes that all new multi-family development within Smart Code zoning districts will be applied for, approved, and developed as apartments over the next ten years.

Table 36. Police District #6: Residential Call Volume Projection Analysis

Apartment Impact

Police District #6

What are the likely impacts of future apartments and apartment building development on Police District #6?

Forest Hill Heights District

APARTMENTS - Police District #6 (2028)				Year	2028			
Projected Annual Call Volume per 100 Apartment Units					31.8			
Property #	Project Name / Project Owner	Zoning Designation	# of units possible or approved	Calls per Year	Calls per Month	Calls per Day	Crimes per Year	
Developments in Process								
46	Viridian Apartments	T4	299	95	7.9	0.26	17	
Underdeveloped Properties								
47	Forest Hill Associates - Phase 19	T5	310	99	8.2	0.27	17	
99C	Forest Hill Associates	T5	300	95	8.0	0.26	17	
99D	Forest Hill Associates	T5	300	95	8.0	0.26	17	
Totals				1,209	384	32.0	1.05	67

Table 37. Police District #6: Apartment Call Volume Summary for 2028

#46: The developer of this 24.45-acre location currently has Outline Plan approval for a maximum of 299 apartment units, or approximately 12 units per acre. This development, known as Viridian, was one of the four developments that were exempted from the moratorium. If the developer were to proceed and receive final approval of a project that was consistent with the aforementioned details, an estimated number of 95 incidents would be anticipated from this location. Of those 95 incidents, approximately 17 would be classified as crimes. The project has been placed in our district incident and crime forecasting model to come be constructed and occupied in 2021.

#47: Although the Watermark development was specifically referenced in the moratorium as an exemption because of an approved Outline Plan, the Project Development Contract and Final Plan did not receive the approval of the Board of Mayor and Aldermen at the July 23, 2018 meeting. Despite failing to receive this final authorization to proceed, our research team included their proposed number of 310 apartment units based on the approved Outline Plan. If the 17.52-acre site were to be developed according to the proposed Final Plan, the property is projected to add another 99 incidents annually. Of those 99 incidents, approximately 17 would be classified as crimes.

#99C: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 34.02-acre site was one of the locations where up to 300 multi-family units would be located. These dwelling units could be condominiums, townhomes, and/or apartments. If this location were to be developed with apartments as the proposed and approved multi-family use, the property could add 95 incidents annually. Of those 95 incidents, approximately 17 would be classified as crimes.

Apartment Impact cont.

Police District #6

What impact will future apartment and apartment building development have on Police District #6?

#99D: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 44.06-acre site was one of the locations where up to 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) would be located. If this location were to be developed in accordance with the small area plan with apartments as the proposed and approved multi-family use, the property could add 95 incidents annually from the apartment development, and 28 incidents annually to single-family attached homes (condominium-type development). Of those 95 incidents to the apartments, approximately 17 would be classified as crimes.

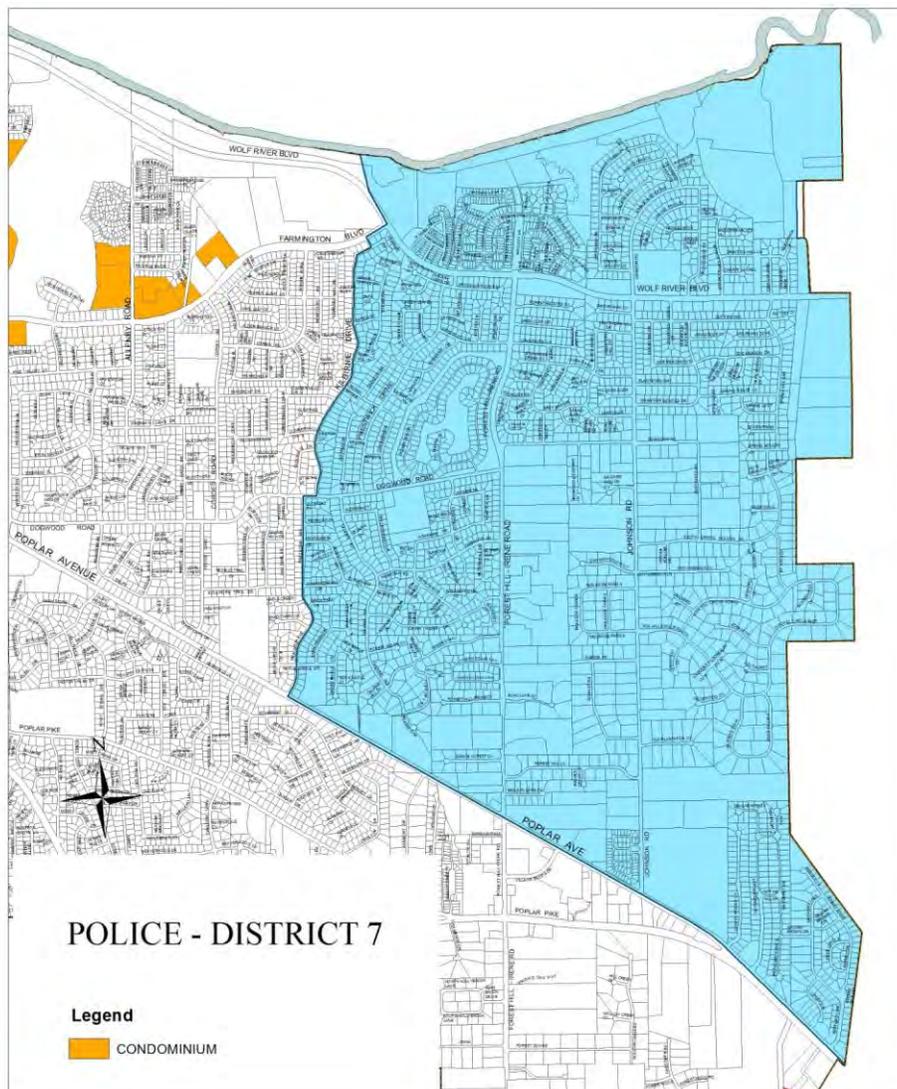
Police District #6 Apartment Impact Summary

In summary, our research team's call volume projections through 2028 made assumptions that Viridian Apartments (299 units) and the three Forest Hill Associates sites [#46 (310 units), #99C (300 units), and #99D (300 units) would each be developed to include a mix of uses that would include multi-family apartments. Under this hypothetical scenario, an additional 1,209 apartment dwelling units would be added to the district's response territory by the year 2028. If this were to occur as analyzed, an approximate amount of 384 annual incidents would be anticipated to these apartment home locations once constructed and fully occupied. Of those 384 annual incidents, approximately 67 would be classified as crimes. These calculations equate to approximately one incident to a new apartment home per day and 1.28 crimes per week.

POLICE DISTRICT #7

Located in the far northeast section of the City, Police District #7 covers a large majority of the residential area in the City that borders Collierville. With 3,222 total dwelling units, residential development over the years in this district has been limited to single-family homes. There are no apartments, condominiums, or age-restricted, independent, and assisted living dwelling units located within this district. The district is bordered by Memphis to the north, Poplar Avenue to the north, and Collierville to the east. There are no Key Commercial Areas within this district and no areas are under the Smart Code zoning.

Figure 34. Police District #7 Territory Map



Existing Dwelling Unit Analysis

Apartments

There are no apartments currently located within the boundaries of this district and no apartment developments are currently proposed or are being considered at this time.

Figure 35. Police District #7: Total Dwelling Unit Count



Condominiums & Townhomes

There are no condominiums currently located within the boundaries of this district and no condominium developments are currently proposed or are being considered at this time.

Single-Family Homes

The 3,222 single-family homes account for 100% of all dwelling units within this district. This district has the most single-family homes within its boundaries.

Age-Restricted, Independent and Assisted Living

There are no age-restricted dwelling units or assisted living units within the district’s boundaries and no age-restricted dwelling units or assisted living units are currently proposed or are being considered at this time.

Residential Calls for Service

Incident Analysis

The residential incident analysis for this district gathered incident data by dwelling type dating back to 2014. For apartment, condominium, and age-restricted, independent, and assisted living dwelling units, data was retrieved using the actual number of dwelling units within the district. Given the number of single-family homes within the district, incident data was retrieved by address from a sample set of the district’s single-family homes (see Appendix D). A collection of more than 500 single-family homes was selected in the district sample. This sample included a representation of homes on multiple streets, evenly dispersed throughout the district. The sample’s incidents per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of incidents for all single-family homes. Total annual incidents and five-year averages were

calculated by dwelling type to provide an approximation of annual residential incidents for the five-year period.

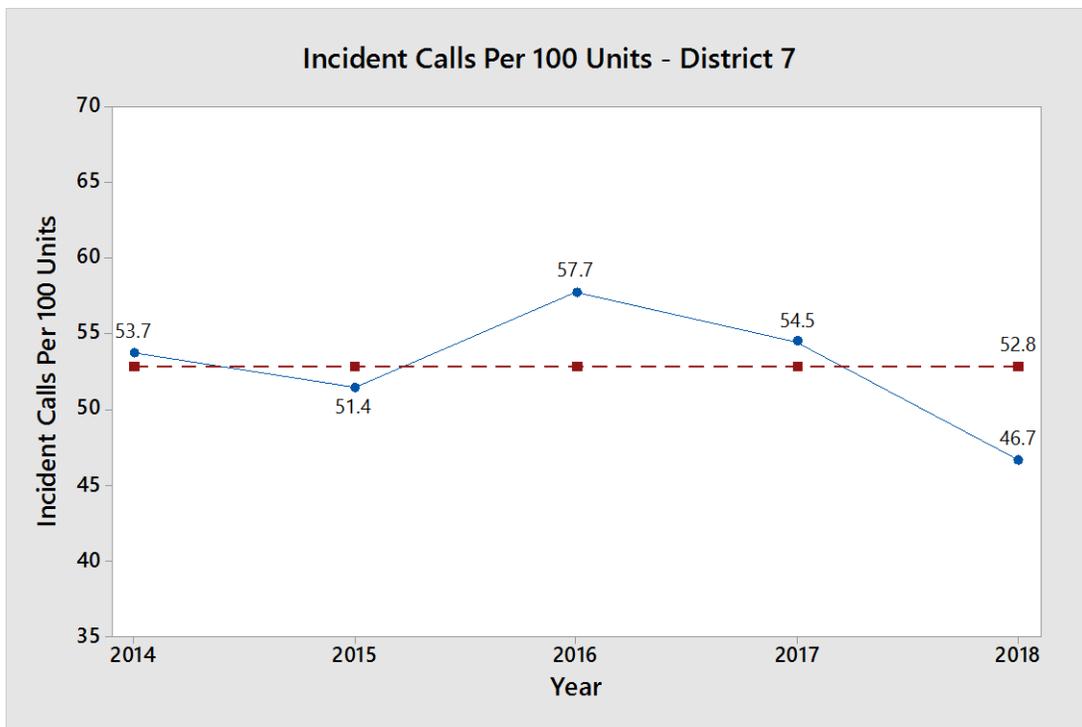
	Dwelling Unit Count		Residential INCIDENTS						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	-	-	-	-	-	-	-	-	-
Single-Family*	525	3222	1731	1657	1860	1755	1504	8506	1701
Assisted Living	-	-	-	-	-	-	-	-	-
APPROX Totals	525	3222	1731	1657	1860	1755	1504	8506	1701

* District incident calculations for the total single family home population was estimated using findings from the sample set

Table 38. Residential Incidents: Police District #7 (2014-2018)

From the beginning of 2014 through the end of 2018, the average annual number of residential incidents in Police District #7 is 1,701 (see Table 38). This average annual number of residential incidents equates to approximately five (4.7) residential incidents per day during this five-year period. At an estimated annual average of 52.8 residential incidents per 100 dwelling units (see Figure 36), this district makes requests for the services of the police department at a rate that is nearly consistent with the 51.9 average for the entire City. The estimated average annual number of residential incidents for this five-year period is between 46 and 58 for every 100 units.

Figure 36. Police District #7: Annual Incidents per 100 Units (2014-2018)



Crime Analysis

As mentioned previously, incidents can sometimes result in criminal violations. Crimes associated with the dwelling unit sample sets, and corresponding incidents, were also collected for the five-year period (see Table 39). The sample’s crime per single-family home ratio was then applied to the total actual number of single-family homes within the district to provide an approximate number of crimes. Total annual crimes and five-year averages were calculated by dwelling type to provide an approximation of annual residential crimes for the five-year period. The estimated average annual number of residential crimes within this district since 2014 is 124.

	Dwelling Unit Count		Residential CRIMES						
	Sample	Actual	2014	2015	2016	2017	2018	5-Yr Totals	5-Yr Avg.
Apartments	-	-	-	-	-	-	-	-	-
Condominium	-	-	-	-	-	-	-	-	-
Single-Family*	525	3222	104	98	135	110	172	620	124
Assisted Living	-	-	-	-	-	-	-	-	-
APPROX Totals	525	3222	104	98	135	110	172	620	124

* District crime calculations for the total single family home population was estimated using findings from the sample set

Table 39. Residential Crimes: Police District #7 (2014-2018)

The future incident and crime estimation model for this district assumes the annual incident and crime rates from existing dwelling units will remain consistent based upon the five-year history and any fluctuations that will occur over the next ten years will ultimately follow the average of the past five years. These five-year average figures for residential incidents and crimes, in Tables 38 and 39, will serve as the ‘baseline’ call volume data from existing dwelling units within the district. New residential development constructed during the ten-year projection period will be assessed the appropriate incidents and resulting crime ratio associated with the dwelling type and the respective year. The estimated incident and crime numbers from new residential development will then be added to the appropriate year’s baseline data (see Table 40).

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included five (5) properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making residential call volume projections for Police District #7. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 37 and Table 40 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum residential calls for service.

Developments in Process:

#31	Chapel Cove Phase II	Zoned “R” for Residential, this 10.29-acre site has been placed in our forecasting model to be constructed and fully occupied by 2020. The addition of 22 single-family homes is projected to increase the average annual number of incidents within the district by thirteen annually through 2028.
-----	----------------------	--

Underdeveloped Properties:

#23	Miti Group	Zoned “R” for Residential, the 18.28 acres at this location could have a maximum of 47 single-family homes. If developed/redeveloped in this manner, the property could add another 27 incidents annually.
-----	------------	--

#25	Steiner	Zoned “RE” for Residential Estate, the 12.81 acres at this location could have a maximum of six dwelling units. If developed/redeveloped in this manner, the property could add three incidents annually through 2028.
-----	---------	--

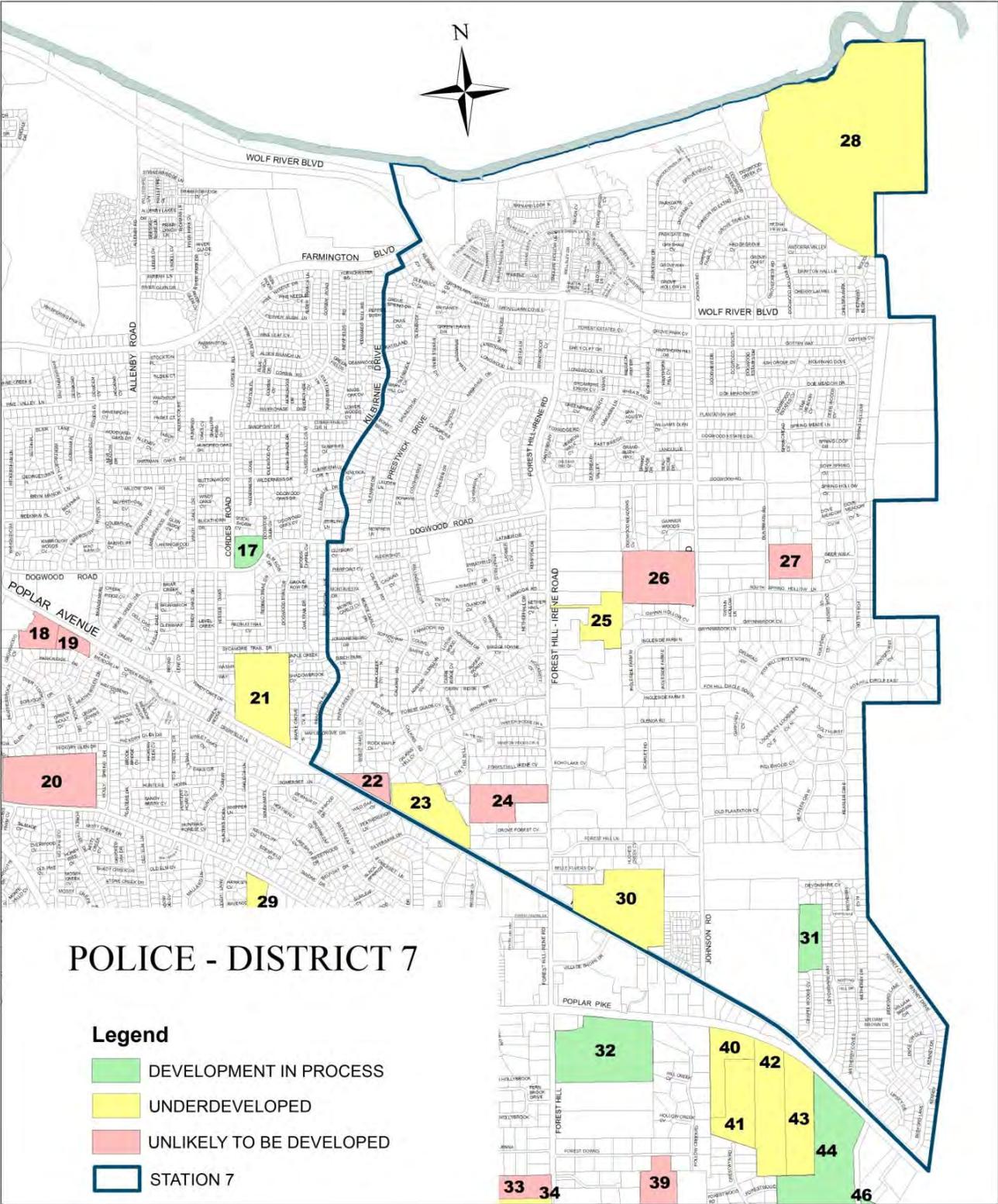
#28	Ben Clark Property	Zoned “AG” for Agricultural, the 180.59 acres at this location could have a maximum of 36 dwelling units (at one home per five acres). One single-family estate home is currently located on this property. If developed/redeveloped under the current agricultural zoning, the property could add another 21 incidents annually through 2028.
-----	--------------------	--

#30	Fogelman Robert F Revocable Trust	Zoned “O-C” for Office – Complex, these 32.3 acres are not projected to include a residential use based on its current zoning.
-----	-----------------------------------	--

Properties Unlikely To Be Developed < 10 Years:

Although categorized as “unlikely to be developed,” four (4) properties (#22, #24, #26, and #27) have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these locations, listed in red on Figure 37 and Table 40, desire or intend to change the current land use of these sites at any point in the immediate future. These properties were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to their existing uses. It should be noted these properties do not fall within one of the Smart Code zoning districts, where apartments are currently permitted.

Figure 37. Police District #7: Property Analysis Map



POLICE DISTRICT #7	Calendar Year										
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
Estimated Annual INCIDENTS From Existing Dwelling Units Within District	1701	1701	1701	1701	1701	1701	1701	1701	1701	1701	1701
Estimated Annual CRIMES From Existing Dwelling Units Within District	124	124	124	124	124	124	124	124	124	124	124

Projected Annual Incidents Per 100 Units By Dwelling Type	Apartments	APT	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8
	Single Family Homes	SFH	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4
	Condominiums	CO	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
	Age-Restricted, Ind. & Asst. Living	AL	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2

Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type												
Developments in Process																		
31	Chapel Cove Phase II	R	10.29	2.904	22	SFH	0	13	13	13	13	13	13	13	13	13	13	
Underdeveloped Properties																		
23	Miti Group	R	18.28	2.904	47	SFH	0	0	0	0	27	27	27	27	27	27	27	
25	Steiner	RE	12.81	0.5	6	SFH	0	0	0	0	0	0	3	3	3	3	3	
28	Ben Clark Property	AG	180.59	0.2	36	SFH	0	0	0	0	21	21	21	21	21	21	21	
30	Fogelman Robert F Revocable Trust	O-C	32.3	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	
Properties Unlikely To Be Developed < 10 Yrs																		
22	Lankford	R	6.09	2.904	18	SFH	0	0	0	0	0	0	0	0	0	0	0	
24	Grizzard	RE	16.26	0.5	16	SFH	0	0	0	0	0	0	0	0	0	0	0	
26	Herring	RE	27	0.5	13	SFH	0	0	0	0	0	0	0	0	0	0	0	
27	Selman	RE-1	10	1	10	SFH	0	0	0	0	0	0	0	0	0	0	0	
Estimated Annual Residential INCIDENT Totals: District #7							1701	1714	1714	1714	1761	1761	1765	1765	1765	1765	1765	
Estimated Annual Residential CRIME Totals: District #7							124	125	125	125	129	129	130	130	130	130	130	

By New Residential Development Type																
Apartments	Annual Incidents	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Annual Crimes (5.76:1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single Family Homes	Annual Incidents	0	13	13	13	60	60	64	64	64	64	64	64	64	64	
	Annual Crimes (11.34:1)	0	1	1	1	5	5	6	6	6	6	6	6	6		
Condominiums	Annual Incidents	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Annual Crimes (6.45:1)	0	0	0	0	0	0	0	0	0	0	0	0	0		
Age-Restricted, Ind. & Asst. Living	Annual Incidents	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Annual Crimes (5.20:1)	0	0	0	0	0	0	0	0	0	0	0	0	0		

Table 40. Police District #7: Future Residential Incident and Crime Estimations

Residential Call Volume Projection Summary: Police District #7

If the five-year average annual number of residential incidents for existing dwelling units continues and new residential development were to take place as hypothetically studied and presented, total residential incidents within Police District #7 are estimated to increase from an annual average of 1,701 to 1,765 by 2028. The average daily incident number from residential dwelling units within the district would increase from 4.7 to 4.8. The average number of annual crimes committed within this district as a result of new residential, single-family home development is estimated to increase by six (see Table 40).

Apartment Impact

Police District #7

What are the likely impacts of future apartments and apartment building development on Police District #7?

Future apartment developments are currently not being considered within the Police District #7 territory and there are no Smart Code Zoning Districts within this district's boundaries. Also, as previously mentioned, there are no existing apartments located within the boundaries of Police District #7. Therefore, based on the current zoning, there should be no direct impact to this district from apartments in general through 2028.

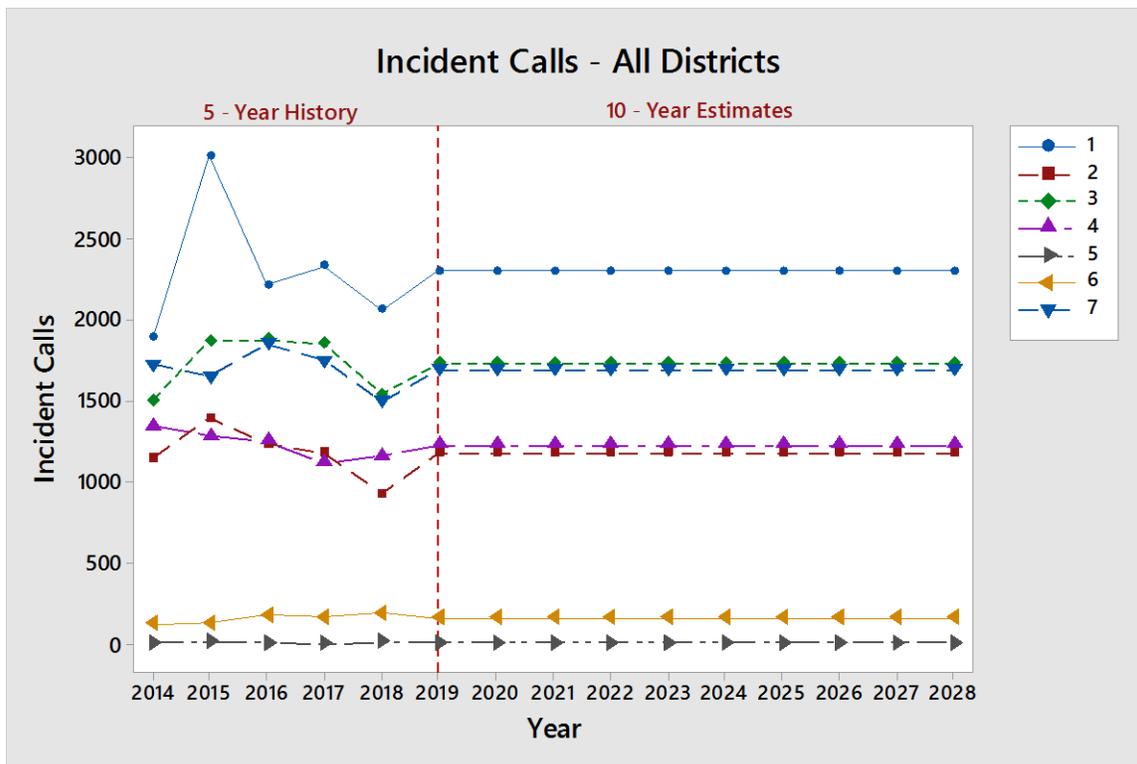
City-wide Police Impact Analysis

Residential Call Volume Projection Summary: ALL POLICE DISTRICTS

Existing Dwelling Units

As illustrated in Figure 38, existing dwelling units within Police District #1 are estimated to continue placing the highest residential demand on the services of the police department over the next ten years. Existing dwelling units within two of the larger residential districts, Police Districts #3 and #7, will also remain among the highest districts in residential incident / call volume demand through 2028. Districts #5, the Central Business District, and #6, in the southeast section of the City, are estimated to continue to have the least amount of residential impact on the services of the police department over the next ten years.

Figure 38. Incident Call Volume History and Projections for Existing Dwelling Units: All Police Districts



If historical trends in incidents / call volume from the last five years continue, annual calls for service from the existing 16,081 dwelling units within the City are estimated to remain around 8,338. As shown in Table 41 on the next page, this number of annual incidents equates to an average of 22.84 residential calls for service per day. When considering both categories of this new residential development scenario, an additional 1,395 annual incidents from 3,642 new dwelling units could potentially add 3.82 incidents per day to the department’s total residential call volume by 2028. The five-year estimated average of 22.84 city-wide residential incidents per day would increase to 26.67. A more detailed analysis for estimated incident and crime volume by the categories of developments in process and underdeveloped properties follows.

ALL POLICE DISTRICTS Residential Call Volume Analysis		Total Unit Count	Estimated Annual Call Volume (2028)	Residential Call Volume per Day	
EXISTING DWELLING UNITS		16,081	8,338	22.84	
Apartments*	Developments In Process	869	276	0.76	1.87
	Underdeveloped Properties	1,272	404	1.11	
Condominiums	Developments In Process	0	0	0.00	0.14
	Underdeveloped Properties	137	51	0.14	
Single-Family Homes	Developments In Process	423	228	0.62	1.76
	Underdeveloped Properties	779	416	1.14	
Age-Restricted, Independent & Assisted Living	Developments In Process	162	20	0.05	0.05
	Underdeveloped Properties	0	0	0.00	
Totals		19,723	9,733	26.67	3.82

*For the purposes of projecting call volume impact based on the maximum number of dwelling units possible, this study assumes that all new multi-family development within Smart Code zoning districts will be applied for, approved, and developed as apartments over the next ten years.

Table 41. All Police Districts: Residential Call Volume Projection Analysis

Developments in Process:

Calls for service from a proposed 1,454 new residential dwelling units are estimated to increase total call volume by 1.44 residential calls for service per day by 2028. As shown in Table 42, this added daily call volume includes a total of 0.76 calls per day to the combined 869 apartment dwelling units at the Thornwood Residences and Market Row, the undeveloped Lot 5 on the Thornwood site (if applied for and approved), and the proposed Viridian development. Another 0.62 calls per day would come from 423 new single-family homes. A marginal amount (0.05) of calls per day is estimated to originate from the Avenida Senior Living development.

Developments in Process	Planned Total Unit Count	Forecasted Incident Volume			% of Incidents
		Per Year	Per Week	Per Day	
Apartments	869	276	5.31	0.76	53%
Condominiums	0	0	0.00	0.00	0%
Single-Family Homes	423	228	4.38	0.62	44%
Age-Restricted, Ind. & Assisted Living	162	20	0.38	0.05	4%
Totals	1,454	524	10.08	1.44	100%

Table 42. City-wide Developments in Process: Forecasted Incident Volume Summary

Using the established incident-to-crime ratios by dwelling unit type, the department can expect close to an average of one additional crime per week (0.92) from the 869 apartment dwelling units within the developments in process category and 1.38 crimes per week from the total 1,454 new residential units (see Table 43).

Developments in Process	Planned Total Unit Count	Forecasted Crime Volume			% of Incidents
		Per Year	Per Week	Per Day	
Apartments	869	48	0.92	0.13	67%
Condominiums	0	0	0.00	0.00	0%
Single-Family Homes	423	20	0.38	0.05	28%
Age-Restricted, Ind. & Assisted Living	162	4	0.07	0.01	5%
Totals	1,454	72	1.38	0.20	100%

Table 43. City-wide Developments in Process: Forecasted Crime Volume Summary

Underdeveloped Properties:

Calls for service from a possible 2,188 new residential dwelling units are estimated to increase total call volume by 2.38 calls per day (Table 44). This added daily call volume includes 1.11 calls per day to the combined 1,272 apartment dwelling units possible per the current land use zoning. Another 1.13 calls per day would come from 779 new single-family homes at the Germantown Country Club site and a number of developed/redeveloped parcels scattered throughout the City.

Underdeveloped Properties	Planned Total Unit Count	Forecasted Incident Volume			% of Incidents
		Per Year	Per Week	Per Day	
Apartments	1,272	404	7.77	1.11	46%
Condominiums	137	51	0.98	0.14	6%
Single-Family Homes	779	414	7.96	1.13	48%
Age-Restricted, Ind. & Assisted Living	0	0	0.00	0.00	0%
Totals	2,188	869	16.71	2.38	100%

Table 44. City-wide Underdeveloped Properties: Forecasted Incident Volume Summary

Using the established incident-to-crime ratios by dwelling unit type, the department could expect 1.35 additional crimes per week from the 1,272 apartment dwelling units included in this underdeveloped properties category and 2.25 crimes per week from the total 2,188 new residential units (see Table 45) if all were to be constructed.

Underdeveloped Properties	Planned Total Unit Count	Forecasted Crime Volume			% of Incidents
		Per Year	Per Week	Per Day	
Apartments	1,272	70	1.35	0.19	60%
Condominiums	137	8	0.15	0.02	7%
Single-Family Homes	779	39	0.75	0.11	33%
Age-Restricted, Ind. & Assisted Living	0	0	0.00	0.00	0%
Totals	2,188	117	2.25	0.32	100%

Table 45. City-wide Underdeveloped Properties: Forecasted Crime Volume Summary

City-wide Summary:

Calls for service from a possible 3,642 new residential dwelling units are estimated to increase total call volume by 2.38 calls per day (Table 46). This added daily call volume includes 1.11 calls per day to the combined 1,272 apartment dwelling units possible per the current land use zoning. Another 1.13 calls per day would come from 779 new single-family homes at the Germantown Country Club site and a number of developed/redeveloped parcels scattered throughout the City.

All Considered Projects	Planned Total Unit Count	Forecasted Incident Volume			% of Incidents
		Per Year	Per Week	Per Day	
Apartments	2,141	680	13.08	1.86	49%
Condominiums	137	51	0.98	0.14	4%
Single-Family Homes	1,202	644	12.38	1.76	46%
Age-Restricted, Ind. & Assisted Living	162	20	0.38	0.05	1%
Totals	3,642	1,395	26.83	3.82	100%

Table 46. City-wide All Considered Projects: Forecasted Incident Volume Summary

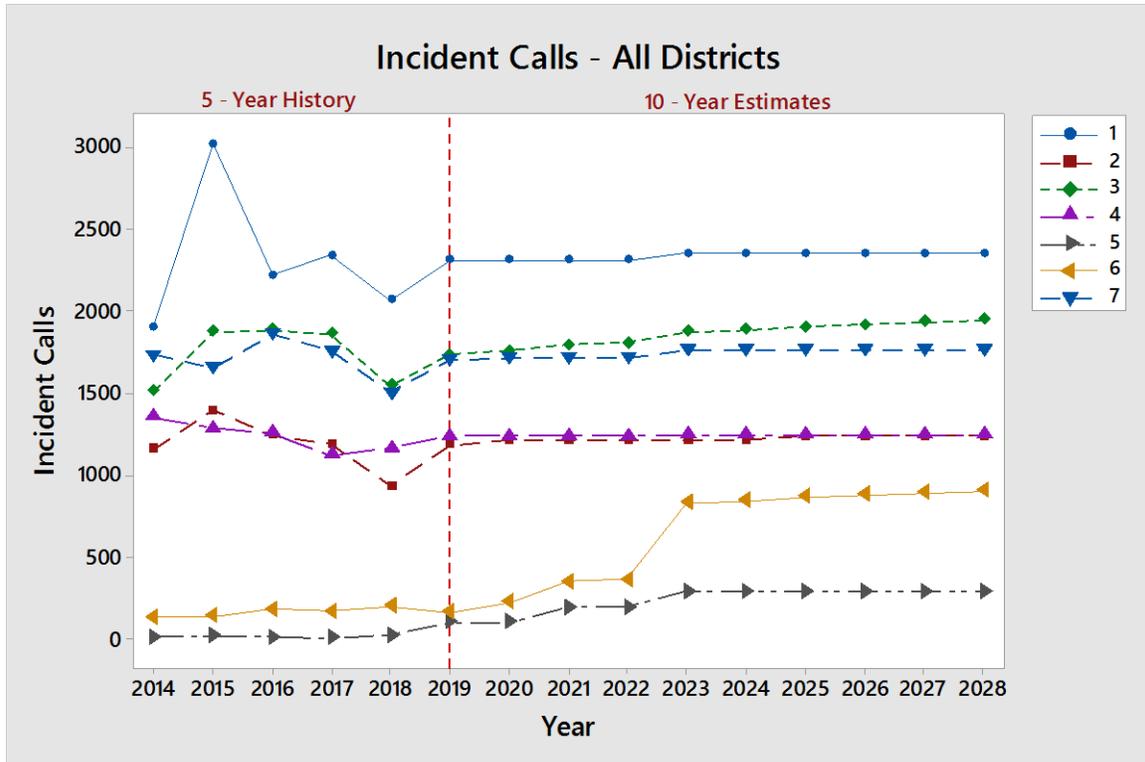
Using the established incident-to-crime ratios by dwelling unit type, the department could expect 2.27 additional crimes per week from the 2,141 apartment dwelling units included in this underdeveloped properties category and 3.59 crimes per week from the total 3,642 new residential units (see Table 47) if all were to be constructed.

All Considered Projects	Planned Total Unit Count	Forecasted Crime Volume			% of Incidents
		Per Year	Per Week	Per Day	
Apartments	2,141	118	2.27	0.32	63%
Condominiums	137	8	0.15	0.02	4%
Single-Family Homes	1,202	57	1.09	0.16	30%
Age-Restricted, Ind. & Assisted Living	162	4	0.07	0.01	2%
Totals	3,642	187	3.59	0.51	100%

Table 47. City-wide All Considered Projects: Forecasted Crime Volume Summary

As illustrated in Figure 39, Police District #1 is still estimated to experience the highest number of residential incidents over the next ten years considering the estimated call volume increase from existing dwelling units and the added calls for service from the aggressive residential build-out scenario presented for all districts. Because our research team’s incident estimation model added 1,261 residential dwelling units in the underdeveloped properties category around 2023, the call volume increased significantly in Police District #6. Nonetheless, the total residential call volume in Police District #6 will remain considerably less than all other districts, with the exception of Police District #5, the residential areas within the Central Business district.

Figure 39. Incident Call Volume History and Projections for Ten-Year Build-Out: All Police Districts



Apartment Impact

All Police Districts

What are the likely impacts of future apartments and apartment building development on the services of the Police Department?

Of the projected 3.82 added calls for service per day from new development (under an aggressive residential build-out scenario with a total of 3,642 new residential dwelling units by 2028), 1.87 incidents per day would originate from the 2,141 new apartment dwelling unit locations included in this study. An estimated amount of 118 crimes per year from these added apartment units could be expected. As of mid-2019, only the 276 new apartment dwelling units at the Thornwood Residences and Market Row have made it through all stages of the City’s approval process and have been constructed.

In general, as shown in Table 48, an apartment development of approximately 300 units is estimated to generate around 95 residential incidents / calls for service annually by 2028, the equivalent of 8.0 calls per month, or one call every fourth day. An annual estimated amount of 17 crimes from these 300 units could be expected also.

APARTMENTS - ALL POLICE DISTRICTS (2028)				Year	2028			
Projected Annual Call Volume per 100 Apartment Units				31.8				
Property #	Project Name / Project Owner	Zoning Designation	# of units possible or approved	Calls per Year	Calls per Month	Calls per Day	Crimes per Year	
Developments in Process								
15A	TW Residences & Market Row Lofts	T5	276	88	7.3	0.24	15	
15B	Thornwood (Undeveloped Lot 5)	T5	294	93	7.8	0.26	16	
46	Viridian Apartments	T4	299	95	7.9	0.26	17	
Underdeveloped Properties								
1B	Bank of Bartlett	T6	20	6	0.5	0.02	1	
1C	Kirby Professional Buildings	T5/T6	40	13	1.1	0.03	2	
4	Arthur Tract	T5	302	96	8.0	0.26	17	
47	Forest Hill Associates - Phase 19	T5	310	99	8.2	0.27	17	
99C	Forest Hill Associates	T5	300	95	8.0	0.26	17	
99D	Forest Hill Associates	T5	300	95	8.0	0.26	17	
Totals				2,141	680	56.7	1.87	118

Table 48. All Police Districts: Apartment Call Volume Summary for 2028

ALL POLICE DISTRICTS				Calendar Year		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
Estimated Annual INCIDENTS From Existing Dwelling Units CITY-WIDE						8338	8338	8338	8338	8338	8338	8338	8338	8338	8338	
Estimated Annual CRIMES From Existing Dwelling Units CITY-WIDE						801	801	801	801	801	801	801	801	801	801	
Projected Annual Incidents Per 100 Units By Dwelling Type		Apartments	APT	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	31.8	
		Single Family Homes	SFH	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	
		Condominiums	CO	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	
		Age-Restricted, Ind. & Asst. Living	AL	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	
Property #	Property Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type	Additional Annual Calls for Service from New Residential Development									
Developments In Process																
1A	Carrefour	T5/T6	10.12	20	0	n/a	0	0	0	0	0	0	0	0	0	
7	Allelon Subdivision	R	25.68	2.904	50	SFH	0	29	29	29	29	29	29	29	29	
14	Avenida Senior Living Apartments	R-H	5.3	31	162	AL	0	20	20	20	20	20	20	20	20	
15A	TW Residences & Market Row Lof	T5	7.09	39	276	APT	88	88	88	88	88	88	88	88	88	
15B	Thornwood (Undeveloped Lot 5)	T5	2.98	99	294	APT	0	0	93	93	93	93	93	93	93	
17	Piper's Gardens	R	5.58	2.904	8	SFH	0	5	5	5	5	5	5	5	5	
31	Chapel Cove Phase II	R	10.29	2.904	22	SFH	0	13	13	13	13	13	13	13	13	
32	Reaves-John Duke	R	36.4	2.904	77	SFH	0	44	44	44	44	44	44	44	44	
37	Cheatham Property	R	18.05	2.904	34	SFH	0	0	20	20	20	20	20	20	20	
44	Goodwin Farms	R	101.3	2.904	232	SFH	0	13	26	39	52	66	79	92	105	
46	Viridian Apartments	T4	24.45	12	299	APT	0	0	95	95	95	95	95	95	95	
Underdeveloped Properties																
0	Germantown Country Club	R	178.6	2.904	261	SFH	0	0	15	30	44	59	74	89	104	
1B	Bank of Bartlett	T6	1	20	20	APT	0	0	0	0	6	6	6	6	6	
1C	Kirby Professional Buildings	T5/T6	2.64	15	40	APT	0	0	0	0	13	13	13	13	13	
3	Owen Jack R Revocable Trust	R	13.6	2.904	39	SFH	0	0	0	0	22	22	22	22	22	
4	Arthur Tract	T5	32.86	15	302	APT	0	0	0	0	96	96	96	96	96	
6	Klycie Walters B Jr.	R	4.1	2.904	12	SFH	0	0	0	0	0	0	7	7	7	
9	Montesi Letitia D Living Trust	R	9.5	2.904	28	SFH	0	0	0	0	0	0	16	16	16	
16A	Patel	R	6.46	2.904	18	SFH	0	0	10	10	10	10	10	10	10	
16B	Dogwood Manor	R	4.88	2.904	14	SFH	0	0	8	8	8	8	8	8	8	
21	Warlick Sandra H and Hulon O	R	30.07	2.904	87	SFH	0	0	0	0	50	50	50	50	50	
23	Miti Group	R	18.28	2.904	47	SFH	0	0	0	0	27	27	27	27	27	
25	Steiner	RE	12.81	0.5	6	SFH	0	0	0	0	0	0	3	3	3	
28	Ben Clark Property	AG	180.59	0.2	36	SFH	0	0	0	0	21	21	21	21	21	
29	Leike Richard H Living Trust	R	5.9	2.904	17	SFH	0	0	0	0	10	10	10	10	10	
30	Fogelman Robert F Revocable Tru	O-C	32.3	0	0	n/a	0	0	0	0	0	0	0	0	0	
34	Bobo	RE-1	6.78	1	6	SFH	0	0	0	0	3	3	3	3	3	
35	Forest Bend Properties	RE-1	47.24	1	18	SFH	0	0	0	0	0	0	10	10	10	
36	Skoutakis Property, Estate Home	R	9.26	2.904	26	SFH	0	0	0	0	15	15	15	15	15	
38	Forest Bend Properties (Vacant)	R	10.27	2.904	29	SFH	0	0	0	0	17	17	17	17	17	
40	Banks	RE-1	15.24	1	15	SFH	0	0	0	0	9	9	9	9	9	
41	Miller	RE-1	19.86	1	19	SFH	0	0	0	0	11	11	11	11	11	
42	King Family Trust	RE-1	25	1	25	SFH	0	0	0	0	14	14	14	14	14	
43	Grant Property	RE-1	24.87	1	24	SFH	0	0	0	0	14	14	14	14	14	
45	Micaten Inc.	T3	7.4	7	52	SFH	0	0	0	0	30	30	30	30	30	
47	Forest Hill Associates - Phase 19	T5	17.69	17.52	310	APT	0	0	0	0	99	99	99	99	99	
99A	SHG Germantown	T5	5.57	0	0	n/a	0	0	0	0	0	0	0	0	0	
99B	Forest Hill Associates	T5	2.63	0	0	n/a	0	0	0	0	0	0	0	0	0	
99C	Forest Hill Associates	T5	34.02	0	300	APT	0	0	0	0	95	95	95	95	95	
99D	Forest Hill Associates	T5	44.06	0	300	APT	0	0	0	0	95	95	95	95	95	
		T5		0	75	CO	0	0	0	0	28	28	28	28	28	
99E	Willmar	T5	2.86	0	31	CO	0	0	0	0	11	11	11	11	11	
99F	Mascom	T5	8.97	0	0	n/a	0	0	0	0	0	0	0	0	0	
99G	Valenti Mid-South Realty	T5	3.1	0	0	n/a	0	0	0	0	0	0	0	0	0	
99H	Baptist Memorial	T5	41.07	0	31	CO	0	0	0	0	11	11	11	11	11	
Properties Unlikely To Be Developed < 10 Yrs																
2	Fulmer Estate	R	190.62	2.904	554		0	0	0	0	0	0	0	0	0	
5	Bowman	R	7.32	2.904	21		0	0	0	0	0	0	0	0	0	
8	Melanie Taylor Marital Trust	R	310	2.904	900		0	0	0	0	0	0	0	0	0	
10	Andrew McFadden	R	60.8	2.904	177		0	0	0	0	0	0	0	0	0	
11	James McFadden	R	12.89	2.904	37		0	0	0	0	0	0	0	0	0	
12	Nancy McFadden	R	25.39	2.904	74		0	0	0	0	0	0	0	0	0	
13	John McFadden	R	14.3	2.904	42		0	0	0	0	0	0	0	0	0	
18	Barzizza	R	7.01	2.904	20		0	0	0	0	0	0	0	0	0	
19	Fite	R	4	2.904	12		0	0	0	0	0	0	0	0	0	
20	Smith Sarah S Family Trust	R	178.6	2.904	99		0	0	0	0	0	0	0	0	0	
22	Lankford	R	6.09	2.904	18		0	0	0	0	0	0	0	0	0	
24	Grizzard	RE	16.26	0.5	16		0	0	0	0	0	0	0	0	0	
26	Herring	RE	27	0.5	13		0	0	0	0	0	0	0	0	0	
27	Selman	RE-1	10	1	10		0	0	0	0	0	0	0	0	0	
33	Monsarrat	RE-1	11.5	1	11		0	0	0	0	0	0	0	0	0	
39	Bruns	RE-1	13.94	1	13		0	0	0	0	0	0	0	0	0	
Estimated Annual Residential INCIDENT Totals: ALL DISTRICTS							8426	8549	8803	8831	9556	9584	9649	9677	9705	9733
Estimated Annual Residential CRIME Totals: ALL DISTRICTS							816	829	868	870	972	974	980	983	985	987

By New Residential Development Type											
Apartments	Annual Incidents	88	88	276	276	680	680	680	680	680	680
	Annual Crimes (5.76:1)	15	15	48	48	118	118	118	118	118	118
Single Family Homes	Annual Incidents	0	103	169	197	467	495	560	588	616	644
	Annual Crimes (11.34:1)	0	9	15	17	41	44	49	52	54	57
Condominiums	Annual Incidents	0	0	0	0	51	51	51	51	51	51
	Annual Crimes (6.45:1)	0	0	0	0	8	8	8	8	8	8
Age-Restricted, Ind. & Asst. Living	Annual Incidents	0	20	20	20	20	20	20	20	20	20
	Annual Crimes (5.20:1)	0	4	4	4	4	4	4	4	4	4

Table 49. All Police Districts: Future Residential Incident and Crime Estimations

FIRE SERVICES IMPACT ANALYSIS



Project Scope

The primary purpose of this departmental study is to determine the likely impact future apartment and apartment building developments within the Smart Code Zoning Districts will have on Fire and Emergency Medical Services (EMS) provided by the Germantown Fire Department (GFD). This report is based on research conducted over the past 18 months, including a review and analysis of GFD call volume dating back to 2008. The report examines the current state and most recent trends in Germantown's Fire/EMS call volume for all residential dwelling units, including existing apartments, and uses the information to forecast the potential impact future apartments and apartment building developments within the Smart Code Zoning Districts will have on the GFD overall and by respective fire district.

Although the report is apartment-centric, our research included an analysis of data from all residential dwelling types within the City for the purposes of context and to better understand the existing and future impact of each on the services of the GFD. This report may be used to inform policy decisions related to future apartment development as well as provide insights into other future residential development applications going forward.

Background

Originally established in 1946 as a volunteer department, today's full-service Fire/EMS Department in Germantown provides the professional services of fire suppression, basic and advanced life support medical care, emergency ambulance transportation, hazardous materials mitigation, and technical rescue services. Additionally, the GFD proactively handles the delivery of fire prevention services and a variety of public education programs regarding the same. The mission of the GFD is to provide timely and effective response to fire and medical emergencies for the protection of life, property, and the environment of Germantown. For the purposes of this report, 9-1-1 calls or texts for emergency fire and/or medical response in one of the aforementioned categories are referred to as "calls for service" or "calls" throughout the remainder of the report.

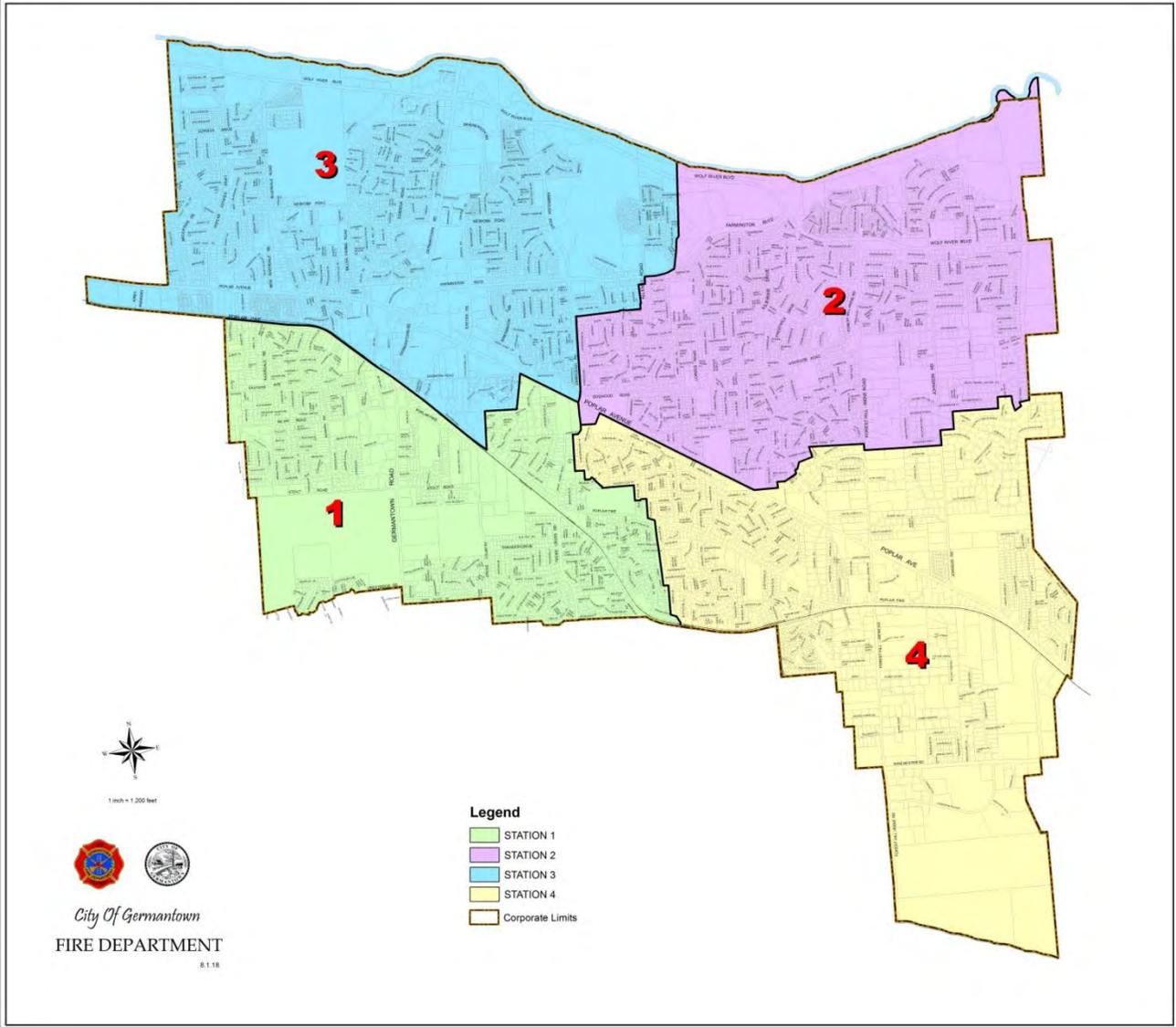
The Fire Department is currently staffed by 92 full-time personnel, five part-time personnel, and approximately 25 reserves. In 2019, the GFD added six full-time firefighter/paramedics to the department after being awarded a Staffing for Adequate Fire and Emergency Response (SAFER) grant from the Federal Emergency Management Agency (FEMA) in 2018. This grant supported two additional personnel per shift. A minimum of 22 to a maximum of 27 full-time firefighters are on duty at any given time within four distinct fire districts (see Figure 1), each identified by the fire station number physically located within their respective district. All Germantown firefighter personnel are licensed EMS providers with approximately half of them licensed as Paramedics and the other half licensed as Advanced Emergency Medical Technicians. Part-time personnel are also used to maintain minimum staffing levels in the event of scheduled and unscheduled time off for full-time personnel.

Having earned the long-standing reputation of being an exemplary, full-service department within the fire industry, the following are some of the department's most recent accomplishments and recognitions:

- **Emergency Ambulance Transportation Service.** In July of 2013, the GFD implemented its Emergency Ambulance Transportation Service, provided by Fire Department personnel, ensuring continuity of care from the time of the 9-1-1 call for assistance until the patient is transferred to a physician's care at a hospital's emergency department.

- Cardiac Arrest Return of Spontaneous Circulation (ROSC).** Cardiac arrest, the abrupt loss of heart function in a person who may or may not have been diagnosed with heart disease, can come on suddenly or in the wake of other symptoms. If appropriate steps are not taken immediately, cardiac arrest is often fatal. The national average for emergency medical services to regain a pulse for a victim in cardiac arrest is 8%. Because of aggressive training and utilization of cutting-edge technology, the GFD has been able to restore a pulse in 45% of patients. The GFD includes all patients that suffer from cardiac arrest in determining survival rates where many services only count patients within specific parameters.
- In-House EMS Continuing Education Program.** The Fire Department provides all EMS training needed for both Advanced-EMTs and Paramedic license renewal at the state and national levels. This training for department personnel is tailored based upon the changing clinical and field environments for both medical and trauma patients.

Figure 1. City of Germantown Fire Department District Map



- **Response Times.** The GFD has improved its response time to calls for assistance. Response time is measured from the time the 9-1-1 call is answered until the Fire Department arrives on the scene. Implementation of the Locution Automated Dispatch System and process improvements, determined after a Six Sigma review, led to a 13% improvement in response times from six minutes and 22 seconds to five minutes and 31 seconds. Calls are processed faster in Dispatch, crews are more efficient after receiving the alarm, and travel routes are better planned.
- **Customer Satisfaction.** After every medical incident or significant fire related event, an After-Incident Survey form is sent to the recipient of the GFD's services to gauge their level of satisfaction. The Fire Department has consistently scored above their target of 98.5% customer satisfaction with fire and emergency medical services on the surveys. For 2018, the measure exceeded 99% customer satisfaction in all four quarters of the fiscal year.
- **Community Emergency Response Team (CERT) Training Program.** CERT training prepares individuals in our community for disasters so they can respond as a community. It teaches citizens what to expect and do during disaster situations. Classes are offered on a quarterly basis and improve our relations with community members.
- **Hazard Material Response.** The GFD was the first department in the state to have its Hazardous Materials Response capabilities accredited by the Tennessee Emergency Management Agency. The standard set by the GFD has been used as the measuring stick for other agencies that followed. The GFD remains the only accredited team in western division of the state.
- **ISO Class 1 Rating.** In May of 2017, the GFD was notified that it secured a Class 1 Fire Protection Rating, the highest rating possible, from the Insurance Services Office (ISO). ISO is an independent company that serves insurance companies, communities, fire departments, insurance regulators, and others by providing information about risk. ISO's expert staff collects information about municipal fire suppression efforts in communities throughout the United States. In each of those communities, ISO analyzes the relevant data and assigns a score from 1 to 10. Class 1 represents an exemplary fire suppression program, and Class 10 indicates that the area's fire suppression program does not meet ISO's minimum criteria. ISO evaluates over 41,000 fire departments and there are fewer than 350 that earn the Class 1 rating. Maintaining the ISO Class 1 Fire Protection Rating is an important consideration of the GFD as the City progresses in determining future land use.

Research Methodology

In order to best determine the likely impact future apartment and apartment building developments in the Smart Code Zoning Districts will have on the GFD, our research team's analysis focused on the use of Germantown-specific EMS and Non-EMS call volume data from existing Germantown apartments to project future call volume related to potential future apartment developments based on current land use zoning. This methodical, data-driven approach was also applied to the other types of residential dwelling units within the City by fire district and city-wide.

A few of the questions that guided our research for the GFD report included:

- What are the total residential call volume trends for EMS and Non-EMS over the last five to ten years?

- What are the call volume trends for EMS and Non-EMS calls for apartments; single-family homes; condominiums; and age-restricted, independent or assisted living facilities over the last five to ten years?
- Has there been a change in the rate of residential calls made annually by dwelling unit to apartments; single-family homes; condominiums; and age-restricted, independent or assisted living facilities over the last five to ten years?
- Based on the empirical evidence, is there a statistical difference between the rate of calls to each of the five existing apartments in Germantown, and if so, can we identify the characteristics that correlate with those differences?
- Over the next ten years, what will be the likely call volume impact of any potential, future apartment development on its respective fire district? What will be the likely impact of other new residential developments within their respective fire district? What will be the likely impact to the department as a whole?

Incident Tracking and Data Gathering

Since the passing of the moratorium in January of 2018, our research team has invested a significant number of hours gathering and analyzing GFD's call volume data. The call volume data used in this study was taken from the Fire Department's National Fire Incident Reporting System (NFIRS). Each time the Fire Department provides an EMS or Non-EMS call for service to the community, a NFIRS report is generated and submitted to both state and federal databases. The data provided in each NFIRS report can then be used by the Tennessee State Fire Marshal's Office (SFO) to provide statistical information to the State Legislature.

For the purposes of this study, the team collected NFIRS total call volume data from the period of January 1, 2009 through December 31, 2018. During this timeframe, the GFD utilized Firehouse Records Management Software, New World Fire Management Software, or a combination of the two software programs to record and analyze call volume data. GFD staff sorted calls by district by the point of origin and by dwelling type. The team used data from this ten-year period to analyze trends and project future call volume figures based on estimates of additional residential development.

In September of 2013, the Fire Department began the process of transitioning a portion of its software tracking needs from Firehouse Records Management Software to the New World Fire Management Software program. Because the department experienced several technical challenges during the changeover process, the ability to track calls by fire district was unavailable for calendar year 2014. Therefore, trend analyses of call volume by district include every year dating back to 2009, with the exception of 2014. In all other circumstances, such as determining call volume trends by dwelling type throughout the entire city, the most recent ten years of data was available and used for the purpose of statistical analysis.

Call Categorization

In order to best determine how the proposed apartments and apartment buildings will impact the services of the Fire Department, the department leadership team researched and then categorized calls for service in the following areas:

(1) Nature of the Call for Service

An incident requiring the response of the Fire Department has been defined and categorized as Emergency Medical Service (EMS) or Non-Emergency Medical Service (Non-EMS). Since the Fire Department became a full-service department in 2013, approximately 68% of calls for service have been for EMS and 32% have been for Non-EMS related calls.

- **Emergency Medical Services (EMS).** EMS incidents are medical in nature, usually involving a person in need of treatment who has been reported to be injured or sick.
- **Non-Emergency Medical Services (Non-EMS).** Non-EMS incidents encompass all other types of incidents the Fire/EMS Department responded to during the period of this study. Non-EMS calls include structure fires, fire danger, fire alarm, smoke scare, good intent, false calls, or any other non-medical call.

(2) Annual Totals by Calendar Year

The team aggregated EMS and Non-EMS data by year dating back to 2009 to allow for trend analysis, to assess current experience, and to forecast future call volume.

(3) Type of Dwelling Unit

Although our primary focus was on how apartments and apartment buildings will impact the services of the Fire Department, our research team determined it was necessary to look at apartment-specific utilization in the greater context of EMS and Non-EMS calls to all residential units. Therefore, EMS and Non-EMS calls for service have also been researched and categorized by the type of residential dwelling/housing unit:

- Apartments
- Condominiums
- Single-Family Homes
- Age-Restricted, Independent and Assisted Living Facilities

(4) Commercial Properties and Common Areas

Since EMS and Non-EMS calls for service often do not originate at a Germantown residential property, all calls for service that do not fall within the residential categories listed above are considered commercial properties and/or “common area” calls. Examples of these are EMS and Non-EMS calls to commercial properties, healthcare providers, vehicular accidents, downed power lines, roadways, and parks and public spaces. Such calls to commercial properties and common areas are included in the current state analysis but are outside the scope of trend and forecast analysis.

(5) Fire District

The Fire Department monitors total call volume city-wide to identify trends and to request and allocate resources between fire districts accordingly. Because the services of the Fire Department are currently divided into four strategic districts, the impact to the department has also been considered by fire district.

Statistical Analysis

Total EMS and Non-EMS Call Volume

From the beginning of calendar year 2014 through the end of 2018, the GFD responded to a total of 19,959 calls for EMS and Non-EMS service. 19,704 (98.7%) of these calls for service were within the borders of Germantown and 255 (1.3%) were for mutual aid in neighboring communities. Over the last five years, total annual calls for service have increased at an average rate of 7.6% annually since 2014.

Call for Service Origination	2014	2015	2016	2017	2018	5-Year Totals
Apartments	41	57	63	86	78	325
Condominiums	36	49	63	71	94	313
Single Family Homes	1,525	1,641	1,531	1,712	1,657	8,066
Age-Restricted, Independent & Assisted Living	399	458	429	508	578	2,372
Commercial Properties & Common Areas	1,358	1,594	1,820	1,908	1,946	8,626
Mutual Aid (calls to assist other communities)	29	44	54	55	73	255
Total Calls	3,388	3,843	3,960	4,340	4,426	19,957

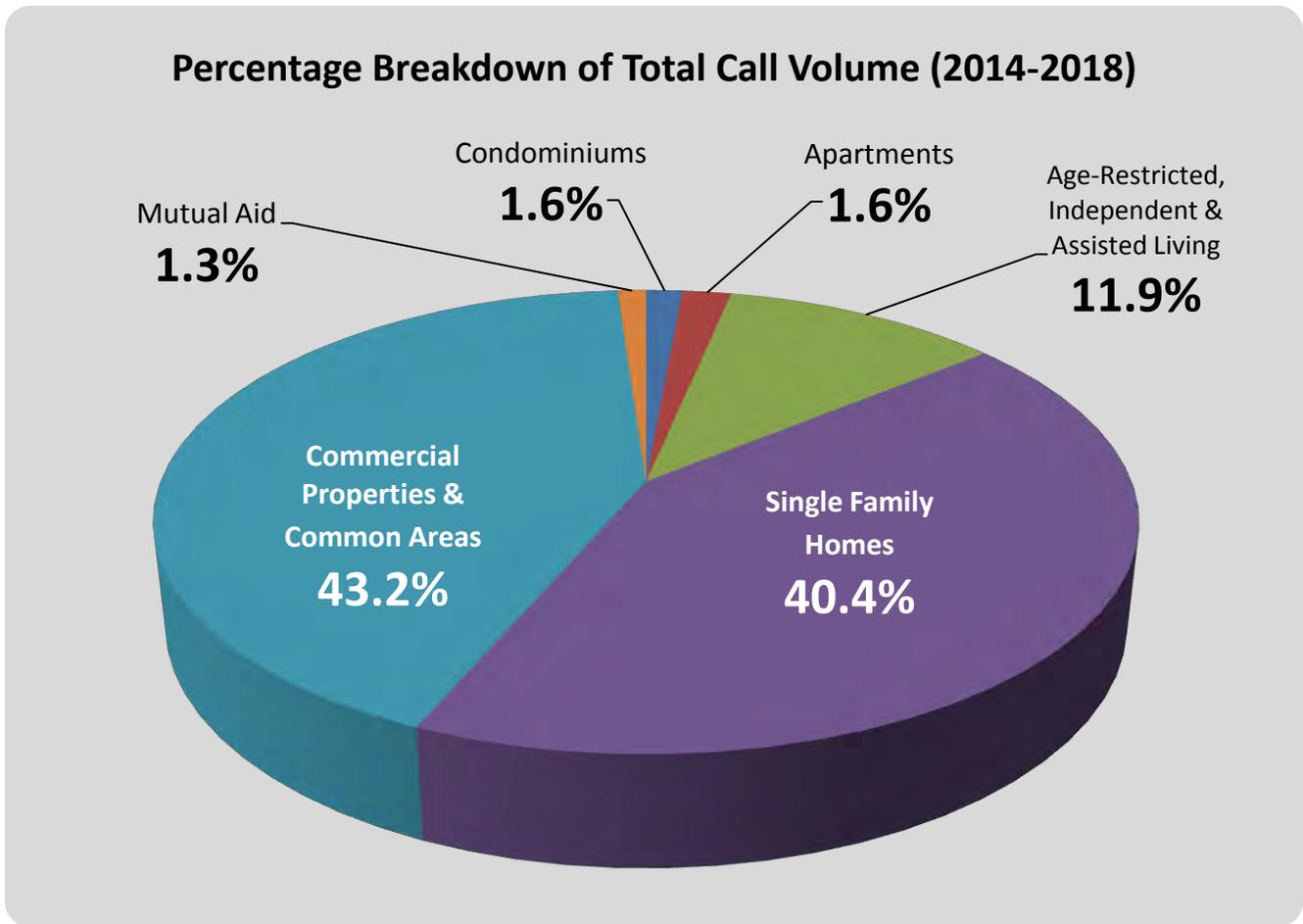
Table 1. EMS and Non-EMS Total Call Volume from 2014-2018

Total EMS and Non-EMS Call Volume highlights (2014 - 2018):

- **Commercial and Common Area Calls.** Calls for service originating from commercial properties common areas in Germantown, and mutual aid to other communities have accounted for 44.5% of total annual calls for service.
- **Residential Calls.** Calls for service originating from residential properties in Germantown have accounted for 55.5% of total annual calls or service.
- **Apartment and Condominium Calls.** 1.6% of total calls for service have been made from an apartment. The same percentage of total call volume applies to condominiums.
- **Mutual Aid Calls.** 1.3% of total calls for service have been made from a neighboring community.

Figure 2 illustrates the percentage breakdown of total EMS and Non-EMS call volume since 2014. Annual calls for service from apartments are comparable in number to that of condominiums and the number of calls made to assist other communities.

Figure 2. Total EMS and Non-EMS Total Call Volume Percentages within Germantown (2014-2018)



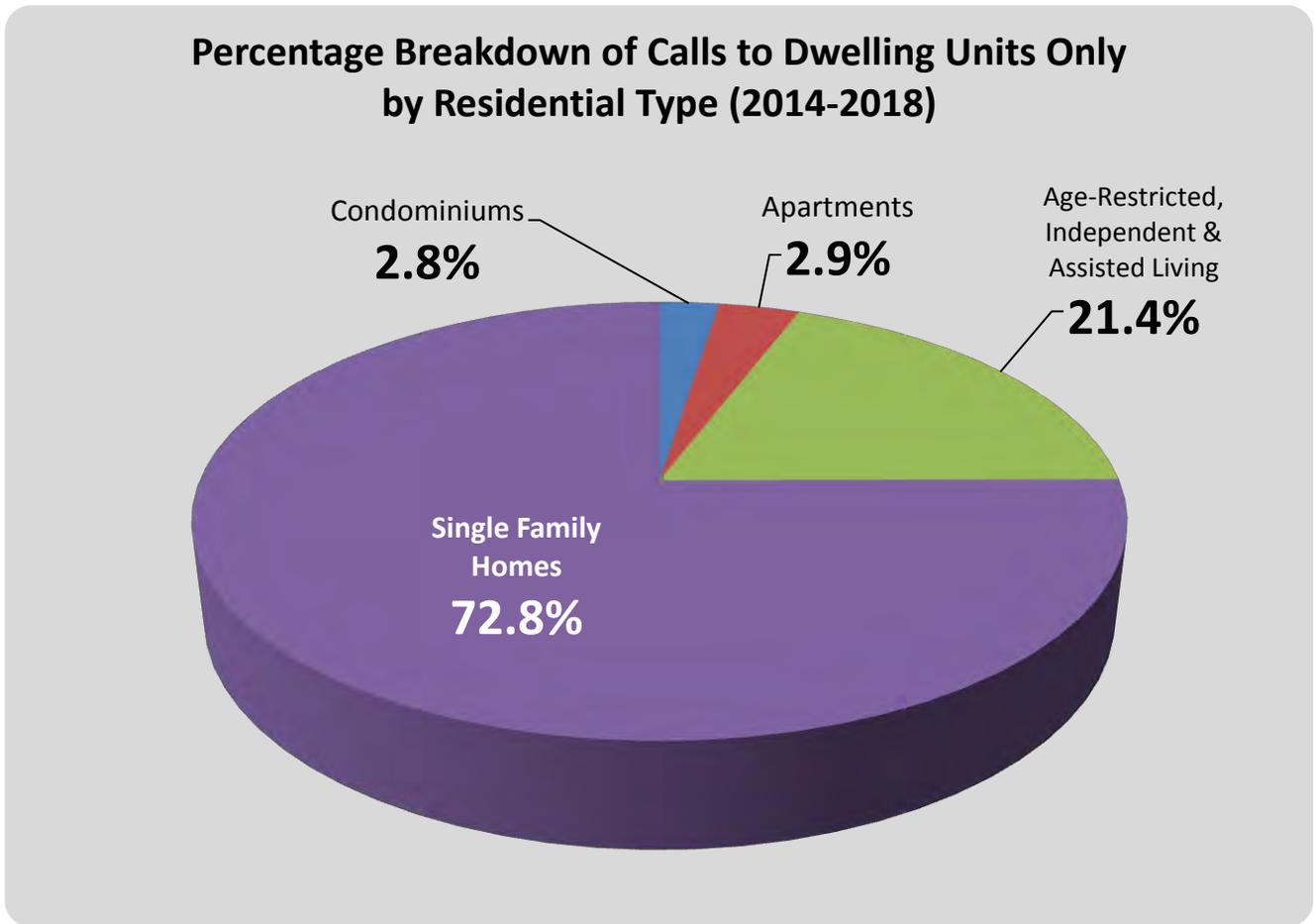
Residential Call Volume

During this same five-year period, the GFD responded to 11,076 residential calls for EMS and Non-EMS service within City limits. As illustrated in Figure 3, nearly three out of every four calls for service originate from a single-family home, and 94% of residential calls for service within Germantown originate from either a single-family home or an age-restricted, independent, and assisted living dwelling unit.

Residential Call Volume highlights (2014 - 2018):

- **Age-Restricted, Independent and Assisted Living Calls.** Although only 4.5% of the dwelling units within the community are classified as age-restricted, independent, and assisted living, 21.4% of calls for service from a Germantown residence are from an age-restricted, independent, or assisted living dwelling unit.
- **Apartment and Condominium Calls.** 2.9% of calls for service from a Germantown residence have been made from an apartment dwelling unit; nearly the same percentage as condominiums. Since 2014, the GFD has responded to a Germantown apartment dwelling unit an average of 65 times per year, or approximately five calls per month.

Figure 3. Total EMS and Non-EMS Residential Call Volume Percentages within Germantown (2014-2018)



Dwelling Unit Type Analysis

Research question:

Is there a statistical difference between the numbers of calls for service per unit by dwelling type?

The total EMS and Non-EMS calls for service by dwelling category were calculated for each of the previous five years using the total number of calls divided by the total number of dwelling category units. The mean for the five-year period was then calculated using these annual call rates (see Appendix G). This approach to determining the mean by dwelling type took into full consideration the respective number of units by location to its respective number of calls. Table 2 shows the difference in average numbers of EMS and Non-EMS call per unit by dwelling type.

Dwelling Type	Year	Calls for Service			# of Units	Total per 100 units	Avg. EMS Calls per 100 units	Avg. Non-EMS Calls per 100 units	Avg. Total Annual Calls per 100 units
		EMS	Non-EMS	Total					
Apartments	2014	21	20	41	1014	4.0	4.1	2.3	6.4
	2015	35	22	57	1014	5.6			
	2016	40	23	63	1014	6.2			
	2017	53	33	86	1014	8.5			
	2018	58	20	78	1014	7.7			
Age-Restricted, Independent & Assisted Living	2014	331	68	399	636	62.7	58.4	11.1	69.5
	2015	374	84	458	636	72.0			
	2016	342	87	429	689	62.3			
	2017	435	73	508	721	70.5			
	2018	515	63	578	721	80.2			
Condominiums	2014	23	13	36	1198	3.0	3.3	1.9	5.2
	2015	29	20	49	1198	4.1			
	2016	39	24	63	1198	5.3			
	2017	44	27	71	1198	5.9			
	2018	64	30	94	1198	7.8			
Single-Family Homes	2014	949	576	1525	12956	11.8	7.8	4.6	12.4
	2015	1074	567	1641	13002	12.6			
	2016	1003	528	1531	13047	11.7			
	2017	1078	634	1712	13120	13.0			
	2018	977	680	1657	13148	12.6			

Table 2. EMS and Non-EMS Call Averages by Dwelling Type

By taking the number of EMS and Non-EMS calls and dividing them out by the number of units that the respective dwelling type had in that calendar year, we can average the number of EMS, Non-EMS and total calls per 100 units.

As shown, Apartments averaged 6.4 total EMS and Non-EMS calls per 100 units over the past five years. Respectively, Condominiums averaged 5.2; Single-Family Homes averaged 12.4; and Assisted Living averaged 69.5 EMS and Non-EMS calls per 100 units.

The general linear model was used so that the simultaneous effects of multiple variables including continuous and discrete variables could be incorporated into the analysis. In the case of the Fire Department analyses, discrete variables included the dwelling category (apartment, condominium, single-family home, and assisted living), the specific apartment, condominium, or assisted living facility, and the Fire District. The continuous variables included the EMS, non-EMS, and total call rates, the number of units in each dwelling category or specific development, and the year of the observed data. The general linear model allows us to observe significant differences, if there are any, between the discrete variables in terms of the calls per 100 units, and the change in those rates over time. The general linear model assesses repeated measures data by conducting all pairwise comparisons when there are more than two groups or levels for comparison. The p-value resulting from the analysis was used to determine a statistically significant finding, with a p-value at or below 0.05 considered to be significant.

The results of the analysis showed that there was not a statistically significant difference between the dwelling types of Apartments, Condominiums and Single-Family Homes. However, the analysis showed that there is a difference (higher) between Age-Restricted, Independent, and Assisted Living dwellings and every other dwelling type.

Table of Total Call Rate Comparisons by Dwelling Type			
Dwelling Type	Compared To	Result	p-value
Assisted Living	Apartments	Assisted Living higher	<.0001
Assisted Living	Condominiums	Assisted Living higher	<.0001
Assisted Living	Single-Family Homes	Assisted Living higher	<.0001
Apartments	Condominiums	No difference	0.7225
Apartments	Single-Family Homes	No difference	0.168
Condominiums	Single-Family Homes	No difference	0.0898

Table 3. Total Call Rate Comparisons by Apartment Development (2014-2018)

The results of this analysis are bolstered by academic and fire and emergency medical services industry literature which shows that age of the resident is a significant variable for EMS and Non-EMS calls for service.¹ For Germantown, these age-restricted, independent, and assisted living units experience a much higher ratio of calls for service than their residential counterparts.

Apartment Trend Analysis

While an extensive amount of data was gathered and analyzed for each of the existing apartment developments to support the research team’s analysis, a limited number of variables were identified as potential factors in relation to EMS and Non-EMS calls for service. Variables such as the year the apartment was built, the average monthly rent per unit, the total number of units, and the number of calls

¹ Multiple industry and academic sources have shown that geriatric members of a population require more emergency interventions than the rest of the populations, which translates into more calls for service. Some studies show that this population may call for service two to three times as often as the rest of the population.

Citations include:

Dickinson, Edward T., Vincent P. Verdile, Christopher T. Kostyun, and Richard F. Salluzzo. "Geriatric Use of Emergency Medical Services." *Annals of Emergency Medicine* 27, no. 2 (February 1996): 199-203. doi:10.1016/s0196-0644(96)70323-2.

Duong, Hieu V., Lauren Nicholas Herrera, Justin Xavier Moore, John Donnelly, Karen E. Jacobson, Jestin N. Carlson, N. Clay Mann, and Henry E. Wang. "National Characteristics of Emergency Medical Services Responses for Older Adults in the United States." *Prehospital Emergency Care* 22, no. 1 (September 1, 2017): 7-14. doi:10.1080/10903127.2017.1347223.

Platts-Mills, Timothy F., Benjamin Leacock, Jose G. Cabañas, Frances S. Shofer, and Samuel A. Mclean. "Emergency Medical Services Use by the Elderly: Analysis of a Statewide Database." *Prehospital Emergency Care* 14, no. 3 (Summer 2010): 329-33. doi:10.3109/10903127.2010.481759.

Shah, M. N., J. J. Bazarrian, E. B. Lerner, R. J. Fairbanks, W. H. Barker, P. Auinger, and B. Friedman. "The Epidemiology of Emergency Medical Services Use by Older Adults: An Analysis of the National Hospital Ambulatory Medical Care Survey." *Academic Emergency Medicine* 14, no. 5 (May 2007): 441-47. doi:10.1197/j.aem.2007.01.019.

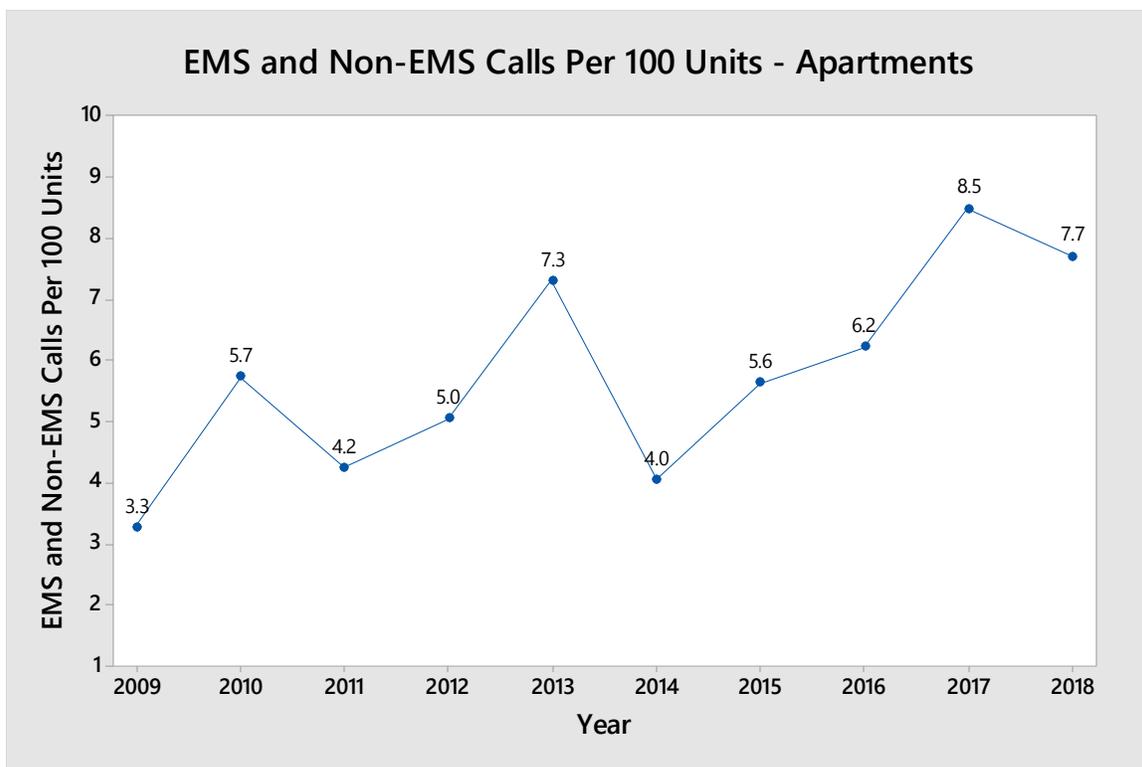
per unit were accessible and therefore analyzed; however, other variables, such as age of the tenants, income, health status, number of residents per unit, and the length of occupancy are not public information and could not be obtained. Without enough data to accurately assess all possible variables and their effect on the number of calls for service by apartment development, our forecasting models used historical call volume trends for all apartments to make call volume projections for each potential apartment development included in the study.

Research Question:

Has there been a change in annual call volume per dwelling unit to Apartments in the past 10 years?

The number of apartments has not changed during the ten-year period in which we analyzed; however, there is an upward trend in calls per unit over the past ten years, as seen in the Figure 4. There were also significant fluctuations in the number of calls for EMS and Non-EMS service to apartments over the researched period. Because our research team was unable to gather data for all of the potential causal variables associated with EMS and Non-EMS calls for service, these fluctuations appear to be random and may be related to the sample set of apartments and call volumes being very small.

Figure 4. Annual EMS and Non-EMS Calls per 100 Units: Apartments (2009-2018)



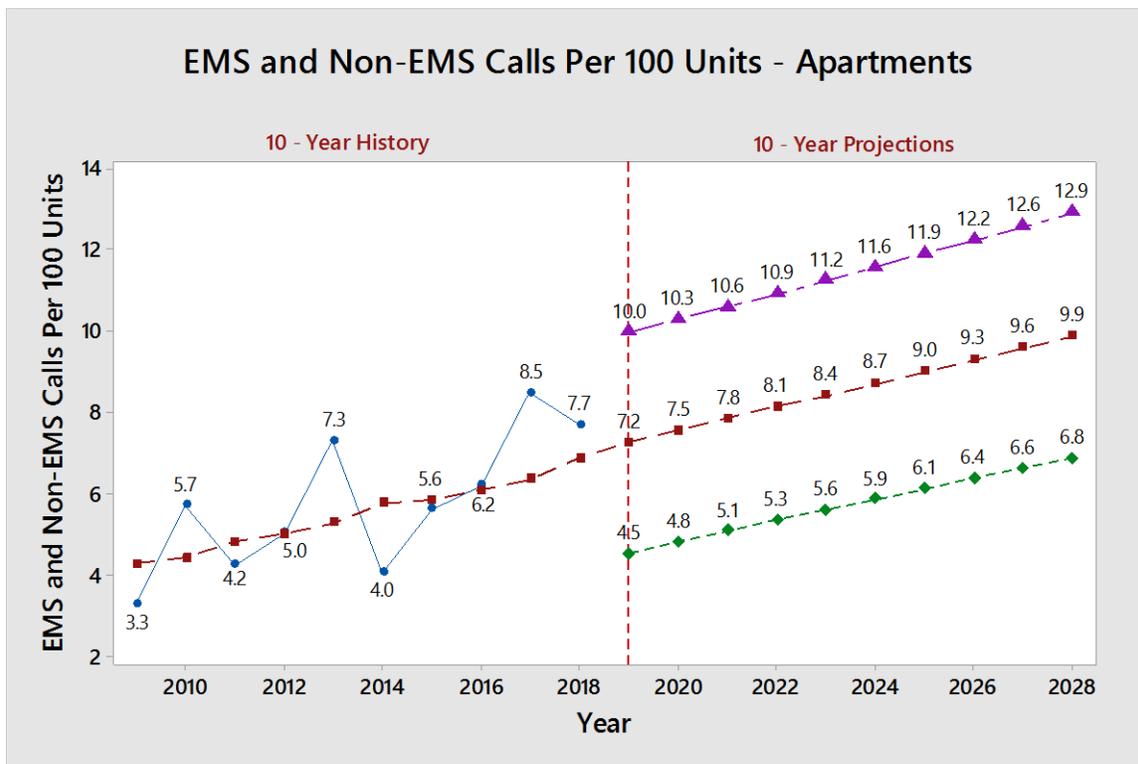
Research Question:

Based on the previous ten years, what will the total call volume to Apartments be over the next ten years?

While there is no change in the number of apartment units in our trend data, a call per unit ratio has been used to account for any possible unit growth in future years. A time series forecasting model for the ten-year trend data allowed us to project the call per unit ratio for the next ten years, based on the previously observed values. (see Figure 5). The forecasting method used historical observations by year as these were the only variables available to account for the changes in calls per 100 units over time. The model generated upper and lower limits at the 95% confidence interval. Assuming no other changes or the presence of other variables that would impact the analysis, the model provides 95% confidence that the actual annual calls per 100 unit number for each of the next ten years will remain within the prediction interval lines established above (purple) and below (green) the projection trend line.

The call for service to unit ratio in future years will serve as a guide as any possible new apartment developments are constructed and occupied, assuming there are no changes that would affect the forecasted ratios. The model also assumes the predicted growth rate in call volume will remain as forecast, though the model’s prediction intervals allows for random fluctuations over that time period, just as the historical data shows fluctuations above and below the historical trend. As new development scenarios are considered, this forecasting model for the trend line and the associated prediction intervals have been used to estimate additional increases in overall call volume for EMS and Non-EMS services later in the study.

Figure 5. Annual EMS and Non-EMS Calls per 100 Units: Apartment Projections



10 - Year Trend Data				10 - Year Projections			
Year	Number of Calls To Apartments	Total Number of Apartment Units	Annual Calls per 100 Units	Year	Number of Calls To Apartments	Total Number of Apartment Units	Annual Calls per 100 Units
2009	33	1014	3.3	2019	73	1014	7.2
2010	58	1014	5.7	2020	76	1014	7.5
2011	43	1014	4.2	2021	79	1014	7.8
2012	53	1014	5.2	2022	82	1014	8.1
2013	74	1014	7.3	2023	85	1014	8.4
2014	41	1014	4.0	2024	88	1014	8.7
2015	57	1014	5.6	2025	91	1014	9.0
2016	63	1014	6.2	2026	94	1014	9.3
2017	86	1014	8.5	2027	97	1014	9.6
2018	78	1014	7.7	2028	100	1014	9.9

Table 4. Annual EMS and Non-EMS Calls per 100 Units: Apartment Projections

Research Question:

Is there a statistical difference in the EMS and Non-EMS calls per dwelling unit by Apartment Development?

Table 5 shows the total number of EMS and Non-EMS calls by year and in their respective apartment developments. By taking the number of EMS and Non-EMS calls and dividing them out by the number of units that the apartment development has, we can average the number of EMS, Non-EMS and total calls per 100 units.

The Bridges averaged 4.76 total calls for service per 100 units over the past five years. Respectively, Farmington Gates averaged 9.78, Retreat 4.93, Vineyards 5.60, and Westminster averaged 10.20 calls per 100 units.

To account for change over time, a general linear model analysis was applied, using both the specific apartment development and year as analysis variables. This model compared each apartment development against each of the other apartment developments.

While there are observed differences between all of the call to unit ratios of each of the apartment developments, there are statistically significant differences between only a few of the apartment development comparisons as seen in Table 6. Statistically significant p-values are noted in red with the differences described. An analysis based on a richer data set that included variables such as those described above might yield different results. Because this is not possible, our research team was unable to continue our analysis of EMS and Non-EMS calls for service by apartment development beyond this point. Therefore, all forecasting analysis pertaining to future apartment developments in this study, regardless of apartment type or classification, will be based upon the ten-year call volume projection ratios for apartments collectively, as referenced in Figure 5.

Year	Apartment	Calls for Service			# of Units	Total Avg. per 100 units	100 unit Avg. per location
		EMS	Non-EMS	Total			
2014	The Bridges	4	6	10	252	3.97	4.76
2015	The Bridges	5	4	9	252	3.57	
2016	The Bridges	9	6	15	252	5.95	
2017	The Bridges	7	7	14	252	5.56	
2018	The Bridges	9	3	12	252	4.76	
2014	Farmington Gates	8	6	14	182	7.69	9.78
2015	Farmington Gates	14	1	15	182	8.24	
2016	Farmington Gates	12	3	15	182	8.24	
2017	Farmington Gates	20	3	23	182	12.64	
2018	Farmington Gates	19	3	22	182	12.09	
2014	The Retreat	2	3	5	280	1.79	4.93
2015	The Retreat	7	10	17	280	6.07	
2016	The Retreat	6	4	10	280	3.57	
2017	The Retreat	8	5	13	280	4.64	
2018	The Retreat	16	8	24	280	8.57	
2014	The Vineyards	1	2	3	200	1.50	5.60
2015	The Vineyards	5	7	12	200	6.00	
2016	The Vineyards	3	7	10	200	5.00	
2017	The Vineyards	8	6	14	200	7.00	
2018	The Vineyards	11	6	17	200	8.50	
2014	Westminster	6	3	9	100	9.00	10.20
2015	Westminster	4	0	4	100	4.00	
2016	Westminster	10	3	13	100	13.00	
2017	Westminster	10	12	22	100	22.00	
2018	Westminster	3	0	3	100	3.00	

Table 5. EMS and Non-EMS Calls per Unit for Existing Apartments (2014-2018)

Table of Total Call Rate Comparisons by Apartment Development			
Development	Compared To	Result	p-value
Bridges	Farmington Gates	No difference	0.0709
Bridges	Retreat	No difference	0.4834
Bridges	Vineyard	No difference	0.9046
Bridges	Westminster	Westminster higher	0.0255
Farmington Gates	Retreat	Farmington Gates higher	0.014
Farmington Gates	Vineyard	No difference	0.055
Farmington Gates	Westminster	No difference	0.6471
Retreat	Vineyard	No difference	0.5608
Retreat	Westminster	Westminster higher	0.0042
Vineyard	Westminster	Westminster higher	0.0191

Table 6. Total Call Rate Comparisons by Apartment Development (2014-2018)

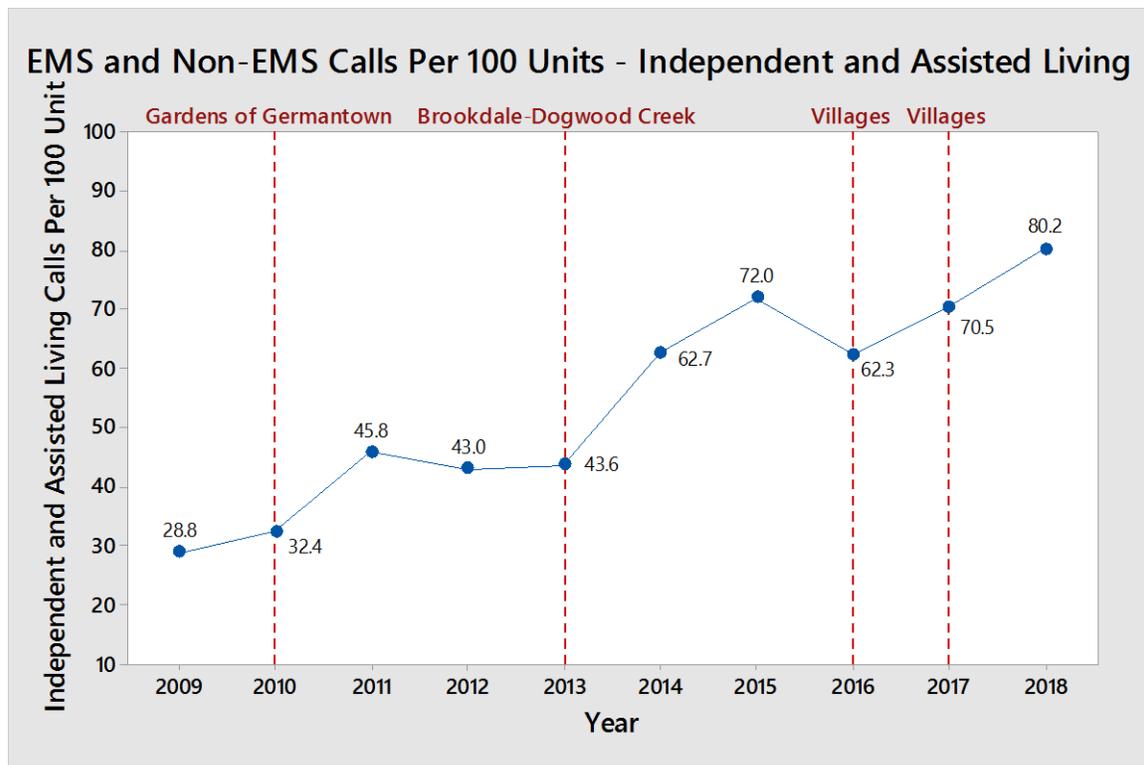
Age-Restricted, Independent, and Assisted Living Trend Analysis

Research Question:

Has there been a change in total call volume to Age-Restricted, Independent, and Assisted Living dwelling units in the past 10 years, and what does that trend say about future projections?

The five-year average of total calls for service per unit was 69.5 calls for service for every 100 independent or assisted living units. 2,372 total calls for service were recorded from an age-restricted, independent, or assisted living address during the same period. This is a considerably higher call ratio than the other dwelling unit types studied. The critical difference between these units and the other dwelling categories is the age of the residents. This is supported by both the statistical analysis of the call ratios and industry literature as cited previously.

Figure 6. Annual EMS and Non-EMS Calls per Unit: Age-Restricted, Independent and Assisted Living (2009–2018)



It is important to note the increase in call-to-unit ratios over the past five years (see Figure 6). Upon further examination, a significant number of age-restricted, independent, and assisted living dwelling units were added throughout the City within the last decade. In 2010, the Gardens of Germantown opened; near the end of 2012, Brookdale-Dogwood Creek (formally Solana) opened; and in 2016 and 2017, the Villages of Germantown opened new phases of their existing complex.

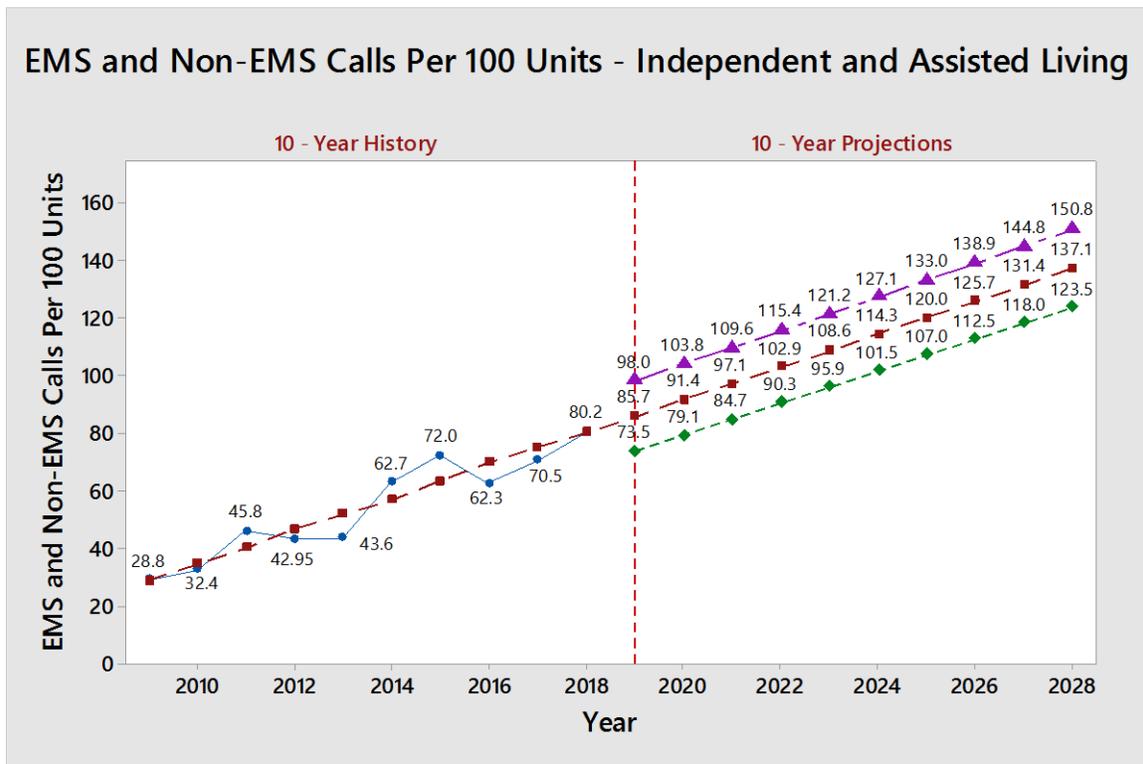
Brookdale-Dogwood Creek (which opened in the latter part of 2012) does not provide onsite medical care, but the other independent and assisted living developments provide some level of patient care. It is evident that facility-provided patient care is a critical variable in the rate of calls associated with an age-restricted, independent, or assisted living development. This could be an important factor for the City to

consider in any proposed or potential new independent and assisted living developments as it relates directly to the amount calls for service per unit.

There has been additional development and units have been added over the past ten years, but the additional units and additional call volume associated with those units are taken into consideration as we look at the data on a call per unit basis. Using a time series forecasting model as described above for the ten-year trend data allowed us to continue that trend out for the future ten years (see Figure 7).

Assuming there are no changes that would affect the forecasted ratios, the call for service to unit ratio in future years will serve as a guide as any possible new age-restricted, independent, and assisted living developments are developed and occupied. The model assumes the predicted growth rate in call volume will remain as forecast, though the model's prediction intervals allows for random fluctuations over that time period, just as the historical data shows fluctuations above and below the historical trend. As new development scenarios are considered, this forecasting model for the trend line and the associated prediction intervals have been used to estimate additional increases in overall call volume for EMS and Non-EMS services later in the study.

Figure 7. Annual EMS and Non-EMS Calls per Unit: Age-Restricted, Independent and Assisted Living Projections



10 - Year Trend Data				10 - Year Projections			
Year	Number of Calls to Assisted Living	Total Number of Assisted Living Units	Annual Calls per 100 Units	Year	Number of Calls to Assisted Living	Total Number of Assisted Living Units	Annual Calls per 100 Units
2009	117	406	28.8	2019	618	721	85.7
2010	147	454	32.4	2020	659	721	91.4
2011	208	454	45.8	2021	700	721	97.1
2012	195	454	43.0	2022	742	721	102.9
2013	277	636	43.6	2023	783	721	108.6
2014	399	636	62.7	2024	824	721	114.3
2015	458	636	72.0	2025	865	721	120.0
2016	429	689	62.3	2026	906	721	125.7
2017	508	721	70.5	2027	948	721	131.4
2018	578	721	80.2	2028	989	721	137.1

Table 7. Annual EMS and Non-EMS Calls per 100 Units: Independent and Assisted Living Projections

Condominium Trend Analysis

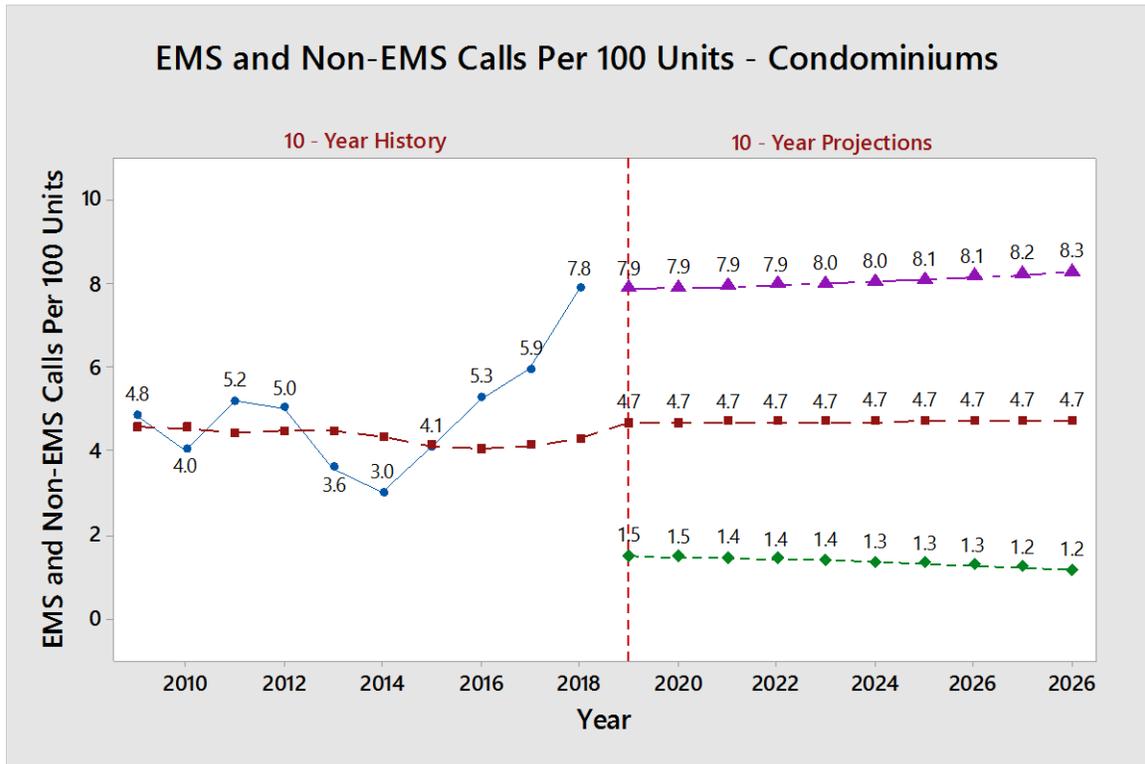
Research Question:

Has there been a change in total call volume to Condominium dwelling units in the past 10 years, and what does that trend say about future projections?

The average total calls for service per unit was 5.2 calls for service for every 100 condominium units. Only 313 total calls for service were recorded to a condominium address during the five-year period and there has been no change to the number of condominium units during the past ten years.

As seen in Figure 8, there has been an increase in calls per unit from 2015 to 2018. There was no information available to the research team that explains the spike, but this is a small sample and it does not represent a statistical outlier and may be random variation in a small sample set. Despite this, the time series forecasting model projects only a slightly upward slope over the next ten years. Assuming there are no changes that would affect the forecasted ratios, the call for service to unit ratio in future years will serve as a guide as any possible additional condominiums are constructed and occupied. The model assumes the predicted growth rate in call volume will remain as forecast, though the model's prediction intervals allows for random fluctuations over that time period, just as the historical data shows fluctuations above and below the historical trend. As new development scenarios are considered, this forecasting model for the trend line and the associated prediction intervals have been used to estimate projected call volume for EMS and Non-EMS services later in the study.

Figure 8. Annual EMS and Non-EMS Calls per Unit: Condominium Projections



10 - Year Trend Data				10 - Year Projections			
Year	Number of Calls to Condos	Total Number of Condo Units	Annual Calls per 100 Units	Year	Number of Calls to Condos	Total Number of Condo Units	Annual Calls per 100 Units
2009	58	1198	4.8	2019	56	1198	4.7
2010	48	1198	4.0	2020	56	1198	4.7
2011	62	1198	5.2	2021	56	1198	4.7
2012	60	1198	5.0	2022	56	1198	4.7
2013	43	1198	3.6	2023	56	1198	4.7
2014	36	1198	3.0	2024	56	1198	4.7
2015	49	1198	4.1	2025	56	1198	4.7
2016	63	1198	5.3	2026	56	1198	4.7
2017	71	1198	5.9	2027	56	1198	4.7
2018	94	1198	7.8	2028	56	1198	4.7

Table 8. Annual EMS and Non-EMS Calls per 100 Units: Condominium Projections

The projected trend for calls for service from condominiums derived from the time series forecast model shows only a slightly upward slope. Assuming there are no changes that would affect the forecasted ratios, the call for service to unit ratio in future years will serve as a guide as any possible additional condominiums are constructed and occupied. The model assumes the predicted growth rate in call volume will remain as forecast, though the model's prediction intervals allows for random fluctuations over that time period, just as the historical data shows fluctuations above and below the historical trend. As new development scenarios are considered, this forecasting model for the trend line and the associated prediction intervals have been used to estimate projected call volume for EMS and Non-EMS services later in the study.

Single-Family Home Trend Analysis

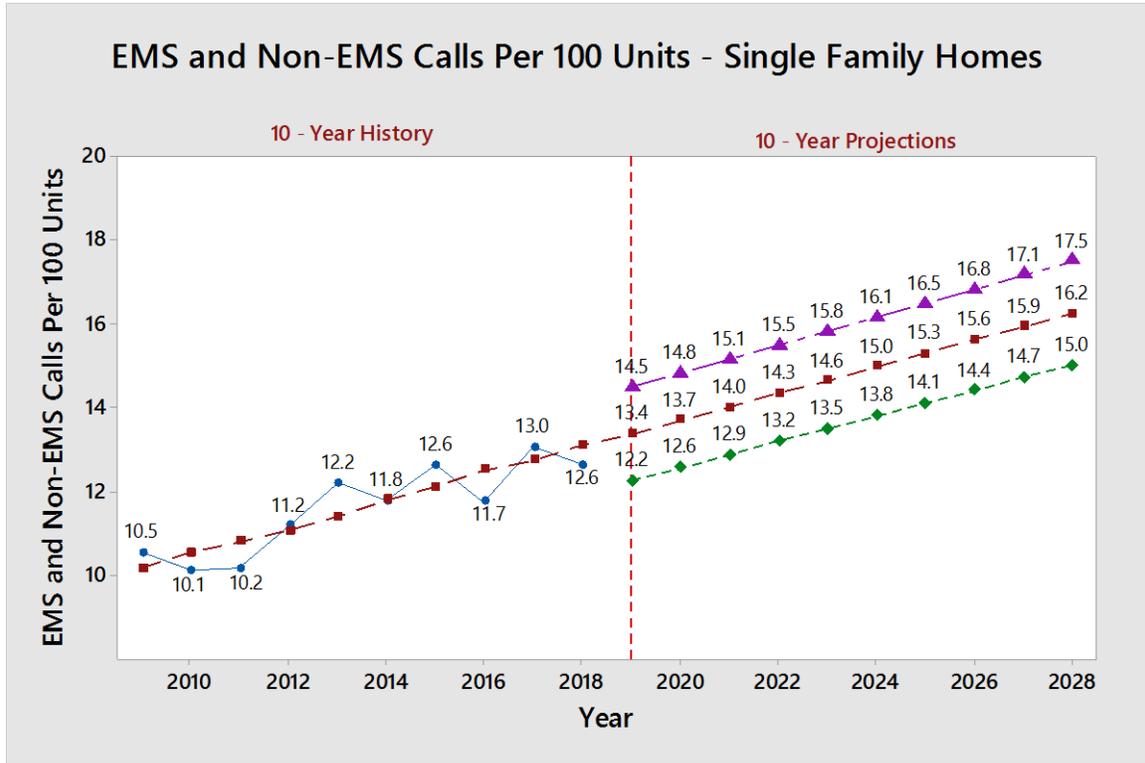
Research Question:

Has there been a change in total call volume to Single-Family Homes in the past 10 years, and what does that trend say about future projections?

The average total calls for service per unit was approximately 12.4 calls for service for every 100 single-family homes, and EMS and Non-EMS calls for service make up the majority of the residential dwelling type calls with 8,066 total calls for service recorded during the five-year period. There has also been consistent building of new single-family homes within the City year over year. Building permit summary reports for new single-family homes were used to track the increase in our sample size as it relates to the volume of calls for service. Figure 9 shows an increase in EMS and Non-EMS calls for service over the past ten years, similar to the other dwelling types studied.

Assuming there are no changes that would affect the forecasted ratios, the call for service to unit ratio in future years will serve as a guide for as any possible single-family homes are constructed and occupied. The model assumes the predicted growth rate in call volume will remain as forecast, though the model's prediction intervals allows for random fluctuations over that time period, just as the historical data shows fluctuations above and below the historical trend. As new development scenarios are considered, this forecasting model for the trend line and the associated prediction intervals have been used to estimate projected call volume for EMS and Non-EMS services later in the study.

Figure 9. Annual EMS and Non-EMS Calls per Unit: Single-Family Home Projections



10 - Year Trend Data			
Year	Number of Calls to Single-Family Homes	Total Number of Single-Family Homes	Annual Calls per 100 Units
2009	1333	12663	10.5
2010	1283	12713	10.1
2011	1295	12758	10.2
2012	1432	12829	11.2
2013	1573	12909	12.2
2014	1525	12956	11.8
2015	1641	13002	12.6
2016	1531	13047	11.7
2017	1712	13120	13.0
2018	1657	13148	12.6

10 - Year Projections			
Year	Number of Calls to Single-Family Homes	Total Number of Single-Family Homes	Annual Calls per 100 Units
2019	1756	13148	13.4
2020	1798	13148	13.7
2021	1840	13148	14.0
2022	1882	13148	14.3
2023	1924	13148	14.6
2024	1966	13148	15.0
2025	2008	13148	15.3
2026	2050	13148	15.6
2027	2092	13148	15.9
2028	2134	13148	16.2

Table 9. Annual EMS and Non-EMS Calls per 100 Units: Single Family Home Projections

Fire District Impact Analysis

The Fire District Impact Analysis for each of the four fire districts begins with a brief profile summary, followed by a basic analysis of the three most recent years of total call volume and residential call volume within the district (calendar years 2016 through 2018). After this orientation to each district, a trend analysis of historical, EMS and Non-EMS call volume data, dating back to 2009, has been completed in order to make call volume projections through 2028. These district-specific, EMS and Non-EMS call volume projections from existing dwelling unit types will serve as the starting point (or ‘baseline’) in each district’s residential call volume forecasting model before considering added call volume numbers from new residential developments. Each district analysis section concludes with a summary of the forecasted information, including an analysis of expected apartment impact.

Residential Dwelling Units by Fire District

Table 10 provides a breakdown of how existing dwelling units are allocated among fire districts. Constructed before the Smart Code zoning districts were established, the City’s existing 1,014 apartment dwelling units are serviced primarily by firefighter/paramedics within Districts #3. Moreover, District #3, the only district to include all four residential dwelling types, has the highest number of total dwelling units at 6,530.

FIRE DISTRICT	SmartCode Zoning	Apartments	Condominiums	Single Family Homes	Independent & Assisted Living	Dwelling Unit Totals by District
1	No	0	54	2,439	0	2,493
2	No	0	32	4,241	182	4,455
3	Yes	1,014	1,112	4,021	383	6,530
4	Yes	0	0	2,447	156	2,603
Dwelling Unit Totals by Type		1,014	1,198	13,148	721	16,081

Table 10. Existing Residential Dwelling Unit Count by Fire District as of 12/2018

Smart Code Zoned Districts

At present, two of the City’s four fire districts include Smart Code zoning: Fire Districts #3 and #4. This study anticipates that these two districts will include new multi-family developments, specifically apartment developments, based on the current land-use zoning.

Fire Districts #1 and #2 are not expected to include new multi-family development, unless re-zoning applications are submitted and are approved after a thorough review process. In consideration of the City’s current land use zoning, there should be no direct impact to Fire Districts #1 and #2 from new apartment development through 2028.

FIRE DISTRICT #1



Fire District #1 is serviced by Fire Station #1, which is located at 2700 Cross Country Road and covers the southwest portion of Germantown (see Figure 10). At any given time, four personnel with firefighting and medical care capabilities are on shift at this location, responding to all fire and medical emergencies with one front-line fire engine company and one reserve fire engine. There are no Key Commercial Areas or Smart Code districts located within the boundaries of Fire District #1; however, this station does respond to calls for service originating from the Old Germantown historic district.

- Personnel:** (4) Firefighters on shift
- Apparatus:** (1) Fire Engine Company (1) Reserve Fire Engine
 (1) Back-up Ambulance
 (1) Hazardous Materials Response Vehicle

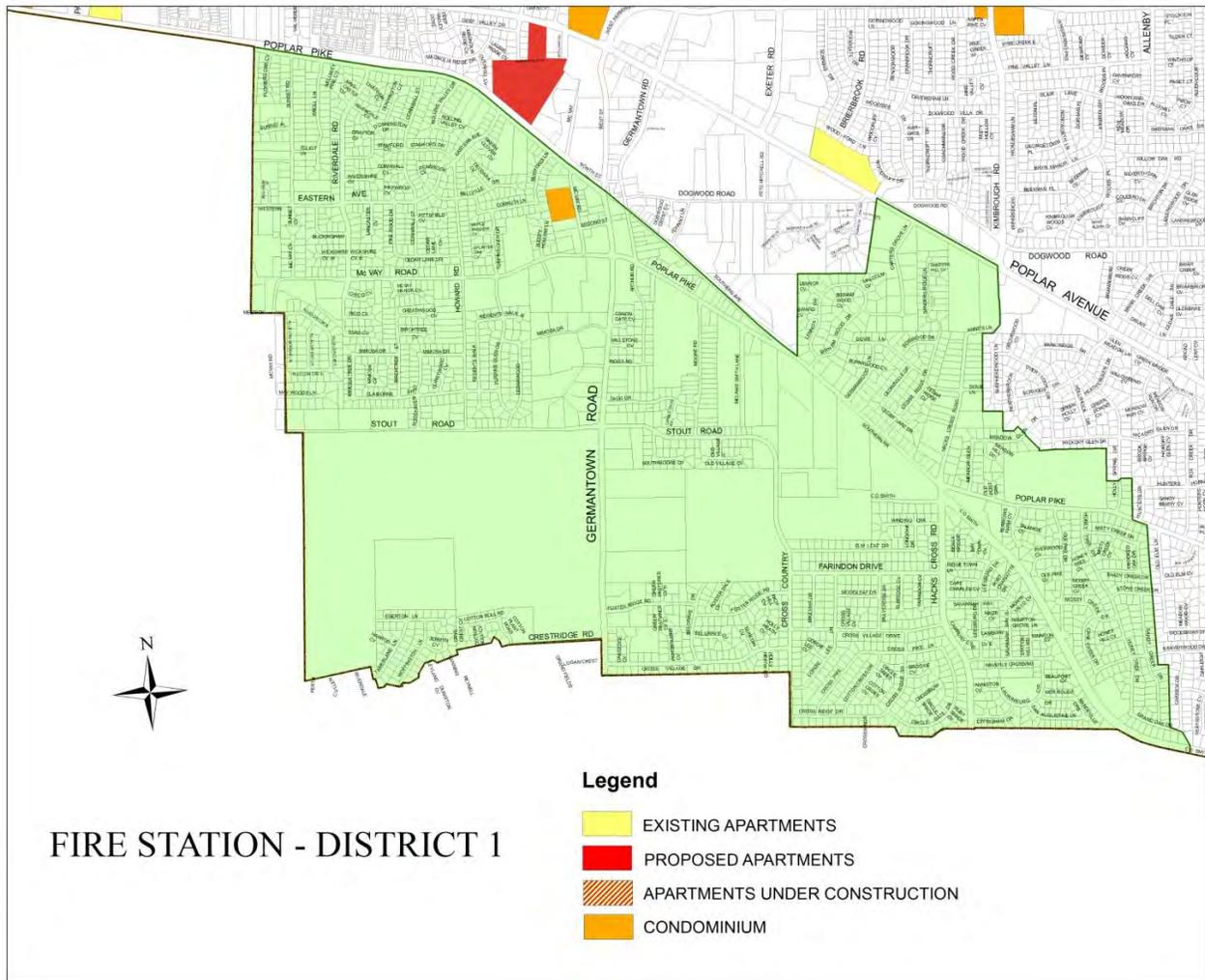
Total Calls for Service

In recent history, the territory within Germantown assigned to Fire District #1 has experienced the fewest calls for service in comparison to the other three districts. From the beginning of 2016 through the end of 2018, only 12% the City's total calls for service and 15% of the City's residential calls for service have originated from within this territory.

Fire District #1 Calls for Service (2016-2018)	Total # of Calls	Average Annual # of Calls	Average # of Calls for Service per day	Percentage of Total Calls Within District
Residential Calls Only	1,023	341	0.93	69%
Commercial and Common Areas Calls Only	464	155	0.43	31%
All Calls within District	1,487	496	1.36	100%

Table 11. Fire District #1 Snapshot: Calls for Service (2016-2018)

Figure 10. Fire District #1 Territory Map



Firefighter/paramedics at Fire Station #1 have, on average, responded to 1.36 calls for service per day that have originated within the district. As shown in Table 11, the majority of calls for service (69%) within the district originate from one of its 2,493 residential dwelling units, the lowest number of residential units within each of the four established fire districts.

Existing Dwelling Unit Analysis

Apartments

There are no apartments currently located within the boundaries of this district and no apartment developments are currently proposed or are being considered at this time.

Figure 11. Fire District #1: Total Dwelling Unit Count



Condominiums & Townhomes

Only 2% of residential dwelling units within this district are condominiums. Over the last four years, the 54 units at Greenleaf Condominiums have accounted for 1% of EMS/Non-EMS calls to residential dwelling units in the district. During this time period, these 54 units have averaged one EMS/Non-EMS call every four months.

Single-Family Homes

Ninety-eight percent of all residential dwelling units within this district are single-family homes. Over the last four years, these 2,439 single-family homes have accounted for 99% of EMS/Non-EMS calls for service to residential dwelling units within the district.

Age-Restricted, Independent, and Assisted Living

There are no age-restricted dwelling units or assisted living units within the district’s boundaries and no age-restricted dwelling units or assisted living units are currently proposed or are being considered at this time.

Residential Calls for Service

From the beginning of 2016 through the end of 2018, there were a total of 1,023 calls for service to residential dwelling units within Fire District #1 (see Table 12). 641 (63%) of the residential calls within the district were for EMS response and 382 (37%) of the residential calls were for Non-EMS response. Compared to a city-wide EMS/Non-EMS call-type percentage ratio of 68% EMS / 32% Non-EMS, this district has responded to a lower percentage of EMS calls and a higher percentage of Non-EMS calls than the combined experience of all the districts during this period.

	EMS				Non-EMS				Total Call Volume			
	2016	2017	2018	Total	2016	2017	2018	Total	2016	2017	2018	Total
Apartments	-	-	-	-	-	-	-	-	-	-	-	-
Condominium	5	1	2	8	0	1	1	2	5	2	3	10
Single-Family	189	221	223	633	115	141	124	380	304	362	347	1013
Assisted Living	-	-	-	-	-	-	-	-	-	-	-	-
Total	194	222	225	641	115	142	125	382	309	364	350	1023

Table 12. Fire District #1 Residential EMS/Non-EMS Call Volume (2016-2018)

Over this most recent three-year period, an average of 213 EMS calls per year and 127 Non-EMS calls per year have come from residential dwelling units within this district. Although the district’s three-year annual average for total residential calls within the district is 341, the 350 total residential calls in 2018 places that year’s residential call volume at just fewer than one call for service per day.

EMS and Non-EMS Residential Call Volume History and Projections

To allow for a better comparative analysis by district, as well as more accurate projections by individual call type, total calls for service for all residential dwelling types within this district were analyzed and separated into EMS and Non-EMS calls (see Figures 12 and 13). As previously mentioned, district data for the calendar year of 2014 was not accessible by district due to the transition of the fire department tracking software. Therefore, nine years’ worth of available EMS and Non-EMS district data, dating back to 2009, was used to generate the time series forecasting for the next ten years.

The ten-year forecast trend line shows the projected growth rate in call volume based upon the ten-year history, though the model’s prediction intervals allow for random fluctuations over that time period. The blue line in each chart, with numerical data points, represents actual calls per 100 units since 2009. The red line is the call volume trend line, beginning with the ten-year history and forecast through 2028. Assuming no other changes or the presence of other variables that would impact the analysis, the model provides 95% confidence that the actual annual calls per 100 unit number for each of the next ten years will remain within the prediction interval lines established above (purple) and below (green) the projection trend line.

Figure 12. Fire District #1: Annual EMS Residential Call Volume History and 10-Year Projections per 100 Units

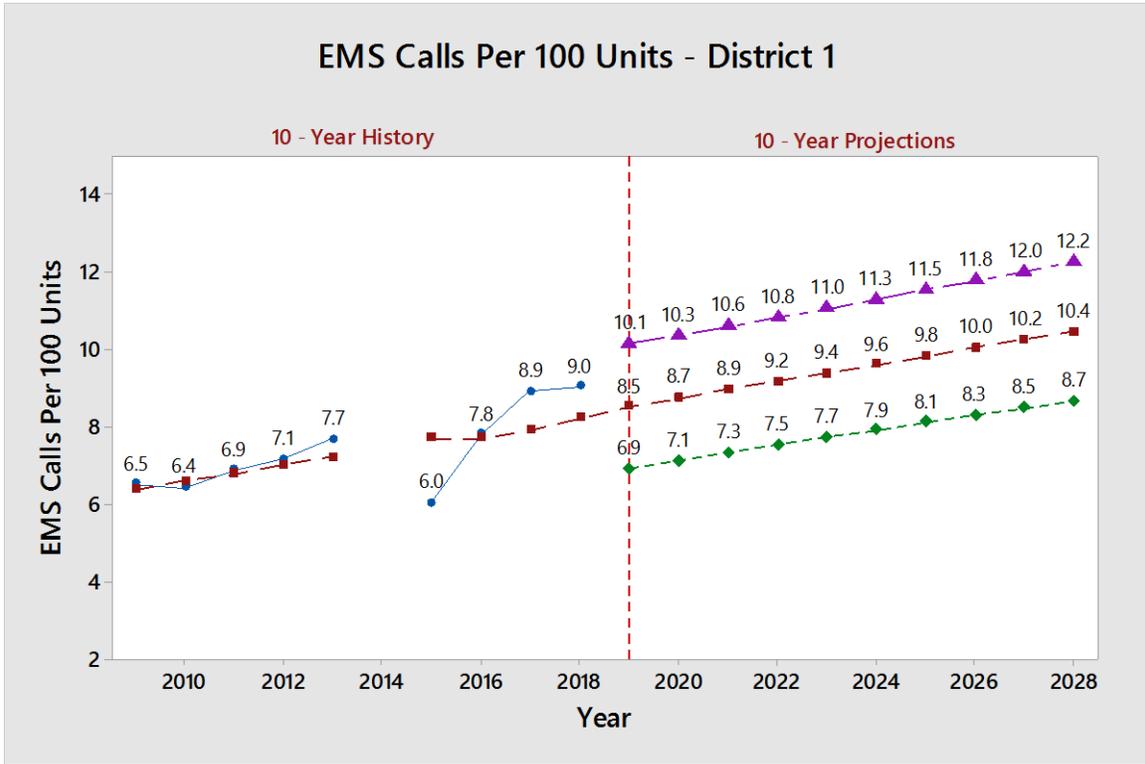
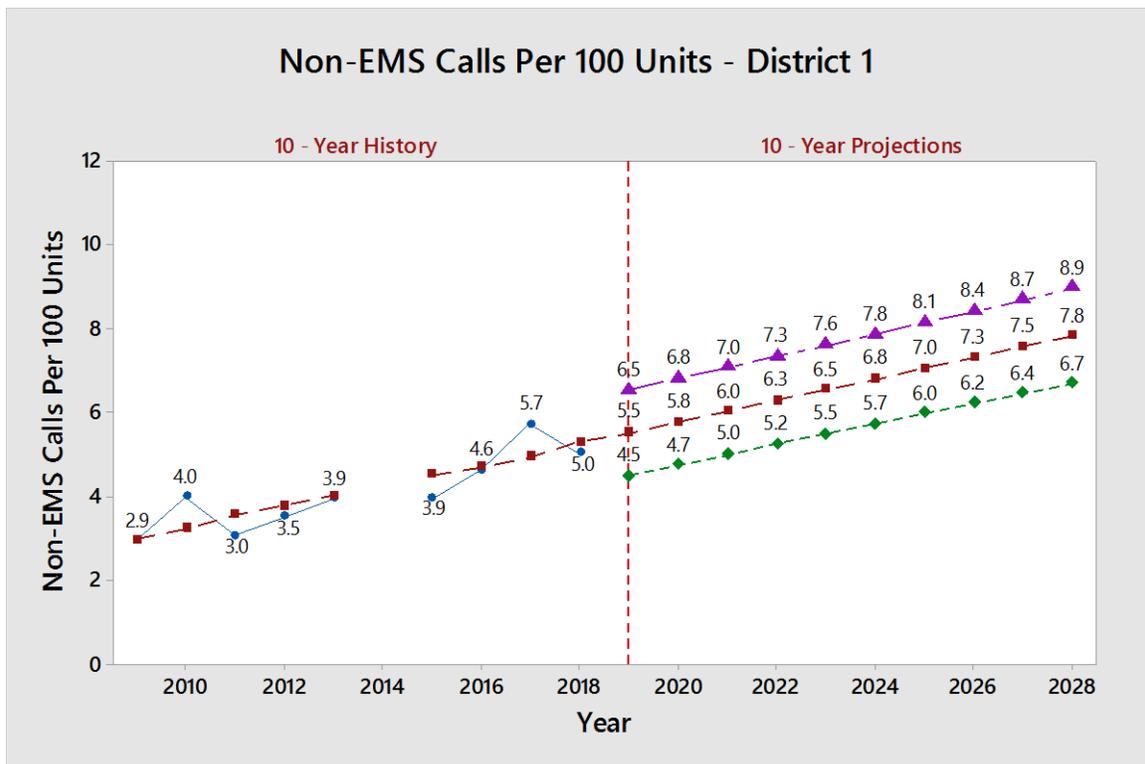


Figure 13. Fire District #1: Annual Non-EMS Residential Call Volume History and 10-Year Projections per 100 units



The district's total of 2,493 existing dwelling units was then multiplied by the forecasted annual call per unit ratio (call per 100 unit number divided by 100) for each year to calculate the total annual call volume by for EMS and Non-EMS calls. These ten-year forecast numbers (see Table 13) will serve as the 'baseline' call volume data from existing dwelling units within the district's future residential call volume projection model (see Table 14 at the end of this section).

10 - Year Trend Data			10 - Year Projections		
Year	District 1 Total EMS Calls	District 1 Total Non-EMS Calls	Year	District 1 Total EMS Calls	District 1 Total Non-EMS Calls
2009	162	73	2019	212	137
2010	160	99	2020	218	144
2011	171	76	2021	223	150
2012	173	87	2022	228	156
2013	191	98	2023	234	163
2014	n/a	n/a	2024	239	169
2015	150	98	2025	244	175
2016	194	115	2026	250	182
2017	222	142	2027	255	188
2018	225	125	2028	260	195

Table 13. Fire District #1: Annual Total EMS and Non-EMS Residential Call Volume Projections

Finally, new residential development constructed during the ten-year projection period will be assessed the appropriate call for service ratio associated with the specific dwelling type and the respective year. The projected call for service numbers from new residential development will then be added to the appropriate year's baseline data of EMS and Non-EMS calls for service in order to calculate the projected total annual residential call volume for each of the next ten years.

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included three (3) properties that are either in the process of being developed or have been categorized as "underdeveloped" for the purposes of assisting in making residential call volume projections for Fire District #1. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 14 and Table 14 for identification purposes. While there is no guarantee that the "underdeveloped" properties will ever be redeveloped, they have been included in our ten-year projection calculations with call volume impact scheduled in outer years for the purposes of forecasting maximum residential calls for service by 2028.

Developments in Process:

#7	Allelon Subdivision	Zoned "R" for Residential, these 50 single-family homes currently under development on this 25.68-acre site are estimated to be completed by calendar year 2020. The addition of these 50 single-family homes is projected to add seven to eight calls for service annually through 2028.
----	---------------------	---

Underdeveloped Properties:

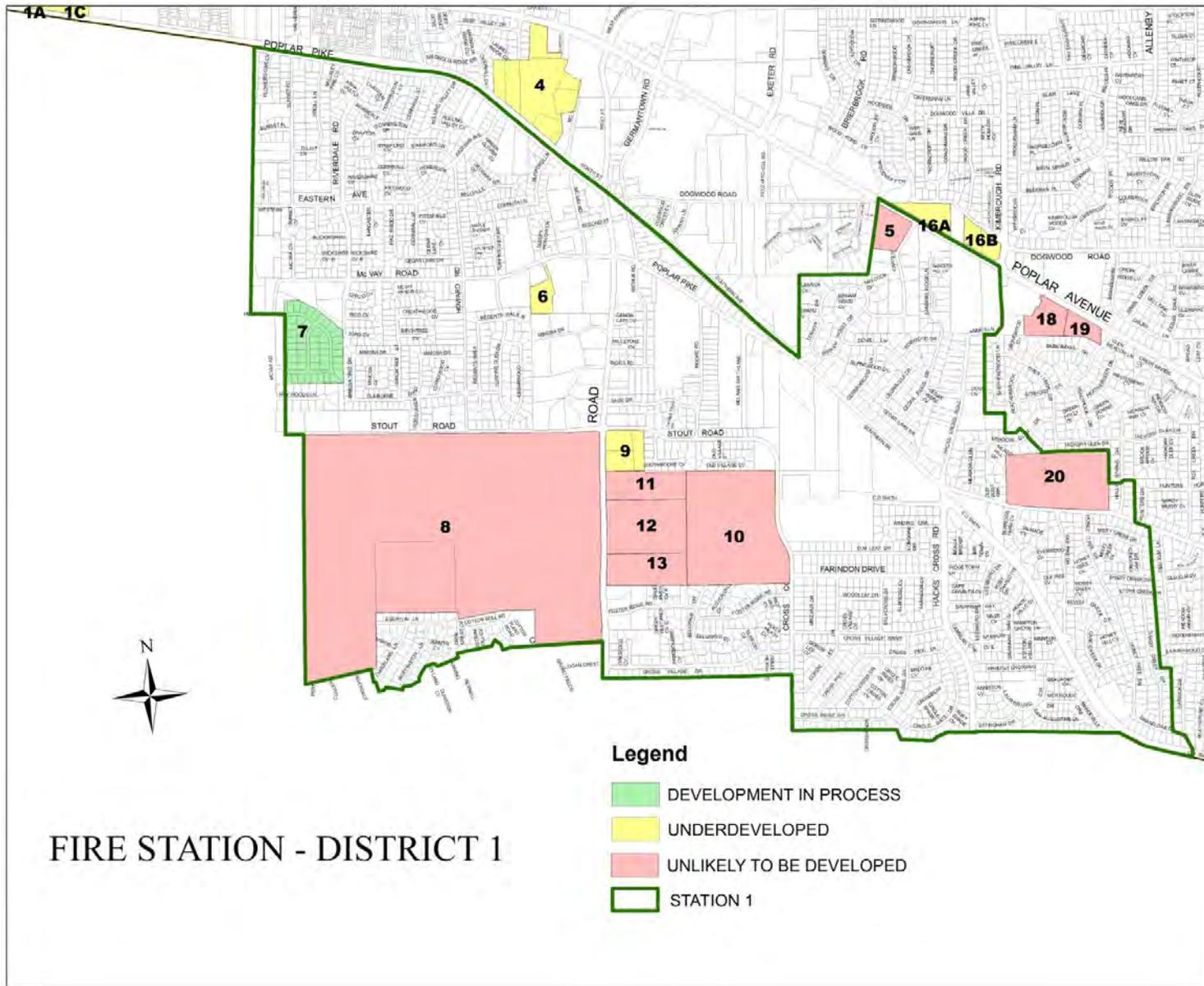
#6	Klycie Walters B. Jr.	Zoned "R" for Residential, the 4.1 acres at this location could have a maximum of 12 dwelling units. If the property were to be developed/redeveloped, another two calls for service should be expected annually through 2028.
----	-----------------------	--

#9	Montesi Letitia D. Living Trust	Zoned "R" for Residential, the 9.5 acres at this location could have a maximum of 28 dwelling units. If the property were to be developed/redeveloped, another four to five calls for service should be expected annually through 2028.
----	---------------------------------	---

Properties Unlikely To Be Developed < 10 Years:

Seven properties categorized as "unlikely to be developed" (#5, #8, #10, #11, #12, #13, and #20) have been included within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these seven locations, shown in red on Figure 14 and Table 14, desire or intend to change the current land use of these sites at any point in the immediate future. These properties were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the seven properties fall within one of the Smart Code zoning districts, where apartments are currently permitted.

Figure 14. Fire District #1: Property Analysis Map



FIRE DISTRICT #1	Calendar Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
		Projected Annual Call Volume From Existing Dwelling Units	EMS	225	212	218	223	228	234	239	244	250
	Non-EMS	125	137	144	150	156	163	169	175	182	188	195
	SUBTOTAL	350	349	362	373	384	397	408	419	432	443	455

Projected Annual Call Volume Per 100 Units By Dwelling Type	Apartments	APT	7.7	7.2	7.5	7.8	8.1	8.4	8.7	9.0	9.3	9.6	9.9
	Single-Family Homes	SFH	12.6	13.4	13.7	14.0	14.3	14.6	15.0	15.3	15.6	15.9	16.2
	Condominiums	CO	7.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	Age-Restricted, Ind. & Asst. Living	SL	80.2	81.3	87.1	92.9	98.8	104.6	110.5	116.3	122.1	128.0	133.8

Property#	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type	Additional Annual Calls for Service from New Residential Development												
Developments in Process																			
7	Allelon Subdivision	R	25.68	2.904	50	SFH	0	0	7	7	7	7	8	8	8	8	8	8	
Underdeveloped Properties																			
6	Klycie Walters B Jr.	R	4.1	2.904	12	SFH	0	0	0	0	0	0	0	2	2	2	2	2	
9	Montesi Letitia D Living Trust	R	9.5	2.904	28	SFH	0	0	0	0	0	0	0	4	4	4	4	5	
Properties Unlikely To Be Developed < 10 Yrs																			
5	Bowman	R	7.32	2.904	21	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
8	Melanie Taylor Marital Trust	R	310	2.904	900	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
10	Andrew McFadden	R	60.8	2.904	177	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
11	James McFadden	R	12.89	2.904	37	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
12	Nancy McFadden	R	25.39	2.904	74	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
13	John McFadden	R	14.3	2.904	42	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
20	Smith Sarah S Family Trust	R	178.6	2.904	99	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
Projected Annual Totals for EMS/Non-EMS Residential Call Volume: District 1							350	349	369	380	391	404	416	433	446	457	470		

		Total residential calls per day	0.96	0.96	1.01	1.04	1.07	1.11	1.14	1.19	1.22	1.25	1.29
Additional Call Volume per day over 2018 from:	Existing residential developments		0.00	0.03	0.06	0.09	0.13	0.16	0.19	0.22	0.25	0.29	
	New residential developments		0.00	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.04	

Analysis by NEW Residential Development Type		# of Units											
Apartments	0	Calls for Service per day	0	0	0	0	0	0	0	0	0	0	0
Single Family Homes	90	Calls for Service per day	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.04
Condominiums	0	Calls for Service per day	0	0	0	0	0	0	0	0	0	0	0
AR, Ind. & Assisted Living	0	Calls for Service per day	0	0	0	0	0	0	0	0	0	0	0
Total	90												

Table 14. Fire District #1: Future Residential Call Volume Projections

Residential Call Volume Projection Summary: Fire District #1

Existing Dwelling Units

If trends in call volume from the last ten years continue, calls for service from the existing 2,493 dwelling units within the district are projected to increase from 350 to 455 over the next ten years. This increase of 105 calls annually would add 0.29 calls per day to the current total of 0.96 residential calls for service per day.

Developments in Process

The addition of seven to eight calls for service per year from the 50 Allelon subdivision single-family homes within the next ten years would add 0.02 calls for service per day.

Underdeveloped Properties

The potential of another 40 single-family homes from two “underdeveloped” properties over the next ten years would yield six to seven annual calls for service if developed, or 0.02 calls for service per day.

District Summary

If trends in call volume follow the projections and new residential development takes place as described in the scenarios above, fifteen annual calls for service will be added to the total projected residential calls for service number of 455 from existing dwelling units within the district by 2028 (see Table 14). This means that Fire District #1, which responds to just under one residential call for service per day within the district, would see a gradual increase in call volume, primarily from existing residences, to 1.29 per day over the next ten years. This daily call volume figure equates to an additional 2.3 calls per week.

With the lowest number of existing residential properties and only a small number of new single-family homes on the horizon, residential call volume in Fire District #1 should continue to remain the lowest among the four fire districts for the foreseeable future.

Apartment Impact

Fire District #1

What are the likely impacts of future apartments and apartment building development on Fire District #1?

Future apartment developments are currently not being considered within the Fire District #1 territory and there are no Smart Code Zoning Districts within this district’s boundaries. Also, as previously mentioned, there are no existing apartments located within the boundaries of Fire District #1. Therefore, based on the current zoning, no calls for service from existing apartments or future apartments should originate from this district through 2028.

FIRE DISTRICT #2



Fire Station #2 is serviced by Fire District #2, which is located at 8925 Dogwood Road and covers the northeast portion of Germantown (see Figure 15). At any given time, six personnel with firefighting and medical care capabilities are on shift at this location, responding to all fire and medical emergencies with a single fire engine company, a single ambulance, an air services truck, and a brush/grass firefighting truck. There are no Key Commercial Areas or Smart Code land use zones located within the boundaries of this district.

Personnel: (6) Firefighters on shift

Apparatus: (1) Fire Engine Company (1) Air Service Truck
(1) Ambulance (1) Brush Truck

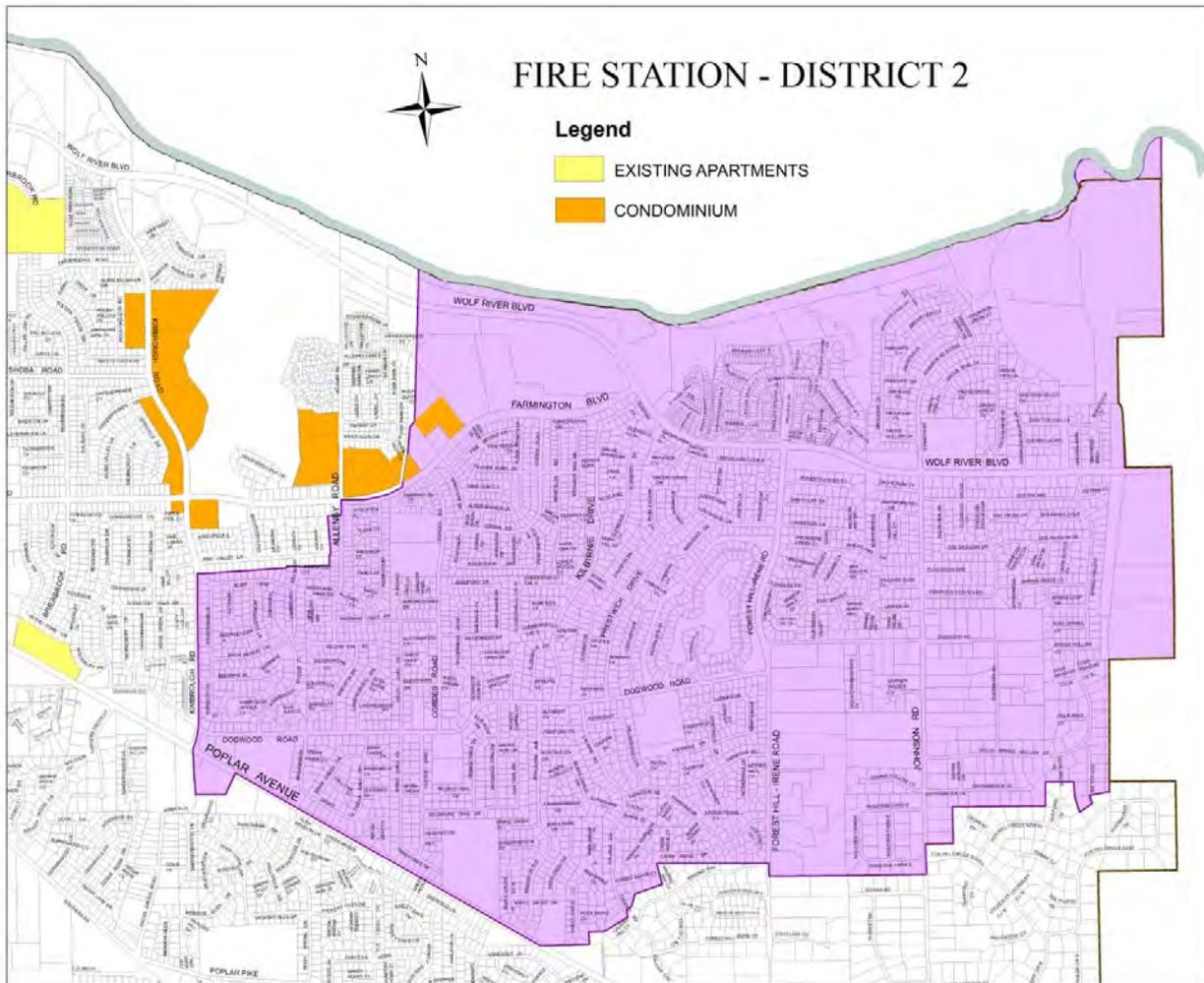
Total Calls for Service

The territory within Germantown assigned to Fire District #2 is primarily a residentially-zoned area. From the beginning of 2016 through the end of 2018, 18% of the City’s total calls for service and 27% of the City’s residential calls for service have originated from within this territory.

Fire District #2 Calls for Service (2016-2018)	Total # of Calls	Average Annual # of Calls	Average # of Calls for Service per day	Percentage of Total Calls Within District
Residential Calls Only	1,847	616	1.69	83%
Commercial and Common Areas Calls Only	370	123	0.34	17%
All Calls within District	2,217	739	2.03	100%

Table 15. Fire District #2 Snapshot: Calls for Service (2016-2018)

Figure 15. Fire District #2 Territory Map



Firefighter/paramedics at Fire Station #2 have, on average, responded to two calls for service per day within the district. As shown in Table 15, the large majority of calls for service (83%) originate from one of its 4,455 residential dwelling units. The only district to have more dwelling units within its district boundaries is Fire District #3.

Existing Dwelling Unit Analysis

Apartments

There are no apartments currently located within the boundaries of this district and no apartment developments are currently proposed or are being considered at this time.

Condominiums & Townhomes

Less than 1% of residential dwelling units within this district are condominiums. Over the last three years, the 32 units at Farmington Blvd. Townhomes and Park Place have accounted for less than 1% of EMS/Non-EMS calls to residential dwelling units within the district.

Figure 16. Fire District #2: Total Dwelling Unit Count



Single-Family Homes

Ninety-five percent of all residential dwelling units within this district are single-family homes. Over the last three years, these 4,241 single-family homes have accounted for 67% of EMS/Non-EMS calls for service to residential dwelling units within the district.

Age-Restricted, Independent, and Assisted Living

Since being completed in the latter part of 2012, the 182 dwelling units at Brookdale – Dogwood Creek have been consistent customers of the fire department’s services. Although this development includes only 4% of all dwelling units within the district, it accounts for 33% of the residential calls for service within the district during this four-year period. The only age-restricted, independent, and assisted living facility in Germantown to not offer onsite medical care, Brookdale – Dogwood Creek is averaging nearly one call for service per unit annually since 2013.

Residential Calls for Service

From the beginning of 2016 through the end of 2018, there were a total of 1,847 calls for service to residential dwelling units within Fire District #2 (see Table 16). 1,248 (68%) of calls within the district were for EMS response and 599 (32%) of those calls were for Non-EMS response. Compared to a city-wide EMS/Non-EMS call-type percentage ratio of 68% EMS / 32% Non-EMS, this district’s call-type experience has been consistent with the combined experience of all the districts during this period.

	EMS				Non-EMS				Total Call Volume			
	2016	2017	2018	Total	2016	2017	2018	Total	2016	2017	2018	Total
Apartments	-	-	-	-	-	-	-	-	-	-	-	-
Condominium	1	1	0	2	1	0	0	1	2	1	0	3
Single-Family	246	232	249	727	140	175	195	510	386	407	444	1237
Assisted Living	136	217	166	519	37	27	24	88	173	244	190	607
Total	383	450	415	1248	178	202	219	599	561	652	634	1847

Table 16. Fire District #2 Residential EMS/Non-EMS Call Volume (2016-2018)

Over this most recent three-year period, an average of 416 EMS calls per year and 200 Non-EMS calls per year have been made to residential dwelling units within the district. Although, the district’s three-year annual average for total residential calls is 616, the 634 total residential calls in 2018 places that year’s residential call volume at 1.74 calls for service per day.

EMS and Non-EMS Residential Call Volume History and Projections

To allow for a better comparative analysis by district, as well as more accurate projections by individual call type, total calls for service for all residential dwelling types within this district were analyzed and separated into EMS and Non-EMS calls (see Figures 17 and 18). As previously mentioned, district data for the calendar year of 2014 was not accessible by district due to the transition of the fire department tracking software. Therefore, the past nine years’ worth of available EMS and Non-EMS district data, dating back to 2009, was used to generate the time series forecasting for the next ten years.

The ten-year forecast trend line shows the projected growth rate in call volume based upon the ten-year history, though the model’s prediction intervals allow for random fluctuations over that time period. The blue line in each chart, with numerical data points, represents actual calls per 100 units since 2009. The red line is the call volume trend line, beginning with the ten-year history and forecast through 2028. Assuming no other changes or the presence of other variables that would impact the analysis, the model provides 95% confidence that the actual annual calls per 100 unit number for each of the next ten years will remain within the prediction interval lines established above (purple) and below (green) the projection trend line.

Figure 17. Fire District #1: Annual EMS Residential Call Volume History and 10-Year Projections per 100 Units

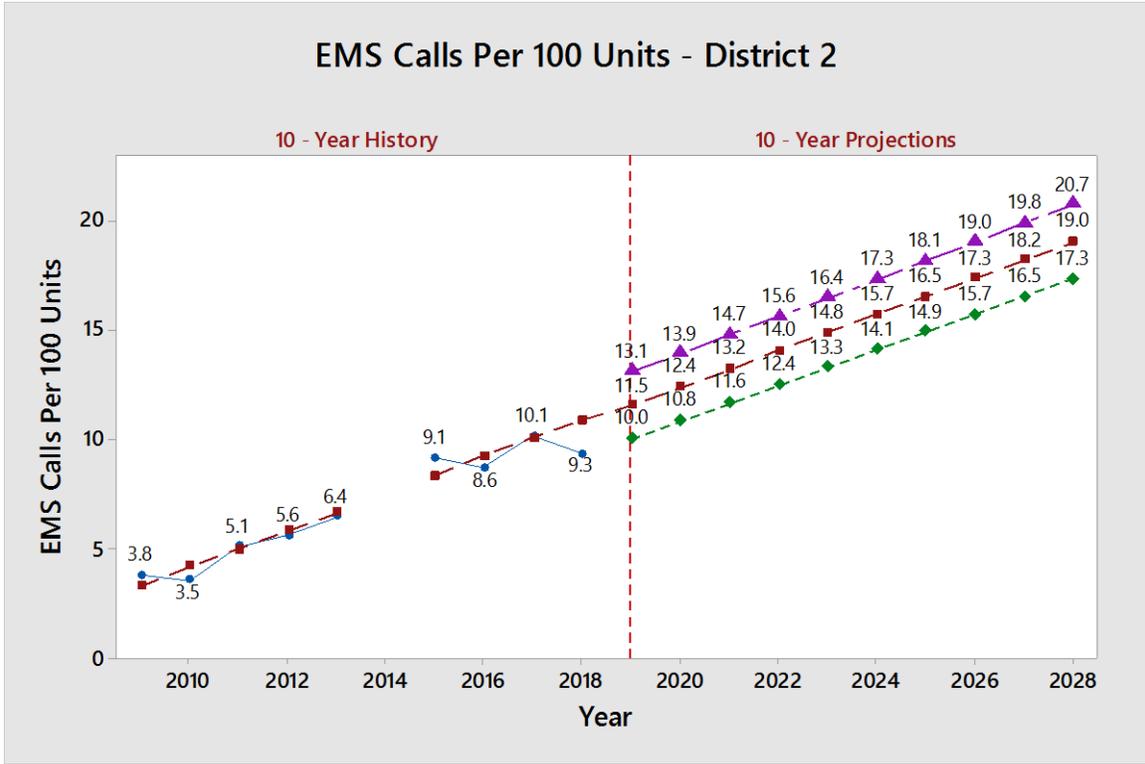
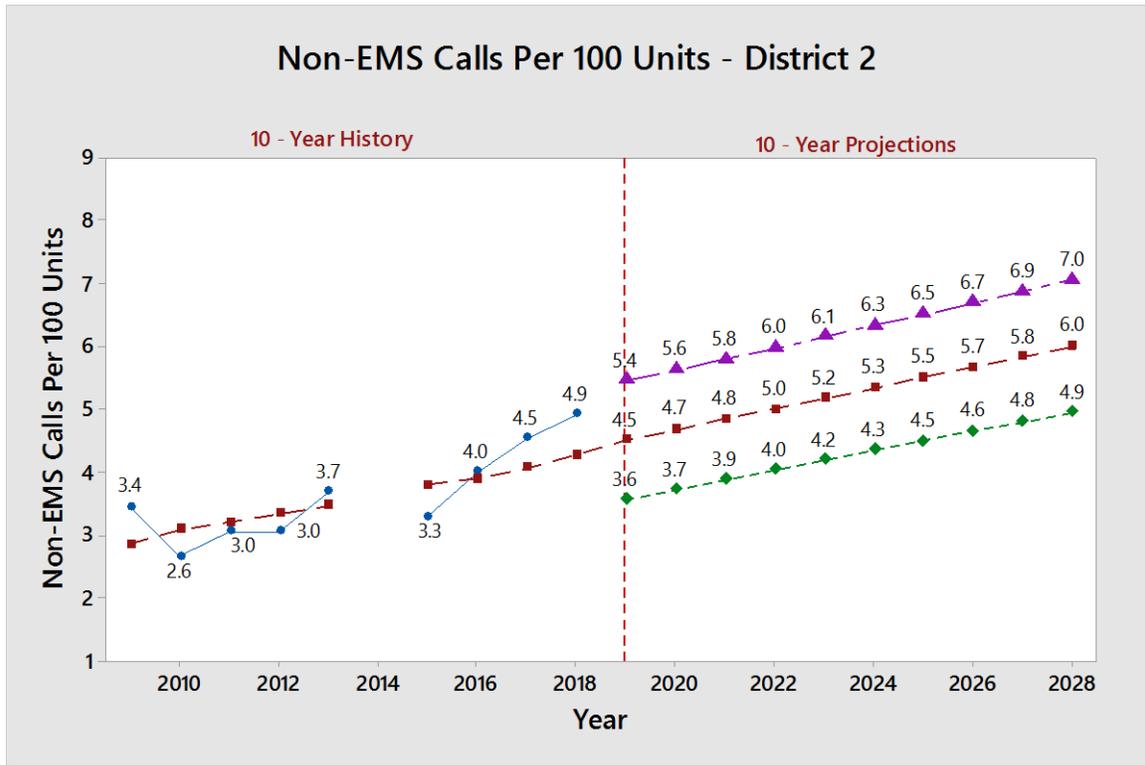


Figure 18. Fire District #1: Annual Non-EMS Residential Call Volume History and 10-Year Projections per 100 units



The district’s total of 4,455 existing dwelling units was then multiplied by the projected annual call per unit ratio (call per 100 unit number divided by 100) for each year to calculate the total annual call volume by for EMS and Non-EMS calls. These ten-year projection numbers (see Table 17) will serve as the ‘baseline’ call volume data from existing dwelling units within the district’s future residential call volume projection model (see Table 18 at the end of this section).

10 - Year Trend Data			10 - Year Projections		
Year	District 2 Total EMS Calls	District 2 Total Non-EMS Calls	Year	District 2 Total EMS Calls	District 2 Total Non-EMS Calls
2009	161	147	2019	513	200
2010	150	113	2020	550	208
2011	217	130	2021	587	215
2012	240	130	2022	624	223
2013	286	164	2023	661	230
2014	n/a	n/a	2024	698	237
2015	407	146	2025	735	245
2016	385	178	2026	772	252
2017	450	202	2027	809	260
2018	415	219	2028	846	267

Table 17. Fire District #2: Annual Total EMS and Non-EMS Residential Call Volume Projections

Finally, new residential development constructed during the ten-year projection period will be assessed the appropriate call for service ratio associated with the specific dwelling type and the respective year. The projected call for service numbers from new residential development will then be added to the appropriate year’s baseline data of EMS and Non-EMS calls for service in order to calculate the projected total annual residential call volume for each of the next ten years.

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included four (4) properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making call volume projections for Fire District #2. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 19 and Table 18 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations with call volume impact scheduled in outer years for the purposes of forecasting maximum residential calls for service by 2028.

Developments in Process:

#17	Piper's Gardens	Zoned "R" for Residential, this 5.58-acre site has been placed in our projection worksheet to be completed and occupied as early as calendar year 2020. Although there is an approved subdivision on this property, no building permits have been issued. The addition of eight single-family homes at this location could increase the annual number of calls for service within the district by one annually through 2028.
-----	-----------------	--

Underdeveloped Properties:

#21	Warlick Sandra H and Hulon O	Zoned "R" for Residential, the 30.07 acres at this location could have a maximum of 87 dwelling units. One single-family home is currently located on this property. If the property were to be developed/redeveloped, another 13 to 14 calls for service should be expected annually through 2028.
-----	------------------------------	---

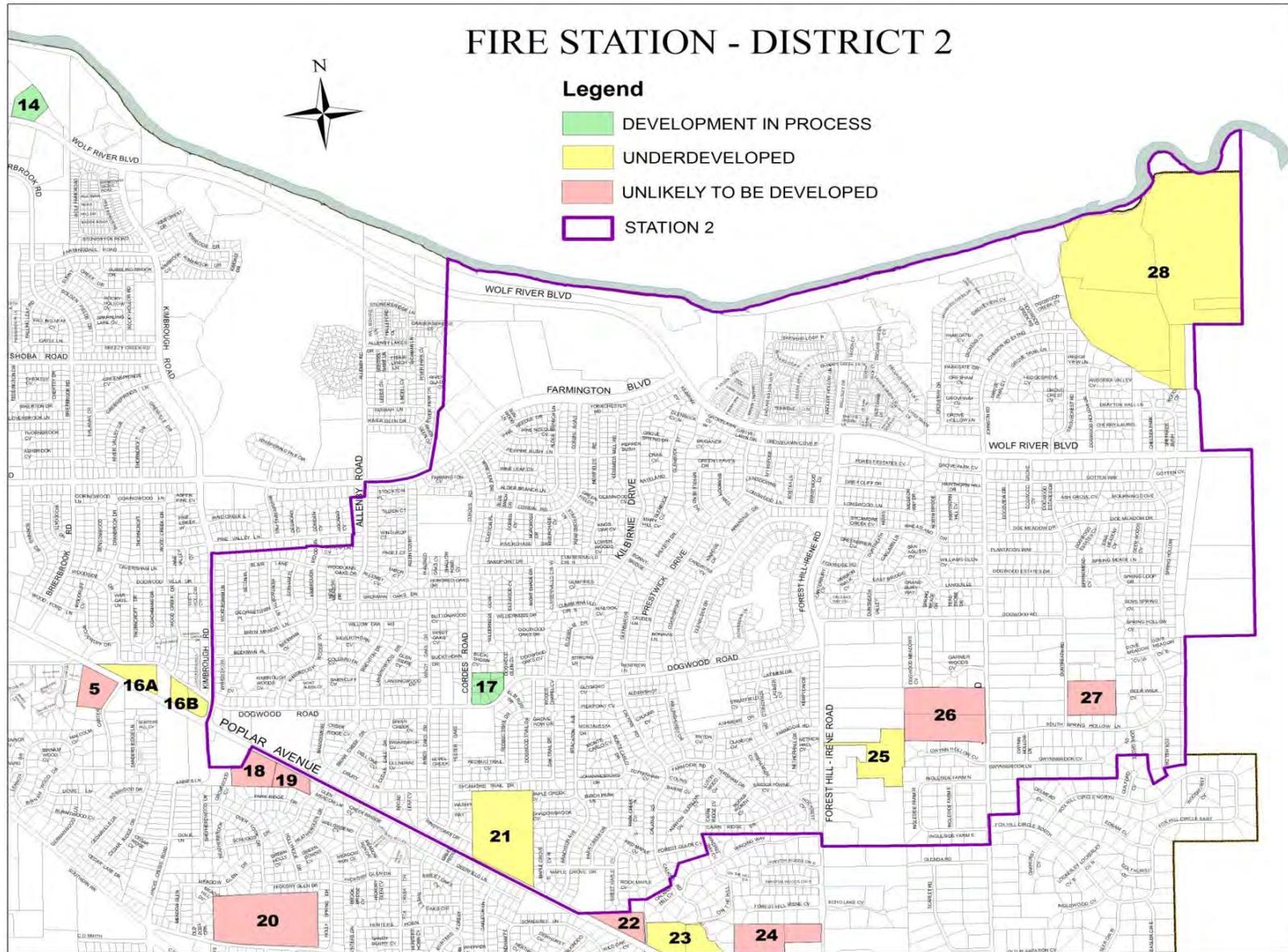
#25	Steiner	Zoned "RE" for Residential Estate, the 12.81 acres at this location could have a maximum of six dwelling units. If developed/redeveloped, the property could add one call for service annually through 2028.
-----	---------	--

#28	Ben Clark Property	Zoned "AG" for Agricultural, the 180.59 acres at this location could have a maximum of 36 dwelling units (at one home per five acres). One single-family estate home is currently located on this property. If developed/redeveloped under the current zoning, the property could add another five to six calls for service annually through 2028.
-----	--------------------	--

Properties Unlikely To Be Developed < 10 Years:

Two properties categorized as "unlikely to be developed" (#26 and #27) have been included within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these two locations, shown in red on Figure 19 and Table 18, desire or intend to change the current land use of these sites at any point in the immediate future. These properties were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that neither of the two properties fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 19. Fire District #2: Property Analysis Map



FIRE DISTRICT #2	Calendar Year		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
	Projected Annual Call Volume From Existing Dwelling Units	EMS		415	513	550	587	624	661	698	735	772	809
Non-EMS		219	200	208	215	223	230	237	245	252	260	267	
SUBTOTAL		634	713	758	802	847	891	935	980	1024	1069	1113	

Projected Annual Call Volume Per 100 Units By Dwelling Type	Apartments	APT	7.7	7.2	7.5	7.8	8.1	8.4	8.7	9.0	9.3	9.6	9.9
	Single-Family Homes	SFH	12.6	13.4	13.7	14.0	14.3	14.6	15.0	15.3	15.6	15.9	16.2
	Condominiums	CO	7.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	Age-Restricted, Ind. & Asst. Living	SL	80.2	81.3	87.1	92.9	98.8	104.6	110.5	116.3	122.1	128.0	133.8

Property #	Project Name /Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	#of units possible or approved	Dwelling Type	Additional Annual Calls for Service from New Residential Development														
Developments in Process																					
17	Piper's Gardens	R	5.58	2.904	8	SFH	0	0	1	1	1	1	1	1	1	1	1	1	1		
Underdeveloped Properties																					
21	Warlick Sandra H and Hulon O	R	30.07	2.904	87	SFH	0	0	0	0	0	13	13	13	14	14	14	14	14		
25	Steiner	RE	12.81	0.5	6	SFH	0	0	0	0	0	0	0	1	1	1	1	1	1		
28	Ben Clark Property	AG	180.59	0.2	36	SFH	0	0	0	0	0	5	5	6	6	6	6	6	6		
Properties Unlikely To Be Developed < 10 Yrs																					
26	Herring	RE	27	0.5	13	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0		
27	Selman	RE-1	10	1	10	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0		
Projected Annual Totals for EMS/Non-EMS Residential Call Volume: District 2							634	713	759	803	848	910	955	1001	1045	1091	1135				

Total residential calls per day		1.74	1.95	2.08	2.20	2.32	2.49	2.62	2.74	2.86	2.99	3.11
Additional Call Volume per day over 2018 from:	Existing residential developments		0.22	0.34	0.46	0.58	0.70	0.82	0.95	1.07	1.19	1.31
	New residential developments		0.00	0.00	0.00	0.00	0.05	0.05	0.06	0.06	0.06	0.06

Analysis by NEW Residential Development Type	#of Units												
Apartments	0	Calls for Service per day	0	0	0	0	0	0	0	0	0	0	0
Single Family Homes	137	Calls for Service per day	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.06	0.06	0.06	0.06
Condominiums	0	Calls for Service per day	0	0	0	0	0	0	0	0	0	0	0
AR, Ind. & Assisted Living	0	Calls for Service per day	0	0	0	0	0	0	0	0	0	0	0
Total	137												

Table 18. Fire District #2 Future Residential Call Volume Projections

Residential Call Volume Projection Summary: Fire District #2

Existing Dwelling Units

If trends in call volume from the last ten years continue, calls for service from the existing 4,455 dwelling units within the district are projected to increase from 634 to 1,113 over the next ten years. This increase of 479 calls annually would add 1.31 calls per day to the current total of 1.74 residential calls for service per day.

Developments in Process

The addition of one call for service per year from the eight single-family homes at Piper's Gardens within the next ten years is relatively insignificant.

Underdeveloped Properties

The potential of another 129 single-family homes from three "underdeveloped" properties over the next ten years would yield 21 annual calls for service by 2028 if developed, or 0.06 calls for service per day.

District Summary

If trends in call volume follow the projections and new residential development takes place as described in the scenarios above, 22 annual calls for service will be added to the total projected residential calls for service number of 1,113 from existing dwelling units within the district by 2028 (see Table 18). This means that Fire District #2, which currently responds to approximately 1.74 residential calls for service per day within district, would see an increase in call volume, primarily from existing residences, to 3.11 calls per day over the next ten years. This difference in call volume equates to an additional 1.37 calls per day or 9.6 calls per week.

Lastly, although not the largest age-restricted, independent, and assisted living facility in the City by dwelling unit count, Brookdale-Dogwood Creek has the highest call volume experience, averaging nearly one call for service per dwelling unit annually since opening. Due large in part to not offering of onsite medical care, this development has and will continue to place a significant demand on this district's (and overall department's) resources absent operational and procedural change.

Apartment Impact

Fire District #2

What are the likely impacts of future apartments and apartment building development on Fire District #2?

Future apartment developments are currently not being considered within the Fire District #2 territory and there are no Smart Code Zoning Districts within this district's boundaries. Also, as previously mentioned, there are no existing apartments located within the boundaries of Fire District #2. Therefore, based on the current zoning, no calls for service from existing apartments or future apartments should originate from this district through 2028.

FIRE DISTRICT #3



Fire Station #3 is serviced by Fire District #3, which is located at 7766 Farmington Boulevard and covers the northwest portion of Germantown (see Figure 20). At any given time, eleven personnel with firefighting and medical care capabilities are on shift at this location, responding to all fire and medical emergencies with a single fire engine company, a single fire truck company, an ambulance, a back-up ambulance, and a battalion chief command vehicle. This district is unique in that it services all five existing apartment developments and 14 of the 17 condominium developments. Additionally, two of the three Key Commercial Areas, the Central Business District and the West Poplar Avenue District, and a thriving Wolf River Medical District heavily impact call volume demand.

- Personnel:** (11) Firefighters on shift
- Apparatus:** (1) Fire Engine Company (1) Fire Truck Company
 (1) Ambulance (1) Back-up Ambulance
 (1) Battalion Chief Command Vehicle

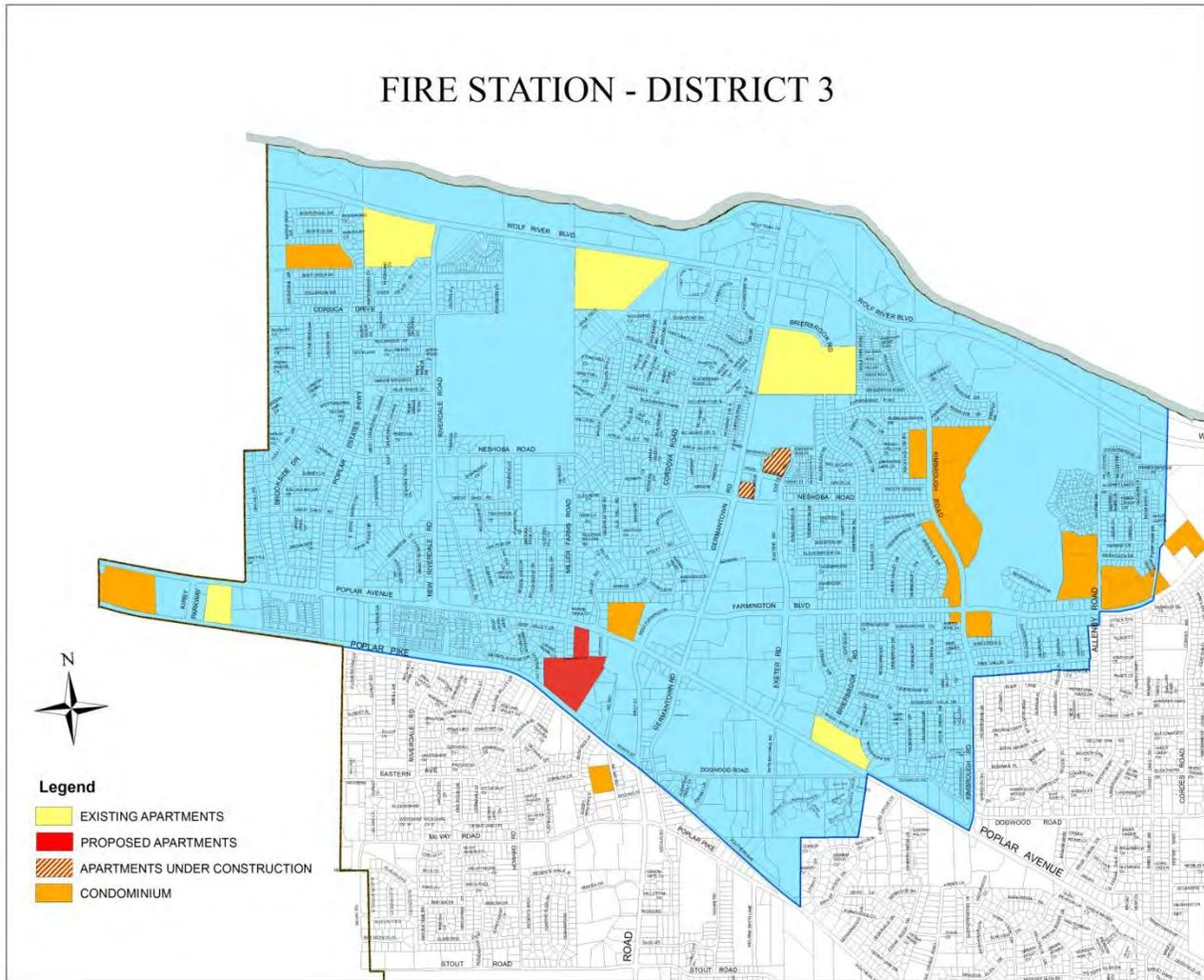
Total Calls for Service

In recent history, the territory within Germantown assigned to Fire District #3 has experienced the greatest amount of calls for service in comparison to the other three districts. From the beginning of 2016 through the end of 2018, 55% of the City’s total calls for service and 42% of the City’s residential calls for service have originated from within this territory.

Fire District #3 Calls for Service (2016-2018)	Total # of Calls	Average Annual # of Calls	Average # of Calls for Service per day	Percentage of Total Calls Within District
Residential Calls Only	2,890	963	2.64	42%
Commercial and Common Areas Calls Only	4,066	1,355	3.71	58%
All Calls within District	6,956	2,318	6.35	100%

Table 19. Fire District #3 Snapshot: Calls for Service (2016-2018)

Figure 20. Fire District #3 Territory Map



Firefighter/paramedics at Fire Station #3 have, on average, responded to 6.35 calls for service per day within the district (see Table 19). Unlike the other districts, the majority of calls for service (58%) within the district originate from commercial and common areas. With 6,530 dwelling units within its boundaries, this district also has the highest average number of residential calls for service per day at 2.64. Without question, this district experiences the most EMS and Non-EMS-related activity within the City on a daily basis.

Existing Dwelling Unit Analysis

Apartments

All five of the City's existing apartment developments are located within the boundaries of Fire District #3. These 1,014 apartment dwelling units make up nearly 16% of all dwelling units within the district. Over the last three years, 8% of EMS/Non-EMS calls to a dwelling unit within this district have been to an apartment.

Figure 21. Fire District #3: Total Dwelling Unit Count



Condominiums & Townhomes

Fourteen of the City’s 17 existing condominium developments are located within the boundaries of this district. These 1,112 condominium dwelling units make up 17% of all dwelling units within the district. Over the last three years, nearly 7% of EMS/Non-EMS calls to a dwelling unit within this district have been to a condominium.

Single-Family Homes

Sixty-two percent of all residential dwelling units within this district are single-family homes. Over the last three years, these 4,021 single-family homes have accounted for 65% of EMS/Non-EMS calls for service to residential dwelling units within the district.

Age-Restricted, Independent, and Assisted Living

The combined 383 dwelling units at The Villages of Germantown and the Brookdale – Poplar location make up nearly 6% of all dwelling units within this district. During this three-year period, however, 20% of residential calls for service within the district came from one of these two locations.

Residential Calls for Service

From the beginning of 2016 through the end of 2018, there were a total of 2,890 calls for service from residential dwelling units within Fire District #3 (see Table 20). 1,984 (69%) of calls within the district were for EMS response and 906 (31%) of those calls were for Non-EMS response. Compared to a city-wide EMS/Non-EMS call-type percentage ratio of 68% EMS / 32% Non-EMS, this district has responded to a slightly higher percentage of EMS calls and a slightly lower percentage of Non-EMS calls than the combined experience of all the districts during this period.

	EMS				Non-EMS				Total Call Volume			
	2016	2017	2018	Total	2016	2017	2018	Total	2016	2017	2018	Total
Apartments	40	53	58	151	23	33	20	76	63	86	78	227
Condominium	33	42	62	137	23	26	29	78	56	68	91	215
Single-Family	396	468	356	1220	196	210	239	645	592	678	595	1865
Assisted Living	116	132	228	476	35	38	34	107	151	170	262	583
Total	585	695	704	1984	277	307	322	906	862	1002	1026	2890

Table 20. Fire District #3 Residential EMS/Non-EMS Call Volume (2016-2018)

Over this most recent three-year period, an average of 661 EMS calls per year and 302 Non-EMS calls per year have been made to residential dwelling units within this district. Although the three-year annual average for total residential calls within the district is 963, the 1026 total residential calls in 2018 puts that year’s residential call volume at 2.81 calls for service per day.

EMS and Non-EMS Residential Call Volume History and Projections

To allow for a better comparative analysis by district, as well as more accurate projections by individual call type, total calls for service for all residential dwelling types within this district were analyzed and separated into EMS and Non-EMS calls (see Figures 22 and 23). As previously mentioned, district data for the calendar year of 2014 was not accessible by district due to the transition of the fire department tracking software. Therefore, the past nine years’ worth of available EMS and Non-EMS district data, dating back to 2009, was used to generate the time series forecasting for the next ten years.

The ten-year forecast trend line shows the projected growth rate in call volume based upon the ten-year history, though the model’s prediction intervals allow for random fluctuations over that time period. The blue line in each chart, with numerical data points, represents actual calls per 100 units since 2009. The red line is the call volume trend line, beginning with the ten-year history and forecast through 2028. Assuming no other changes or the presence of other variables that would impact the analysis, the model provides 95% confidence that the actual annual calls per 100 unit number for each of the next ten years will remain within the prediction interval lines established above (purple) and below (green) the projection trend line.

The district’s total of 6,530 existing dwelling units was then multiplied by the projected annual call per unit ratio (call per 100 unit number divided by 100) for each year to calculate the total annual call volume by for EMS and Non-EMS calls. These ten-year projection numbers (see Table 21) will serve as the ‘baseline’ call volume data from existing dwelling units within the district’s future residential call volume projection model (see Table 22 at the end of this section).

Figure 22. Fire District #3: Annual EMS Residential Call Volume History and 10-Year Projections per 100 Units

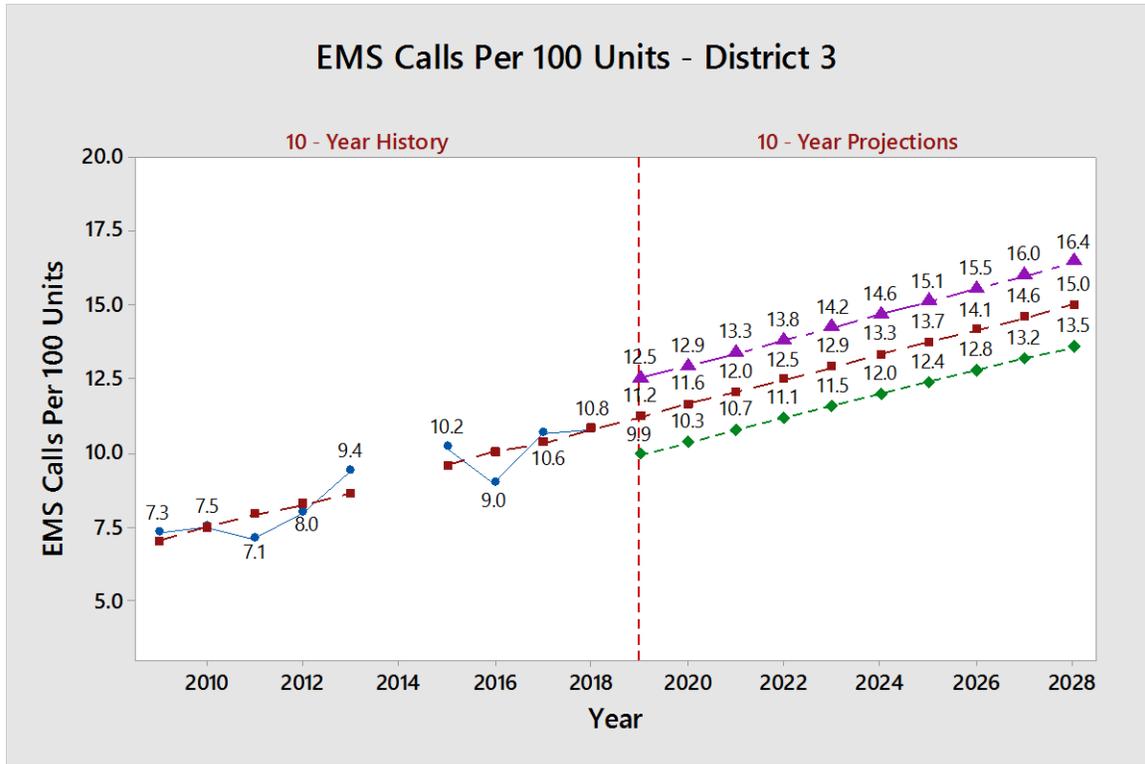
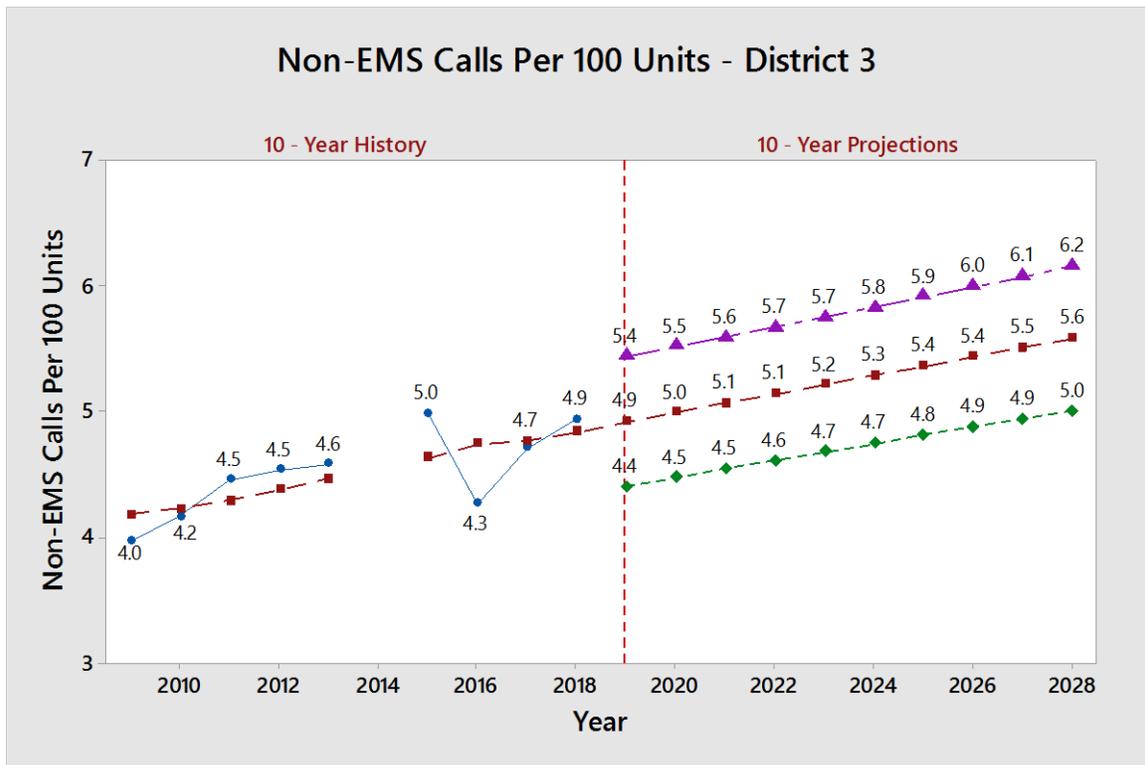


Figure 23. Fire District #3: Annual Non-EMS Residential Call Volume History and 10-Year Projections per 100 units



10 - Year Trend Data			10 - Year Projections		
Year	District 3 Total EMS Calls	District 3 Total Non-EMS Calls	Year	District 3 Total EMS Calls	District 3 Total Non-EMS Calls
2009	470	255	2019	731	321
2010	482	268	2020	759	326
2011	457	287	2021	786	330
2012	515	292	2022	813	335
2013	604	295	2023	841	340
2014	n/a	n/a	2024	868	345
2015	656	321	2025	896	350
2016	583	277	2026	923	354
2017	695	307	2027	951	359
2018	704	322	2028	978	364

Table 21. Fire District #3: Annual Total EMS and Non-EMS Residential Call Volume Projections

Finally, new residential development constructed during the ten-year projection period will be assessed the appropriate call for service ratio associated with the specific dwelling type and the respective year. The projected call for service numbers from new residential development will then be added to the appropriate year’s baseline data of EMS and Non-EMS calls for service in order to calculate the projected total annual residential call volume for each of the next ten years.

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included eleven (11) properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making call volume projections for Fire District #3. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 24 and Table 22 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations with call volume impact scheduled in outer years for the purposes of forecasting maximum residential calls for service by 2028.

Developments in Process:

#1A	Carrefour at the Gateway	Partially-zoned “T6” for Urban Core Zone and “T5” for Urban Center Zone within the Smart Code district, the property owners at this 10.12, two-acre location have submitted an application to redevelop the existing site. The approved outline plan calls for a mix of retail, commercial and office uses. If apartments were subsequently proposed and approved for this location, an initial 7.8 (2021) to and eventual 9.9 (2028) annual calls for service for every 100 units would need to be added to the projection model.
------------	--------------------------	--

#14	Avenida Senior Living Apartments	Zoned "R-H" for Retirement Housing, this 5.3-acre site has been scheduled to be completed and occupied late 2019. The addition of 162 senior living apartments is projected to significantly increase the annual number of calls for service within the district by 141 in 2020 and increase to 217 by 2028. This age-restricted senior living development will not offer on-site medical care. Because Avenida is an age-restricted, independent living development for seniors, our research team categorized this residential dwelling unit type as an age-restricted, independent, and assisted living within our call volume projection models.
-----	----------------------------------	--

#15A	The Residences at Thornwood and Market Row Lofts	Zoned "T5" for Urban Center Zone within the Smart Code district, the fourth and fifth phase of Thornwood is scheduled for completion in 2019. The addition of 276 apartments on 7.09 acres is projected to increase the annual number of calls for service within the district by 20 in 2019 (or once fully-leased) and increase to 27 by 2028.
------	--	---

#15B	Thornwood - Phase 6 (Undeveloped Lot 5)	Zoned "T5" for Urban Center Zone within the Smart Code, these 2.98 acres on Lot 5 are the last phase of the Thornwood development project. As part of the development's Outline Plan approval in 2014, a maximum of 294 multi-family units were included. If the developer were to propose and receive final approval for apartments at this location, an initial 23 (2021) to and eventual 29 (2028) annual calls for service would be expected from this location. Final site plan approval by both the Planning Commission and BMA would be required.
------	---	--

Underdeveloped Properties:

#0	Germantown Country Club	Zoned "R" for Residential, this 178.6-acre property is on the market for sale at the time of this study. Given the uncertainty of this property's future, 90 acres of unrestricted property was considered for residential development for the purpose of projecting maximum residential call volume figures. The addition of 261 single-family homes over a period of ten years could gradually increase the annual number of calls within the district from an initial four to an eventual 34 by 2028.
----	-------------------------	--

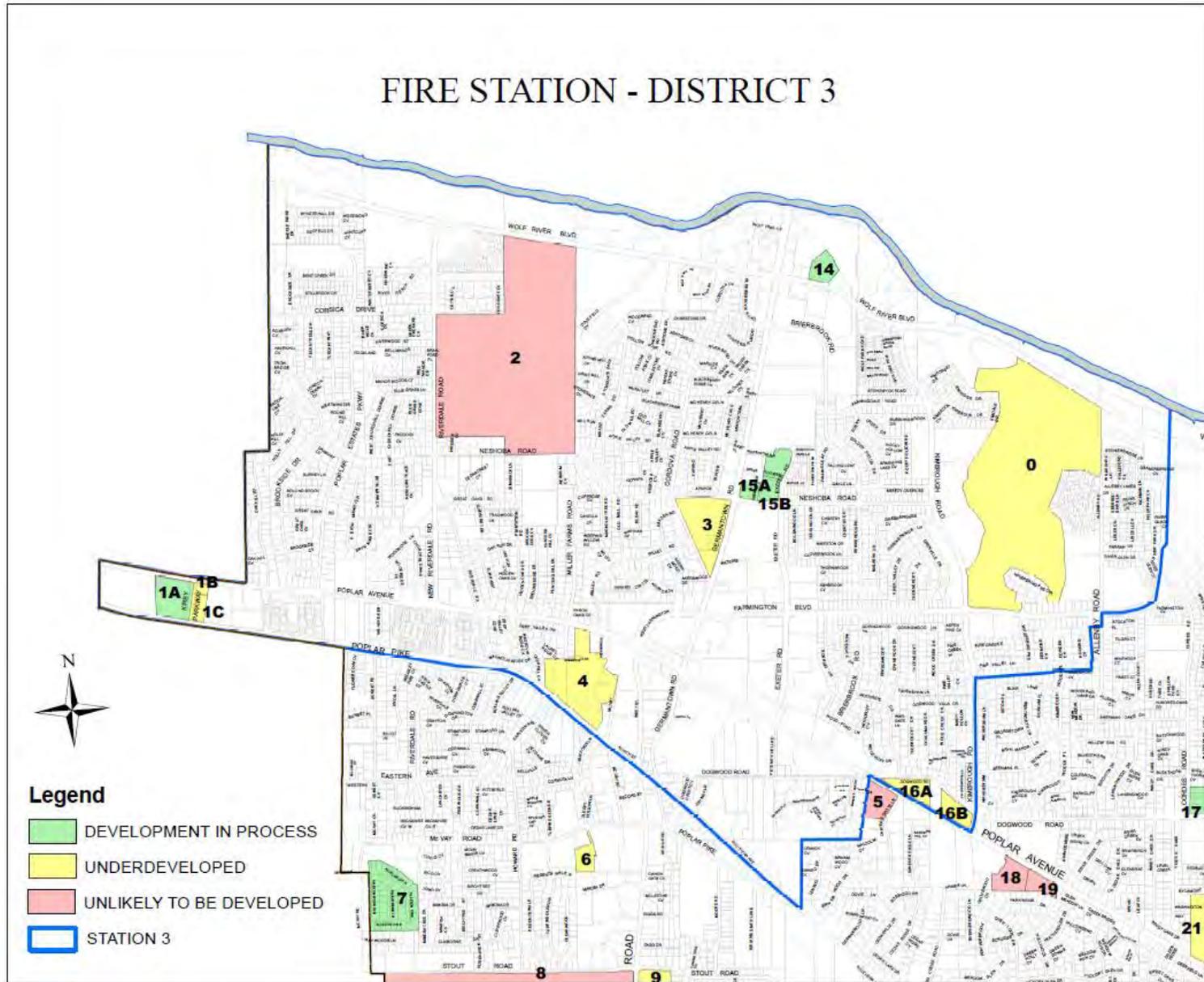
#1B	Bank of Bartlett	Zoned "T6" for Urban Core Zone within the Smart Code district, our research team included 20 apartment dwelling units on this one-acre property for the purposes of projecting maximum residential call volume figures. If redeveloped in this manner, an additional two calls for service per year can be expected from this location.
-----	------------------	---

#1C	Kirby Professional Buildings	Partially-zoned “T6” for Urban Core Zone and “T5” for Urban Center Zone within the Smart Code district, our research team included 40 apartment dwelling units on this 2.64-acre property for the purposes of projecting maximum residential call volume figures. If redeveloped in this manner, an additional three to four calls for service per year can be expected from this location.
#3	Owen Jack R Revocable Trust	Zoned “R” for Residential, this 13.6-acre property was rezoned to Residential from its previous “T4” Smart Code zoning classification in 2018. Our research team included the addition of 39 single-family homes in our projections around 2023. If proposed and approved, the district can anticipate another six calls for service per year from this location.
#4	Arthur Tract (Carter)	Zoned “T5” for Urban Center Zone within the Smart Code district, these 32.86 acres to the west/southwest of Saddle Creek have been identified as a location for mixed use development. Although their project approval has expired, Carter received preliminary approval from the Planning Commission to include 302 apartment dwelling units at this location. If the property were to be developed in this manner, an additional 25 to an eventual 30 calls for service per year can be expected from this location.
#16A	Patel	Zoned “R” for Residential, the 6.46 acres at this location could have a maximum of 18 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property could add another three calls for service annually through 2028.
#16B	Dogwood Manor	Zoned “R” for Residential, the 4.88 acres at this location could have a maximum of 14 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property could add another two calls for service annually through 2028.

Properties Unlikely To Be Developed < 10 Years:

Although categorized as “unlikely to be developed,” one property (#2) has been included within the study; however, development or redevelopment of this property is not expected to take place by 2028. To be clear, City staff has no indication that the current property owner at this location, shown in red on Figure 24 and Table 22, desires or intends to change the current land use of this site at any point in the immediate future. This property was recognized because its total acreage fell within the general parameters established by the research team and its redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted this property does not fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 24. Fire District #3: Property Analysis Map



FIRE DISTRICT #3	Calendar Year		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
	Projected Annual Call Volume From Existing Dwelling Units	EMS		704	731	759	786	813	841	868	896	923	951
Non-EMS		322	321	326	330	335	340	345	350	354	359	364	
SUBTOTAL		1026	1052	1085	1116	1148	1181	1213	1246	1277	1310	1342	

Projected Annual Call Volume Per 100 Units By Dwelling Type	Apartments		APT	7.7	7.2	7.5	7.8	8.1	8.4	8.7	9.0	9.3	9.6	9.9
	Single-Family Homes		SFH	12.6	13.4	13.7	14.0	14.3	14.6	15.0	15.3	15.6	15.9	16.2
	Condominiums		CO	7.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	Age-Restricted, Ind. & Asst. Living		SL	80.2	81.3	87.1	92.9	98.8	104.6	110.5	116.3	122.1	128.0	133.8

Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type	Additional Annual Calls for Service from New Residential Development												
Developments in Process																			
1A	Carrefour	T5/T6	10.12	20	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Avenida Senior Living Apartments	R-H	5.3	31	162	AL	0	0	141	150	160	169	179	188	198	207	217	217	
15A	TW Residences & Market Row Lofts	T5	7.09	39	276	APT	0	20	21	22	22	23	24	25	26	26	27	27	
15B	Thornwood (Undeveloped Lot 5)	T5	2.98	99	294	APT	0	0	0	23	24	25	26	26	27	28	29	29	
Underdeveloped Properties																			
0	Germantown Country Club	R	178.6	2.904	261	SFH	0	0	0	4	7	11	16	20	24	29	34	34	
1B	Bank of Bartlett	T6	1	20	20	APT	0	0	0	0	0	2	2	2	2	2	2	2	
1C	Kirby Professional Buildings	T5/T6	2.64	15	40	APT	0	0	0	0	0	3	3	4	4	4	4	4	
3	Owen Jack R Revocable Trust	R	13.6	2.904	39	SFH	0	0	0	0	0	6	6	6	6	6	6	6	
4	Arthur Tract	T5	32.86	15	302	APT	0	0	0	0	0	25	26	27	28	29	30	30	
16A	Patel	R	6.46	2.904	18	SFH	0	0	0	3	3	3	3	3	3	3	3	3	
16B	Dogwood Manor	R	4.88	2.904	14	SFH	0	0	0	2	2	2	2	2	2	2	2	2	
Properties Unlikely To Be Developed < 10 Yrs																			
2	Fulmer Estate	R	190.62	2.904	554	SFH	0	0	0	0	0	0	0	0	0	0	0	0	

Projected Annual Totals for EMS/Non-EMS Residential Call Volume: **District 3**

1026	1072	1247	1319	1366	1450	1499	1549	1597	1647	1696
------	------	------	------	------	------	------	------	------	------	------

Total residential calls per day		2.81	2.94	3.42	3.61	3.74	3.97	4.11	4.24	4.38	4.51	4.65
Additional Call Volume per day over 2018 from:	Existing residential developments		0.07	0.16	0.25	0.33	0.42	0.51	0.60	0.69	0.78	0.87
	New residential developments		0.05	0.44	0.56	0.60	0.74	0.78	0.83	0.88	0.92	0.97

Analysis by NEW Residential Development Type		# of Units	Calls for Service per day										
Apartments		932	0.00	0.05	0.06	0.12	0.13	0.21	0.22	0.23	0.24	0.25	0.25
Single Family Homes		332	0.00	0.00	0.00	0.02	0.03	0.06	0.07	0.08	0.10	0.11	0.12
Condominiums		0	0	0	0	0	0	0	0	0	0	0	0
AR, Ind. & Assisted Living		162	0.00	0.00	0.39	0.41	0.44	0.46	0.49	0.52	0.54	0.57	0.59
Total		1426											

Table 22. Fire District #3: Future Residential Call Volume Projections

Residential Call Volume Projection Summary: Fire District #3

Existing Dwelling Units

If trends in call volume from the last ten years continue, calls for service from the existing 6,530 dwelling units within the district are projected to increase from 1,026 to 1,342 over the next ten years. This increase of 316 calls annually would add 0.87 calls per day to the current total of 2.81 residential calls for service per day.

District 3: Call Volume Projection Analysis		Total Unit Count	Annual Calls for Service (2018-2028)			Added Call Volume per Day
			Current (2018)	Projected (2028)	Variance	
EXISTING DWELLING UNITS		6,530	1,026	1,342	316	0.87
Apartments*	Developments In Process	570	0	56	56	0.15
	Underdeveloped Properties	362	0	36	36	0.10
Single-Family Homes	Developments In Process	0	0	0	0	0.00
	Underdeveloped Properties	332	0	45	45	0.12
Age-Restricted, Independent & Assisted Living	Developments In Process	162	0	217	217	0.59
	Underdeveloped Properties	0	0	0	0	0.00
Totals		7,956	1,026	1,696	670	1.84

*For the purposes of projecting call volume impact based on the maximum number of dwelling units possible, this study assumes that all new multi-family development within Smart Code zoning districts will be applied for, approved, and developed as apartments over the next ten years.

Table 23. Fire District #3: Call Volume Projection Analysis

Developments in Process

The addition 273 calls for service per year from a proposed 732 new residential dwelling units are projected to increase total EMS and Non-EMS district call volume by .74 calls per day. This added daily call volume includes 0.15 calls per day to the 276 apartment dwelling units at the Thornwood Residences and Market Row, and 294 apartment dwelling units for the undeveloped Lot 5 on the Thornwood site. The large majority (.59) of the added 0.74 total residential calls per day is projected to originate from the 162-unit Avenida Senior Living development.

Underdeveloped Properties

The addition of 81 calls for service per year from a possible 694 new residential dwelling units would add increase total EMS and Non-EMS district call volume by 0.22 calls per day. Under this aggressive build-out scenario, the possibility of 261 single-family homes on the Germantown Country Club site and 302 apartments on the Arthur Tract site in the Central Business District make up the majority of the projected 0.22 calls per day.

New Development

When considering both categories of this new residential development scenario, an additional 670 annual residential calls for service by 2028 from 1,426 new dwelling units is projected to add 0.97 calls per day to the district's call volume.

District Summary

If trend in call volume follow the projections and new residential development takes place as described in the scenarios above, almost three residential calls for service per day (2.81) from the existing 6,503 dwelling units would increase to nearly five residential calls for service per day (4.65) with the increase of 0.87 calls per day from existing dwelling units and 0.97 calls per day from the added 1,426 dwelling units to the district (see bottom of Table 22).

Apartment Impact

Fire District #3

What are the likely impacts of future apartments and apartment building development on Fire District #3?

Central Business District

#15A: Beginning in 2019, the 276 dwelling units at The Residences at Thornwood and Market Row Lofts are projected to add an approximate 20 to an eventual 27 residential calls for service annually by 2028. Of the four multi-family developments that were exempted from the moratorium, the Thornwood development is the only project that has moved through the approval process to the construction phase.

#15B: As of December 2018, a final proposed use for the remaining 2.98-acres of Lot 5 (Phase 6) of the Thornwood development has yet to be submitted by the developer. The Outline Plan for Phase 6, as originally submitted and approved, includes a possible 294 multi-family units for this location. However, final site plan approval by the Planning Commission and the BMA is still required. For the purposes of understanding the maximum potential impact apartments could have on City services, these 294 units were included as apartments in future call volume projection calculations. If the developer were to propose and receive approval for this number of apartments at this location, a projected number of 23 to an eventual 29 residential calls for service annually would be anticipated by 2028.

#4: Although the Carter development was referenced in the moratorium, as of December 2018, representatives for the Carter project have not proceeded past an initial Planning Commission Outline Plan approval and the Planning Commission approval has expired. However, because it was specifically listed within the moratorium as a development that had received some form of approval during the development consideration process, the call volume numbers from these 32.86 acres were included in our projection model. If a developer were to propose and receive approval of a project that was consistent with the Carter proposal, a projected number of 25 to an eventual 30 residential calls for service annually would be anticipated from this location by 2028.

Apartment Impact cont.

Fire District #3

APARTMENTS - Fire District #3 (2028)				Year	2028	
Projected Annual Call Volume per 100 Apartment Units				9.9		
Property #	Project Name / Project Owner	Zoning Designation	# of units possible or approved	Calls per Year	Calls per Month	Calls per Day
Developments in Process						
15A	TW Residences & Market Row Lofts	T5	276	27	2.3	0.07
15B	Thornwood (Undeveloped Lot 5)	T5	294	29	2.4	0.08
Underdeveloped Properties						
1B	Bank of Bartlett	T6	20	2	0.2	0.01
1C	Kirby Professional Buildings	T5/T6	40	4	0.3	0.01
4	Arthur Tract	T5	302	30	2.5	0.08
Totals			932	92	7.7	0.25

Table 24. Fire District #3: Apartment Call Volume Summary for 2028

West Poplar District

#1B & #1C: The combined 3.64 acres that are currently occupied by the Bank of Bartlett and the Kirby Professional Buildings, at the corner of Poplar Ave. and Kirby Pkwy., are considered locations where a mixed-use redevelopment could occur as a result of the T5 and T6 zoning. The possible 60 multi-family apartment dwelling units on these sites would add around six calls for service annually to the district through 2028.

On November 26, 2018, the Board of Mayor and Alderman approved the Carrefour at the Gateway Planned Development Outline Plan as recommended by the Planning Commission. Partially-zoned T5 and T6, the proposed Outline Plan included a mix of office, retail and hotel uses with a complimentary parking garage and civic space on this 10.12-acre site. If apartments were to be subsequently proposed at this location and made it through the final approval process, an initial 7.8 (2021) to and eventual 9.9 (2028) annual calls for service for every 100 units would need to be added to the projection model.

Fire District #3 Apartment Impact Summary

In summary, our research team’s call volume projection calculations through 2028 made assumptions that the Residences and the Market Row Lofts at Thornwood (276 units), the Bank of Bartlett (20 units) and Kirby Professional Building (40 units) sites, the Arthur Tract property (302 units), and the final phase at Thornwood (294 units) would each be developed/redeveloped to include a mix of uses that would include multi-family apartments. Under this hypothetical scenario, an additional 932 apartment dwelling units would be added to this district’s response territory over the next ten years. If this were to occur as studied, an additional and approximate amount of 92 calls for service per year (.25 calls for service per day) should be anticipated to these apartment development locations by the year 2028.

These calculations equate to approximately one additional EMS or Non-EMS call for service to a new apartment unit within this district every fourth day.

FIRE DISTRICT #4



Fire Station #4 is serviced by Fire District #4, which is located at 3031 Forest Hill-Irene Road and covers the southeast portion of Germantown (see Figure 25). At any given time, six personnel with firefighting and medical care capabilities are on shift at this location, responding to all fire and medical emergencies with a single fire engine company, an ambulance, two reserve fire engines, a back-up ambulance, and a communications/command vehicle. Completed in 2012, this LEED-certified station is also home to the department's training center, back-up emergency operations center, and back-up public safety communications center. One of the City's Key Commercial Areas, the Forest Hill Heights District, is located within this district's service territory.

Personnel: (6) Firefighters on shift

Apparatus: (1) Fire Engine Company (1) Ambulance
 (1) Back-up Ambulance (1) Command Vehicle
 (2) Reserve Fire Engine

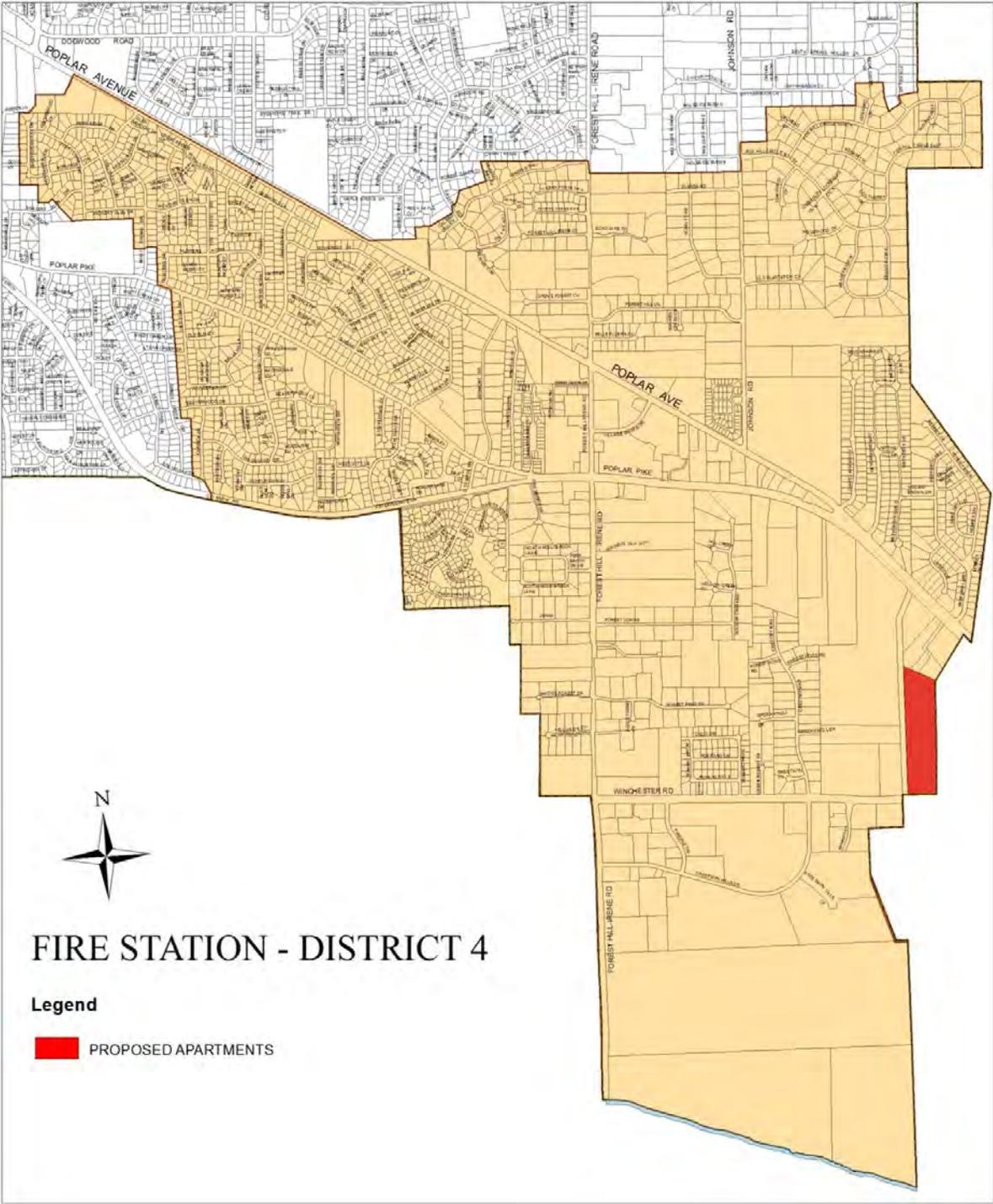
Total Calls for Service

In recent history, the territory within Germantown assigned to Fire District #4 has experienced the second smallest amount of calls for service in comparison to the other three districts. From the beginning of 2016 through the end of 2018, only 15% of the City's total calls for service and 16% of the City's residential calls for service have originated from within this territory.

Fire District #4 Calls for Service (2016-2018)	Total # of Calls	Average Annual # of Calls	Average # of Calls for Service per day	Percentage of Total Calls Within District
Residential Calls Only	1,113	371	1.02	59%
Commercial and Common Areas Calls Only	774	258	0.71	41%
All Calls within District	1,887	629	1.73	100%

Table 25. Fire District #4 Snapshot: Calls for Service (2016-2018)

Figure 25: Fire District #4 Territory Map



Firefighter/paramedics at Fire Station #4 have, on average, responded to 1.73 calls for service per day that have originated within the district. As shown in Table 25, the majority of calls for service (59%) within the district originate from one of the its 2,603 residential dwelling units, the second lowest number of residential units within each of the four established fire districts.

Figure 26. Fire District #4: Total Dwelling Unit Count



Existing Dwelling Unit Analysis

Apartments

There are no apartments currently located within the boundaries of this district.

Condominiums & Townhomes

There are no condominiums currently located within the boundaries of this district.

Single-Family Homes

Ninety-four percent of all residential dwelling units within this district are single-family homes. Over the last three years, these 2,447 single-family homes have accounted for 71% of EMS/Non-EMS calls for service to residential dwelling units in this district.

Age-Restricted, Independent, and Assisted Living

The combined 156 dwelling units at Germantown Plantation and the Gardens of Germantown make up close to 6% of all dwelling units within this district. During this three-year period, however, nearly 29% of residential calls for service within the district came from one of these two locations.

Residential Calls for Service

From the beginning of 2016 through the end of 2018, there were a total of 1,113 calls for service to residential dwelling units within Fire District #4 (see Table 26). 775 (70%) of calls within the district were for EMS response and 338 (30%) of those calls were for Non-EMS response. Compared to a city-wide EMS/Non-EMS call-type percentage ratio of 68% EMS / 32% Non-EMS, this district has responded

to a higher percentage of EMS calls and a lower percentage of Non-EMS calls than the combined experience of all the districts during this time.

	EMS				Non-EMS				Total Call Volume			
	2016	2017	2018	Total	2016	2017	2018	Total	2016	2017	2018	Total
Apartments	-	-	-	-	-	-	-	-	-	-	-	-
Condominium	-	-	-	-	-	-	-	-	-	-	-	-
Single-Family	172	157	149	478	77	108	122	307	249	265	271	785
Assisted Living	90	86	121	297	12	14	5	31	102	100	126	328
Total	262	243	270	775	89	122	127	338	351	365	397	1113

Table 26. Fire District #4 Residential EMS/Non-EMS Call Volume (2016-2018)

Over this most three-year period, an average of 258 EMS calls per year and 113 Non-EMS calls per year have been made to residential dwelling units within this district. Although, the district’s three-year annual average for total residential calls is 371, the 397 total residential calls in 2018 puts that year’s residential call volume at just over one call for service per day.

EMS and Non-EMS Residential Call Volume History and Projections

To allow for a better comparative analysis by district, as well as more accurate projections by individual call type, total calls for service for all residential dwelling types within this district were analyzed and separated into EMS and Non-EMS calls (see Figures 27 and 28). As previously mentioned, district data for the calendar year of 2014 was not accessible by district due to the transition of the fire department tracking software. Therefore, nine years’ worth of available EMS and Non-EMS district data, dating back to 2009, was used to generate the time series forecasting for the next ten years.

The ten-year forecast trend line shows the projected growth rate in call volume based upon the ten-year history, though the model’s prediction intervals allow for random fluctuations over that time period. The blue line in each chart, with numerical data points, represents actual calls per 100 units since 2009. The red line is the call volume trend line, beginning with the ten-year history and forecast through 2028. Assuming no other changes or the presence of other variables that would impact the analysis, the model provides 95% confidence that the actual annual calls per 100 unit number for each of the next ten years will remain within the prediction interval lines established above (purple) and below (green) the projection trend line.

The district’s total of 2,603 existing dwelling units was then multiplied by the projected annual call per unit ratio (call per 100 unit number divided by 100) for each year to calculate the total annual call volume by for EMS and Non-EMS calls. These ten-year projection numbers (see Table 27) will serve as the ‘baseline’ call volume data from existing dwelling units within the district’s future residential call volume projection model (see Table 28 at the end of this section).

Figure 27. Fire District #4: Annual EMS Residential Call Volume History and 10-Year Projections per 100 Units

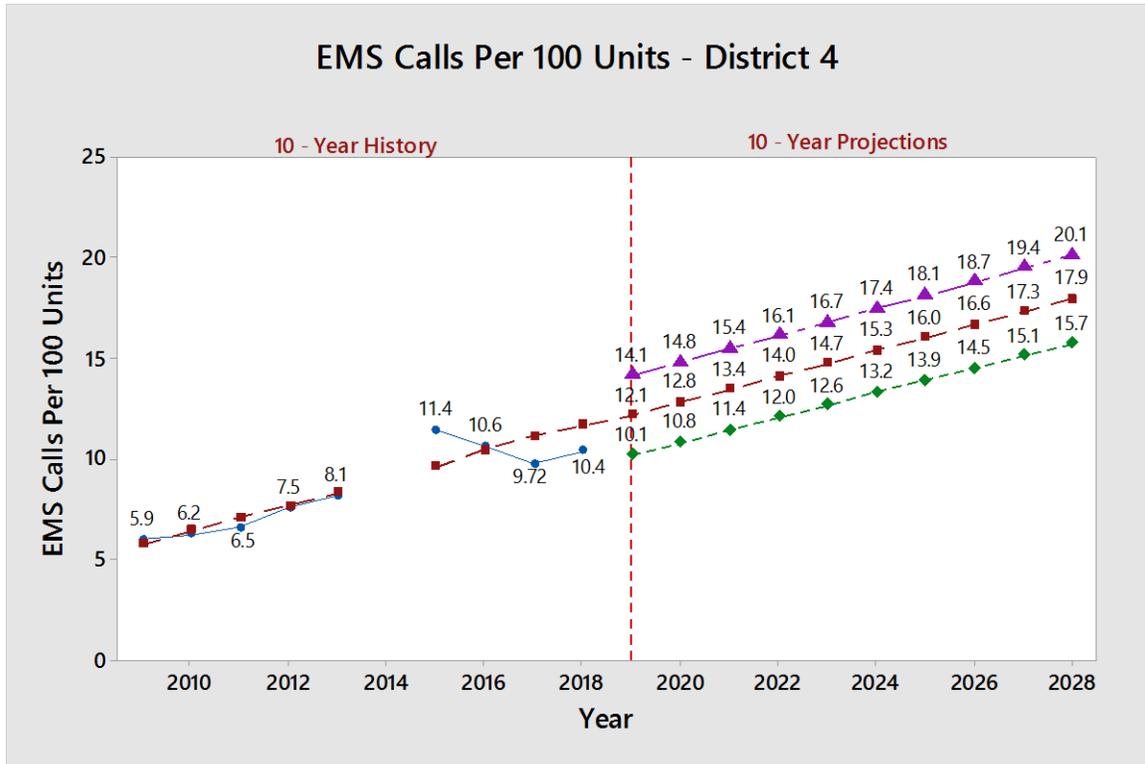
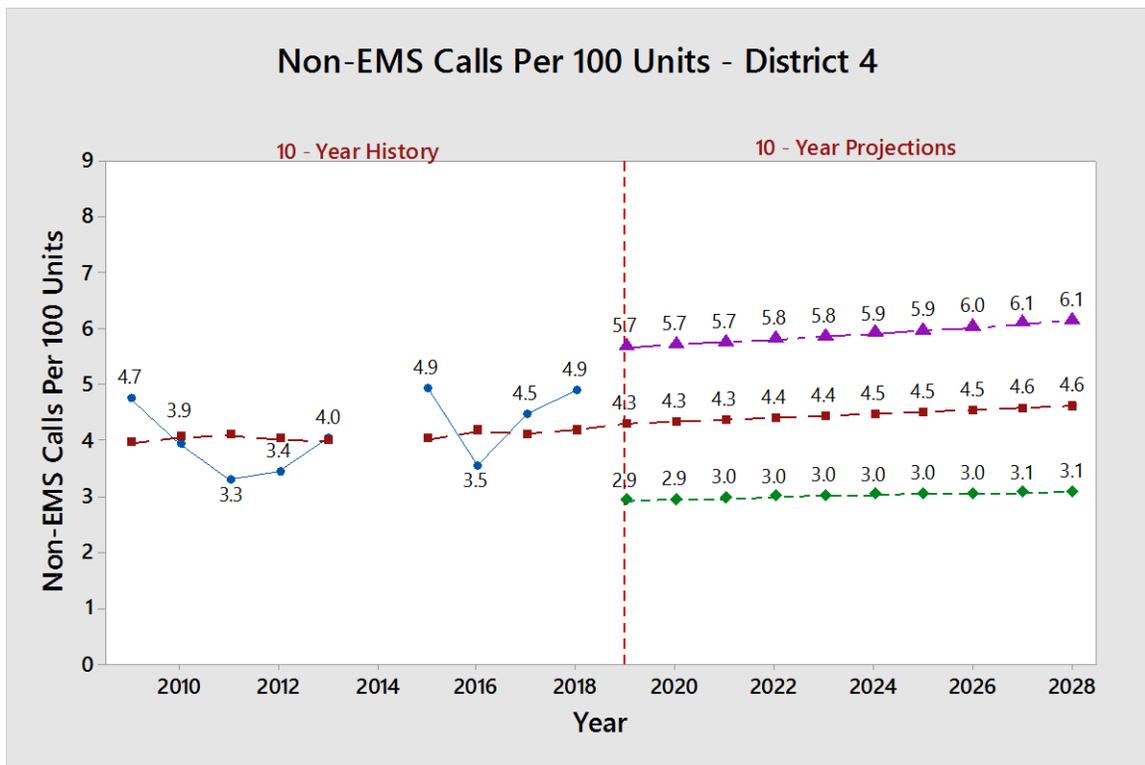


Figure 28. Fire District #4: Annual Non-EMS Residential Call Volume History and 10-Year Projections per 100 units



10 - Year Trend Data			10 - Year Projections		
Year	District 4 Total EMS Calls	District 4 Total Non-EMS Calls	Year	District 4 Total EMS Calls	District 4 Total Non-EMS Calls
2009	152	121	2019	316	111
2010	162	102	2020	332	112
2011	185	82	2021	349	113
2012	211	91	2022	366	114
2013	224	104	2023	382	115
2014	n/a	n/a	2024	399	116
2015	299	124	2025	416	117
2016	262	89	2026	432	118
2017	243	122	2027	449	119
2018	270	127	2028	466	120

Table 27. Fire District #4: Annual Total EMS and Non-EMS Residential Call Volume Projections

Finally, new residential development constructed during the ten-year projection period will be assessed the appropriate call for service ratio associated with the specific dwelling type and the respective year. The projected call for service numbers from new residential development will then be added to the appropriate year’s baseline data of EMS and Non-EMS calls for service in order to calculate the projected total annual residential call volume for each of the next ten years.

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included 26 properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making call volume projections for Fire District #4. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 29 and Table 28 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations with call volume impact scheduled in outer years for the purposes of forecasting maximum residential calls for service by 2028.

Developments in Process:

#31	Chapel Cove Phase II	Zoned “R” for Residential, this 10.29-acre site has been placed in our call volume projection model to be completed and occupied by 2020. The addition of 22 single-family homes is projected to increase the annual number of calls within the district by three to four annually by 2028.
------------	----------------------	---

#32	Reaves – John Duke	Zoned “R” for Residential, this 36.4-acre site was rezoned in 2018 from RE-1 in anticipation of a 77-lot planned development. The addition of a maximum of 77 single-family homes is projected to increase the annual number of calls within this district by eleven to twelve annually by 2028.
-----	--------------------	--

#37	Cheatham Property	Zoned “R” for Residential, this 18.05-acre site has been placed in our call volume projection model to be completed and occupied by 2021. The addition of 34 single-family homes is projected to increase the annual number of calls within this district by five to six annually by 2028.
-----	-------------------	--

#44	Goodwin Farms	Zoned “R” for Residential, this 101.3-acre site has been placed in our call volume projection model to have construction underway by 2020. The addition of 232 single-family homes over a period of ten years (ten phases) will gradually increase the annual number of calls within the district from an initial three to an eventual thirty near project completion.
-----	---------------	--

#46	Viridian Apartments	Zoned “T4” for General Urban Zone within the Smart Code, the 24.45 acres at this location, the site of the proposed Viridian development project, has Outline Plan approval for a maximum number of 299 apartment units (12 units per acre). If this location is to be developed according to the approved and recorded Outline Plan, the property is projected to add 23 to an eventual 30 calls annually by 2028.
-----	---------------------	---

Underdeveloped Properties:

#23	Miti Group	Zoned “R” for Residential, the 18.28 acres at this location could have a maximum of 47 single-family homes. If developed, the property is projected to add another seven to eight calls annually by 2028.
-----	------------	---

#29	Leike Richard H Living Trust	Zoned “R” for Residential, the 5.9 acres at this location could have a maximum of 17 single-family homes. If developed, the property is projected to add another three calls annually by 2028.
-----	------------------------------	--

#30	Fogelman Robert F Revocable Trust	Zoned “O-C” for Office – Complex, these 32.3 acres are not projected to include a residential use based on its current zoning.
-----	-----------------------------------	--

#34	Bobo	Zoned "RE-1" for Residential Estate – 1 Acre, these 6.78 acres adjacent to Forest-Hill Irene Road could have a maximum of six single-family homes based on current zoning. If developed, the property is projected to add one call annually by 2028.
#35	Forest Bend Properties	Zoned "RE-1" for Residential Estate – 1 Acre, these 22 lots on 47.24 acres to the east of Forest Hill Irene Road has been subdivided to include a total of 22 single-family homes (18 new single-family homes). These new homes have been placed in our call volume projection model to be completed and occupied by 2025. If developed, the property is projected to add three calls annually by 2028.
#36	Skoutakis Property, Estate Home	Zoned "R" for Residential, the 9.26 acres at this location could have a maximum of 26 single-family homes. If developed, the property is projected to add four calls annually by 2028.
#38	Forest Bend Properties	Zoned "R" for Residential, the 10.27 acres at this location could have a maximum of 29 single-family homes. If developed, the property is projected to add four to five calls annually by 2028.
#40	Banks	Zoned "RE-1" for Residential – 1 Acre, the 15.24 acres at this location could have a maximum of 15 single-family homes. If developed, the property is projected to add two calls annually by 2028.
#41	Miller	Zoned "RE-1" for Residential – 1 Acre, the 19.86 acres at this location could have a maximum of 19 single-family homes. If developed, the property is projected to add three calls annually by 2028.
#42	King Family Trust	Zoned "RE-1" for Residential, the 25 acres at this location could have a maximum of 25 single-family homes. If developed, the property is projected to add four calls annually by 2028.
#43	Grant Property	Zoned "RE-1" for Residential, the 24.87 acres at this location could have a maximum of 24 single-family homes. If developed, the property is projected to add four calls for service annually by 2028.

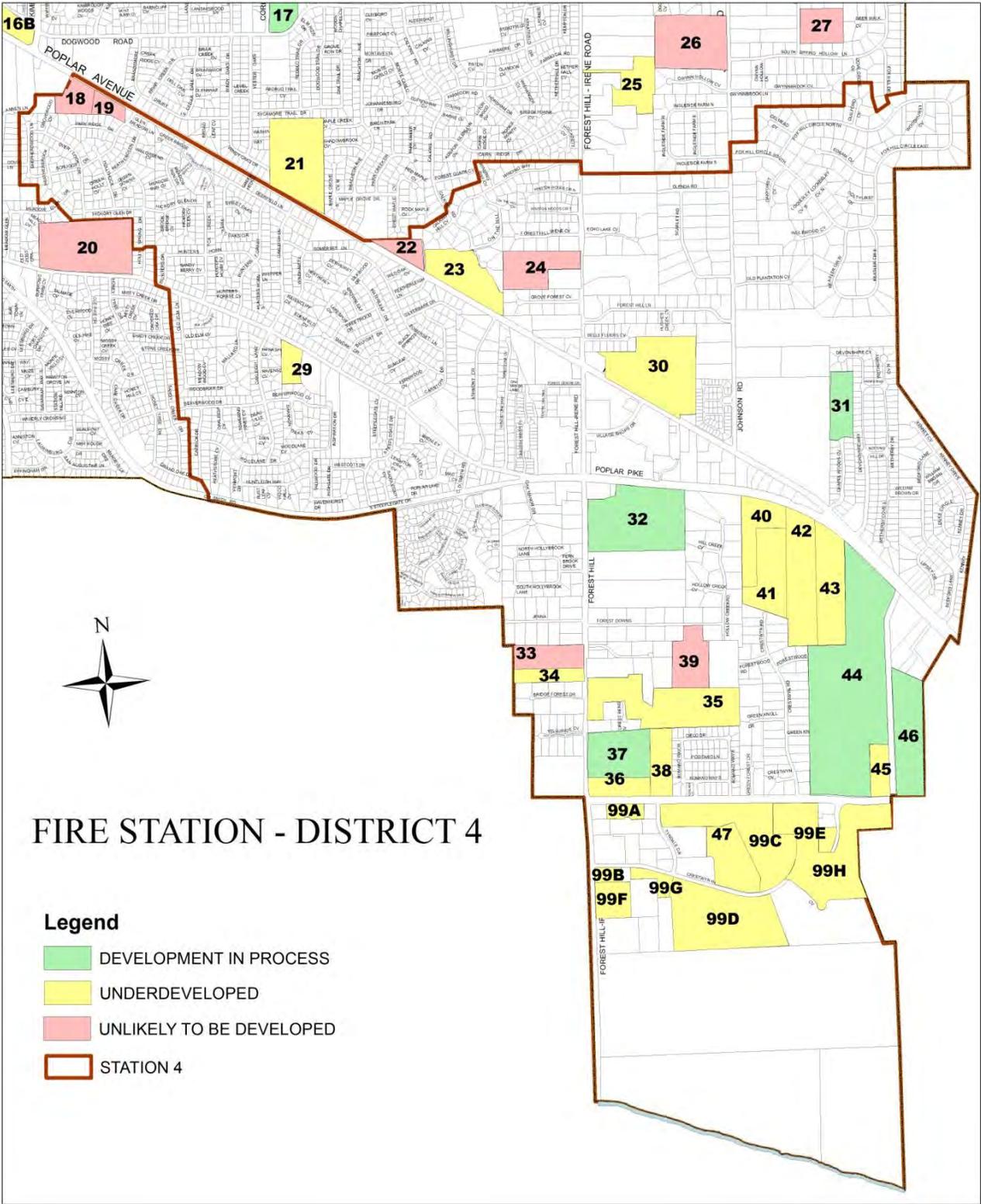
#45	Micaten Inc.	Zoned "T3" for Sub-Urban Zone within the Smart Code, the 7.4 acres on this site could have a maximum of seven dwelling units per acre. Apartment buildings, row houses, or duplexes are not permitted residential uses. If developed with single-family homes, the property is projected to add eight calls annually by 2028.
#47	Forest Hill Associates Phase 19 FHH	Zoned "T5" for Urban Center Zone within the Smart Code, the 17.69 acres at this location, the former site of the proposed Watermark development project, had Final Plan approval for a maximum number of 310 apartment units. If this location were to be developed according to the approved and recorded Outline Plan, the property is projected to add 26 to an eventual 31 calls annually by 2028.
#99A	SHG Germantown	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 5.57-acre site. For 99A, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99B	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.63-acre site. For 99B, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99C	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 34.02-acre site. For 99C, the plan called for commercial, office, and residential uses designated as part of the conceptual land use plan. 300 multi-family units were proposed on this 34.02-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, with apartments as the proposed and approved multi-family use, the property would be projected to add 25 to an eventual 30 calls annually.
#99D	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 44.06-acre site. For 99D, the plan called for office, single-family attached, and multi-family uses designated as part of the conceptual land use plan. 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) were proposed on this 44.06-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan with apartments as the proposed and approved multi-family use, the property would be projected to add 25 to an eventual 30 calls annually from the apartment development, and four calls annually from single-family attached homes (condominium-type development) by 2028.

#99E	Willmar	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.86-acre site. For 99E, the plan called for retail, office (medical), and approximately 31 attached single-family structures (e.g. row houses similar to condominiums). If this location were to be developed in accordance with the small area plan, the property would be projected to add one call annually to the single-family attached homes (condominium-type development) through 2028.
#99F	Mascom	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 8.97-acre site. For 99F, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99G	Valenti Mid-South Realty	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 3.1-acre site. For 99G, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99H	Baptist Memorial	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 41.07-acre site. For 99H, the plan called for commercial, office, and 31 single-family attached homes (e.g. row houses similar to condominiums) uses as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, the property would be projected to add one call annually from the single-family attached homes (condominium-type development) through 2028.

Properties Unlikely To Be Developed < 10 Years:

Although categorized as “unlikely to be developed,” six additional properties have been included within the study; however, development or redevelopment of these properties is not expected to take place by 2028. To be clear, City staff has no indication that the current property owners at these six locations desire or intend to change the current land use of these sites at any point in the immediate future. These properties, shown in red on Figure 29 and Table 28, were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the six properties fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 29: Fire District #4: Property Analysis Map



FIRE DISTRICT #4	Calendar Year		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
	Projected Annual Call Volume From Existing Dwelling Units	EMS		270	316	332	349	366	382	399	416	432	449
Non-EMS		127	111	112	113	114	115	116	117	118	119	120	
SUBTOTAL		397	427	444	462	480	497	515	533	550	568	586	

Projected Annual Call Volume Per 100 Units By Dwelling Type	Apartments		APT	7.7	7.2	7.5	7.8	8.1	8.4	8.7	9.0	9.3	9.6	9.9
	Single-Family Homes		SFH	12.6	13.4	13.7	14.0	14.3	14.6	15.0	15.3	15.6	15.9	16.2
	Condominiums		CO	7.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	Age-Restricted, Ind. & Asst. Living		SL	80.2	81.3	87.1	92.9	98.8	104.6	110.5	116.3	122.1	128.0	133.8

Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	Dwelling Type	Additional Annual Calls for Service from New Residential Development												
Developments in Process																			
31	Chapel Cove Phase II	R	10.29	2.904	22	SFH	0	0	3	3	3	3	3	3	3	3	3	4	
32	Reaves-John Duke	R	36.4	2.904	77	SFH	0	0	11	11	11	11	12	12	12	12	12	12	
37	Cheatham Property	R	18.05	2.904	34	SFH	0	0	0	5	5	5	5	5	5	5	5	6	
44	Goodwin Farms *	R	101.3	2.904	232	SFH	0	0	3	6	10	13	17	21	25	29	30	30	
46	Viridian Apartments	T4	24.45	12	299	APT	0	0	0	23	24	25	26	27	28	29	30	30	
Underdeveloped Properties																			
23	Miti Group	R	18.28	2.904	47	SFH	0	0	0	0	0	7	7	7	7	7	7	8	
29	Leike Richard H Living Trust	R	5.9	2.904	17	SFH	0	0	0	0	0	2	3	3	3	3	3	3	
30	Fogelman Robert F Revocable Tr	O-C	32.3	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	
34	Bobo	RE-1	6.78	1	6	SFH	0	0	0	0	0	1	1	1	1	1	1	1	
35	Forest Bend Properties	RE-1	47.24	1	18	SFH	0	0	0	0	0	0	0	3	3	3	3	3	
36	Skoutakis Property, Estate Home	R	9.26	2.904	26	SFH	0	0	0	0	0	4	4	4	4	4	4	4	
38	Forest Bend Properties (Vacant)	R	10.27	2.904	29	SFH	0	0	0	0	0	4	4	4	5	5	5	5	
40	Banks	RE-1	15.24	1	15	SFH	0	0	0	0	0	2	2	2	2	2	2	2	
41	Miller	RE-1	19.86	1	19	SFH	0	0	0	0	0	3	3	3	3	3	3	3	
42	King Family Trust	RE-1	25	1	25	SFH	0	0	0	0	0	4	4	4	4	4	4	4	
43	Grant Property	RE-1	24.87	1	24	SFH	0	0	0	0	0	4	4	4	4	4	4	4	
45	Micaten Inc.	T3	7.4	7	52	SFH	0	0	0	0	0	8	8	8	8	8	8	8	
47	Forest Hill Associates - Phase 19	T5	17.69	17.52	310	APT	0	0	0	0	0	26	27	28	29	30	31	31	
99A	SHG Germantown	T5	5.57	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	
99B	Forest Hill Associates	T5	2.63	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	
99C	Forest Hill Associates	T5	34.02	0	300	APT	0	0	0	0	0	25	26	27	28	29	30	30	
99D	Forest Hill Associates	T5	44.06	0	300	APT	0	0	0	0	0	25	26	27	28	29	30	30	
		T5		0	75	CO	0	0	0	0	0	4	4	4	4	4	4	4	
99E	Willmar	T5	2.86	0	31	CO	0	0	0	0	0	1	1	1	1	1	1	1	
99F	Mascom	T5	8.97	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	
99G	Valenti Mid-South Realty	T5	3.1	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	
99H	Baptist Memorial	T5	41.07	0	31	CO	0	0	0	0	0	1	1	1	1	1	1	1	
Properties Unlikely To Be Developed < 10 Yrs																			
18	Barzizza	R	7.01	2.904	20	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
19	Fite	R	4	2.904	12	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
22	Lankford	R	6.09	2.904	18	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
24	Grizzard	RE	16.26	0.5	16	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
33	Monsarrat	RE-1	11.5	1	11	SFH	0	0	0	0	0	0	0	0	0	0	0	0	
39	Bruns	RE-1	13.94	1	13	SFH	0	0	0	0	0	0	0	0	0	0	0	0	

Projected Annual Totals for EMS/Non-EMS Residential Call Volume: District 4	397	427	461	510	533	676	703	732	758	785	809
--	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Total residential calls per day		1.09	1.17	1.26	1.40	1.46	1.85	1.93	2.01	2.08	2.15	2.22
Additional Call Volume per day over 2018 from:	Existing residential developments	0.00	0.08	0.13	0.18	0.23	0.27	0.32	0.37	0.42	0.47	0.52
	New residential developments	0.00	0.00	0.05	0.13	0.15	0.49	0.51	0.55	0.57	0.59	0.61

Analysis by NEW Residential Development Type	# of Units	Calls for Service per day										
Apartments	1209	0.00	0.00	0.00	0.06	0.07	0.28	0.29	0.30	0.31	0.32	0.33
Single Family Homes	643	0.00	0.00	0.05	0.07	0.08	0.19	0.21	0.23	0.24	0.26	0.26
Condominiums	137	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02
AR, Ind. & Assisted Living	0	0	0	0	0	0	0	0	0	0	0	0
Total	1989											

Table 28. Fire District #4: Future Call Volume Projections

Residential Call Volume Projection Summary: Fire District #4

Existing Dwelling Units

If trends in call volume from the last ten years continue, calls for service from the existing 2,603 dwelling units within the district are projected to increase from 397 to 586 over the next ten years. This increase of 189 calls annually would add 0.52 calls per day to the current total of 1.09 residential calls for service per day.

District 4: Call Volume Projection Analysis		Total Unit Count	Annual Calls for Service (2018-2028)			Added Call Volume per Day
			Current (2018)	Projected (2028)	Variance	
EXISTING DWELLING UNITS		2,603	397	586	189	0.52
Apartments*	Developments In Process	299	0	30	30	0.08
	Underdeveloped Properties	910	0	90	90	0.25
Condominiums	Developments In Process	0	0	0	0	0.00
	Underdeveloped Properties	137	0	6	6	0.02
Single-Family Homes	Developments In Process	365	0	51	51	0.14
	Underdeveloped Properties	278	0	45	45	0.12
Totals		4,592	397	809	412	1.13

*For the purposes of projecting call volume impact based on the maximum number of dwelling units possible, this study assumes that all new multi-family development within Smart Code zoning districts will be applied for, approved, and developed as apartments over the next ten years.

Table 29. Fire District #4: Call Volume Projection Analysis

Developments in Process

The addition of 81 calls for service per year from a proposed 664 new residential dwelling units would add 0.22 calls for service per day. This added daily call volume includes 0.08 calls per day to the 299 apartment dwelling units at the proposed Viridian development. The majority of the added 0.22 total residential calls per day should originate from one of the four single-family home developments in process.

Underdeveloped Properties

Calls for service from a possible 1,325 new residential dwelling units are projected to increase total EMS and Non-EMS district call volume by 0.39 calls per day. The majority of these added calls would originate from the 910 apartment dwelling units included in our analysis per the Forest Hill Heights Small Area Plan's multi-family designation.

New Development

When considering both categories of this new residential development scenario, an additional 223 annual residential calls for service by 2028 from 1,989 new dwelling units is projected to add 0.61 calls per day to the district's call volume.

District Summary

If trend in call volume follow the projections and new residential development takes place as described in the scenarios above, the one residential call for service per day (1.09) from the existing 2,603 dwelling units would essentially double to two residential calls for service per day (2.22) with the increase of 0.52 calls per day from existing dwelling units and 0.61 calls per day from the added 1,989 dwelling units to the district (see bottom of Table 28).

Apartment Impact

Fire District #4

What are the likely impacts of future apartments and apartment building development on Fire District #4?

Forest Hill Heights District

#46: The developer of this 24.45-acre location currently has Outline Plan approval for a maximum of 299 apartment units, or approximately 12 units per acre. This development, known as Viridian, was one of the four developments that were exempted from the moratorium. If the developer were to proceed and receive final approval of a project that was consistent with the aforementioned details, a projected number of 23 to an eventual 30 residential calls for service annually by 2028 would be anticipated from this location. The project has been placed in our district call volume projection model to be completed and occupied by 2021.

#47: Although the Watermark development was specifically referenced in the moratorium as an exemption because of an approved Outline Plan, the Project Development Contract and Final Plan did not receive the approval of the Board of Mayor and Aldermen at the July 23, 2018 meeting. Despite failing to receive this final authorization to proceed, our research team included their proposed number of 310 apartment units based on the approved Outline Plan. If the 17.52-acre site were to be developed according to the proposed Final Plan, the property is projected to add 26 to 31 calls by 2028.

#99C: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 34.02-acre site was one of the locations where up to 300 multi-family units would be located. These dwelling units could be condominiums, townhomes, and/or apartments. If this location were to be developed with apartments as the proposed and approved multi-family use, the property would be projected to add 25 to 30 calls by 2028.

#99D: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 44.06-acre site was one of the locations where up to 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) would be located. If this location were to be developed in accordance with the small area plan with apartments as the proposed and approved multi-family use, the property would be projected to add 25 to 30 calls annually to the apartment development, and four calls annually to single family attached homes (condominium-type development) by 2028.

Apartment Impact cont.

Fire District #4

What are the likely impacts of future apartments and apartment building development on Fire District #4?

APARTMENTS - Fire District #4 (2028)				Year	2028	
Projected Annual Call Volume per 100 Apartment Units				9.9		
Property #	Project Name / Project Owner	Zoning Designation	# of units possible or approved	Calls per Year	Calls per Month	Calls per Day
Developments in Process						
46	Viridian Apartments	T4	299	30	2.5	0.08
Underdeveloped Properties						
47	Forest Hill Associates - Phase 19	T5	310	31	2.6	0.08
99C	Forest Hill Associates	T5	300	30	2.5	0.08
99D	Forest Hill Associates	T5	300	30	2.5	0.08
Totals				1,209	120	0.33

Table 30. Fire District #4: Apartment Call Volume Summary for 2028

Fire District #4 Apartment Impact Summary

In summary, our research team’s call volume projections through 2028 made assumptions that Viridian Apartments (299 units) and the three Forest Hill Associates sites [#47 (310 units), #99C (300 units), and #99D (300 units)] would each be developed to include a mix of uses that would include multi-family apartments. Under this hypothetical scenario, an additional 1,209 apartment dwelling units would be added to the district’s response territory by the year 2028. If this were to occur as analyzed, an additional and approximate amount of 121 calls for service per year (.33 calls for service per day) should be anticipated to these apartment home locations by the year 2028.

These calculations equate to approximately one additional EMS or Non-EMS call for service to a new apartment home every third day.

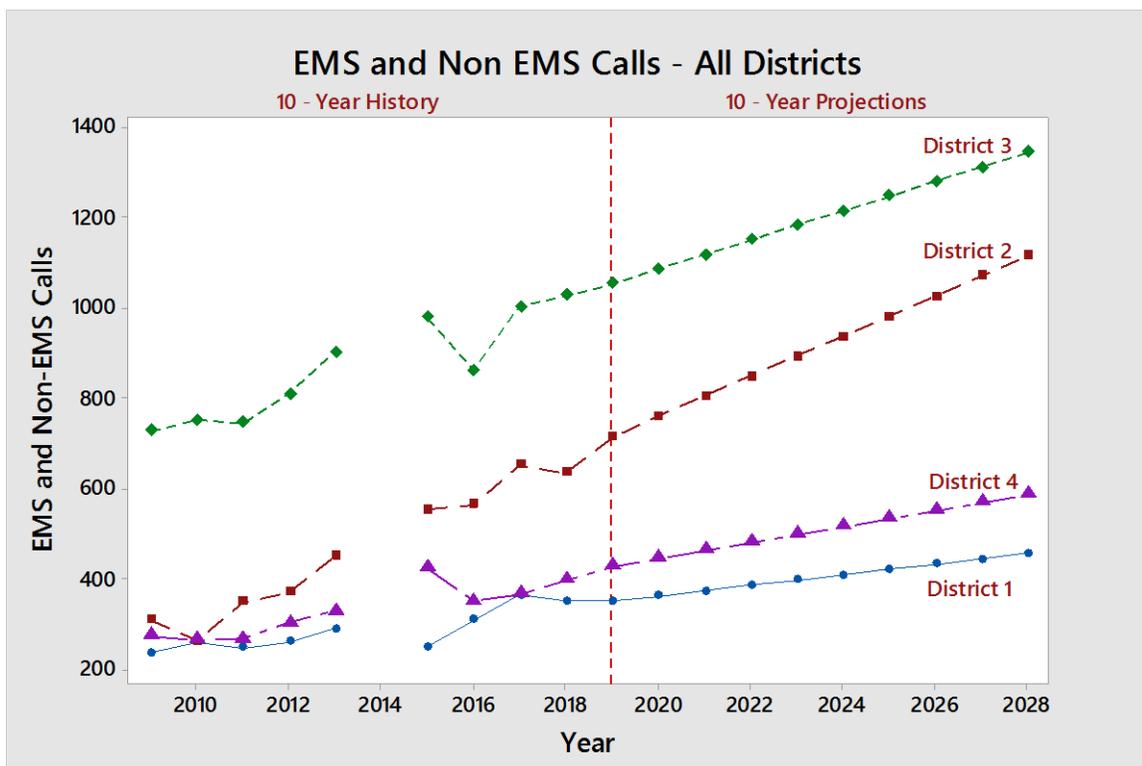
City-wide Fire Impact Analysis

Residential Call Volume Projection Summary: ALL FIRE DISTRICTS

Existing Dwelling Units

As illustrated in Figure 30, Fire Districts #2 and #3 are projected to experience the sharpest increases in calls for service from existing dwelling units over the next ten years. These increases in call volume projections from existing dwelling units within Fire Districts #2, #3, and #4 are heavily influenced by the age-restricted, independent, and assisted living dwelling units within their primary response territories. If trends in call volume from the last ten years continue, annual calls for service from the existing 16,081 dwelling units within the City are projected to increase from 2,407 to 3,496 over the next ten years. This increase of 1,089 calls annually would add 2.98 calls per day to the current total of 6.59 residential calls for service per day (see top of Table 31).

Figure 30. EMS and Non-EMS Call Volume History and Projections for Existing Dwelling Units: All Fire Districts



Developments in Process

Calls for service from a proposed 1,454 new residential dwelling units are projected to increase total EMS and Non-EMS district call volume by one residential call for service per day by 2028. As shown in Table 31, this added daily call volume includes a total of:

- 0.24 calls per day to the combined 869 apartment dwelling units at the Thornwood Residences and Market Row, the undeveloped Lot 5 on the Thornwood site (if applied for and approved), and the proposed Viridian development.

- 0.17 calls per day would come from 423 new single-family homes.
- 0.59 calls per day is projected to originate from the Avenida Senior Living development.

ALL FIRE DISTRICTS: Call Volume Projection Analysis		Total Unit Count	Annual Calls for Service (2018-2028)			Added Call Volume per Day	
			Current (2018)	Projected (2028)	Variance		
EXISTING DWELLING UNITS		16,081	2,407	3,496	1,089	2.98	
Apartments*	Developments In Process	869	0	86	86	0.24	0.58
	Underdeveloped Properties	1,272	0	126	126	0.35	
Condominiums	Developments In Process	0	0	0	0	0.00	0.02
	Underdeveloped Properties	137	0	6	6	0.02	
Single-Family Homes	Developments In Process	423	0	61	61	0.17	0.49
	Underdeveloped Properties	779	0	118	118	0.32	
Age-Restricted, Independent & Assisted Living	Developments In Process	162	0	217	217	0.59	0.59
	Underdeveloped Properties	0	0	0	0	0.00	
Totals		19,723	2,407	4,110	1,703	4.66	1.68

*For the purposes of projecting call volume impact based on the maximum number of dwelling units possible, this study makes the assumption that all new multi-family development within Smart Code zoning districts will be applied for, approved, and developed as apartments over the next ten years.

Table 31. All Fire Districts: Call Volume Projection Analysis

Underdeveloped Properties

Calls for service from a possible 2,188 new residential dwelling units are projected to increase total EMS and Non-EMS district call volume by 0.69 calls per day. This added daily call volume includes 0.35 calls per day to the combined 1,272 apartment dwelling units possible per the current land use zoning. Another 0.32 calls per day would come from 779 new single-family homes at the Germantown Country Club site and a number of developed/redeveloped parcels scattered throughout the City.

New Development

When considering both categories of this new residential development scenario, an additional 1,703 annual residential calls for service by 2028 from 3,642 new dwelling units is projected to add 1.68 calls per day to the Fire Department’s overall call volume.

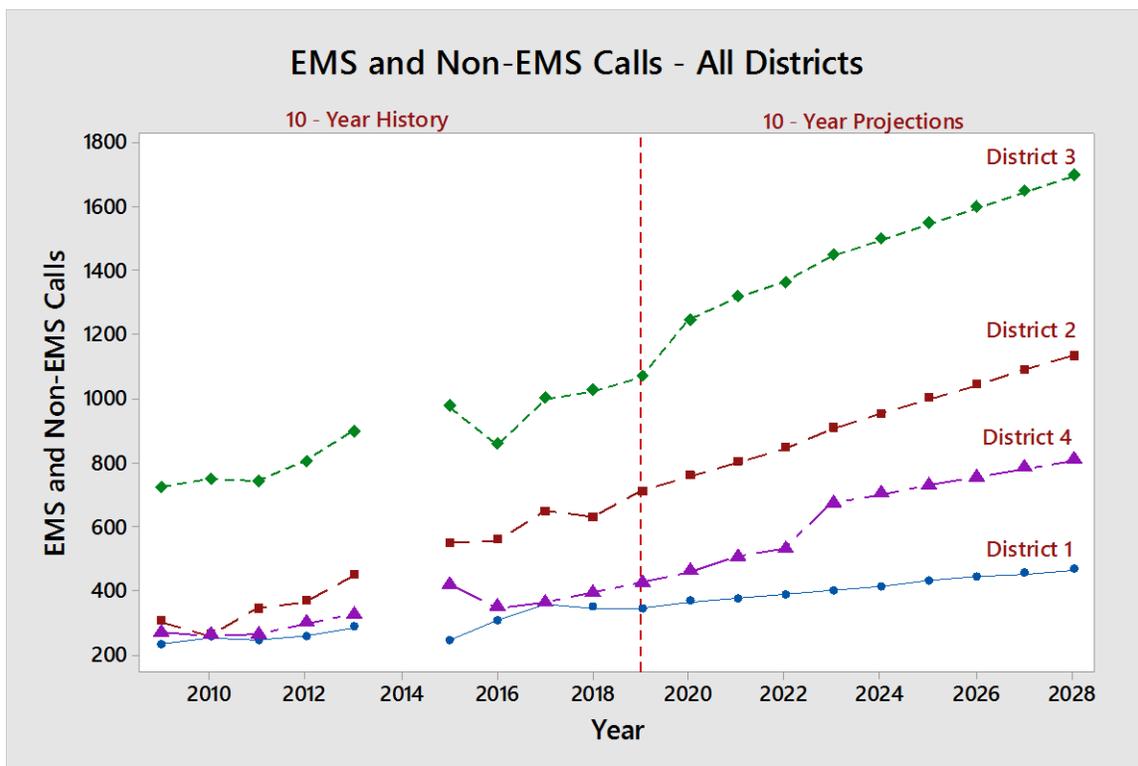
City-wide Summary

Under this aggressive ten-year build-out scenario, the current 6.59 residential calls for service per day from an existing 16,081 dwelling units would increase to a rounded 11.26 residential calls for service per day by 2028 from 19,723 dwelling units – an increase of 4.66 residential calls for service per day. Almost three (2.98) new calls per day would come from existing dwelling units based on call volume trends and 1.68 calls for service per day would be the result of new residential development as researched, studied,

and presented. Total annual residential call volume would increase to 4,110 by 2028 (see Tables 31 and 33).

As shown in Figure 31, Fire Districts #2 and #3 are still projected to experience the sharpest increases in calls for service over the next ten years considering the projected call volume increase from existing dwelling units and the added calls for service from the aggressive residential build-out scenario presented. Because our research team’s call volume projection model added 1,325 residential dwelling units in the underdeveloped properties category around 2023, the call volume increased significantly in Fire District #4. Nonetheless, the total residential call volume in Fire District #4 will remain considerably less than Fire Districts #2 and #3. Under this aggressive residential build-out scenario, Fire District #1 continues to have the least amount of residential call volume within the City.

Figure 31. EMS and Non-EMS Call Volume History and Projections for Ten-Year Build-Out: All Fire Districts



Apartment Impact

All Fire Districts

What are the likely impacts of future apartments and apartment building development on the services of the Fire Department?

Of the projected 1.68 added calls for service per day from new development (under an aggressive residential build-out scenario with a total of 3,642 new residential dwelling units by 2028), 0.58 calls per day would originate from the 2,141 new apartment dwelling unit locations included in this study. As of mid-2019, only the 276 new apartment dwelling units at the Thornwood Residences and Market Row have made it through all stages of the City’s approval process and have been constructed.

In general, as shown at the bottom of Table 32 for 99C and 99D, an apartment development of approximately 300 dwelling units would be projected to generate around 30 residential calls for service annually by 2028, the equivalent of 2.5 calls per month.

APARTMENTS - ALL FIRE DISTRICTS (2028)				Year	2028	
Projected Annual Call Volume per 100 Apartment Units				9.9		
Property #	Project Name / Project Owner	Zoning Designation	# of units possible or approved	Calls per Year	Calls per Month	Calls per Day
Developments in Process						
15A	TW Residences & Market Row Lofts	T5	276	27	2.3	0.07
15B	Thornwood (Undeveloped Lot 5)	T5	294	29	2.4	0.08
46	Viridian Apartments	T4	299	30	2.5	0.08
Underdeveloped Properties						
1B	Bank of Bartlett	T6	20	2	0.2	0.01
1C	Kirby Professional Buildings	T5/T6	40	4	0.3	0.01
4	Arthur Tract	T5	302	30	2.5	0.08
47	Forest Hill Associates - Phase 19	T5	310	31	2.6	0.08
99C	Forest Hill Associates	T5	300	30	2.5	0.08
99D	Forest Hill Associates	T5	300	30	2.5	0.08
Totals			2,141	212	17.7	0.58

Table 32. All Fire Districts: Apartment Call Volume Summary for 2028

ALL FIRE DISTRICTS	Calendar Year		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
	Projected Annual Call Volume From Existing Dwelling Units	EMS		1614	1772	1859	1945	2031	2118	2204	2291	2377	2464
Non-EMS		793	769	790	808	828	848	867	887	906	926	946	
SUBTOTAL		2407	2541	2649	2753	2859	2966	3071	3178	3283	3390	3496	

Projected Annual Call Volume Per 100 Units By Dwelling Type	Apartments		APT	7.7	7.2	7.5	7.8	8.1	8.4	8.7	9.0	9.3	9.6	9.9
	Single-Family Homes		SFH	12.6	13.4	13.7	14.0	14.3	14.6	15.0	15.3	15.6	15.9	16.2
	Condominiums		CO	7.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	Age-Restricted, Ind. & Asst. Living		SL	80.2	81.3	87.1	92.9	98.8	104.6	110.5	116.3	122.1	128.0	133.8

Property#	Project Name / Project Owner	Zoning Designation	Acreeage	Dwelling Units Per Acre	#of units possible or approved	Dwelling Type	Additional Annual Calls for Service from New Residential Development												
Developments in Process																			
1A	Carrefour	T5/T6	10.12	20	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Allelon Subdivision	R	25.68	2.904	50	SFH	0	0	7	7	7	7	8	8	8	8	8	8	8
14	Avenida Senior Living Apartments	R-H	5.3	31	162	AL	0	0	141	150	160	169	179	188	198	207	217	217	217
15A	TW Residences & Market Row Lofts	T5	7.09	39	276	APT	0	20	21	22	22	23	24	25	26	26	26	27	27
15B	Thornwood (Undeveloped Lot 5)	T5	2.98	99	294	APT	0	0	0	23	24	25	26	26	27	28	28	29	29
17	Piper's Gardens	R	5.58	2.904	8	SFH	0	0	1	1	1	1	1	1	1	1	1	1	1
31	Chapel Cove Phase II	R	10.29	2.904	22	SFH	0	0	3	3	3	3	3	3	3	3	3	3	4
32	Reaves-John Duke	R	36.4	2.904	77	SFH	0	0	11	11	11	11	12	12	12	12	12	12	12
37	Cheatham Property	R	18.05	2.904	34	SFH	0	0	0	5	5	5	5	5	5	5	5	5	6
44	Goodwin Farms	R	101.3	2.904	232	SFH	0	0	3	6	10	13	17	21	25	29	29	30	30
46	Viridian Apartments	T4	24.45	12	299	APT	0	0	0	23	24	25	26	27	28	29	29	30	30
Underdeveloped Properties																			
0	Germantown Country Club	R	178.6	2.904	261	SFH	0	0	0	4	7	11	16	20	24	29	29	34	34
1B	Bank of Bartlett	T6	1	20	20	APT	0	0	0	0	0	2	2	2	2	2	2	2	2
1C	Kirby Professional Buildings	T5/T6	2.64	15	40	APT	0	0	0	0	0	3	3	4	4	4	4	4	4
3	Owen Jack R Revocable Trust	R	13.6	2.904	39	SFH	0	0	0	0	0	6	6	6	6	6	6	6	6
4	Arthur Tract	T5	32.86	15	302	APT	0	0	0	0	0	25	26	27	28	29	29	30	30
6	Klycie Walters B Jr.	R	4.1	2.904	12	SFH	0	0	0	0	0	0	0	2	2	2	2	2	2
9	Montesi Letitia D Living Trust	R	9.5	2.904	28	SFH	0	0	0	0	0	0	0	4	4	4	4	5	5
16A	Patel	R	6.46	2.904	18	SFH	0	0	0	3	3	3	3	3	3	3	3	3	3
16B	Dogwood Manor	R	4.88	2.904	14	SFH	0	0	0	2	2	2	2	2	2	2	2	2	2
21	Warlick Sandra H and Hulon O	R	30.07	2.904	87	SFH	0	0	0	0	0	13	13	13	14	14	14	14	14
23	Miti Group	R	18.28	2.904	47	SFH	0	0	0	0	0	7	7	7	7	7	7	7	8
25	Steiner	RE	12.81	0.5	6	SFH	0	0	0	0	0	0	0	1	1	1	1	1	1
28	Ben Clark Property	AG	180.59	0.2	36	SFH	0	0	0	0	0	5	5	6	6	6	6	6	6
29	Leike Richard H Living Trust	R	5.9	2.904	17	SFH	0	0	0	0	0	2	3	3	3	3	3	3	3
30	Fogelman Robert F Revocable Trus	O-C	32.3	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
34	Bobo	RE-1	6.78	1	6	SFH	0	0	0	0	0	1	1	1	1	1	1	1	1
35	Forest Bend Properties	RE-1	47.24	1	18	SFH	0	0	0	0	0	0	0	3	3	3	3	3	3
36	Skoutakis Property, Estate Home	R	9.26	2.904	26	SFH	0	0	0	0	0	4	4	4	4	4	4	4	4
38	Forest Bend Properties (Vacant)	R	10.27	2.904	29	SFH	0	0	0	0	0	4	4	4	5	5	5	5	5
40	Banks	RE-1	15.24	1	15	SFH	0	0	0	0	0	2	2	2	2	2	2	2	2
41	Miller	RE-1	19.86	1	19	SFH	0	0	0	0	0	3	3	3	3	3	3	3	3
42	King Family Trust	RE-1	25	1	25	SFH	0	0	0	0	0	4	4	4	4	4	4	4	4
43	Grant Property	RE-1	24.87	1	24	SFH	0	0	0	0	0	4	4	4	4	4	4	4	4
45	Micaten Inc.	T3	7.4	7	52	SFH	0	0	0	0	0	8	8	8	8	8	8	8	8
47	Forest Hill Associates - Phase 19	T5	17.69	17.52	310	APT	0	0	0	0	0	26	27	28	29	30	30	31	31
99A	SHG Germantown	T5	5.57	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
99B	Forest Hill Associates	T5	2.63	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
99C	Forest Hill Associates	T5	34.02	0	300	APT	0	0	0	0	0	25	26	27	28	29	29	30	30
99D	Forest Hill Associates	T5	44.06	0	300	APT	0	0	0	0	0	25	26	27	28	29	29	30	30
		T5		0	75	CO	0	0	0	0	0	4	4	4	4	4	4	4	
99E	Willmar	T5	2.86	0	31	CO	0	0	0	0	0	1	1	1	1	1	1	1	1
99F	Mascom	T5	8.97	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
99G	Valenti Mid-South Realty	T5	3.1	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
99H	Baptist Memorial	T5	41.07	0	31	CO	0	0	0	0	0	1	1	1	1	1	1	1	1
Properties Unlikely To Be Developed < 10 Yrs																			
2	Fulmer Estate	R	190.62	2.904	554		0	0	0	0	0	0	0	0	0	0	0	0	0
5	Bowman	R	7.32	2.904	21		0	0	0	0	0	0	0	0	0	0	0	0	0
8	Melanie Taylor Marital Trust	R	310	2.904	900		0	0	0	0	0	0	0	0	0	0	0	0	0
10	Andrew McFadden	R	60.8	2.904	177		0	0	0	0	0	0	0	0	0	0	0	0	0
11	James McFadden	R	12.89	2.904	37		0	0	0	0	0	0	0	0	0	0	0	0	0
12	Nancy McFadden	R	25.39	2.904	74		0	0	0	0	0	0	0	0	0	0	0	0	0
13	John McFadden	R	14.3	2.904	42		0	0	0	0	0	0	0	0	0	0	0	0	0
18	Barzizza	R	7.01	2.904	20		0	0	0	0	0	0	0	0	0	0	0	0	0
19	Fite	R	4	2.904	12		0	0	0	0	0	0	0	0	0	0	0	0	0
20	Smith Sarah S Family Trust	R	178.6	2.904	99		0	0	0	0	0	0	0	0	0	0	0	0	0
22	Lankford	R	6.09	2.904	18		0	0	0	0	0	0	0	0	0	0	0	0	0
24	Grizzard	RE	16.26	0.5	16		0	0	0	0	0	0	0	0	0	0	0	0	0
26	Herring	RE	27	0.5	13		0	0	0	0	0	0	0	0	0	0	0	0	0
27	Selman	RE-1	10	1	10		0	0	0	0	0	0	0	0	0	0	0	0	0
33	Monsarrat	RE-1	11.5	1	11		0	0	0	0	0	0	0	0	0	0	0	0	0
39	Bruns	RE-1	13.94	1	13		0	0	0	0	0	0	0	0	0	0	0	0	0

Projected Annual Totals for EMS/Non-EMS Residential Call Volume: **ALL DISTRICTS** 2407 2561 2835 3013 3139 3441 3572 3715 3846 3980 4110

Total residential calls per day		6.59	7.02	7.77	8.25	8.60	9.43	9.79	10.18	10.54	10.90	11.26
Additional Call Volume per day over 2018 from:	Existing residential developments		0.37	0.66	0.95	1.24	1.53	1.82	2.11	2.40	2.69	2.98
	New residential developments		0.05	0.51	0.71	0.77	1.30	1.37	1.47	1.54	1.62	1.68

Analysis by NEW Residential Development Type	#of Units	Calls for Service per day										
Apartments	2141	0.00	0.05	0.06	0.19	0.19	0.49	0.51	0.53	0.55	0.56	0.58
Single Family Homes	1202	0.00	0.00	0.07	0.11	0.13	0.33	0.36	0.41	0.44	0.47	0.49
Condominiums	137	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02
AR, Ind. & Assisted Living	162	0.00	0.00	0.39	0.41	0.44	0.46	0.49	0.52	0.54	0.57	0.59
Total	3642											

Table 33. City-wide Future Call Volume Projections

GMSD IMPACT ANALYSIS



Project Scope

The purpose of this departmental study is to determine the impact future apartment and apartment building developments within the Smart Code Zoning Districts will have on services provided by the Germantown Municipal School District (GMSD). This report is based on research conducted over the past 18 months, including a review and analysis of GMSD student enrollment numbers for the 2018-19 school year. The report examines the current state of GMSD enrollment from Germantown's residential dwelling units, including existing apartments, and uses the information to project the potential impact proposed apartments and apartment building developments within the Smart Code Zoning Districts will have on GMSD by school attendance zone and collectively as a district.

Although the report is apartment-centric, our research included an analysis of data from all residential dwelling types within the City, excluding age-restricted, independent and assisted living facilities, for the purposes of context and to better understand the existing and future impact of each on the services of GMSD. This report may be used to inform policy decisions related to future apartment development as well as provide insights into other future residential development applications going forward.

Background

In July of 2013, Germantown residents voted by referendum to create its own municipal school district. Less than one year later, in May of 2014, the Tennessee Department of Education approved the Germantown Board of Education (GBOE) as a Local Education Agency (LEA). With this designation, GMSD was officially formed and assumed responsibility for the management, administration, and operation of five schools within its borders (see listing below). As of the 2018-19 school year, GMSD consists of one high school, a middle school, two elementary schools that serve kindergarten through 5th grade, and one school (Riverdale) that serves kindergarten through 8th grade.

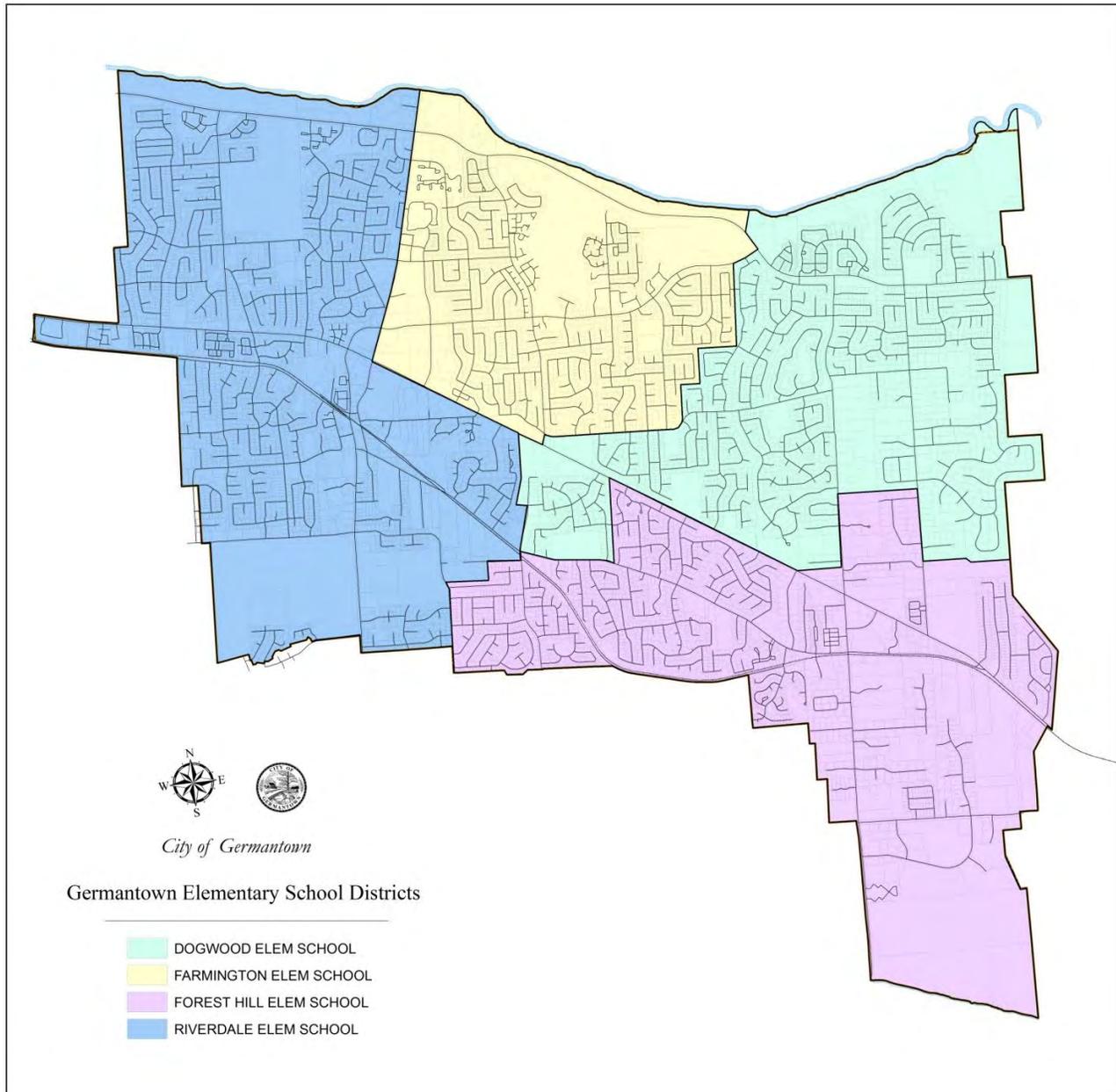
1. Dogwood Elementary School (K-5)
2. Farmington Elementary School (K-5)
3. Riverdale School (K-8)
4. Houston Middle School (5-8)
5. Houston High School (9-12)

A fourth elementary school, Forest Hill Elementary School (K-5), is in the process of being constructed and will eventually serve grades kindergarten through 5th grade. This fourth elementary location is scheduled to open for the start of the 2019-20 school year. Upon completion, GMSD will manage and operate a total of six school locations, all within the city of Germantown. Figures 1 and 2 are the recently established 2019-20 school year attendance zoning maps for the elementary and middle schools. The only school that serves the entire city is Houston High School.

Student Enrollment

The 2018-19 school year began with a total enrollment of approximately 6,000 GMSD students. The district draws students who reside in Germantown, Collierville, and from other areas throughout Shelby County. This same enrollment policy was in place when the only provider of public education in Germantown was Shelby County Schools. GMSD enrollment among students living in Germantown has and continues to increase due to rising births in the 38138 and 38139 zip codes, migrating populations to the Memphis and Shelby County area, and the district's exceptionally-high quality of public education and

Figure 1. GMSD Elementary School Attendance Zones Map (2019-20)



March 19, 2019

range of academic offerings. Upon the creation of GMSD, all Germantown resident students were guaranteed a spot in the GMSD system, if so desired, and this policy continues to this day.

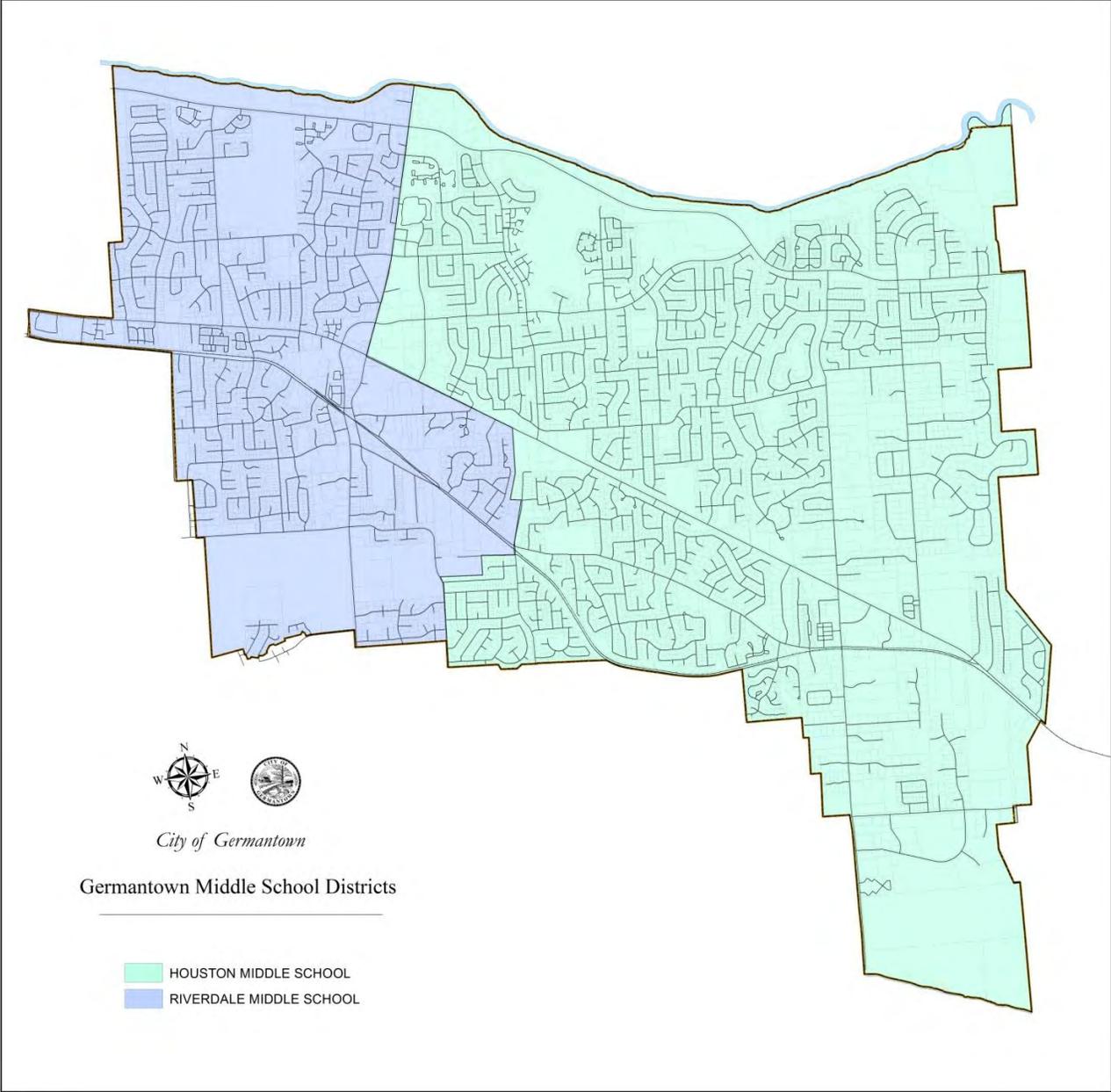
As enrollment among Germantown resident students has grown since inception, the district has limited open enrollment and reduced the number of non-resident students eligible to enroll in the district. Since the 2014-15 school year, resident student enrollment has increased by approximately 1,000 students, while non-resident student enrollment has decreased by approximately 600-700 students. The majority of the decrease in non-resident student population has come as a result of children aging out of the system and lower numbers of new non-resident students being enrolled.

With the significant increase in resident student population and the gradual reduction in the non-resident student population, student capacity challenges have been temporarily addressed through the use of

modular instructional spaces, while long-term capital expansion and new construction projects were prioritized and completed. In partnership with the City of Germantown, significant investments in school capital improvement projects, totaling over \$50 million, have been made during GMSD’s initial five years of existence. The majority of these capital investments have sought to address elementary and middle school capacity challenges and a considerable amount of deferred maintenance at each school.

During the 2018-19 school year, the GBOE amended several policies pertaining to the open enrollment process. One of the major changes to the process includes the requirement for all non-resident and resident transfer students to re-apply on an annual basis. By doing so, GMSD further enhanced their ability to proactively address capacity issues resulting from an increased resident student enrollment population.

Figure 2. GMSD Middle School Attendance Zones Map (2019-20)



March 19, 2019

Research Methodology

In order to best determine the likely impact future apartment and apartment building developments in the Smart Code Zoning Districts will have on GMSD, our research team's analysis focused on the use of existing Germantown resident student enrollment numbers to project future resident student enrollment numbers related to potential future apartment developments based on current land use zoning. This data-driven approach was also applied to the other types of residential dwelling units within the city by school attendance zone and for the district as a whole.

A few of the questions that guided our research for the GMSD report included:

- How many GMSD students currently reside in an apartment in Germantown and how does that number compare to the number of GMSD students residing in other residence types, such as single-family homes or condominiums?
- Based on existing data, are there variables that influence the number of GMSD students coming from apartments?
- Are we able to estimate the number of GMSD students that will be added to the school system with each proposed apartment development; what will the proposed development's impact be for each individual school; and what could each school's total enrollment be ten years from now when considering the entirety of additional residential development?
- Which, if any, GMSD schools have capacity issues currently? Based on our student enrollment projections, will any of the GMSD schools have capacity issues at any point through 2028?

GMSD Student Enrollment Capacity and Forecasting

Programmatic Capacity

According to GMSD's Facilities Master Plan FY 2019, "the demand for instructional and core facility space depends greatly upon the number of students enrolled and the programs offered from year to year. In order to meet the demand, classroom capacity is adjusted on an annual basis. Although the overall square footage of a school building does not change, the capacity can fluctuate as it is influenced by factors, such as student-teacher ratios, class scheduling, classroom design, and the curriculum or programs offered. At the start of each school year, district administrators monitor enrollment to determine the number of students enrolled per classroom and perform school site visits to determine the maximum number of students that can be accommodated within each school building."

The Facilities Master Plan FY 2019 goes on to say that "Maximum capacity is defined as the number of students that can be accommodated within a classroom. The utilization rate determines how efficiently the student population and programs operate within the available classroom space.

- For grades K-3, the maximum student to teacher ratio allowed by the state is an average of 20:1, with no individual class to exceed 25 students.
- For grades 4-6, the maximum student to teacher ratio allowed by the state is an average of 25:1, with no individual class to exceed 30 students.

- For grades 7-12, the maximum student to teacher ratio allowed by the state is an average of 30:1, with no individual class to exceed 35 students.

These state maximums, along with a count of classrooms, define how many students can attend GMSD schools per state law. A comparison of enrollment to capacity results in the utilization rate.”

GMSD School	Programmatic Capacity	
	School Year	School Year
	2018-19 Actual	2019-20 Projected
Dogwood Elementary	790	790
Farmington Elementary	720	720
Forest Hill Elementary	n/a	815
Riverdale Elementary	800	800
Riverdale Middle	510	510
Houston Middle	930	930
Houston High	2,100	2,100
Total Capacity	5,850	6,665

Table 1. Programmatic Capacity Numbers by GMSD School

The programmatic, or maximum, capacity for each of GMSD’s schools is listed above in Table 1. At the conclusion of each school attendance zone analysis within this report, projected programmatic capacity figures for the 2019-20 school year were applied to the student enrollment forecasting models for each of the next ten years in order to complete a capacity assessment. Although programmatic capacity is revisited by the GMSD Administration annually, this study makes the assumption that current capacity figures by school location will remain relatively constant through the 2028-29 school year.

Demographer Projections

In the spring of 2017, GMSD hired the services of McKibben Demographic Research to assist the district in planning for future student enrollment demands. Community demographics, census data, and historical enrollment information was used by McKibben, in addition to other research analytics, to forecast student enrollment numbers through the 2026-27 school year. The study can be found on GMSD’s website at www.gmsdk12.org/16-17DemographicStudyReslts.aspx.

The demographer provided annual student enrollment percentage changes for each of the existing five schools through the 2026-27 school year. At the conclusion of each school attendance zone analysis within this report, these student enrollment percentage changes will be applied to the number of students from existing dwelling units before considering the number of added students from new residential development.

Statistical Analysis

GMSD Student Enrollment Analysis

Data on school enrollment from GMSD’s geocoding software program was received from the district during the fall of 2018. Official enrollment numbers are typically calculated on an annual basis a few weeks after each new school year begins. For the purpose of this study, our research team studied the effect that the 2018-19 school year enrollment numbers would have on the new 2019-20 school zone boundaries, including Forest Hill Elementary since it is scheduled to open in August of 2019.

The data set requested by and provided to our research team only included Germantown resident students attending GMSD schools. Private school resident students or GMSD students who currently reside outside of Germantown were not included in this analysis, since GMSD’s primary objective is to meet the educational needs of Germantown resident students who choose to enroll in the GMSD public school system.

GMSD was able to provide the number of students coming from both apartments and condominiums within Germantown by using the residential address provided for each student (see Table 2). Using the information provided, our research team then calculated the number of GMSD resident students residing in single-family homes, since age-restricted, independent, and assisted-living dwelling units do not produce school-aged children.

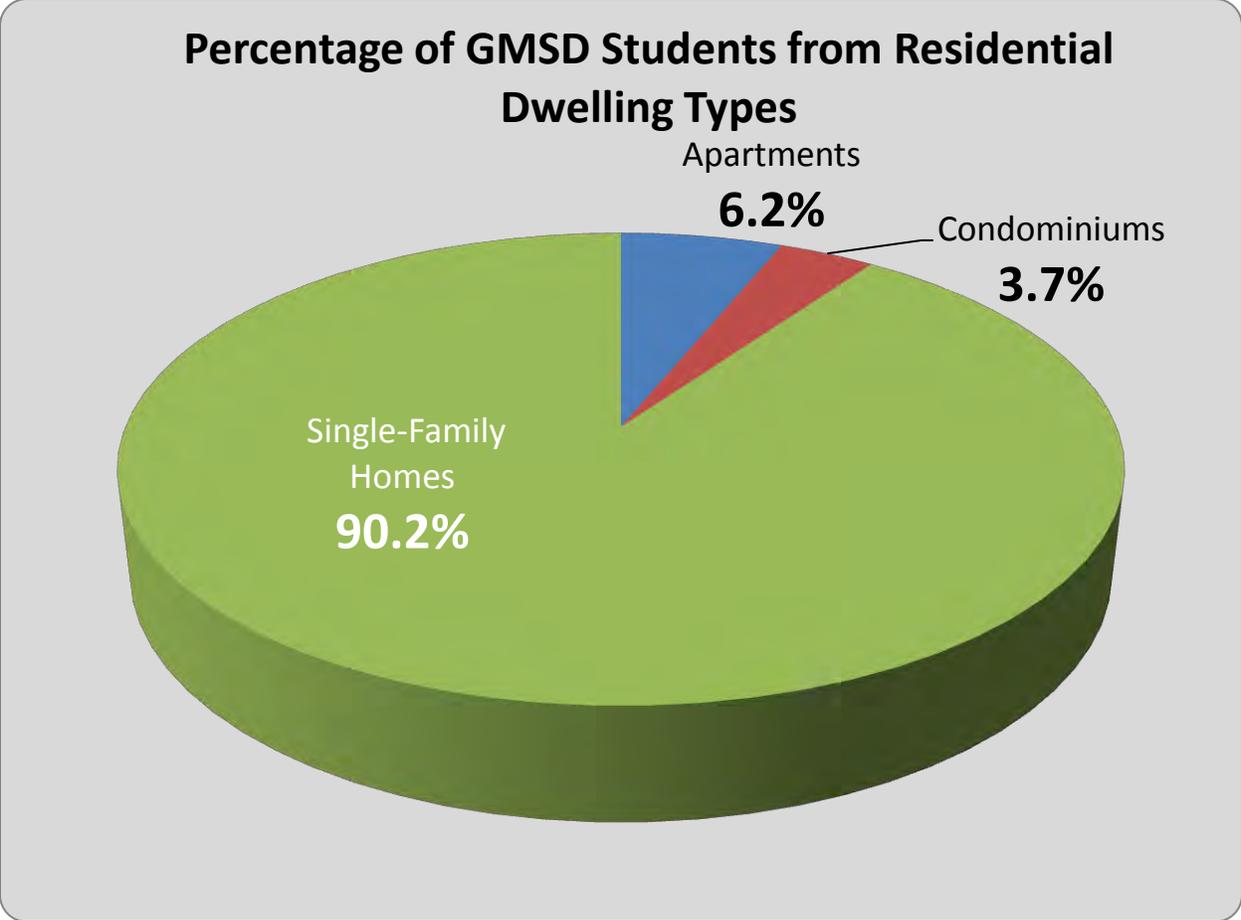
Dwelling Type	School Year	# of Total GMSD Resident Students
Apartments	2018-19	339
Condominiums	2018-19	201
Single-family Homes	2018-19	4,949
Total	2018-19	5,489

Table 2. Total Number of GMSD Resident Students by Dwelling Type (2018-19)

As shown in Table 2, there were a total of 5,489 Germantown resident students attending GMSD schools during the fall of 2018. For the 2018-19 school year, 339 (6.2%) resided in an apartment, 201 (3.7%) resided in a condominium, and 4,949 students (90.2%) resided in a single-family home within Germantown (see Figure 3).

Through the use of geocoding software, GMSD was also able to provide total resident student enrollment numbers by grade band for each school location using the recently established 2019-20 attendance zoning (see Table 3). Using this information, our research team was able to determine the number of GMSD students by dwelling type for each school attendance zone (see Table 4).

Figure 3. Percentage of GMSD Students from Dwelling Types (2018-19)



Attendance Zone	K	1	2	3	4	5	6	7	8	9	10	11	12	Totals
Dogwood Elementary	125	113	95	142	99	133								707
Farmington Elementary	125	124	102	99	113	119								682
Forest Hill Elementary	80	80	81	83	65	54								443
Riverdale School	125	121	147	138	126	115	126	143	144					1,185
Houston Middle							304	349	336					989
Houston High										416	397	335	335	1,483

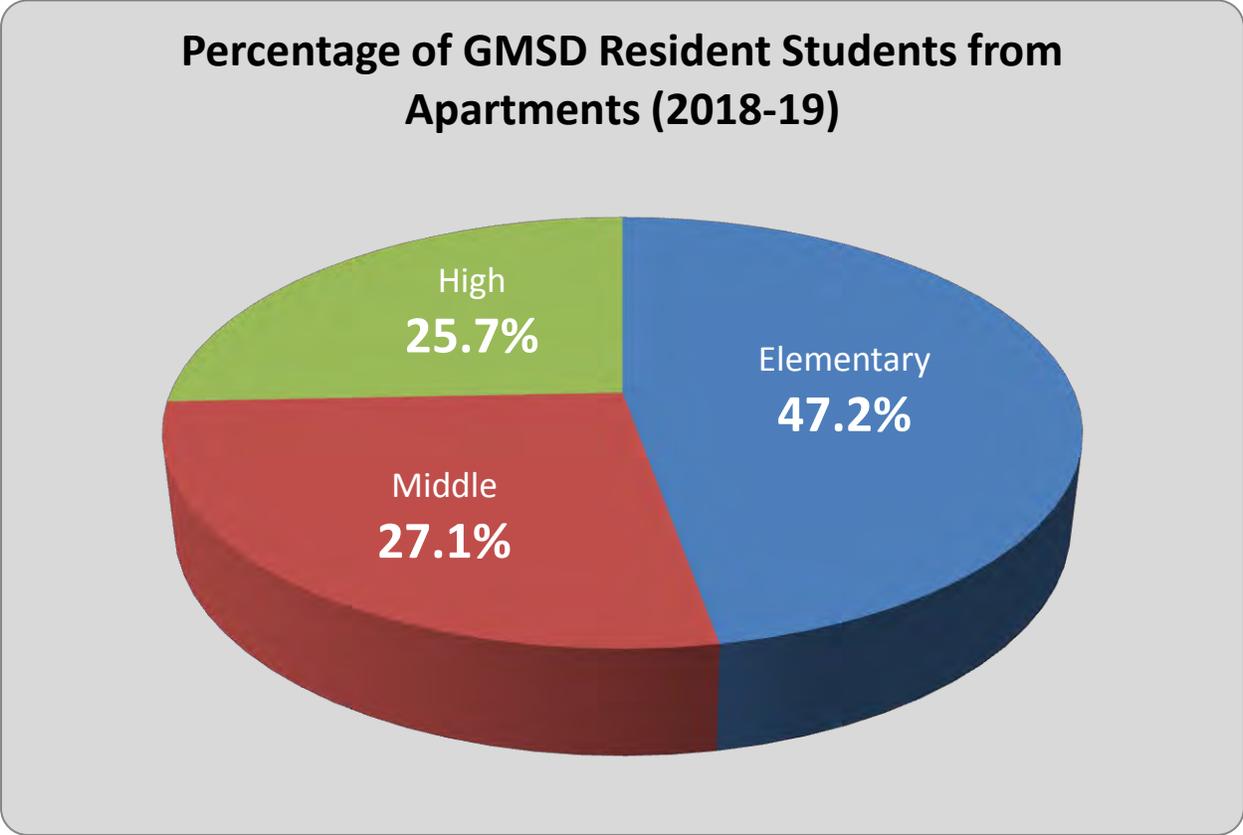
Table 3. Total Number of GMSD Resident Students by Grade Band with 2019-20 Attendance Zoning

Attendance Zone	Dwelling Type	Elementary	Middle	High
Dogwood Elementary	Apartments			
	Condominiums			
	Single-Family Homes	707		
Farmington Elementary	Apartments	66		
	Condominiums	54		
	Single-Family Homes	562		
Forest Hill Elementary	Apartments			
	Condominiums			
	Single-Family Homes	443		
Riverdale School	Apartments	94	45	
	Condominiums	37	13	
	Single-Family Homes	641	355	
Houston Middle	Apartments		47	
	Condominiums		40	
	Single-Family Homes		902	
Houston High	Apartments			87
	Condominiums			57
	Single-Family Homes			1,339
Totals	Apartments	160	92	87
	Condominiums	91	53	57
	Single-Family Homes	2,353	1,257	1,339
	All Dwelling Types	2,604	1,402	1,483

Table 4. Total Number of GMSD Resident Students by Dwelling Type with 2019-20 Attendance Zoning

Using the student enrollment data provided by the district, our research team also determined the percentage of GMSD resident students by grade band and by dwelling type. As shown in Table 5 and illustrated in Figure 4, the percentage of GMSD students attending elementary, middle, and high school from an existing Germantown apartment is comparable to the percentage allocations from existing condominiums and single-family homes. On average, 47% of GMSD students are attending elementary school, 26% are attending middle school, and 27% are attending high school. The percentage calculations by specific dwelling type, in Table 5, will be applied later in the study for each attendance zone when making future student enrollment projections.

Figure 4. Percentage of GMSD Resident Students from Apartments (2018-19)



	Elementary Resident Students	%	Middle Resident Students	%	High School Resident Students	%	All GMSD Resident Students	% Totals
Apartments	160	47%	92	27%	87	26%	339	100%
Condominiums	91	45%	53	26%	57	28%	201	100%
Single-Family Homes	2,353	48%	1,257	25%	1,339	27%	4,949	100%
All Dwelling Units	2,604	47%	1,402	26%	1,483	27%	5,489	100%

Table 5. GMSD Residential Student Allocation Percentages for Elementary, Middle, and High School Levels

Dwelling Unit Type Analysis

Research question:

Is there a statistical difference between the numbers of GMSD students per unit by dwelling type?

For the purposes of this study, our research team made the assumption that studio and one bedroom apartments and condominiums are unlikely to have school-aged children residing within them. Our research team also assumed that there are no one bedroom single-family homes within the City. While the possibility for both does exist, the probability is low and the number of students would be minimal. Furthermore, since our research team received data for the total number of students by apartment development in general and not by apartment unit address, we were unable to gather information on the particular number of bedrooms per unit. Although it increased the student to apartment unit ratio, we removed the one bedroom units from consideration and inferred that all GMSD students were coming from the two or more bedroom apartment units. Our research team decided that the ratio of students coming from the two or more bedroom was not only a more accurate ratio of what the data represented, it also served as a better comparison to the other, predominantly multiple bedroom residential dwelling types. Therefore, for any and all GMSD student enrollment analysis in this report, the ratio of GMSD students coming from two or more bedroom units will be used.

Dwelling Type	School Year	# of Total GMSD Students	# of Total Units	# of 2+ Bedroom Units	2 + Bedroom to Student Ratio x 100
Apartments	2018-19	339	1,014	694	48.8
Condominiums	2018-19	201	1,198	1,136	17.7
Single-Family Homes	2018-19	4,949	13,148	13,148	37.6
Total	2018-19	5,489	15,360	14,978	35.7

Table 6. GMSD Resident Students per 100 Units by Dwelling Type (2018-19)

By dividing the number of total students by their respective two or more bedroom unit counts in each dwelling type and then multiplying by 100, we can calculate the students per 100 unit ratio. For the 2018-19 school year, apartments produced 48.8 GMSD students per 100 units, condominiums produced 17.7 per 100 units, and single-family homes produced a per 100 unit ratio of 37.6 students (see Table 6).

Using the General Linear Model to test for statistical significance between dwelling types, it is evident by the resulting p-values that a statistical significance exists between the dwelling types of apartments and condominiums, and apartments and single-family homes. Apartments have a higher ratio of students per 100 dwelling units in both cases. A statistical difference does not exist between condominiums and single-family homes.

2018-19 GMSD Resident Enrollment by Dwelling Type			
Dwelling Type	Compared To	Result	P-value
Apartments	Condominiums	Apartments higher	0.0179
Apartments	Single-Family Homes	Apartments higher	0.0173
Condominiums	Single-Family Homes	No difference	0.5957

Table 7. Analysis of GMSD Resident Students per 100 Units by Dwelling Type (2018-19)

Apartment Development Analysis

Research Question:

Is there a statistical difference in the number of GMSD resident students coming from the existing apartment developments?

Apartment Development	Total Students	Number of Units	Number of 2 + Bedroom Units	2 + Bedroom to Student Ratio x 100
The Bridges	61	252	168	36.3
Farmington Gates	119	182	138	86.2
The Retreat	39	280	172	22.7
The Vineyards	32	200	116	27.6
Westminster	88	100	100	88.0

Table 8. Total GMSD Resident Students by Apartment Development (2018-19)

As shown above in Table 8, the total number of GMSD students residing in each of the five existing apartment developments varies significantly. Farmington Gates and Westminster have 119 and 88 students residing in them respectively; however, each of the developments have two of the lowest numbers of total units, and two or more bedroom units. As a result, Farmington Gates and Westminster have a much higher ratio of students coming from the two or more bedroom units than the other three apartments in our sample set. Therefore, it is logical to conclude that apartment developments with a higher number of units will not always produce a higher number of students. Moreover, it is also logical to conclude that apartment developments with a lower number of units will not always produce a lower number of students. For that reason, further analysis is needed to determine what other factors definitively influence an apartment's student ratio, such as the average monthly rent.

As seen in Table 9 below, significant differences exist between several of the apartment developments when statistically comparing their student ratios per 100 two or more bedroom units.

2018-19 GMSD Resident Students by Apartment Development			
Apartment	Compared To	Result	P-value
Farmington Gates	The Retreat	Farmington Gates higher	<0.0001
Farmington Gates	The Bridges	Farmington Gates higher	<0.0001
Farmington Gates	The Vineyards	Farmington Gates higher	<0.0001
Farmington Gates	Westminster	No Difference	0.6891
The Retreat	The Bridges	The Bridges higher	0.0081
The Retreat	The Vineyards	No Difference	0.3428
The Retreat	Westminster	Westminster higher	<0.0001
The Bridges	The Vineyards	No Difference	0.1509
The Bridges	Westminster	Westminster higher	<0.0001
The Vineyards	Westminster	Westminster higher	<0.0001

Table 9. GMSD Resident Students by Apartment Development (2018-19)

Both Farmington Gates and Westminster have a comparably high student ratio per 100 two or more bedroom units. Therefore, with a p-value of .6891, no statistical difference exists between. There is also no statistical difference between The Retreat and The Vineyards, and The Bridges and The Vineyards.

With p-values of <.0001, Farmington Gates and Westminster are statistically different when compared individually to each of the other three existing apartment developments.

Research Question:

Is there a correlation between the average monthly rent of the two or more bedroom units and the number of students coming from them?

Apartment Development	Total Students	Number of Units	Number of 2 + Bedroom Units	2 + Bedroom to Student Ratio x 100	Average Monthly Rent	Avg. Monthly Rent - 2 + Bedroom Units
Bridges	61	252	168	36.3	\$1,400.85	\$1,515.33
Farmington Gates	119	182	138	86.2	\$1,073.48	\$1,177.58
Retreat	39	280	172	22.7	\$1,447.31	\$1,607.94
Vineyard	32	200	116	27.6	\$1,270.60	\$1,446.00
Westminster	88	100	100	88.0	\$1,141.50	\$1,141.50

Table 10. Total GMSD Students by Apartment Development with Average Monthly Rent

Correlation: Average Monthly Rent 2 + Bedroom Apartments and 2 + Bedroom Apartment Student Ratio

Pearson correlation -0.967
P-value 0.007
R-Sq 93.5%

A correlation and regression analysis of average monthly rent and student ratios for two or more bedroom apartment units for all five existing apartment developments shows a statistically significant relationship with a p-value of .007. The Pearson correlation value of -0.967 shows that there is a strong negative correlation between the apartment rent and the ratio of students per 100 dwelling units, therefore, as rent increases in the sample, the ratio of students gets smaller. The r-squared value of 93.5% tells us that over 93% of the variation in student ratios is explained by the apartment rent and therefore, rent is a variable both statistically significant and practically useful for the predicting the ratio of students per 100 units from apartments.

Research Question:

Can we use the 2018-19 student data and the correlation results to extrapolate and estimate the number of students coming from new apartment developments if certain variables are known?

Given that the only data available was for the 2018-19 school year, our research team made several assumptions within our small sample size and the resulting data set in order to formulate student enrollment predictions for future apartment developments.

Assumptions include:

- Past years GMSD student ratios from the existing apartment developments have held relatively consistent to the 2018-19 data set.
- When families with GMSD students move out, graduate, or otherwise leave an apartment; the families that move in will also have the same approximate number of GMSD students. Unlike the GMSD demographer's study which factored in attrition for single-family homes, our research team assumed a 1-1 exchange in students from apartment developments.
- In an attempt to simplify student enrollment projections from potential, future apartment developments, all future apartment dwelling units within the City's Smart Code zones are assumed to be one of the following general apartment product types.
 - **Apartment Type A.**
 - **A vertically mixed-use, multi-family residential building.** Similar in nature to Thornwood's Market Row Lofts which includes multiple uses, such as retail on the ground floor and residential on the upper floors within the same building.
 - **A multi-family residential building, proposed as a component of a comprehensive mixed-use development application.** Similar in nature to The Residences at Thornwood, this multi-family building is one component of a comprehensive mixed use development application. The Residences at Thornwood were constructed subsequent or simultaneous to a mix of other integrated uses on the project site.

For the purposes of this study, Type A apartments have a 50/50 ratio, split evenly between studio or one bedroom units, and two bedroom units. This ratio is consistent with the 276 total residential units at the Thornwood development.

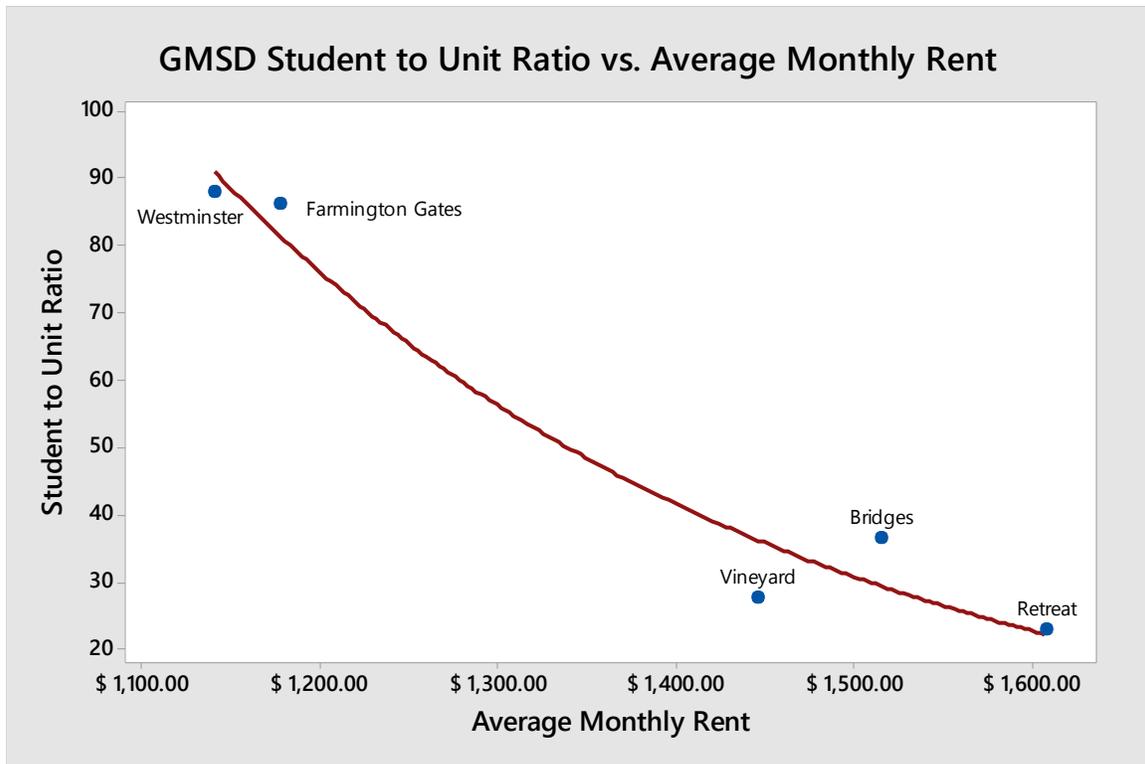
- **Apartment Type B.**
 - **Stand-alone, single-use, multi-family residential complex.** Similar in nature to the proposed Watermark and Viridian developments, these developments are garden style apartment complexes that typically have a higher percentage of multiple bedroom units and are not proposed as a component of a comprehensive mixed-use development application.

For the purposes of this study, Type B apartments have a 40/60 ratio, 40% one bedroom and 60% two or more bedrooms units. This ratio is consistent with the 310 total residential units at the previously proposed Watermark development and the proposed Viridian development.

- If we are assuming that the correlation analysis for average monthly rent is accurate (the more expensive a two or more bedroom unit becomes, the less likely it is that a GMSD student will reside there), we can also assume that the least number of students coming from any future apartment development will be zero.
- There are no GMSD students coming from a studio or one bedroom apartment unit.

Figure 5 is a non-linear regression model for the average monthly rent of two or more bedroom apartment units and the 2018-19 GMSD student ratio for two or more apartment units, showing the correlation as described above. As illustrated, Westminster and Farmington Gates are less expensive in rent and produce a higher number of students per two or more bedroom units. The ratio of GMSD students decreases and tends to flatten as the rent increases.

Figure 5. GMSD Student to Unit Ratio vs. Average Monthly Rent of Existing Apartments



Our research team then took the known applicable variables from the Thornwood and proposed Watermark developments and incorporated them into the non-linear regression model to predict the number of students each will produce. Thornwood does not have three bedroom apartments and the average monthly rent for two bedroom units is \$2,299.00, which results in a ratio of 2.7 students per 100 units. Because only 138 of the 276 total units at Thornwood are two bedroom units, we can calculate that a total of four students will attend GMSD from this location. As of the completion of this report, Thornwood has approximately 35% rental occupancy and one child has been enrolled with GMSD to date from this location.

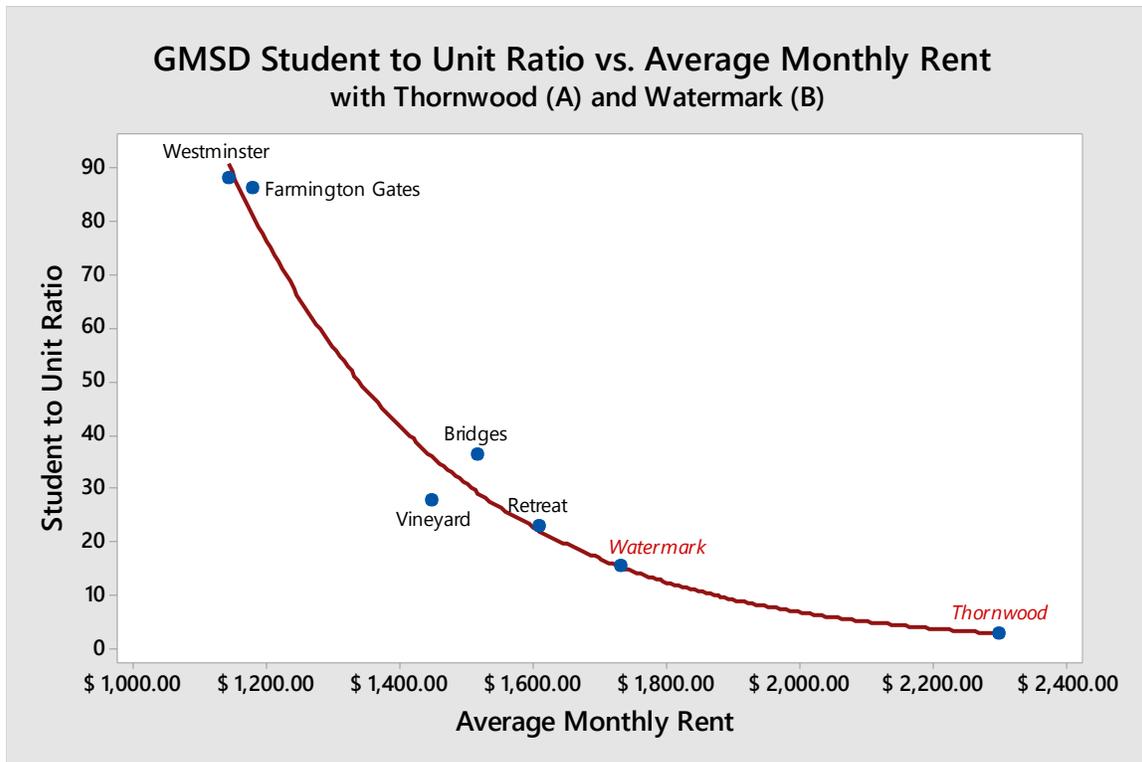
Watermark’s proposed monthly rent for two bedroom units was \$1,730.79, which results in a ratio of 15.3 students per 100 units. Since Watermark had proposed a total of 190 two and three bedroom units, we can calculate that 29 GMSD students will be coming from this development.

Apartment Development	Total Students	Number of Units	2 + Bedroom Units	2 + Bedroom to Student Ratio x 100	Avg. Monthly Rent - 2 + Bedroom Units
Bridges	61	252	168	36.3	\$1,515.33
Farmington Gates	119	182	138	86.2	\$1,177.58
Retreat	39	280	172	22.7	\$1,607.94
Vineyard	32	200	116	27.6	\$1,446.00
Westminster	88	100	100	88.0	\$1,141.50
Thornwood	4	276	138	2.7*	\$2,299.39
Watermark	29	310	190	15.3*	\$1,730.79

*Predicted values based upon regression equation

Table 11. Proposed Apartment Developments GMSD Students and Ratios

Figure 6. GMSD Student to Unit Ratio vs. Average Monthly Rent with Thornwood and Watermark



Given that our calculation requires certain variables, such as the proposed unit breakdown of any future apartments as well as the average monthly rents for those apartment units, we have assumed that any future apartments will fall into one of the two previously mentioned apartment product types. For use in projecting the number of GMSD students that will be coming from any future apartment, the ratios for Apartment Type A (2.7 GMSD students per 100 two or more bedroom units) and Apartment Type B (15.3 GMSD students per 100 two or more bedroom units) will be used. Based on the analysis of the two Germantown apartment developments recently constructed or proposed, garden style apartments (Apartment Type B) have a higher number of two or more bedroom apartments as well as a lower average rental price point than that of the Apartment Type A products.

The two variables, average monthly rent of the two or more bedroom units as well as the number of those units for each development, could vary. Below is a table that will estimate the student to unit ratio of the two or more bedroom units if the average monthly rent is known. This estimation would follow the fitted line plot seen in Figure 6. As shown in both Figure 6 and Table 12 below, the higher the average monthly rent, the lower the number of students.

Average Monthly Rent - 2 & 3 Bedroom Apartments	Student to Unit Ratio x 100 - 2 & 3 Bedroom Apartments
\$1,000	139.8
\$1,100	103.3
\$1,200	76.3
\$1,300	56.3
\$1,400	41.6
\$1,500	30.7
\$1,600	22.7
\$1,700	16.8
\$1,800	12.4
\$1,900	9.2
\$2,000	6.8
\$2,100	5.0
\$2,200	3.7
\$2,300	2.7
\$2,400	2.0

Table 12. GMSD Resident Student Ratio by Average Monthly Rent

School Attendance Zone Impact Analysis

The School Attendance Zone Impact Analysis for each of the seven school attendance zones begins with a brief school profile, including a basic description of the number of existing dwelling units by attendance zone. After this general orientation, an analysis of future residential build-out within each attendance zone has been completed to assist with future enrollment projections. Each attendance zone analysis section concludes with a summary of the forecasted information, including an analysis of expected apartment impact.

Residential Dwelling Units by School Attendance Zone

Tables 13 through 15 below provide a breakdown of how existing dwelling units are allocated among school attendance zones. Age-restricted, independent, and assisted living dwelling units are not included in these dwelling unit totals. Constructed before GMSD was established, the only school attendance zone that does not currently serve an existing apartment or include Smart Code zoning is Dogwood Elementary School. When Forest Hill Elementary School opens in the fall of 2019, it will initially serve 2,843 single-family homes. However, Smart Code zoning does apply within the Forest Hill attendance zone area.

Elementary School	SmartCode Zoning	Apartments	Condominiums	Single-family Homes	Dwelling Unit Totals by District
Dogwood	No	0	0	3,575	3,575
Farmington	Yes	462	711	2,682	3,855
Forest Hill	Yes	0	0	2,843	2,843
Riverdale	Yes	552	487	4,048	5,087
Dwelling Unit Totals by Type		1,014	1,198	13,148	15,360

Table 13. Existing Residential Dwelling Unit Count by Elementary School Attendance Zone

Middle School	SmartCode Zoning	Apartments	Condominiums	Single-family Homes	Dwelling Unit Totals by District
Riverdale	Yes	552	487	4,048	5,087
Houston	Yes	462	711	9,100	10,273
Dwelling Unit Totals by Type		1,014	1,198	13,148	15,360

Table 14. Existing Residential Dwelling Unit Count by Middle School Attendance Zone

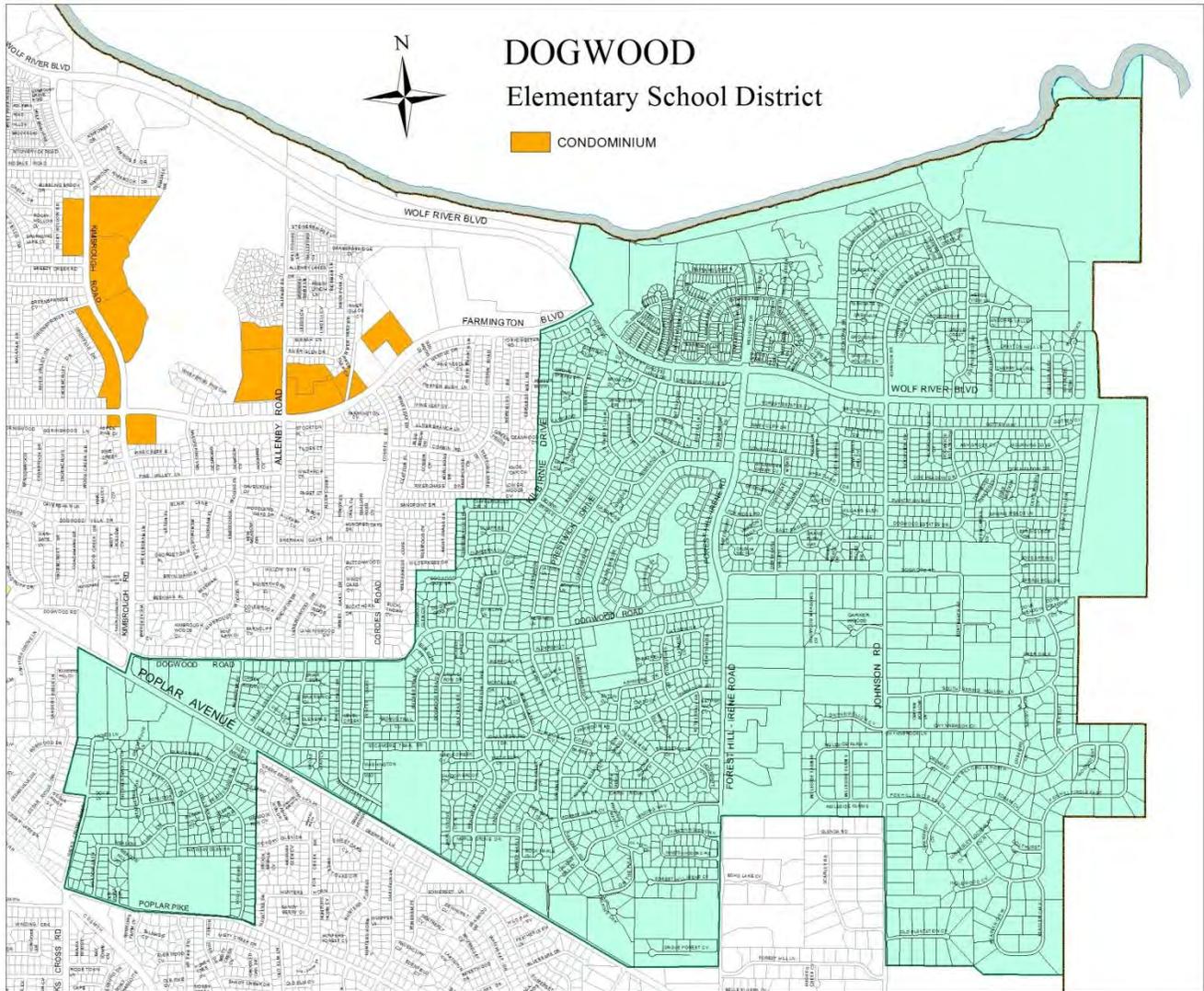
High School	SmartCode Zoning	Apartments	Condominiums	Single-family Homes	Dwelling Unit Totals by District
Houston	Yes	1,014	1,198	13,148	15,360
Dwelling Unit Totals by Type		1,014	1,198	13,148	15,360

Table 15. Existing Residential Dwelling Unit Count by High School Attendance Zone

DOGWOOD ELEMENTARY

Located at 8945 Dogwood Road, Dogwood Elementary School (DES) was originally constructed in 1976. This 88,000 sq. ft. building, with a total of 52 classrooms, sits on 14 acres and is adjacent to the City's Dogwood Park, which is 4.5 acres. DES serves kindergarten through 5th grade and has a programmatic capacity of 790 students. There are no Key Commercial Areas or Smart Code districts located within the boundaries of the DES attendance zone.

Figure 7. Dogwood Elementary Attendance Zoning Map (School Year 2019-20)



Existing Dwelling Unit Analysis

Apartments

There are no apartments currently located within the boundaries of this school attendance zone and no apartment developments are currently proposed or are being considered at this time.

Figure 8. Dogwood Elementary Existing Dwelling Unit Counts



*This dwelling unit count excludes Age-Restricted, Independent, and Assisted Living dwelling units due to the age-restrictions placed on occupants at these residential locations.

Condominiums & Townhomes

There are no condominiums currently located within the boundaries of this school attendance zone and no condominium developments are currently proposed or are being considered at this time.

Single-Family Homes

All elementary students who attend DES and live within the Dogwood school attendance zone reside in one of the attendance zone’s 3,575 single-family homes. For the 2018-19 school year, 707 resident elementary students who reside in a single-family home within this attendance zone were enrolled at DES. As shown in Table 16, the student to dwelling unit ratio within this school attendance zone for single-family homes is 19.8.

Zone	Dwelling Type	Students	SFH Units	Ratio
Dogwood Elementary	Single-Family Homes	707	3,575	19.8
Farmington Elementary	Single-Family Homes	562	2,682	21.0
Forest Hill Elementary	Single-Family Homes	443	2,843	15.6
Riverdale Elementary	Single-Family Homes	641	4,048	15.8

Table 16. Student to Dwelling Unit Ratio for Single-Family Homes: Elementary (K-5)

Future Residential Development Property Analysis

Through the end of the 2028-29 school year, our research team has included four (4) properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making elementary student enrollment projections for DES. These properties are listed below yellow and the numbers in the left hand column (below) correspond with the numbers in Figure 9 and Table 17 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of projecting maximum GMSD elementary student enrollment numbers.

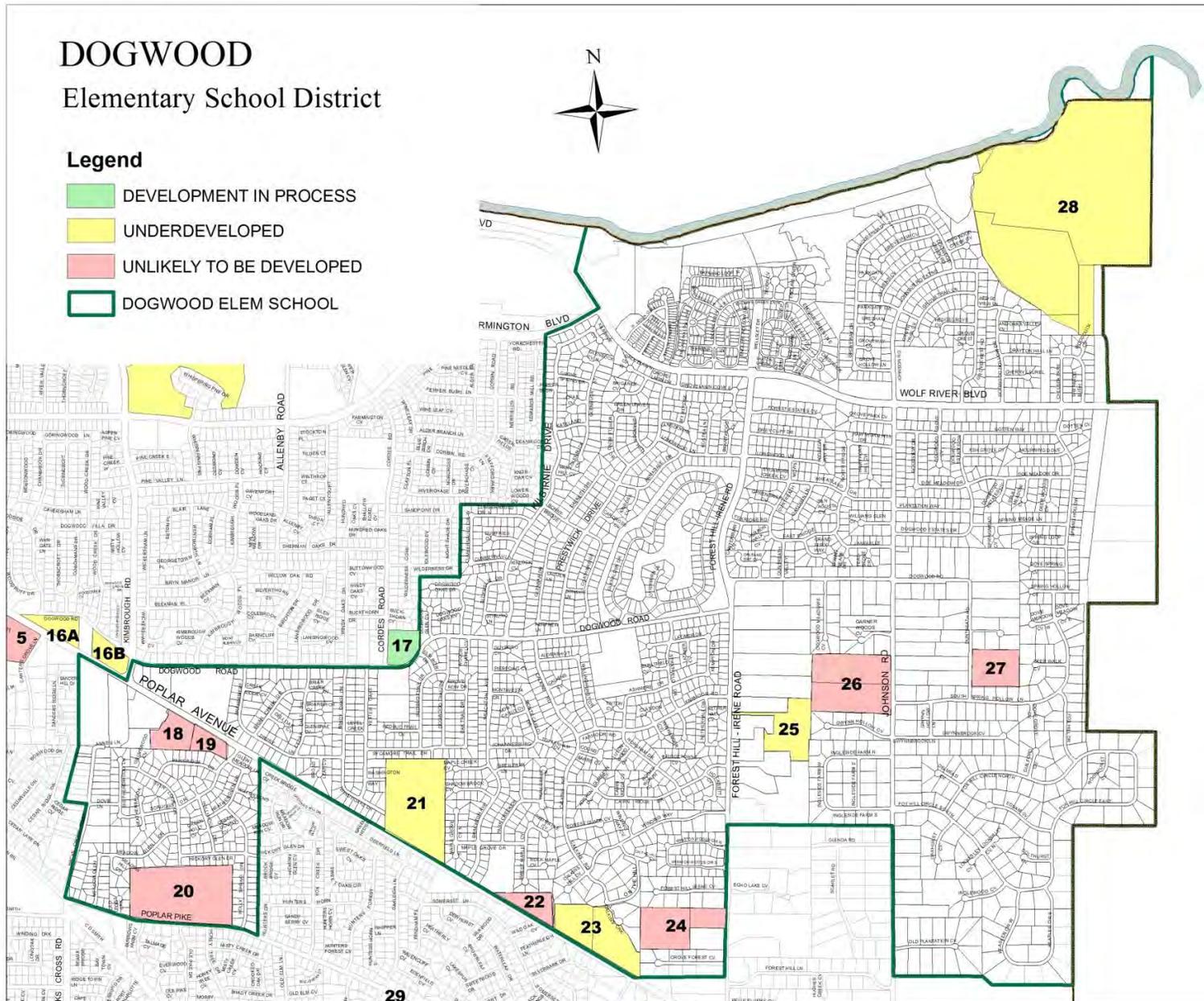
Underdeveloped Properties:

#21	Warlick Sandra H and Hulon O	Zoned “R” for Residential, the 30.07 acres at this location could have a maximum of 87 dwelling units. One single-family home is currently located on this property. If the property were to be developed/redeveloped with this number of units, 17 elementary students should be expected to attend DES.
#23	Miti Group	Zoned “R” for Residential, the 18.28 acres at this location could have a maximum of 47 single-family homes. If developed/redeveloped with this number of units, nine elementary students should be expected to attend DES.
#25	Steiner	Zoned “RE” for Residential Estate, the 12.81 acres at this location could have a maximum of six dwelling units. If developed/redeveloped with this number of units, one elementary student should be expected to attend DES.
#28	Ben Clark Property	Zoned “AG” for Agricultural, the 180.59 acres at this location could have a maximum of 36 dwelling units (at one home per five acres). One single-family estate home is currently located on this property. If developed/redeveloped under the current zoning with this number of units, seven elementary students should be expected to attend DES.

Properties Unlikely To Be Developed < 10 Years:

Although categorized as “unlikely to be developed,” seven additional properties (#18, #19, #20, #22, #24, #26, and #27) have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these seven locations, listed in red on Figure 9 and Table 17, desire or intend to change the current land use of these sites at any point in the immediate future. These properties were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the seven properties fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 9. Dogwood Elementary: Property Analysis Map



DOGWOOD ELEMENTARY			School Year																
			18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29						
Enrollment Projections from Existing Dwelling Units			Demographer Enrollment Forecast % Increase/Decrease																
			2.0%	1.9%	2.2%	0.9%	-2.6%	-2.5%	-2.3%	-1.5%	-1.2%	0.0%	0.0%						
			Forecasted Enrollment using 18/19 Geocoding Actuals																
			707	720	736	743	724	706	689	679	671	671	671						
Enrollment Ratio Per 100 2+ Bedroom Units By Dwelling			Apartments A (2.7 x 47%)		APTA	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3				
			Apartments B (15.3 x 47%)		APT B	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2			
			Single Family Homes (Dogwood SFH Ratio)		SFH	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8			
			Condominiums (17.7 x 45%)		CO	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0			
Property #	Project Name / Project Owner	Zoning Designation	Acreeage	Dwelling Units Per Acre	# of units possible or approved	# of 2+ Bedroom Units	Dwelling Type	Additional Students from New Residential Development											
Underdeveloped Properties																			
21	Warlick Sandra H and Hulon O	R	30.07	2.904	87	87	SFH	0	0	0	0	0	17	17	17	17	17	17	17
23	Miti Group	R	18.28	2.904	47	47	SFH	0	0	0	0	0	9	9	9	9	9	9	9
25	Steiner	RE	12.81	0.5	6	6	SFH	0	0	0	0	0	0	0	1	1	1	1	1
28	Ben Clark Property	AG	180.59	0.2	36	36	SFH	0	0	0	0	0	7	7	7	7	7	7	7
Properties Unlikely To Be Developed < 10 Yrs																			
18	Barzizza	R	7.01	2.904	20	20	SFH	0	0	0	0	0	0	0	0	0	0	0	0
19	Fite	R	4	2.904	12	12	SFH	0	0	0	0	0	0	0	0	0	0	0	0
20	Smith Sarah S Family Trust	R	178.6	2.904	99	99	SFH	0	0	0	0	0	0	0	0	0	0	0	0
22	Lankford	R	6.09	2.904	18	18	SFH	0	0	0	0	0	0	0	0	0	0	0	0
24	Grizzard	RE	16.26	0.5	16	16	SFH	0	0	0	0	0	0	0	0	0	0	0	0
26	Herring	RE	27	0.5	13	13	SFH	0	0	0	0	0	0	0	0	0	0	0	0
27	Selman	RE-1	10	1	10	10	SFH	0	0	0	0	0	0	0	0	0	0	0	0
Projected Number of Total Resident Students: Dogwood Elementary								707	720	736	743	724	739	723	714	706	706	706	
Programmatic Capacity ----			790		Additional Capacity				70	54	47	66	51	67	76	84	84	84	
Change in Annual Student Enrollment		Existing Dwelling Units			13	16	7	-19	-18	-16	-10	-8	0	0					
		New Residential Development			0	0	0	0	33	33	34	34	34	34					
Net increase/decrease in student population from 2018-19					13	29	36	17	32	16	7	-1	-1	-1					
Additional Students By New Residential Development Type																			
Apartments					0	0	0	0	0	0	0	0	0	0					
Single-Family Homes					0	0	0	0	33	33	34	34	34						
Condominiums					0	0	0	0	0	0	0	0	0						
Annual Totals					0	0	0	0	33	33	34	34	34						

Table 17. Dogwood Elementary: Future Enrollment Projections

Student Enrollment Projection Summary: Dogwood Elementary

Existing Dwelling Units

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, an approximate number of 707 resident DES students would have attended DES during the 2018-19 school year from the attendance zone's 3,575 single-family homes. In continuing the use of the demographer's percentage changes for the DES student population through the 2026-27 school year, student enrollment from existing dwelling units is projected to peak at 743 resident DES students in the 2021-22 school year and subsequently decline through 2026-27.

Developments in Process

There are no developments currently in process within the DES attendance zone that will have an immediate impact on DES enrollment numbers.

Underdeveloped Properties

Based on the current land use zoning, a total of 176 new single-family home units were included on four underdeveloped properties within the DES attendance zone. If all of these properties were to be developed/redeveloped in accordance with this residential build-out scenario by the 2028-29 school year, DES should expect to increase their enrollment number by 34 students.

Attendance Zone Summary

Based on the demographer's enrollment forecast through 2026-27, student enrollment numbers from existing dwelling units are projected to remain below the school's current programmatic capacity of 790 through the 2028-29 school year. Under the residential build-out scenario presented, the total number of projected DES students remained below programmatic capacity with the addition of 34 DES students within the next ten years from underdeveloped, single-family home properties. As shown in green row at the bottom of Table 17, DES is projected to have sufficient capacity to serve resident DES students within the DES attendance zone through the 2028-29 school year under this scenario.

Apartment Impact

Dogwood Elementary

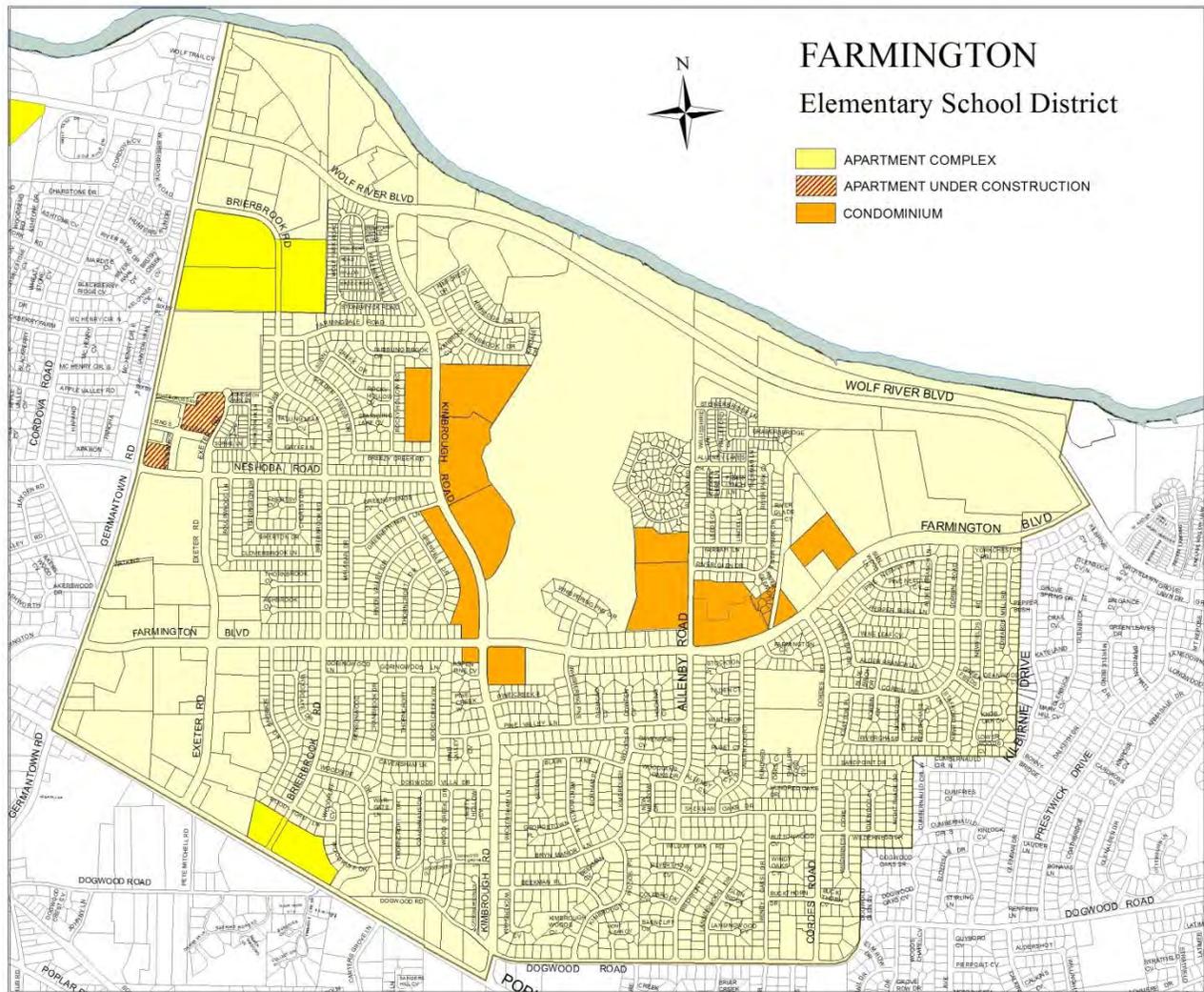
What are the likely impacts of future apartments and apartment building development on Dogwood Elementary?

Future apartment developments are currently not being considered within the DES attendance zone and there are no Smart Code Zoning Districts within this attendance zone's boundaries. Also, as previously mentioned, there are no existing apartments located within the boundaries of the DES attendance zone. Therefore, based on the current zoning, no students from apartments in general should originate from this zone through the 2028-29 school year.

FARMINGTON ELEMENTARY

Located at 2085 Cordes Road, Farmington Elementary School (FES) was originally constructed in 1973. Expansions to the original building were completed in 1978 and 1985. At present, the 73,908 sq. ft. building, with a total of 46 classrooms, sits on nine acres and is adjacent to the City's Farmington Park, which is also nine acres. FES serves kindergarten through 5th grade and has a programmatic capacity of 720 students. A portion of the Central Business District, where Smart Code zoning applies, is located within the boundaries of the FES attendance zone.

Figure 10. Farmington Elementary Attendance Zoning Map (School Year 2019-20)



Existing Dwelling Unit Analysis

Apartments

Two of the City's five existing apartment developments are located in the FES attendance zone. The 462 apartment dwelling units at The Retreat and Farmington Gates account for nearly 12% of dwelling units served by FES. Of these units, 310 have two or more bedrooms.

Figure 11. Farmington Elementary Existing Dwelling Unit Counts



*This dwelling unit count excludes Age-Restricted, Independent, and Assisted Living dwelling units due to the age-restrictions placed on occupants at these residential locations.

Condominiums & Townhomes

The majority of the City’s condominiums are located within the FES attendance zone. The 711 condominium units account for 18% of dwelling units served by FES. Of these units, 656 have two or more bedrooms.

Single-Family Homes

Approximately 70% of all dwelling units served by FES are single-family homes. There are 2,682 single-family homes within this school attendance zone. For the 2018-19 school year, 562 resident elementary students who reside in a single-family home within this attendance zone were enrolled at FES. As shown in Table 18, the student to dwelling unit ratio within this attendance zone for single-family homes is 21.0.

Zone	Dwelling Type	Students	SFH Units	Ratio
Dogwood Elementary	Single-Family Homes	707	3,575	19.8
Farmington Elementary	Single-Family Homes	562	2,682	21.0
Forest Hill Elementary	Single-Family Homes	443	2,843	15.6
Riverdale Elementary	Single-Family Homes	641	4,048	15.8

Table 18. Student to Dwelling Unit Ratio for Single-Family Homes: Elementary (K-5)

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included seven (7) properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making elementary student enrollment projections for FES. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 12 and Table 19 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum GMSD elementary student enrollment numbers.

Developments in Process:

#14	Avenida Senior Living Apartments	Zoned “R-H” for Retirement Housing, this 5.3-acre site has been scheduled for completion in late 2019. These 162 senior-living dwelling units will have no impact on student enrollment numbers due to age-restrictions placed on occupants at this location.
#15A	The Residences at Thornwood and Market Row Lofts	Zoned “T5” for Urban Center Zone within the Smart Code district, the fourth and fifth phases of Thornwood are scheduled for completion in 2019. Of the 276 total apartment units, half are one bedroom units and the other half are two bedroom units. Based on the non-linear regression analysis presented earlier in the study, the addition of 138 two bedroom apartment (Type A) units at an average monthly rent of \$2,299.39 per month is projected to add 2.7 GMSD students per 100 two bedroom units. Since 47% (1.3 per 100) of these students will attend elementary school, based on current student allocations, a total of two elementary students are projected to attend FES once all units are fully-leased.
#15B	Thornwood - Phase 6 (Undeveloped Lot 5)	Zoned “T5” for Urban Center Zone within the Smart Code district, these 2.98 acres on Lot 5 are the last phase of the Thornwood development project. As part of the development’s Outline Plan approval in 2014, a maximum of 294 multi-family units were included. If the developer were to propose and receive final approval for apartments at this location, our research team has estimated that the percentage breakdown of units would be fairly consistent with The Residences and Market Row Lofts, an approximate 50/50 split between one and two bedroom units. Based on the non-linear regression analysis presented earlier in the study, the addition of 147 two bedroom apartment (Type A) units at an average monthly rent of \$2,299.39 per month is projected to add 2.7 GMSD students per 100 two bedroom units. Since 47% (1.3 per 100) of these students will attend a GMSD elementary school, based on current student allocations, a total of two elementary students are projected to attend FES once all units are fully-leased. Final site plan approval by both the Planning Commission and BMA would be required for this development to proceed in this manner.

#17	Piper's Gardens	Zoned "R" for Residential, this 5.58-acre site has been placed in our projection worksheet to be constructed and occupied as early as calendar year 2020. Although there is an approved subdivision on this property, no building permits have been issued. The addition of eight single-family homes at this location could add two elementary students if all eight are completed.
-----	-----------------	--

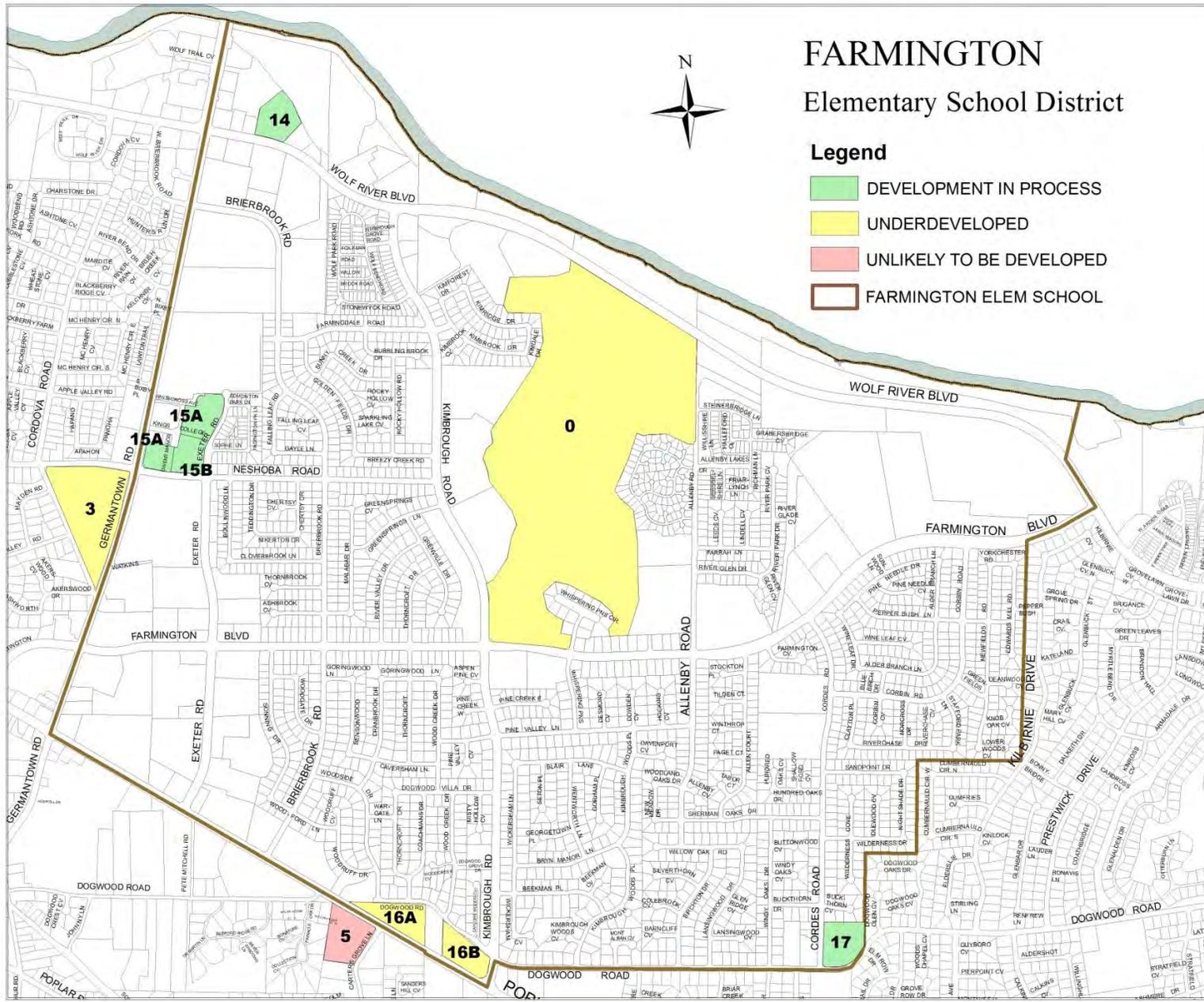
Underdeveloped Properties:

#0	Germantown Country Club	Zoned "R" for Residential, this 178.6-acre property is on the market for sale at the time of this study. Given the uncertainty of this property's future, 90 acres of unrestricted property was considered for residential development for the purpose of projecting maximum student enrollment numbers. The addition of 261 single-family homes over a period of ten years could gradually increase the annual number of elementary students within the zone from an initial five to over 40 by 2028.
----	-------------------------	--

#16A	Patel	Zoned "R" for Residential, the 6.46 acres at this location could have a maximum of 18 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property should be expected to add four FES students.
------	-------	--

#16B	Dogwood Manor	Zoned "R" for Residential, the 4.88 acres at this location could have a maximum of 14 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property should be expected to add three FES students.
------	---------------	---

Figure 12. Farmington Elementary: Property Analysis Map



FARMINGTON ELEMENTARY								School Year																		
								18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29								
Enrollment Projections from Existing Dwelling Units								Demographer Enrollment Forecast % Increase/Decrease								1.8%	1.3%	-1.4%	0.2%	-1.2%	-1.3%	-0.6%	-0.6%	-0.7%	0.0%	0.0%
								Forecasted Enrollment using 18/19 Geocoding Actuals								682	691	681	683	674	666	662	658	653	653	653
Enrollment Ratio Per 100 2+ Bedroom Units By Dwelling								Apartments A (2.7 x 47%)		APTA	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3				
								Apartments B (15.3 x 47%)		APT B	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	
								Single Family Homes (Farmington SFH Ratio)		SFH	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	
								Condominiums (17.7 x 45%)		CO	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	# of 2+ Bedroom Units	Dwelling Type	Additional Students from New Residential Development																		
Developments in Process																										
14	Avenida Senior Living Apartments	R-H	5.3	31	162	-	AL	0	0	0	0	0	0	0	0	0	0	0	0	0						
15A	TW Residences & Market Row Lofts	T5	7.09	39	276	138	APT A	0	2	2	2	2	2	2	2	2	2	2	2	2						
15B	Thornwood (Undeveloped Lot 5)	T5	2.98	99	294	147	APT A	0	0	0	2	2	2	2	2	2	2	2	2	2						
17	Piper's Gardens	R	5.58	2.904	8	8	SFH	0	0	2	2	2	2	2	2	2	2	2	2	2						
Underdeveloped Properties																										
0	Germantown Country Club	R	178.6	2.904	261	261	SFH	0	0	0	5	11	16	22	27	33	38	44								
16A	Patel	R	6.46	2.904	18	18	SFH	0	0	0	4	4	4	4	4	4	4	4	4	4						
16B	Dogwood Manor	R	4.88	2.904	14	14	SFH	0	0	0	3	3	3	3	3	3	3	3	3	3						
Projected Number of Total Resident Students: Farmington Elementary								682	693	685	700	697	694	695	697	698	703	709								
Programmatic Capacity ----			720		Additional Capacity				27	35	20	23	26	25	23	22	17	11								
Change in Annual Student Enrollment		Existing Dwelling Units							9	-10	1	-8	-9	-4	-4	-5	0	0								
		New Residential Development							2	4	18	24	29	35	40	46	51	57								
Net increase/decrease in student population from 2018-19									11	3	18	15	12	13	15	16	21	27								
Additional Students By New Residential Development Type																										
Apartments								0	2	2	4	4	4	4	4	4	4	4	4							
Single-Family Homes								0	0	2	14	20	25	31	36	42	47	53								
Condominiums								0	0	0	0	0	0	0	0	0	0	0								
Annual Totals								0	2	4	18	24	29	35	40	46	51	57								

Table 19. Farmington Elementary: Future Enrollment Projections

Student Enrollment Projection Summary: Farmington Elementary

Existing Dwelling Units

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, an approximate number of 682 resident FES students would have attended FES during the 2018-19 school year from the attendance zone's 3,855 total dwelling units. In continuing the use of the demographer's percentage changes for FES student population through the 2026-27 school year, student enrollment from existing dwelling units is projected to peak at 691 resident FES students in the 2019-20 school year and subsequently decline through 2026-27.

Developments in Process

Of the four developments currently in process within the FES attendance zone, only one will have an immediate impact on FES, the Thornwood Residences and Market Row Lofts. Once fully leased, the 135 two bedroom units at this location are projected to add two FES students. The undeveloped Lot 5 at Thornwood and Piper's Gardens could add the same number of FES students if developed in accordance with the scenario presented.

Underdeveloped Properties

Based on the current land use zoning, a total of 293 new single-family home units were included on three underdeveloped properties within the FES attendance zone. This number includes a 10-year phasing in of 261 single-family homes on the Germantown Country Club property beginning in 2021. If each of these properties were to be developed/redeveloped in accordance with the scenario presented, an increase of 51 FES students should be expected by the 2028-29 school year.

Attendance Zone Summary

Based on the demographer's projections through 2026-27, student enrollment numbers from existing dwelling units should remain below the school's current programmatic capacity of 720 for the foreseeable future. The addition of residential units at the Thornwood development and Piper's Gardens is projected to add approximately six FES students. Under GMSD's current attendance zoning, the future use of the residentially-zoned Germantown Country Club could have a significant impact on enrollment numbers at FES. Given this potential impact on FES programmatic capacity, any future residential development decisions at this location may require FES capital improvements or elementary attendance zone modifications. Based on this maximum GMSD student enrollment projection scenario, a net increase of 27 resident students is projected for FES by the 2028-29 school year. FES student enrollment is projected to be consistently around programmatic capacity through the 2028-29 school year.

Apartment Impact

Farmington Elementary

What are the likely impacts of future apartments and apartment building development on Farmington Elementary?

Central Business District

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, the only future apartments that will have an impact on FES enrollment numbers are the multi-family developments taking place at the Thornwood development within the Central Business District.

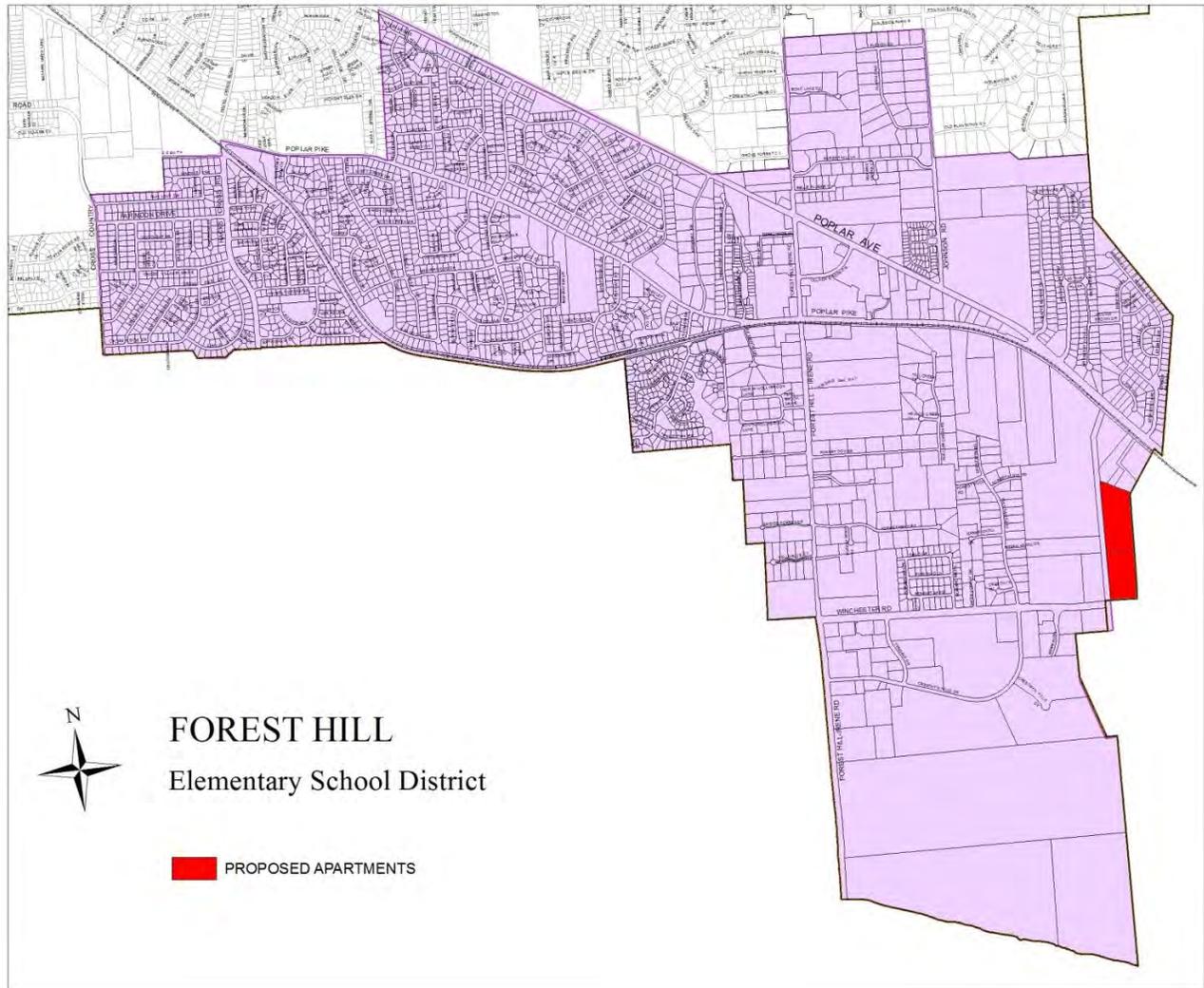
#15A: For the 2019-20 school year, the 138 two bedroom apartment units (classified as Type A apartments in this study) at The Residences at Thornwood and Market Row Lofts are projected to add two FES students, once all units are fully occupied. As mentioned previously, with around 35% occupancy at the time of this report, one child has been enrolled with GMSD from this location.

#15B: As of the release date of this report, a final proposed use for the remaining 2.98-acres of Lot 5 (Phase 6) of the Thornwood development has yet to be submitted by the developer. The Outline Plan for Phase 6, as originally submitted and approved, includes a possible 294 multi-family units for this location. However, final site plan approval by the Planning Commission and the BMA is still required. For the purposes of understanding the maximum potential impact apartments could have on GMSD, 147 two bedroom units were included as apartments (classified as Type A apartments in this study) for future student enrollment projection calculations. If the developer were to propose and receive approval for this number of apartments, two FES students should be expected from this location.

FOREST HILL ELEMENTARY

Forest Hill Elementary School (FHES) is in the process of being constructed at 3366 Forest Hill Irene Road. This state of the art, 105,780 sq. ft. building, with a total of 38 classrooms, sits on 38 acres and is will be adjacent to GMSD's new central office building. FHES will serve kindergarten through 5th grade and have a programmatic capacity of 815 students. The Forest Hill Heights District, where Smart Code zoning applies, is located within the boundaries of the FHES attendance zone.

Figure 13. Forest Hill Elementary Attendance Zoning Map (School Year 2019-20)



Existing Dwelling Unit Analysis

Apartments

There are no apartments currently located within the boundaries of this school attendance zone.

Figure 14. Forest Hill Elementary Existing Dwelling Unit Counts



*This dwelling unit count excludes Age-Restricted, Independent, and Assisted Living dwelling units due to the age-restrictions placed on occupants at these residential locations.

Condominiums & Townhomes

There are no condominiums currently located within the boundaries of this school attendance zone and no condominium developments are currently proposed or are being considered at this time.

Single-Family Homes

All elementary students who would have attended FHES during the 2018-19 school year and live within the new Forest Hill school attendance zone currently reside in one of the attendance zone’s 2,843 single-family homes. For the 2018-19 school year, 443 resident elementary students would have been enrolled at FHES if it were in operation. The majority of these students currently reside in the DES attendance zone. As shown in Table 20, the student to dwelling unit ratio within this new school attendance zone for single-family homes is 15.6.

Zone	Dwelling Type	Students	SFH Units	Ratio
Dogwood Elementary	Single-Family Homes	707	3,575	19.8
Farmington Elementary	Single-Family Homes	562	2,682	21.0
Forest Hill Elementary	Single-Family Homes	443	2,843	15.6
Riverdale Elementary	Single-Family Homes	641	4,048	15.8

Table 20. Student to Dwelling Unit Ratio for Single-Family Homes: Elementary (K-5)

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included 25 properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making elementary student enrollment projections for FHES. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 15 and Table 21 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum GMSD elementary student enrollment numbers.

Developments in Process:

#31	Chapel Cove Phase II	Zoned “R” for Residential, this 10.29-acre site has been placed in our projection model to be constructed and fully occupied by 2020. The addition of 22 single-family homes is projected to add three elementary students to FHES enrollment numbers.
#32	Reaves – John Duke	Zoned “R” for Residential, this 36.4-acre site was rezoned in 2018 from RE-1 in anticipation of a 77-lot planned development. The addition of a maximum of 77 single-family homes is projected to add twelve elementary students to FHES enrollment numbers.
#37	Cheatham Property	Zoned “R” for Residential, this 18.05-acre site has been placed in our projection model to be constructed and occupied in 2021. The addition of 34 single-family homes is projected to add five elementary students to FHES enrollment numbers.
#44	Goodwin Farms	Zoned “R” for Residential, this 101.3-acre site has been placed in our projection model to be constructed and occupied beginning in 2020. The addition of 232 single-family homes over a period of ten years (ten phases) will gradually increase the number of elementary students at FHES from four to over 30 by the 2028-29 school year.

#46	Viridian Apartments	Zoned "T4" for General Urban Zone within the Smart Code, the 24.45 acres at this location, the site of the proposed Viridian development project, has Outline Plan approval for a maximum number of 299 apartment units (12 units per acre). If this location is developed in accordance with the approved and recorded Outline Plan, our research team has estimated that the percentage breakdown of units would be 40% one bedroom units to 60% two or more bedroom units. Based on the non-linear regression analysis presented earlier in the study, the addition of 179 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 47% (7.2 per 100) of these students will attend a GMSD elementary school, based on current student allocations, a total of 13 elementary students are projected to attend FHES once all units are fully-leased. Additional plan approvals by both the Planning Commission and BMA would be required for this development to proceed in this manner.
-----	---------------------	---

Underdeveloped Properties:

#29	Leike Richard H Living Trust	Zoned "R" for Residential, the 5.9 acres at this location could have a maximum of 17 single-family homes. If developed, the property should be expected to add three FHES students.
-----	------------------------------	---

#30	Fogelman Robert F Revocable Trust	Zoned "O-C" for Office – Complex, these 32.3 acres are not projected to include a residential use based on its current zoning.
-----	-----------------------------------	--

#34	Bobo	Zoned "RE-1" for Residential Estate – 1 Acre, these 6.78 acres adjacent to Forest-Hill Irene Road could have a maximum of six single-family homes based on current zoning. If developed, the property should be expected to add one FHES student.
-----	------	---

#35	Forest Bend Properties	Zoned "RE-1" for Residential Estate – 1 Acre, these 22 lots on 47.24 acres to the east of Forest Hill Irene Road has been subdivided to include a total of 22 single-family homes (18 new single-family homes). These new homes have been placed in our projection model to be constructed and occupied by 2025. If developed, the property should be expected to add three FHES students.
-----	------------------------	--

#36	Skoutakis Property, Estate Home	Zoned "R" for Residential, the 9.26 acres at this location could have a maximum of 26 single-family homes. If developed, the property should be expected to add four FHES students.
-----	---------------------------------	---

#38	Forest Bend Properties	Zoned "R" for Residential, the 10.27 acres at this location could have a maximum of 29 single-family homes. If developed, the property should be expected to add five FHES students.
#40	Banks	Zoned "RE-1" for Residential – 1 Acre, the 15.24 acres at this location could have a maximum of 15 single-family homes. If developed, the property should be expected to add two FHES students.
#41	Miller	Zoned "RE-1" for Residential – 1 Acre, the 19.86 acres at this location could have a maximum of 19 single-family homes. If developed, the property should be expected to add three FHES students.
#42	King Family Trust	Zoned "RE-1" for Residential, the 25 acres at this location could have a maximum of 25 single-family homes. If developed, the property should be expected to add four FHES students.
#43	Grant Property	Zoned "RE-1" for Residential, the 24.87 acres at this location could have a maximum of 24 single-family homes. If developed, the property should be expected to add four FHES students.
#45	Micaten Inc.	Zoned "T3" for Sub-Urban Zone within the Smart Code, the 7.4 acres on this site could have a maximum of seven dwelling units per acre. Apartment buildings, row houses, or duplexes are not permitted residential uses. If developed with single-family homes, the property should be expected to add eight FHES students.
#47	Forest Hill Associates Phase 19 FHH	Zoned "T5" for Urban Center Zone within the Smart Code, the 17.52 acres at this location, the former site of the proposed Watermark development project, had Final Plan approval for a maximum number of 310 apartment units. This project ultimately failed to receive a development agreement with the City. If this location were to be developed in accordance with the approved and recorded Outline Plan for the site, approximately 60% of the apartments would likely have two or more bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 190 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 47% (7.2 per 100) of these students will attend a GMSD elementary school, based on current student allocations, a total of 14 elementary students are projected to attend FHES once all units are fully-leased.

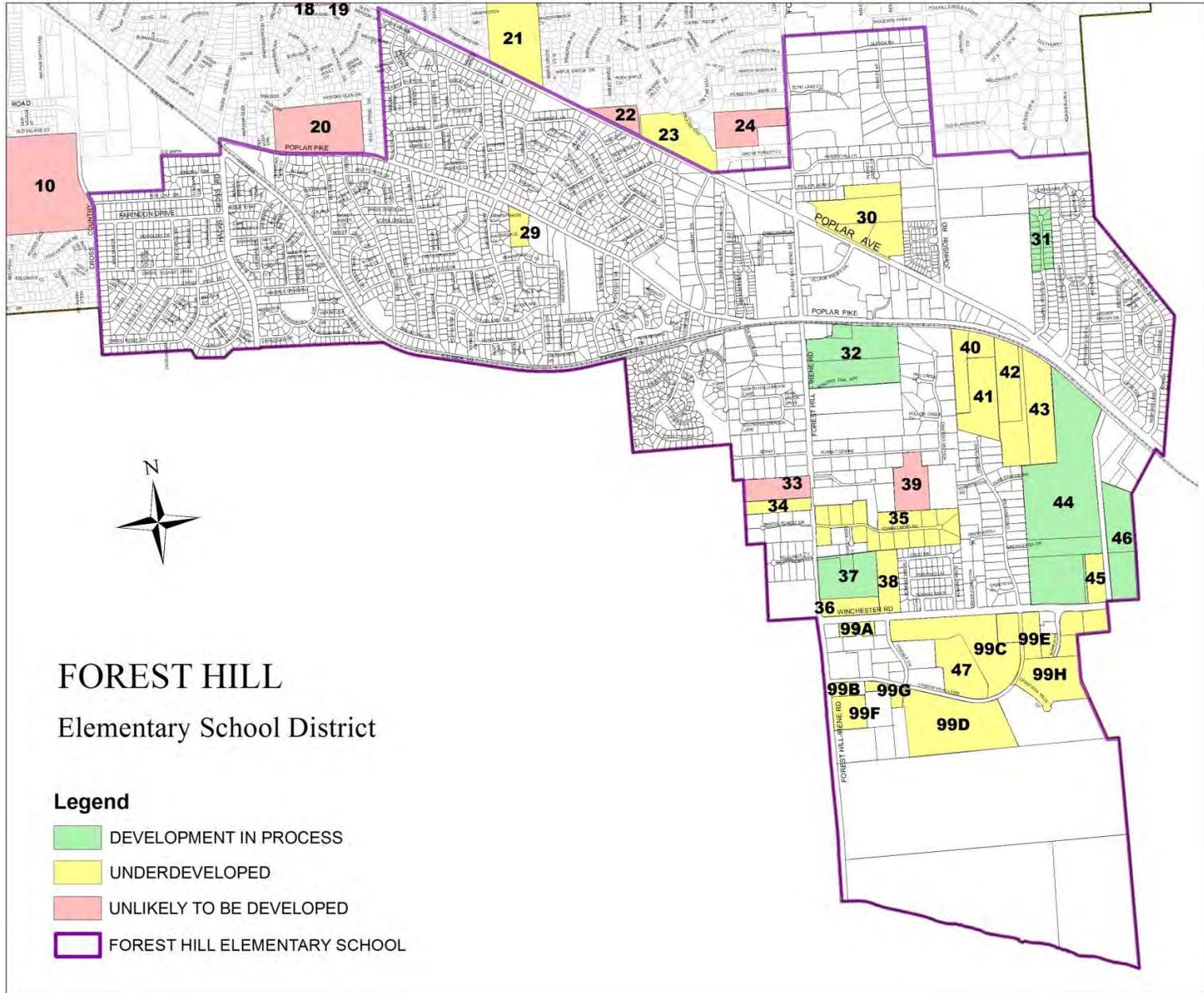
#99A	SHG Germantown	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 5.57-acre site. For 99A, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99B	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.63-acre site. For 99B, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99C	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 34.02-acre site. For 99C, the plan called for commercial, office, and residential uses designated as part of the conceptual land use plan. 300 multi-family units were proposed on this 34.02-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, with apartments as the proposed and approved multi-family use, approximately 60% of the apartments would likely have two or more bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 180 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 47% (7.2 per 100) of these students will attend a GMSD elementary school, based on current student allocations, a total of 13 elementary students are projected to attend FHES once all units are fully-leased.
#99D	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 44.06-acre site. For 99D, the plan called for office, single-family attached and multi-family uses designated as part of the conceptual land use plan. 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) were proposed on this 44.06-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, with apartments as the proposed and approved multi-family use, approximately 60% of the apartments would likely have two or more bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 180 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 47% (7.2 per 100) of these students will attend a GMSD elementary school, based on current student allocations, a total of 13 elementary students are projected to attend FHES once all units are fully-leased. Six elementary students are projected from the single-family attached homes (condominium-type development).

#99E	Willmar	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.86-acre site. For 99E, the plan called for retail, office (medical), and approximately 31 attached single-family structures (e.g. row houses similar to condominiums). If this location were to be developed in accordance with the small area plan, the property should be expected to add two FHES students.
#99F	Mascom	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 8.97-acre site. For 99F, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99G	Valenti Mid-South Realty	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 3.1-acre site. For 99G, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99H	Baptist Memorial	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 41.07-acre site. For 99H, the plan called for commercial, office, and 31 single-family attached homes (e.g. row houses similar to condominiums) uses as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, the property should be expected to add two FHES students.

Properties Unlikely To Be Developed < 10 Years:

Although categorized as "unlikely to be developed," two additional properties have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these two locations desire or intend to change the current land use of these sites at any point in the immediate future. These properties, listed in red on Figure 15 and Table 21, were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the properties fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 15. Forest Hill Elementary: Property Analysis Map



FOREST HILL ELEMENTARY		School Year	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29
Enrollment Projections from Existing Dwelling Units		Demographer Enrollment Forecast % Increase/Decrease	2.0%	1.9%	2.2%	0.9%	-2.6%	-2.5%	-2.3%	-1.5%	-1.2%	0.0%	0.0%
		Forecasted Enrollment using 18/19 Geocoding Actuals	443	451	461	466	453	442	432	425	420	420	420

Enrollment Ratio Per 100 2+ Bedroom Units By Dwelling		Apartments A (2.7 x 47%)	APTA	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
		Apartments B (15.3 x 47%)	APT B	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
		Single Family Homes (Forest Hill SFH ratio)	SFH	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
		Condominiums (17.7 x 45%)	CO	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

Property #	Property Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	# of 2+ Bedroom Units	Dwelling Type	Additional Students from New Residential Development															
								18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29					
Developments in Process																							
31	Chapel Cove Phase II	R	10.29	2.904	22	22	SFH	0	0	3	3	3	3	3	3	3	3	3					
32	Reaves-John Duke	R	36.4	2.904	77	77	SFH	0	0	12	12	12	12	12	12	12	12	12					
37	Cheatham Property	R	18.05	2.904	34	34	SFH	0	0	5	5	5	5	5	5	5	5	5					
44	Goodwin Farms	R	101.3	2.904	232	232	SFH	0	0	4	7	11	14	18	22	25	29	32					
46	Viridian Apartments	T4	24.45	12	299	179	APT B	0	0	0	13	13	13	13	13	13	13	13					
Underdeveloped Properties																							
29	Leike Richard H Living Trust	R	5.9	2.904	17	17	SFH	0	0	0	0	0	3	3	3	3	3	3					
30	Fogelman Robert F Revocable Trust	O-C	32.3	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0					
34	Bobo	RE-1	6.78	1	6	6	SFH	0	0	0	0	0	1	1	1	1	1	1					
35	Forest Bend Properties	RE-1	47.24	1	18	18	SFH	0	0	0	0	0	0	3	3	3	3	3					
36	Skoutakis Property, Estate Home	R	9.26	2.904	26	26	SFH	0	0	0	0	0	4	4	4	4	4	4					
38	Forest Bend Properties (Vacant)	R	10.27	2.904	29	29	SFH	0	0	0	0	0	5	5	5	5	5	5					
40	Banks	RE-1	15.24	1	15	15	SFH	0	0	0	0	0	2	2	2	2	2	2					
41	Miller	RE-1	19.86	1	19	19	SFH	0	0	0	0	0	3	3	3	3	3	3					
42	King Family Trust	RE-1	25	1	25	25	SFH	0	0	0	0	0	4	4	4	4	4	4					
43	Grant Property	RE-1	24.87	1	24	24	SFH	0	0	0	0	0	4	4	4	4	4	4					
45	Micaten Inc.	T3	7.4	7	52	52	SFH	0	0	0	0	0	8	8	8	8	8	8					
47	Forest Hill Associates - Phase 19	T5	17.69	17.52	310	190	APT B	0	0	0	0	0	14	14	14	14	14	14					
99A	SHG Germantown	T5	5.57	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0					
99B	Forest Hill Associates	T5	2.63	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0					
99C	Forest Hill Associates	T5	34.02	0	300	180	APT B	0	0	0	0	0	13	13	13	13	13	13					
99D	Forest Hill Associates	T5	44.06	0	300	180	APT B	0	0	0	0	0	13	13	13	13	13	13					
		T5		0	75	75	CO	0	0	0	0	0	6	6	6	6	6	6					
99E	Willmar	T5	2.86	0	31	31	CO	0	0	0	0	0	2	2	2	2	2	2					
99F	Mascom	T5	8.97	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0					
99G	Valenti Mid-South Realty	T5	3.1	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0					
99H	Baptist Memorial	T5	41.07	0	31	31	CO	0	0	0	0	0	2	2	2	2	2	2					
Properties Unlikely To Be Developed < 10 Yrs																							
33	Monsarrat	RE-1	11.5	1	11	11	SFH	0	0	0	0	0	0	0	0	0	0	0					
39	Bruns	RE-1	13.94	1	13	13	SFH	0	0	0	0	0	0	0	0	0	0	0					
Projected Number of Total Resident Students: Forest Hill Elementary								443	451	486	506	498	574	567	567	566	569	573					
Programmatic Capacity ----								815	Additional Capacity														
								372	364	329	309	317	241	248	248	249	246	242					

Change in Annual Student Enrollment	Existing Dwelling Units		8	10	4	-12	-11	-10	-6	-5	0	0
	New Residential Development		0	24	40	44	131	135	142	145	149	152
Net increase/decrease in student population from 2018-19			8	43	63	55	131	124	124	123	126	130

Additional Students By New Residential Development Type												
Apartments		0	0	0	13	13	53	53	53	53	53	53
Single-Family Homes		0	0	24	27	31	68	72	79	82	86	89
Condominiums		0	0	0	0	0	10	10	10	10	10	10
Annual Totals		0	0	24	40	44	131	135	142	145	149	152

Table 21. Forest Hill Elementary: Future Enrollment Projections

Student Enrollment Projection Summary: Forest Hill Elementary

Existing Dwelling Units

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, an approximate number of 443 resident GMSD elementary students would have attended FHES during the 2018-19 school year from the attendance zone's 2,843 existing dwelling units. Using the demographer's forecasted enrollment percentage changes for Dogwood Elementary School, since the majority of students at FHES students were formerly zoned for DES, student enrollment from existing dwelling units is projected to peak at 466 resident FHES students in the 2021-22 school year and subsequently decline through 2026-27. This figure is only 57% of total student capacity (466/815) at the new school.

Developments in Process

Four residential developments with a combined total of 365 single-family homes have some level of approval within the new FHES attendance zone. Based on the study's construction phasing projections, FHES should expect 52 elementary students from these developments by the 2028-29 school year. If the Viridian apartment development proceeds through the approval process and is constructed and fully-leased, an added 13 FHES students should be expected from this location. Therefore, GMSD should expect a total of 65 FHES students from developments in process by the 2028-29 school year.

Underdeveloped Properties

Based on the current land use zoning, a total of 231 new single-family home units were included on ten underdeveloped properties within the FHES attendance zone. Also, a total of 550 two or more bedroom apartment units and 137 single-family attached (condominium-style) homes were included within the Forest Hill Heights Smart Code district. If each of these properties were to be developed/redeveloped in accordance with the scenario presented, an added 87 FES students should be expected by the 2028-29 school year.

Attendance Zone Summary

Under the new school attendance zoning, FHES will begin operations at the new school serving 2,843 single-family homes and should open with less than a 60% occupancy to capacity rate. As illustrated in Table 21, a residential build-out scenario of an added 1,942 new dwelling units over the next ten years should not create an enrollment issue for FHES with students from within this attendance zone for the foreseeable future. A net increase of 130 resident students is projected for FHES by the 2028-29 school year under this scenario.

Apartment Impact

Forest Hill Elementary

What are the likely impacts of future apartments and apartment building development on Forest Hill Elementary?

Forest Hill Heights

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, the only future apartments that will have an impact on FHES enrollment numbers are the multi-family developments currently proposed or included within the small area plan for the Forest Hill Heights District.

#46: This development, known as Viridian, was one of the four apartment developments that were exempted from the moratorium. If the developer were to proceed and receive final approval of a project that was consistent with the aforementioned details (Type B apartments), a projected number of 13 FHES students should be expected from this location upon completion.

#47: Although the Watermark development was specifically referenced in the moratorium as an exemption because of an approved Outline Plan, the Project Development Contract and Final Plan did not receive the approval of the Board of Mayor and Aldermen at the July 23, 2018 meeting. Despite failing to receive this final authorization to proceed, our research team included their proposed number of 310 apartment (Type B) units based on the approved Outline Plan. If the 17.52-acre site were to be developed according to the proposed Final Plan, a projected number of 14 FHES students should be expected from this location upon completion.

#99C: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 34.02-acre site was one of the locations where up to 300 multi-family units would be located. These dwelling units could be condominiums, townhomes, and/or apartments. If this location were to be developed with apartments (Type B) as the proposed and approved multi-family use, the property should be expected to add 13 FHES students to enrollment numbers upon completion.

#99D: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 44.06-acre site was one of the locations where up to 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) would be located. If this location were to be developed in accordance with the small area plan with apartments (Type B) as the proposed and approved multi-family use, the property should be expected to add 13 FHES students from the apartment development, and six FHES students from single-family attached homes (condominium-type development).

RIVERDALE ELEMENTARY

Located at 7391 Neshoba Road, Riverdale School was originally constructed in 1968 on 15 acres and is adjacent to the City's Riverdale Park, which is 10 acres. This 152,199 square foot building recently completed a state of the art, 64,000 square foot addition in 2017, and now has an approximate number of 70 classrooms to serve the grade levels of kindergarten through 8th grade. The kindergarten through 5th grade portion of Riverdale Elementary (RES) has a programmatic capacity of 800 students. The West Poplar District and a portion of the Central Business District, where Smart Code zoning applies, is located within the boundaries of the RES attendance zone.

Figure 16. Riverdale Elementary Attendance Zoning Map (School Year 2019-20)

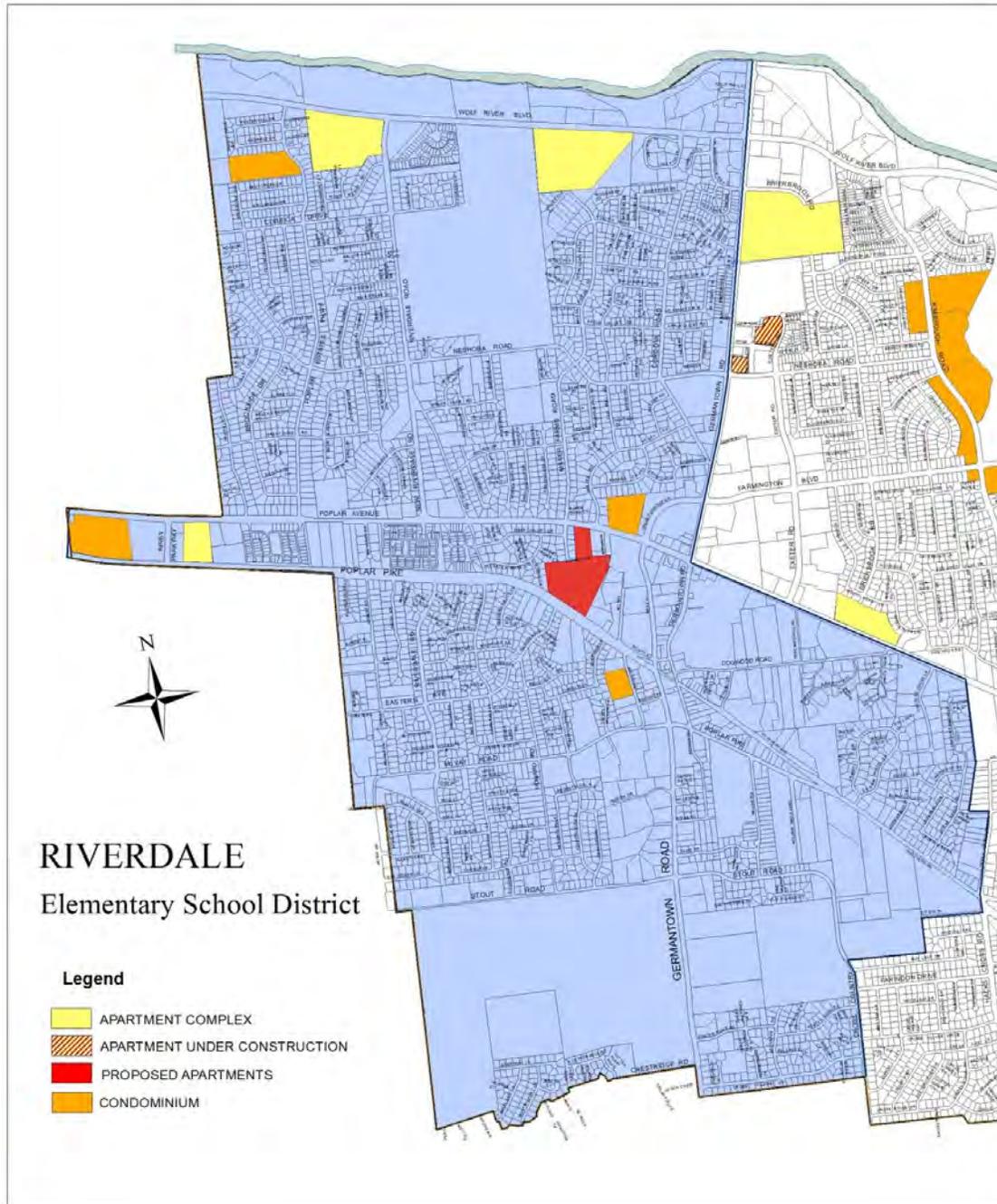


Figure 17. Riverdale Elementary Existing Dwelling Unit Counts



*This dwelling unit count excludes Age-Restricted, Independent, and Assisted Living dwelling units due to the age-restrictions placed on occupants at these residential locations.

Existing Dwelling Unit Analysis

Apartments

Three of the City’s five existing apartment developments are located in the RES attendance zone. The 552 apartment dwelling units at The Bridges, The Vineyards, and Westminster account for nearly 11% of dwelling units served by RES. Of these units, 384 have two or more bedrooms.

Condominiums & Townhomes

Four of the City’s condominiums are located within the RES attendance zone. The 487 condominium units account for 10% of dwelling units served by RES. Of these units, 434 have two or more bedrooms.

Single-Family Homes

Approximately 80% of all dwelling units served by RES are single-family homes. There are 4,048 single-family homes within this school attendance zone. For the 2018-19 school year, 641 resident elementary students who reside in a single-family home within this attendance zone were enrolled at RES. As shown in Table 22, the student to dwelling unit ratio within this attendance zone for single-family homes is 15.8.

Zone	Dwelling Type	Students	SFH Units	Ratio
Dogwood Elementary	Single-Family Homes	707	3,575	19.8
Farmington Elementary	Single-Family Homes	562	2,682	21.0
Forest Hill Elementary	Single-Family Homes	443	2,843	15.6
Riverdale Elementary	Single-Family Homes	641	4,048	15.8

Table 22. Student to Dwelling Unit Ratio for Single-Family Homes: Elementary (K-5)

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included eight (8) properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making elementary student enrollment projections for RES. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 18 and Table 23 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum GMSD elementary student enrollment numbers.

Developments in Process:

#1A	Carrefour at the Gateway	Partially-zoned “T6” for Urban Core Zone and “T5” for Urban Center Zone within the Smart Code district, the property owners at this 10.12, two-acre location have submitted an application to redevelop the existing site. The approved outline plan calls for a mix of retail, commercial and office uses. If apartments were subsequently proposed and approved for this location, the number of total students per 100 two or more apartment units would need determined using the non-linear regression analysis (Figure 6 and Table 12) presented in this study. 47% of the total student calculation would likely attend RES.
#7	Allelon Subdivision	Zoned “R” for Residential, these 50 single-family homes currently under development on this 25.68-acre site are estimated to be completed by calendar year 2020. The addition of these 50 single-family homes is projected to add eight elementary students to RES enrollment numbers.

Underdeveloped Properties:

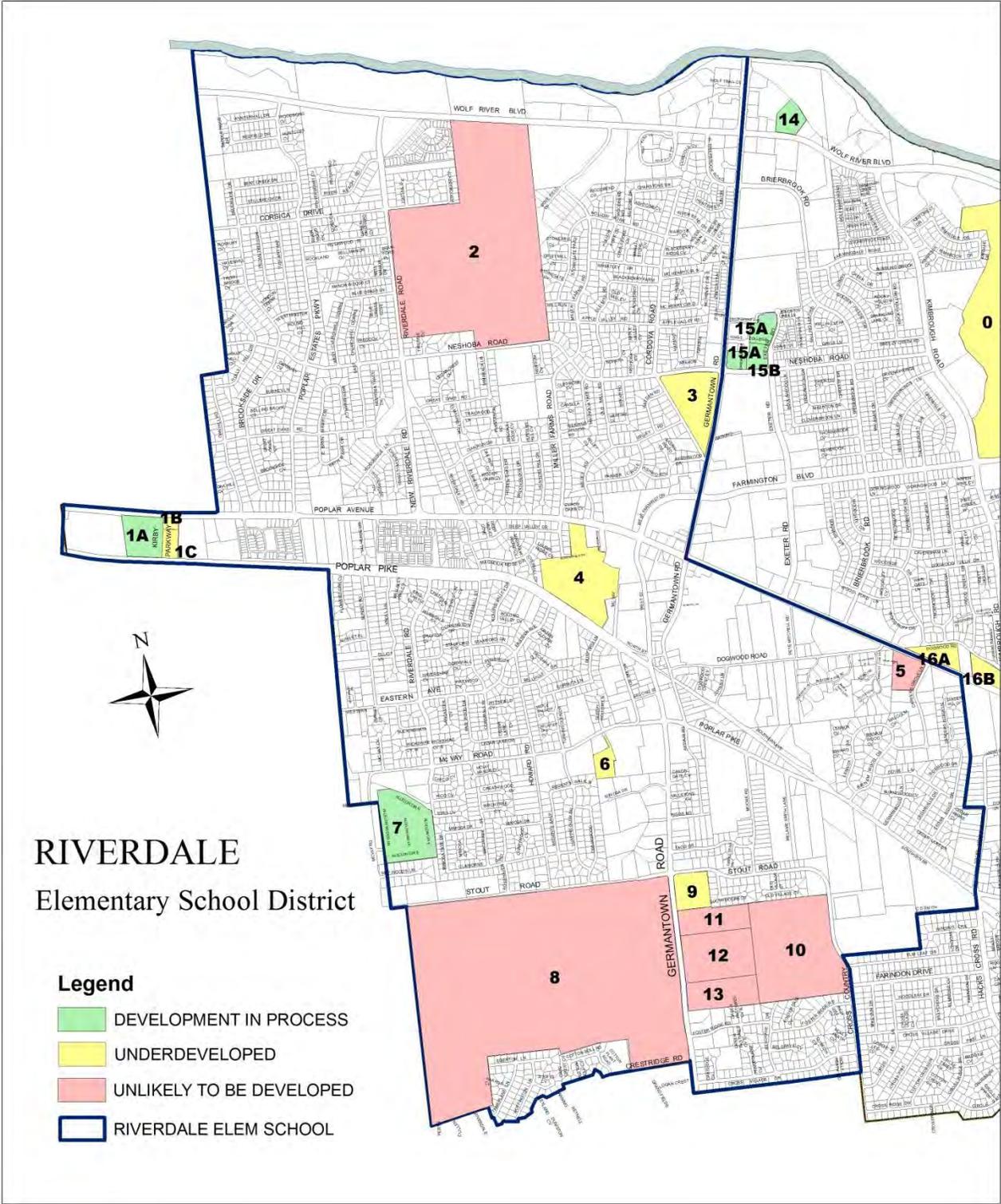
#1B	Bank of Bartlett	Zoned “T6” for Urban Core Zone within the Smart Code district, our research team included 20 apartment dwelling units on this one-acre property. If redeveloped in this manner, there are no elementary students expected from this location.
#1C	Kirby Professional Buildings	Partially-zoned “T6” for Urban Core Zone and “T5” for Urban Center Zone within the Smart Code district, our research team included 40 apartment dwelling units on this 2.64-acre property. If redeveloped in this manner, there are no elementary students expected from this location.

#3	Owen Jack R Revocable Trust	Zoned "R" for Residential, this 13.6-acre property was rezoned to Residential from its previous "T4" Smart Code zoning classification in 2018. Our research team included the addition of 39 single-family homes in our projections around 2023. If proposed, approved, and constructed as presented, RES should expect to add six elementary students from this location.
#4	Arthur Tract (Carter)	Zoned "T5" for Urban Center Zone within the Smart Code district, these 32.86 acres to the west/southwest of Saddle Creek have been identified as a location for mixed use development. Although their project approval has expired, Carter received preliminary approval from the Planning Commission to include 302 apartment dwelling units at this location. If this location were to be developed as apartments (Type A), similar in nature to the Thornwood development, approximately 50% of the apartments would likely have two bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 151 two bedroom apartment (Type A) units at an average monthly rent of \$2,299.39 per month is projected to add 2.7 GMSD students per 100 two bedroom units. Since 47% (1.3 per 100) of these students will attend a GMSD elementary school, based on current student allocations, a total of two elementary students would be projected to attend RES once all units are fully-leased.
#6	Klycie Walters B. Jr.	Zoned "R" for Residential, the 4.1 acres at this location could have a maximum of 12 dwelling units. If the property were to be developed/redeveloped, the property should be expected to add two RES students.
#9	Montesi Letitia D. Living Trust	Zoned "R" for Residential, the 9.5 acres at this location could have a maximum of 28 dwelling units. If the property were to be developed/redeveloped, the property should be expected to add four RES students.

Properties Unlikely To Be Developed < 10 Years:

Although categorized as "unlikely to be developed," seven additional properties have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these seven locations desire or intend to change the current land use of these sites at any point in the immediate future. These properties, listed in red on Figure 18 and Table 23, were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the properties fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 18: Riverdale Elementary Property Analysis Map



RIVERDALE ELEMENTARY (K-5)			School Year																
			18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29						
Enrollment Projections from Existing Dwelling Units			Demographer Enrollment Forecast % Increase/Decrease																
			-0.4%	0.7%	0.3%	0.9%	-1.6%	-1.5%	-1.7%	-2.2%	-1.7%	0.0%	0.0%						
			Forecasted Enrollment using 18/19 Geocoding Actuals																
			772	777	780	787	774	763	750	733	721	721	721						
Enrollment Ratio Per 100 2+ Bedroom Units By Dwelling Type			Apartments A (2.7 x 47%)		APTA	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3						
			Apartments B (15.3 x 47%)		APT B	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2					
			Single Family Homes (Riverdale SFH ratio)		SFH	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8					
			Condominiums (17.7 x 45%)		CO	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0					
Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	# of 2+ Bedroom Units	Dwelling Type	Additional Students from New Residential Development											
Developments in Process																			
1A	Carrefour	T6	10.12	20	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	
7	Allelon Subdivision	R	25.68	2.904	50	50	SFH	0	0	8	8	8	8	8	8	8	8	8	
Underdeveloped Properties																			
1B	Bank of Bartlett	T6	1	20	20	10	APT A	0	0	0	0	0	0	0	0	0	0	0	
1C	Kirby Professional Buildings	T5/T6	2.64	15	40	20	APT A	0	0	0	0	0	0	0	0	0	0	0	
3	Owen Jack R Revocable Trust	R	13.6	2.904	39	39	SFH	0	0	0	0	0	6	6	6	6	6	6	
4	Arthur Tract	T5	32.86	15	302	151	APT A	0	0	0	0	0	2	2	2	2	2	2	
6	Klycie Walters B Jr.	R	4.1	2.904	12	12	SFH	0	0	0	0	0	0	2	2	2	2	2	
9	Montesi Letitia D Living Trust	R	9.5	2.904	28	28	SFH	0	0	0	0	0	0	4	4	4	4	4	
Properties Unlikely To Be Developed < 10																			
2	Fullmer Estate	R	190.62	2.904	554	554	SFH	0	0	0	0	0	0	0	0	0	0	0	
5	Bowman	R	7.32	2.904	21	21	SFH	0	0	0	0	0	0	0	0	0	0	0	
8	Melanie Taylor Marital Trust	R	310	2.904	900	900	SFH	0	0	0	0	0	0	0	0	0	0	0	
10	Andrew McFadden	R	60.8	2.904	177	177	SFH	0	0	0	0	0	0	0	0	0	0	0	
11	James McFadden	R	12.89	2.904	37	37	SFH	0	0	0	0	0	0	0	0	0	0	0	
12	Nancy McFadden	R	25.39	2.904	74	74	SFH	0	0	0	0	0	0	0	0	0	0	0	
13	John McFadden	R	14.3	2.904	42	42	SFH	0	0	0	0	0	0	0	0	0	0	0	
Projected Number of Total Resident Students: Riverdale Elementary								772	777	788	795	782	779	766	756	743	743	743	
Programmatic Capacity ----			800		Additional Capacity				23	12	5	18	21	34	44	57	57	57	
Change in Annual Student Enrollment			Existing Dwelling Units						5	2	7	-13	-12	-13	-16	-12	0	0	
			New Residential Development						0	8	8	8	16	16	22	22	22	22	
Net increase/decrease in student population from 2018-19									5	16	23	10	7	-6	-16	-29	-29	-29	
Additional Students By New Residential Development Type																			
Apartments								0	0	0	0	0	2	2	2	2	2	2	
Single-Family Homes								0	0	8	8	8	14	14	20	20	20	20	
Condominiums								0	0	0	0	0	0	0	0	0	0	0	
Annual Totals								0	0	8	8	8	16	16	22	22	22	22	

Table 23. Riverdale Elementary: Future Enrollment Projections

Student Enrollment Projection Summary: Riverdale Elementary

Existing Dwelling Units

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, an approximate number of 772 resident RES students would have been attending RES during the 2018-19 school year from the attendance zone's 5,087 total dwelling units. In continuing the use of the demographer's changes for the RES student population through the 2026-27 school year, student enrollment from existing dwelling units is projected to peak at 787 resident RES students in the 2021-22 school year and subsequently decline through 2026-27.

Developments in Process

Of the two developments currently in process within the RES attendance zone, only the Allelon Subdivision will have an immediate impact on RES, unless changes are made to the mix of uses proposed for the Carrefour development during the approval process. The 50 single-family homes at Allelon are projected to add eight RES students upon completion.

Underdeveloped Properties

Based on the current land use zoning, a total of 79 new single-family home units were included on three underdeveloped properties within the RES attendance zone. If each of these properties were to be developed/redeveloped in accordance with the scenario presented, an increase of 12 RES students should be expected by the 2028-29 school year.

Three projects were also included in this category that are planned to include a multi-family residential component: the Bank of Bartlett, the Kirby Professional Buildings, and the Arthur Tract property. At a 50/50 split between one and two bedroom apartment (Type A) units, a total of 181 two bedroom apartment units combined among these locations is projected to add two RES students.

Attendance Zone Summary

Based on the demographer's projections through 2026-27, student enrollment numbers from existing dwelling units will remain relatively close to the school's current programmatic capacity of 800 through the 2021-22 school year and then subsequently decline. The addition of residential units at the Allelon development and the potential of an added 441 dwelling units on underdeveloped property should be expected to add approximately 22 RES students, if developed in accordance with the scenario presented. Assuming this maximum GMSD student enrollment projection scenario occurs, RES is projected to be at or near programmatic capacity in the short-term until resident student enrollment begins to decline after the 2021-22 school year. A net decrease of 29 resident students is projected for RES by the 2028-29 school year.

Apartment Impact

Riverdale Elementary

What are the likely impacts of future apartments and apartment building development on Riverdale Elementary?

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, the only future apartments that will have an impact on RES enrollment numbers are the multi-family developments currently proposed or included within the small area plans for the West Poplar Ave. District and a portion of the Central Business District.

West Poplar District

#1B & #1C: The combined 3.64 acres that are currently occupied by the Bank of Bartlett and the Kirby Professional Buildings, at the corner of Poplar Ave. and Kirby Pkwy., are considered locations where a mixed-use redevelopment could occur as a result of the T5 and T6 zoning. The possible 60 multi-family apartment dwelling units (30 two bedroom units based on Type A apartment assumption) on these sites are not projected to add students to RES.

On November 26, 2018, the Board of Mayor and Alderman approved the Carrefour at the Gateway Planned Development Outline Plan as recommended by the Planning Commission. Partially-zoned T5 and T6, the proposed Outline Plan included a mix of office, retail and hotel uses with a complimentary parking garage and civic space on this 10.12-acre site. If apartments were to be subsequently proposed at this location and made it through the final approval process, the number of total students per 100 two or more apartment units would need to be determined using the non-linear regression analysis (Figure 6 and Table 12) presented earlier in this study. 47% of the total student calculation would likely attend RES.

Central Business District

#4: Although the Carter development was referenced in the moratorium, as of December 2018, representatives for the Carter project have not proceeded past an initial Planning Commission Outline Plan approval and the Planning Commission approval has expired. However, because it was specifically listed within the moratorium as a development that had received some form of approval during the development consideration process, student enrollment numbers from these 32.86 acres were included in our enrollment projection model. If a developer were to propose and receive approval of a project (including Type A apartments) that was consistent with the Carter proposal, a projected number of two RES students should be expected from this location upon completion.

RIVERDALE MIDDLE

Located at 7391 Neshoba Road, Riverdale School was originally constructed in 1968 on 15 acres and is adjacent to the City's Riverdale Park, which is 10 acres. This 152,199 square foot building recently completed a state of the art, 64,000 square foot addition in 2017, and now has an approximate number of 70 classrooms to serve the grade levels of kindergarten through 8th grade. The 6th through 8th grade portion of Riverdale Middle (RMS) has a programmatic capacity of 510 students. The West Poplar District and a portion of the Central Business District, where Smart Code zoning applies, is located within the boundaries of the RMS attendance zone.

Figure 19. Riverdale Middle Attendance Zoning Map (School Year 2019-20)

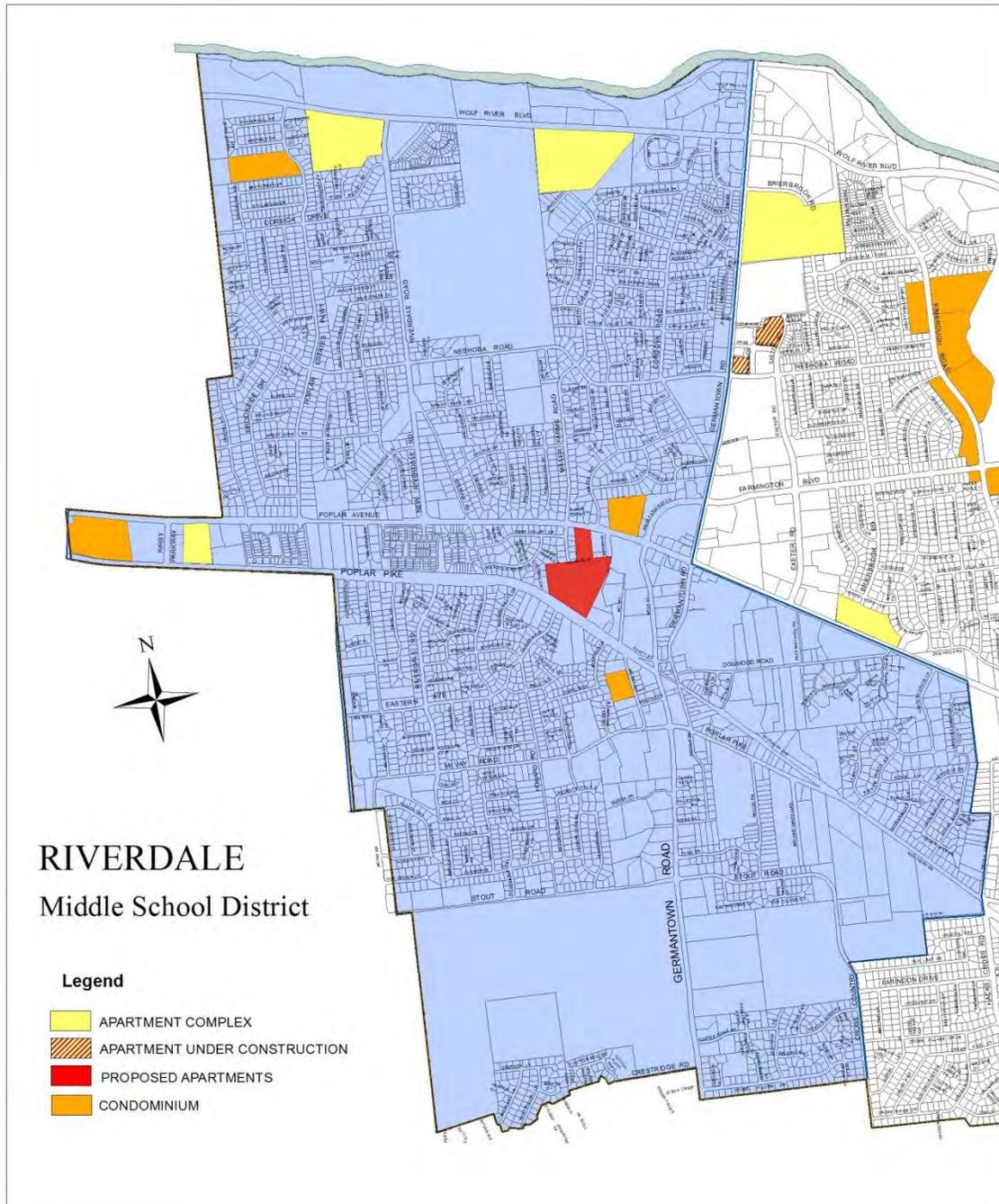


Figure 20. Riverdale Middle Existing Dwelling Unit Counts



*This dwelling unit count excludes Age-Restricted, Independent, and Assisted Living dwelling units due to the age-restrictions placed on occupants at these residential locations.

Existing Dwelling Unit Analysis

Apartments

Three of the City’s five existing apartment developments are located in the RMS attendance zone. The 552 apartment dwelling units at The Bridges, The Vineyards, and Westminster account for nearly 11% of dwelling units served by RMS. Of these units, 384 have two or more bedrooms.

Condominiums & Townhomes

Four of the City’s condominiums are located within the RMS attendance zone. The 487 condominium units account for 10% of dwelling units served by RMS. Of these units, 434 have two or more bedrooms.

Single-Family Homes

Approximately 80% of all dwelling units served by RMS are single-family homes. There are 4,048 single-family homes within this school attendance zone. For the 2018-19 school year, 355 resident middle school-aged students who reside in a single-family home within this attendance zone were enrolled at RMS. As shown in Table 24, the student to dwelling unit ratio within this attendance zone for single-family homes is 8.8.

Zone	Dwelling Type	Students	Units	Ratio
Riverdale Middle	Single-Family Homes	355	4048	8.8
Houston Middle	Single-Family Homes	902	9100	9.9

Table 24. Student to Dwelling Unit Ratio for Single-Family Homes: Middle (6-8)

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included eight (8) properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making student enrollment projections for RMS. These properties are listed below in green and yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 21 and Table 25 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum GMSD student enrollment numbers.

Developments in Process:

#1A	Carrefour at the Gateway	Partially-zoned “T6” for Urban Core Zone and “T5” for Urban Center Zone within the Smart Code district, the property owners at this 10.12, two-acre location have submitted an application to redevelop the existing site. The approved outline plan calls for a mix of retail, commercial and office uses. If apartments were subsequently proposed and approved for this location, the number of total students per 100 two or more apartment units would need determined using the non-linear regression analysis (Figure 6 and Table 12) presented in this study. 27% of the total student calculation would likely attend RMS.
#7	Allelon Subdivision	Zoned “R” for Residential, these 50 single-family homes currently under development on this 25.68-acre site are estimated to be completed by calendar year 2020. The addition of these 50 single-family homes is projected to add four students to RMS enrollment numbers.

Underdeveloped Properties:

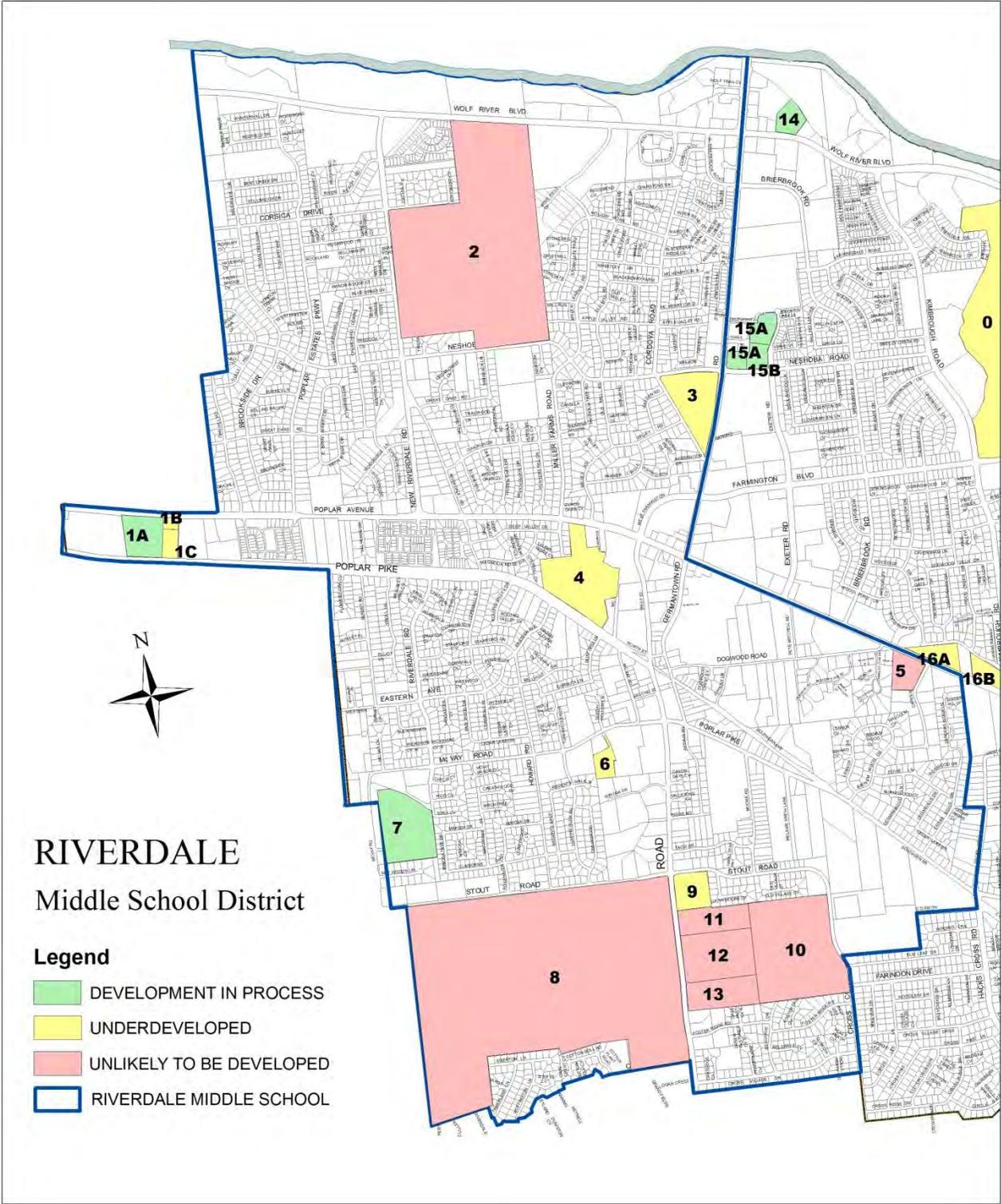
#1B	Bank of Bartlett	Zoned “T6” for Urban Core Zone within the Smart Code district, our research team included 20 apartment dwelling units on this one-acre property. If redeveloped in this manner, there are no students expected from this location.
#1C	Kirby Professional Buildings	Partially-zoned “T6” for Urban Core Zone and “T5” for Urban Center Zone within the Smart Code district, our research team included 40 apartment dwelling units on this 2.64-acre property. If redeveloped in this manner, there are no students expected from this location.

#3	Owen Jack R Revocable Trust	Zoned "R" for Residential, this 13.6-acre property was rezoned to Residential from its previous "T4" Smart Code zoning classification in 2018. Our research team included the addition of 39 single-family homes in our projections around 2023. If proposed, approved, and constructed as presented, RMS should expect to add three students from this location.
#4	Arthur Tract (Carter)	Zoned "T5" for Urban Center Zone within the Smart Code district, these 32.86 acres to the west/southwest of Saddle Creek have been identified as a location for mixed use development. Although their project approval has expired, Carter received preliminary approval from the Planning Commission to include 302 apartment dwelling units at this location. If this location were to be developed as apartments (Type A), similar in nature to the Thornwood development, approximately 50% of the apartments would likely have two bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 151 two bedroom apartment (Type A) units at an average monthly rent of \$2,299.39 per month is projected to add 2.7 GMSD students per 100 two bedroom units. Since 27% (0.7 per 100) of these students will attend a GMSD middle school, based on current student allocations, a total of one student would be projected to attend RMS once all units are fully-leased.
#6	Klycie Walters B. Jr.	Zoned "R" for Residential, the 4.1 acres at this location could have a maximum of 12 dwelling units. If the property were to be developed/redeveloped, the property should be expected to add one RMS students.
#9	Montesi Letitia D. Living Trust	Zoned "R" for Residential, the 9.5 acres at this location could have a maximum of 28 dwelling units. If the property were to be developed/redeveloped, the property should be expected to add two RMS students.

Properties Unlikely To Be Developed < 10 Years:

Although categorized as "unlikely to be developed," seven additional properties have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these seven locations desire or intend to change the current land use of these sites at any point in the immediate future. These properties, listed in red on Figure 21 and Table 25, were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the properties fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 21: Riverdale Middle Property Analysis Map



RIVERDALE MIDDLE (6-8)	School Year	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29
	Enrollment Projections from Existing Dwelling Units	Demographer Enrollment Forecast % Increase/Decrease	7.9%	5.5%	1.4%	-5.3%	2.3%	1.8%	3.0%	-1.7%	-2.0%	0.0%
	Forecasted Enrollment using 18/19 Geocoding Actuals	413	436	442	418	428	436	449	441	432	432	432

Enrollment Ratio Per 100 2+ Bedroom Units By Dwelling Type	Apartments A (2.7 x 27%)	APTA	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
	Apartments B (15.3 x 27%)	APT B	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	Single Family Homes (Riverdale SFH ratio)	SFH	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8	8.8
	Condominiums (17.7 x 26%)	CO	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6

Property #	Project Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	# of 2+ Bedroom Units	Dwelling Type	Additional Students from New Residential Development														
Developments in Process																						
1A	Carrefour	T6	10.12	20	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7	Allelon Subdivision	R	25.68	2.904	50	50	SFH	0	0	4	4	4	4	4	4	4	4	4	4	4	4	
Underdeveloped Properties																						
1B	Bank of Bartlett	T6	1	20	20	10	APT A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1C	Kirby Professional Buildings	T5/T6	2.64	15	40	20	APT A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	Owen Jack R Revocable Trust	R	13.6	2.904	39	39	SFH	0	0	0	0	0	0	3	3	3	3	3	3	3	3	
4	Arthur Tract	T5	32.86	15	302	151	APT A	0	0	0	0	0	0	1	1	1	1	1	1	1	1	
6	Klycie Walters B Jr.	R	4.1	2.904	12	12	SFH	0	0	0	0	0	0	0	0	1	1	1	1	1	1	
9	Montesi Letitia D Living Trust	R	9.5	2.904	28	28	SFH	0	0	0	0	0	0	0	0	2	2	2	2	2	2	
Properties Unlikely To Be Developed < 10																						
2	Fullmer Estate	R	190.62	2.904	554	554	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
5	Bowman	R	7.32	2.904	21	21	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8	Melanie Taylor Marital Trust	R	310	2.904	900	900	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10	Andrew McFadden	R	60.8	2.904	177	177	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	James McFadden	R	12.89	2.904	37	37	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	Nancy McFadden	R	25.39	2.904	74	74	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13	John McFadden	R	14.3	2.904	42	42	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Projected Number of Total Resident Students: Riverdale Middle								413	436	446	423	432	445	458	454	445	445	445			
Programmatic Capacity ----				510				Additional Capacity					74	64	87	78	65	52	56	65	65

Change in Annual Student Enrollment	Existing Dwelling Units		23	6	-23	10	8	13	-8	-9	0	0
	New Residential Development		0	4	4	4	8	8	11	11	11	11
Net increase/decrease in student population from 2018-19			23	33	10	19	32	45	41	32	32	32

Additional Students By New Residential Development Type																		
Apartments								0	0	0	0	0	1	1	1	1	1	1
Single-Family Homes								0	0	4	4	4	7	7	10	10	10	10
Condominiums								0	0	0	0	0	0	0	0	0	0	0
Annual Totals								0	0	4	4	4	8	8	11	11	11	11

Table 25. Riverdale Middle: Future Enrollment Projections

Student Enrollment Projection Summary: Riverdale Middle

Existing Dwelling Units

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, an approximate number of 413 resident RMS students would have been attending RMS during the 2018-19 school year from the attendance zone's 5,087 total dwelling units. In continuing the use of the demographer's percentage changes for the RMS student population through the 2026-27 school year, student enrollment from existing dwelling units is projected to peak at 449 resident RMS students in the 2024-25 school year and then subsequently decline.

Developments in Process

Of the two developments currently in process within the RMS attendance zone, only the Allelon Subdivision will have an immediate impact on RMS, unless changes are made to the Carrefour development during the approval process. The 50 single-family homes at Allelon are projected to add four RMS students upon completion.

Underdeveloped Properties

Based on the current land use zoning, a total of 79 new single-family home units were included on three underdeveloped properties within the RMS attendance zone. If each of these properties were to be developed/redeveloped in accordance with the scenario presented, an increase of six RMS students should be expected by the 2028-29 school year.

Three projects were also included in this category that are planned to include a multi-family residential component: the Bank of Bartlett, the Kirby Professional Buildings, and the Arthur Tract property. At a 50/50 split between one and two bedroom apartment (Type A) units, a total of 181 two bedroom apartment units combined among these locations are projected to add one RMS student.

Attendance Zone Summary

Based on the demographer's projections through 2026-27, student enrollment numbers from existing dwelling units will be below the school's current programmatic capacity of 510 for the foreseeable future. The addition of residential units at the Allelon development and the potential of an added 441 dwelling units on underdeveloped property should be expected to add approximately 11 RMS students, if developed in accordance with the scenario presented. Assuming this maximum GMSD student enrollment projection scenario occurs, total resident student enrollment at RMS is projected to remain under programmatic capacity through the 2028-29 school year. A maximum net increase of 45 resident students is projected for RMS in the 2024-25 school year.

Apartment Impact

Riverdale Middle

What are the likely impacts of future apartments and apartment building development on Riverdale Elementary?

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, the only future apartments that will have an impact on RMS enrollment numbers are the multi-family developments currently proposed or included within the small area plans for the West Poplar Ave. District and a portion of the Central Business District.

West Poplar District

#1B & #1C: The combined 3.64 acres that are currently occupied by the Bank of Bartlett and the Kirby Professional Buildings, at the corner of Poplar Ave. and Kirby Pkwy., are considered locations where a mixed-use redevelopment could occur as a result of the T5 and T6 zoning. The possible 60 multi-family apartment dwelling units (30 two bedroom units based on Type A apartment assumption) on these sites are not projected to add students to RMS.

On November 26, 2018, the Board of Mayor and Alderman approved the Carrefour at the Gateway Planned Development Outline Plan as recommended by the Planning Commission. Partially-zoned T5 and T6, the proposed Outline Plan included a mix of office, retail and hotel uses with a complimentary parking garage and civic space on this 10.12-acre site. If apartments were to be subsequently proposed at this location and made it through the final approval process, the number of total students per 100 two or more apartment units would need to be determined using the non-linear regression analysis (Figure 6 and Table 12) presented earlier in this study. 27% of the total student calculation would attend RMS.

Central Business District

#4: Although the Carter development was referenced in the moratorium, as of December 2018, representatives for the Carter project have not proceeded past an initial Planning Commission Outline Plan approval and the Planning Commission approval has expired. However, because it was specifically listed within the moratorium as a development that had received some form of approval during the development consideration process, student enrollment numbers from these 32.86 acres were included in our enrollment projection model. If a developer were to propose and receive approval of a project (including Type A apartments) that was consistent with the Carter proposal, a projected number of one RMS student should be expected from this location upon completion.

HOUSTON MIDDLE

Located at 9400 Wolf River Boulevard, Houston Middle School (HMS) sits on 20 acres and is just under a mile west of Houston High School. This 92,750 sq. ft. building, with a total of 50 classrooms, serves 6th through 8th grade and has a programmatic capacity of 930 students. The Forest Hill Heights District and a portion of the Central Business District, where Smart Code zoning applies, is located within the boundaries of the HMS attendance zone.

Figure 22. Houston Middle Attendance Zoning Map (School Year 2019-20)

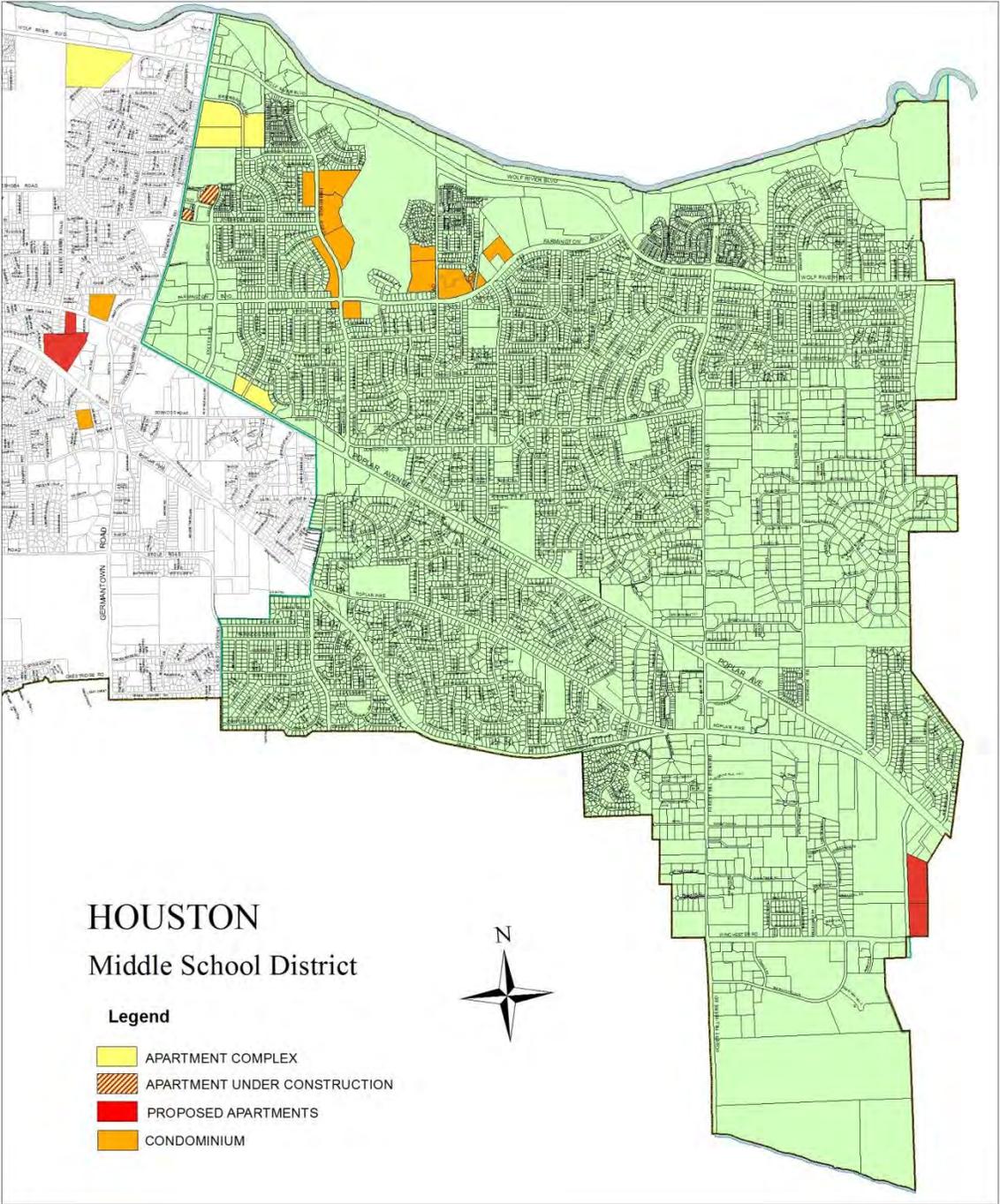


Figure 23. Houston Middle Existing Dwelling Unit Counts



*This dwelling unit count excludes Age-Restricted, Independent, and Assisted Living dwelling units due to the age-restrictions placed on occupants at these residential locations.

Existing Dwelling Unit Analysis

Apartments

Two of the City’s five existing apartment developments are located in the HMS attendance zone. The 462 apartment dwelling units at The Retreat and Farmington Gates account for 4% of dwelling units served by HMS. Of these units, 310 have two or more bedrooms.

Condominiums & Townhomes

The majority of the City’s condominiums are located within the HMS attendance zone. The 711 condominium units account for 7% of dwelling units served by HMS. Of these units, 656 have two or more bedrooms.

Single-Family Homes

Approximately 89% of all dwelling units served by HMS are single-family homes. There are 9,100 single-family homes within this school attendance zone. For the 2018-19 school year, 902 resident middle-school aged students who reside in a single-family home within this attendance zone were enrolled at HMS. As shown in Table 26, the student to dwelling unit ratio within this attendance zone for single-family homes is 9.9.

Zone	Dwelling Type	Students	Units	Ratio
Riverdale Middle	Single-Family Homes	355	4048	8.8
Houston Middle	Single-Family Homes	902	9100	9.9

Table 26. Student to Dwelling Unit Ratio for Single-Family Homes: Middle (6-8)

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included 36 properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making student enrollment projections for HMS. These properties are listed below in yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 24 and Table 27 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum student enrollment numbers.

Developments in Process:

#14	Avenida Senior Living Apartments	Zoned “R-H” for Retirement Housing, this 5.3-acre site has been scheduled for completion in late 2019. These 162 senior-living dwelling units will have no impact on student enrollment numbers due to age-restrictions placed on occupants at this location.
#15A	The Residences at Thornwood and Market Row Lofts	Zoned “T5” for Urban Center Zone within the Smart Code district, the fourth and fifth phases of Thornwood are scheduled for completion in 2019. Of the 276 total apartment units, half are one bedroom units and the other half are two bedroom units. Based on the non-linear regression analysis presented earlier in the study, the addition of 138 two bedroom apartment (Type A) units at an average monthly rent of \$2,299.39 per month is projected to add 2.7 GMUSD students per 100 two bedroom units. Since 27% (0.7 per 100) of these students will attend middle school, based on current student allocations, a total of one student is projected to attend HMS once all units are fully-leased.
#15B	Thornwood - Phase 6 (Undeveloped Lot 5)	Zoned “T5” for Urban Center Zone within the Smart Code district, these 2.98 acres on Lot 5 are the last phase of the Thornwood development project. As part of the development’s Outline Plan approval in 2014, a maximum of 294 multi-family units were included. If the developer were to propose and receive final approval for apartments at this location, our research team has estimated that the percentage breakdown of units would be fairly consistent with The Residences and Market Row Lofts, an approximate 50/50 split between one and two bedroom units. Based on the non-linear regression analysis presented earlier in the study, the addition of 147 two bedroom apartment (Type A) units at an average monthly rent of \$2,299.39 per month is projected to add 2.7 GMUSD students per 100 two bedroom units. Since 27% (0.7 per 100) of these students will attend middle school, based on current student allocations, a total of one student is projected to attend HMS once all units are fully-leased. Final site plan approval by both the Planning Commission and BMA would be required for this development to proceed in this manner.

#17	Piper's Gardens	Zoned "R" for Residential, this 5.58-acre site has been placed in our projection worksheet to be constructed and occupied as early as calendar year 2020. Although there is an approved subdivision on this property, no building permits have been issued. The addition of eight single-family homes at this location could add one HMS student if all eight are completed.
#31	Chapel Cove Phase II	Zoned "R" for Residential, this 10.29-acre site has been placed in our projection model to be constructed and fully occupied by 2020. The addition of 22 single-family homes is projected to add two HMS students.
#32	Reaves – John Duke	Zoned "R" for Residential, this 36.4-acre site was rezoned in 2018 from RE-1 in anticipation of a 77-lot planned development. The addition of a maximum of 77 single-family homes is projected to add eight HMS students.
#37	Cheatham Property	Zoned "R" for Residential, this 18.05-acre site has been placed in our projection model to be constructed and occupied in 2021. The addition of 34 single-family homes is projected to add three HMS students.
#44	Goodwin Farms	Zoned "R" for Residential, this 101.3-acre site has been placed in our projection model to be constructed and occupied beginning in 2020. The addition of 232 single-family homes over a period of ten years (ten phases) will gradually increase the number of HMS students from two to 20 by the 2028-29 school year.
#46	Viridian Apartments	Zoned "T4" for General Urban Zone within the Smart Code, the 24.45 acres at this location, the site of the proposed Viridian development project, has Outline Plan approval for a maximum number of 299 apartment units (12 units per acre). If this location is developed in accordance with the approved and recorded Outline Plan, our research team has estimated that the percentage breakdown of units would be 40% one bedroom units to 60% two or more bedroom units. Based on the non-linear regression analysis presented earlier in the study, the addition of 179 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 27% (4.1 per 100) of these students will attend middle school, based on current student allocations, a total of and added seven HMS students are projected once all units are fully-leased. Additional plan approvals by both the Planning Commission and BMA would be required for this development to proceed in this manner.

Underdeveloped Properties:

#0	Germantown Country Club	Zoned "R" for Residential, this 178.6-acre property is on the market for sale at the time of this study. Given the uncertainty of this property's future, 90 acres of unrestricted property was considered for residential development for the purpose of projecting maximum student enrollment numbers. The addition of 261 single-family homes over a period of ten years could gradually increase the annual number of HMS students within the district from an initial three to over 20 by 2028.
#16A	Patel	Zoned "R" for Residential, the 6.46 acres at this location could have a maximum of 18 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property should be expected to add two HMS students.
#16B	Dogwood Manor	Zoned "R" for Residential, the 4.88 acres at this location could have a maximum of 14 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property should be expected to add one HMS student.
#21	Warlick Sandra H and Hulon O	Zoned "R" for Residential, the 30.07 acres at this location could have a maximum of 87 dwelling units. One single-family home is currently located on this property. If the property were to be developed/redeveloped with this number of units, nine students should be expected to attend HMS.
#23	Miti Group	Zoned "R" for Residential, the 18.28 acres at this location could have a maximum of 47 single-family homes. If developed/redeveloped with this number of units, five students should be expected to attend HMS.
#25	Steiner	Zoned "RE" for Residential Estate, the 12.81 acres at this location could have a maximum of six dwelling units. If developed/redeveloped with this number of units, one student should be expected to attend HMS.
#28	Ben Clark Property	Zoned "AG" for Agricultural, the 180.59 acres at this location could have a maximum of 36 dwelling units (at one home per five acres). One single-family estate home is currently located on this property. If developed/redeveloped under the current zoning with this number of units, four students should be expected to attend HMS.

#29	Leike Richard H Living Trust	Zoned "R" for Residential, the 5.9 acres at this location could have a maximum of 17 single-family homes. If developed, the property should be expected to add two HMS students.
#30	Fogelman Robert F Revocable Trust	Zoned "O-C" for Office – Complex, these 32.3 acres are not projected to include a residential use based on its current zoning.
#34	Bobo	Zoned "RE-1" for Residential Estate – 1 Acre, these 6.78 acres adjacent to Forest-Hill Irene Road could have a maximum of six single-family homes based on current zoning. If developed, the property should be expected to add one HMS student.
#35	Forest Bend Properties	Zoned "RE-1" for Residential Estate – 1 Acre, these 22 lots on 47.24 acres to the east of Forest Hill Irene Road has been subdivided to include a total of 22 single-family homes (18 new single-family homes). These new homes have been placed in our projection model to be constructed and occupied by 2025. If developed, the property should be expected to add two HMS students.
#36	Skoutakis Property, Estate Home	Zoned "R" for Residential, the 9.26 acres at this location could have a maximum of 26 single-family homes. If developed, the property should be expected to add three HMS students.
#38	Forest Bend Properties	Zoned "R" for Residential, the 10.27 acres at this location could have a maximum of 29 single-family homes. If developed, the property should be expected to add three HMS students.
#40	Banks	Zoned "RE-1" for Residential – 1 Acre, the 15.24 acres at this location could have a maximum of 15 single-family homes. If developed, the property should be expected to add one HMS student.
#41	Miller	Zoned "RE-1" for Residential – 1 Acre, the 19.86 acres at this location could have a maximum of 19 single-family homes. If developed, the property should be expected to add two HMS students.
#42	King Family Trust	Zoned "RE-1" for Residential, the 25 acres at this location could have a maximum of 25 single-family homes. If developed, the property should be expected to add two HMS students.

#43	Grant Property	Zoned "RE-1" for Residential, the 24.87 acres at this location could have a maximum of 24 single-family homes. If developed, the property should be expected to add two HMS students.
#45	Micaten Inc.	Zoned "T3" for Sub-Urban Zone within the Smart Code, the 7.4 acres on this site could have a maximum of seven dwelling units per acre. Apartment buildings, row houses, or duplexes are not permitted residential uses. If developed with single-family homes, the property should be expected to add two HMS students.
#47	Forest Hill Associates Phase 19 FHH	Zoned "T5" for Urban Center Zone within the Smart Code, the 17.52 acres at this location, the former site of the proposed Watermark development project, had Final Plan approval for a maximum number of 310 apartment units. This project ultimately failed to receive a development agreement with the City. If this location were to be developed in accordance with the approved and recorded Outline Plan for the site, approximately 60% of the apartments would likely have two or more bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 190 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 27% (4.1 per 100) of these students will attend middle school, based on current student allocations, a total of eight students are projected to attend HMS once all units are fully-leased.
#99A	SHG Germantown	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 5.57-acre site. For 99A, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99B	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.63-acre site. For 99B, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.

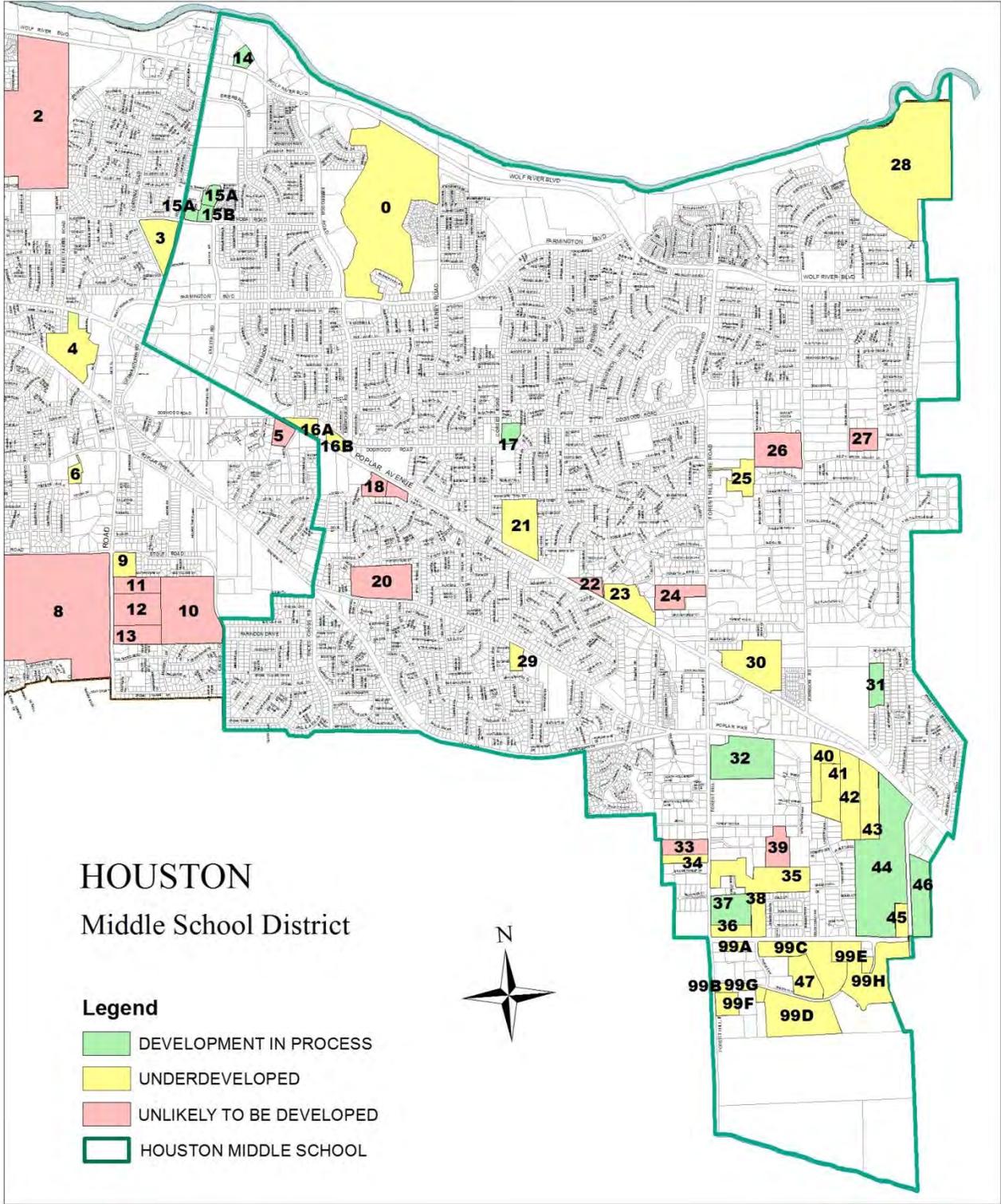
#99C	Forest Hill Associates	<p>Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 34.02-acre site. For 99C, the plan called for commercial, office, and residential uses designated as part of the conceptual land use plan. 300 multi-family units were proposed on this 34.02-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, with apartments as the proposed and approved multi-family use, approximately 60% of the apartments would likely have two or more bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 180 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 27% (4.1 per 100) of these students will attend middle school, based on current student allocations, a total of seven students are projected to attend HMS once all units are fully-leased.</p>
#99D	Forest Hill Associates	<p>Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 44.06-acre site. For 99D, the plan called for office, single-family attached and multi-family uses designated as part of the conceptual land use plan. 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) were proposed on this 44.06-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, with apartments as the proposed and approved multi-family use, approximately 60% of the apartments would likely have two or more bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 180 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 27% (4.1 per 100) of these students will attend middle school, based on current student allocations, a total of seven students are projected to attend HMS once all units are fully-leased. Three students are projected for HMS from the single-family attached homes (condominium-type development).</p>
#99E	Willmar	<p>Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.86-acre site. For 99E, the plan called for retail, office (medical), and approximately 31 attached single-family structures (e.g. row houses similar to condominiums). If this location were to be developed in accordance with the small area plan, the property should be expected to add one HMS student.</p>
#99F	Mascom	<p>Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 8.97-acre site. For 99F, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.</p>

#99G	Valenti Mid-South Realty	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 3.1-acre site. For 99G, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99H	Baptist Memorial	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 41.07-acre site. For 99H, the plan called for commercial, office, and 31 single-family attached homes (e.g. row houses similar to condominiums) uses as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, the property should be expected to add one HMS student.

Properties Unlikely To Be Developed < 10 Years:

Although categorized as “unlikely to be developed,” nine additional properties have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these nine locations desire or intend to change the current land use of these sites at any point in the immediate future. These properties, listed in red on Figure 24 and Table 27, were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the properties fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 24: Houston Middle Property Analysis Map



HOUSTON MIDDLE	School Year	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29
		Enrollment Projections from Existing Dwelling Units	Demographer Enrollment Forecast % Increase/Decrease	-0.3%	0.7%	-3.2%	-1.6%	3.1%	1.8%	2.3%	-1.1%	-0.8%
	Forecasted Enrollment using 18/19 Geocoding Actuals	989	996	964	949	978	996	1019	1007	999	999	999

Enrollment Ratio Per 100 2+ Bedroom Units By Dwelling	Apartments A (2.7 x 27%)	APTA	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
	Apartments B (15.3 x 27%)	APT B	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	Single Family Homes (HMS SFH ratio)	SFH	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
	Condominiums (17.7 x 26%)	CO	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6

Property #	Property Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	# of 2+ Bedroom Units	Dwelling Type	Additional Students from New Residential Development												
								18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29		
Developments in Process																				
14	Avenida Senior Living Apartments	R-H	5.3	31	162	-	AL	0	0	0	0	0	0	0	0	0	0	0	0	0
15A	TW Residences & Market Row Lofts	T5	7.09	39	276	138	APT A	0	1	1	1	1	1	1	1	1	1	1	1	1
15B	Thornwood (Undeveloped Lot 5)	T5	2.98	99	294	147	APT A	0	0	0	1	1	1	1	1	1	1	1	1	1
17	Piper's Gardens	R	5.58	2,904	8	8	SFH	0	0	1	1	1	1	1	1	1	1	1	1	1
31	Chapel Cove Phase II	R	10.29	2,904	22	22	SFH	0	0	2	2	2	2	2	2	2	2	2	2	2
32	Reaves-John Duke	R	36.4	2,904	77	77	SFH	0	0	8	8	8	8	8	8	8	8	8	8	8
37	Cheatham Property	R	18.05	2,904	34	34	SFH	0	0	3	3	3	3	3	3	3	3	3	3	3
44	Goodwin Farms	R	101.3	2,904	232	232	SFH	0	0	2	5	7	9	11	14	16	18	20		
46	Viridian Apartments	T4	24.45	12	299	179	APT B	0	0	0	7	7	7	7	7	7	7	7	7	7
Underdeveloped Properties																				
0	Germantown Country Club	R	178.6	2,904	261	261	SFH	0	0	0	3	5	8	10	13	15	18	21		
16A	Patel	R	6.46	2,904	18	18	SFH	0	0	0	2	2	2	2	2	2	2	2	2	2
16B	Dogwood Manor	R	4.88	2,904	14	14	SFH	0	0	0	1	1	1	1	1	1	1	1	1	1
21	Warlick Sandra H and Hulon O	R	30.07	2,904	87	87	SFH	0	0	0	0	0	9	9	9	9	9	9	9	9
23	Miti Group	R	18.28	2,904	47	47	SFH	0	0	0	0	0	5	5	5	5	5	5	5	5
25	Steiner	RE	12.81	0.5	6	6	SFH	0	0	0	0	0	0	0	1	1	1	1	1	1
28	Ben Clark Property	AG	180.59	0.2	36	36	SFH	0	0	0	0	0	4	4	4	4	4	4	4	4
29	Leike Richard H Living Trust	R	5.9	2,904	17	17	SFH	0	0	0	0	0	2	2	2	2	2	2	2	2
30	Fogelman Robert F Revocable Trust	O-C	32.3	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
34	Bobo	RE-1	6.78	1	6	6	SFH	0	0	0	0	0	1	1	1	1	1	1	1	1
35	Forest Bend Properties	RE-1	47.24	1	18	18	SFH	0	0	0	0	0	0	0	2	2	2	2	2	2
36	Skoutakis Property, Estate Home	R	9.26	2,904	26	26	SFH	0	0	0	0	0	3	3	3	3	3	3	3	3
38	Forest Bend Properties (Vacant)	R	10.27	2,904	29	29	SFH	0	0	0	0	0	3	3	3	3	3	3	3	3
40	Banks	RE-1	15.24	1	15	15	SFH	0	0	0	0	0	1	1	1	1	1	1	1	1
41	Miller	RE-1	19.86	1	19	19	SFH	0	0	0	0	0	2	2	2	2	2	2	2	2
42	King Family Trust	RE-1	25	1	25	25	SFH	0	0	0	0	0	2	2	2	2	2	2	2	2
43	Grant Property	RE-1	24.87	1	24	24	SFH	0	0	0	0	0	2	2	2	2	2	2	2	2
45	Micaten Inc.	T3	7.4	7	52	52	SFH	0	0	0	0	0	5	5	5	5	5	5	5	5
47	Forest Hill Associates - Phase 19	T5	17.69	17.52	310	190	APT B	0	0	0	0	0	8	8	8	8	8	8	8	8
99A	SHG Germantown	T5	5.57	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
99B	Forest Hill Associates	T5	2.63	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
99C	Forest Hill Associates	T5	34.02	0	300	180	APT B	0	0	0	0	0	7	7	7	7	7	7	7	7
99D	Forest Hill Associates	T5	44.06	0	300	180	APT B	0	0	0	0	0	7	7	7	7	7	7	7	7
		T5		0	75	75	CO	0	0	0	0	0	3	3	3	3	3	3	3	
99E	Willmar	T5	2.86	0	31	31	CO	0	0	0	0	0	1	1	1	1	1	1	1	1
99F	Mascom	T5	8.97	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
99G	Valenti Mid-South Realty	T5	3.1	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0
99H	Baptist Memorial	T5	41.07	0	31	31	CO	0	0	0	0	0	1	1	1	1	1	1	1	1
Properties Unlikely To Be Developed < 10 Yrs																				
18	Barzizza	R	7.01	2,904	20	20	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Fite	R	4	2,904	12	12	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Smith Sarah S Family Trust	R	178.6	2,904	99	99	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Lankford	R	6.09	2,904	18	18	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Grizzard	RE	16.26	0.5	16	16	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Herring	RE	27	0.5	13	13	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0
27	Selman	RE-1	10	1	10	10	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0
33	Monsarrat	RE-1	11.5	1	11	11	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0
39	Bruns	RE-1	13.94	1	13	13	SFH	0	0	0	0	0	0	0	0	0	0	0	0	0

Projected Number of Total Resident Students: Houston Middle	989	997	981	983	1016	1105	1132	1129	1125	1130	1135
Programmatic Capacity ----	930										
Additional Capacity		-67	-51	-53	-86	-175	-202	-199	-195	-200	-205

Change in Annual Student Enrollment	Existing Dwelling Units	7	-32	-15	29	18	23	-11	-8	0	0
	New Residential Development	1	17	34	38	109	113	122	126	131	136
Net increase/decrease in student population from 2018-19		8	-8	-6	27	116	143	140	136	141	146

Additional Students By New Residential Development Type											
Apartments		0	1	1	9	9	31	31	31	31	31
Single-Family Homes		0	0	16	25	29	73	77	86	90	100
Condominiums		0	0	0	0	0	5	5	5	5	5
Annual Totals		0	1	17	34	38	109	113	122	126	131

Table 27. Houston Middle: Future Enrollment Projections

Student Enrollment Projection Summary: Houston Middle

Existing Dwelling Units

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, an approximate number of 989 resident HMS students would have attended HMS during the 2018-19 school year from the attendance zone's 10,273 total dwelling units. In continuing the use of the demographer's percentage changes for the HMS student population through the 2026-27 school year, student enrollment from existing dwelling units within this attendance zone is projected to peak at 1,019 resident HMS students in the 2024-25 school year. This 1,019 projected resident student number is 89 students above the school's current programmatic capacity number of 930.

Developments in Process

Five residential developments with a combined total of 373 single-family homes have some level of approval within the HMS attendance zone. Based on the study's construction phasing projections, HMS should expect 34 students from these developments by the 2028-29 school year. A total of two HMS students are projected from the Thornwood development, one from the 138 two bedroom apartment units at The Residences and Market Row Lofts, and one from the undeveloped Lot 5, if it were to be proposed, approved, and developed with an additional 147 two bedroom apartment units. If the Viridian development proceeds through the approval process and is constructed and has 179 fully-leased, two or more bedroom apartment units, an added seven students should be expected from this location. Therefore, GMSD should expect a total of 43 HMS students from developments in process by the 2028-29 school year.

Underdeveloped Properties

Based on the current land use zoning, a total of 700 new single-family home units were included on 17 underdeveloped properties within the HMS attendance zone. Also, a total of 550 two or more bedroom apartment units and 137 single-family attached (condominium-style) homes were included within the Forest Hill Heights Smart Code district. If these properties were to be developed/redeveloped in accordance with the scenario presented, an added 93 HMS students should be expected by the 2028-29 school year.

Attendance Zone Summary

Based on the demographer's projections through 2026-27, student enrollment numbers from existing dwelling units will continue to be well in excess of the school's current programmatic capacity of 930 for the foreseeable future. Assuming this maximum GMSD student enrollment projection scenario occurs, total resident student enrollment at HMS is projected to reach a maximum of 1,135 resident students by the 2028-29 school year. A maximum net increase of 146 resident students is projected for HMS by the 2024-25 school year. This number is in addition to the 59 resident students HMS is already over programmatic capacity (a total of 205 over capacity by the 2028-29 school year under this aggressive build-out scenario).

Apartment Impact

Houston Middle

What are the likely impacts of future apartments and apartment building development on Houston Middle?

Forest Hill Heights

Under the new attendance zones approved by the GMSD board for the 2019-20 school year, the only future apartments that will have an impact on HMS enrollment numbers are the multi-family developments currently proposed or included within the small area plan for the Forest Hill Heights District and a portion of the Central Business District.

#46: This development, known as Viridian, was one of the four apartment developments that were exempted from the moratorium. If the developer were to proceed and receive final approval of a project that was consistent with the aforementioned details (Type B apartments), a projected number of seven HMS students should be expected from this location upon completion.

#47: Although the Watermark development was specifically referenced in the moratorium as an exemption because of an approved Outline Plan, the Project Development Contract and Final Plan did not receive the approval of the Board of Mayor and Aldermen at the July 23, 2018 meeting. Despite failing to receive this final authorization to proceed, our research team included their proposed number of 310 apartment (Type B) units based on the approved Outline Plan. If the 17.52-acre site were to be developed according to the proposed Final Plan, a projected number of eight HMS students should be expected from this location upon completion.

#99C: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 34.02-acre site was one of the locations where up to 300 multi-family units would be located. These dwelling units could be condominiums, townhomes, and/or apartments. If this location were to be developed with apartments (Type B) as the proposed and approved multi-family use, the property should be expected to add seven HMS students to enrollment numbers upon completion.

#99D: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 44.06-acre site was one of the locations where up to 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) would be located. If this location were to be developed in accordance with the small area plan with apartments (Type B) as the proposed and approved multi-family use, the property should be expected to add seven HMS students from the apartment development, and three HMS students from single-family attached homes (condominium-type development).

Central Business District

#15A: For the 2019-20 school year, the 138 two bedroom apartment units (classified as Type A apartments in this study) at The Residences at Thornwood and Market Row Lofts are projected to add one HMS student, once all units are fully occupied. As mentioned previously, with around 35% occupancy at the time of this report, one child has been enrolled with GMSD from this location.

Apartment Impact cont.

Houston Middle

#15B: As of the release date of this report, a final proposed use for the remaining 2.98-acres of Lot 5 (Phase 6) of the Thornwood development has yet to be submitted by the developer. The Outline Plan for Phase 6, as originally submitted and approved, includes a possible 294 multi-family units for this location. However, final site plan approval by the Planning Commission and the BMA is still required. For the purposes of understanding the maximum potential impact apartments could have on GMSD, 147 two bedroom units were included as apartments (classified as Type A apartments in this study) for future student enrollment projection calculations. If the developer were to propose and receive approval for this number of apartments, one HMS student should be expected from this location.

HOUSTON HIGH

Located at 9755 Wolf River Boulevard in the northeast corner of Germantown’s city limits, Houston High School (HHS) sits on a 45-acre campus just under a mile east of Houston Middle School. This 263,689 sq. ft. building, constructed in 1989, serves 9th through 12th grade and has a programmatic capacity of 2,100 students. All three Smart Code zoning districts are located within the boundaries of the HHS attendance zone.

Figure 25. Houston High Attendance Zoning Map (School Year 2019-20)



March 19, 2019

Figure 26. Houston High Existing Dwelling Unit Counts



*This dwelling unit count excludes Age-Restricted, Independent, and Assisted Living dwelling units due to the age-restrictions placed on occupants at these residential locations.

Existing Dwelling Unit Analysis

Apartments

The 1,014 apartment units within the City account for almost 7% of dwelling units served by HHS. Of these units, 694 have two or more bedroom units.

Condominiums & Townhomes

The 1,198 condominium units account for 8% of dwelling units served by HHS. Of these units, 1,090 have two or more bedroom units.

Single-Family Homes

Approximately 85% of all dwelling units served by HHS are single-family homes. All high school students that live in the City’s 13,148 single-family homes have a spot in HHS, if so desired. For the 2018-19 school year, 1,339 resident high school-aged students who reside in a single-family home within this attendance zone were enrolled at HHS. As shown in Table 28, the student to dwelling unit ratio within the high school attendance zone (city-wide) for single-family homes is 10.2.

Zone	Dwelling Type	Students	Units	Ratio
Houston High	Single-Family Homes	1,339	13,148	10.2

Table 28. Student to Dwelling Unit Ratio for Single-Family Homes: High (9-12)

Future Residential Development Property Analysis

Through the end of calendar year 2028, our research team has included 44 properties that are either in the process of being developed or have been categorized as “underdeveloped” for the purposes of assisting in making student enrollment projections for HMS. These properties are listed below in yellow and the numbers in the left-hand column (below) correspond with the numbers in Figure 27 and Table 29 for identification purposes. While there is no guarantee that the “underdeveloped” properties will ever be redeveloped, they have been included in our ten-year projection calculations for the purposes of forecasting maximum student enrollment numbers.

Developments in Process:

#1A	Carrefour at the Gateway	Partially-zoned “T6” for Urban Core Zone and “T5” for Urban Center Zone within the Smart Code district, the property owners at this 10.12, two-acre location have submitted an application to redevelop the existing site. The approved outline plan calls for a mix of retail, commercial and office uses. If apartments were subsequently proposed and approved for this location, the number of total students per 100 two or more apartment units would need determined using the non-linear regression analysis (Figure 6 and Table 12) presented in this study. 26% of the total student calculation would attend HHS.
#7	Allelon Subdivision	Zoned “R” for Residential, these 50 single-family homes currently under development on this 25.68-acre site are estimated to be completed by calendar year 2020. The addition of these 50 single-family homes is projected to add five students to HHS enrollment numbers.
#14	Avenida Senior Living Apartments	Zoned “R-H” for Retirement Housing, this 5.3-acre site has been scheduled for completion in late 2019. These 162 senior-living dwelling units will have no impact on student enrollment numbers due to age-restrictions placed on occupants at this location.
#15A	The Residences at Thornwood and Market Row Lofts	Zoned “T5” for Urban Center Zone within the Smart Code district, the fourth and fifth phases of Thornwood are scheduled for completion in 2019. Of the 276 total apartment units, half are one bedroom units and the other half are two bedroom units. Based on the non-linear regression analysis presented earlier in the study, the addition of 138 two bedroom apartment (Type A) units at an average monthly rent of \$2,299.39 per month is projected to add 2.7 GMSD students per 100 two bedroom units. Since 26% (0.7 per 100) of these students will attend high school, based on current student allocations, a total of one student is projected to attend HHS once all units are fully-leased.

#15B	Thornwood - Phase 6 (Undeveloped Lot 5)	Zoned "T5" for Urban Center Zone within the Smart Code district, these 2.98 acres on Lot 5 are the last phase of the Thornwood development project. As part of the development's Outline Plan approval in 2014, a maximum of 294 multi-family units were included. If the developer were to propose and receive final approval for apartments at this location, our research team has estimated that the percentage breakdown of units would be fairly consistent with The Residences and Market Row Lofts, an approximate 50/50 split between one and two bedroom units. Based on the non-linear regression analysis presented earlier in the study, the addition of 147 two bedroom apartment (Type A) units at an average monthly rent of \$2,299.39 per month is projected to add 2.7 GMSD students per 100 two bedroom units. Since 26% (0.7 per 100) of these students will attend high school, based on current student allocations, a total of one student is projected to attend HHS once all units are fully-leased. Final site plan approval by both the Planning Commission and BMA would be required for this development to proceed in this manner.
#17	Piper's Gardens	Zoned "R" for Residential, this 5.58-acre site has been placed in our projection worksheet to be constructed and occupied as early as calendar year 2020. Although there is an approved subdivision on this property, no building permits have been issued. The addition of eight single-family homes at this location could add one HHS student if all eight are completed.
#31	Chapel Cove Phase II	Zoned "R" for Residential, this 10.29-acre site has been placed in our projection model to be constructed and fully occupied by 2020. The addition of 22 single-family homes is projected to add two HHS students.
#32	Reaves – John Duke	Zoned "R" for Residential, this 36.4-acre site was rezoned in 2018 from RE-1 in anticipation of a 77-lot planned development. The addition of a maximum of 77 single-family homes is projected to add eight HHS students.
#37	Cheatham Property	Zoned "R" for Residential, this 18.05-acre site has been placed in our projection model to be constructed and occupied in 2021. The addition of 34 single-family homes is projected to add three HHS students.
#44	Goodwin Farms	Zoned "R" for Residential, this 101.3-acre site has been placed in our projection model to be constructed and occupied beginning in 2020. The addition of 232 single-family homes over a period of ten years (ten phases) will gradually increase the number of HHS students from two to 21 by the 2028-29 school year.

#46	Viridian Apartments	Zoned "T4" for General Urban Zone within the Smart Code, the 24.45 acres at this location, the site of the proposed Viridian development project, has Outline Plan approval for a maximum number of 299 apartment units (12 units per acre). If this location is developed in accordance with the approved and recorded Outline Plan, our research team has estimated that the percentage breakdown of units would be 40% one bedroom units to 60% two or more bedroom units. Based on the non-linear regression analysis presented earlier in the study, the addition of 179 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 26% (4.0 per 100) of these students will attend high school, based on current student allocations, a total of and added seven HHS students are projected once all units are fully-leased. Additional plan approvals by both the Planning Commission and BMA would be required for this development to proceed in this manner.
-----	---------------------	---

Underdeveloped Properties:

#0	Germantown Country Club	Zoned "R" for Residential, this 178.6-acre property is on the market for sale at the time of this study. Given the uncertainty of this property's future, 90 acres of unrestricted property was considered for residential development for the purpose of projecting maximum student enrollment numbers. The addition of 261 single-family homes over a period of ten years could gradually increase the annual number of HHS students within the district from an initial three to over 20 by 2028.
----	-------------------------	--

#1B	Bank of Bartlett	Zoned "T6" for Urban Core Zone within the Smart Code district, our research team included 20 apartment dwelling units on this one-acre property. If redeveloped in this manner, there are no HHS students expected from this location.
-----	------------------	--

#1C	Kirby Professional Buildings	Partially-zoned "T6" for Urban Core Zone and "T5" for Urban Center Zone within the Smart Code district, our research team included 40 apartment dwelling units on this 2.64-acre property. If redeveloped in this manner, there are no HHS students expected from this location.
-----	------------------------------	--

#3	Owen Jack R Revocable Trust	Zoned "R" for Residential, this 13.6-acre property was rezoned to Residential from its previous "T4" Smart Code zoning classification in 2018. Our research team included the addition of 39 single-family homes in our projections around 2023. If proposed, approved, and constructed as presented, HHS should expect to add four students from this location.
----	-----------------------------	--

#4	Arthur Tract (Carter)	Zoned "T5" for Urban Center Zone within the Smart Code district, these 32.86 acres to the west/southwest of Saddle Creek have been identified as a location for mixed use development. Although their project approval has expired, Carter received preliminary approval from the Planning Commission to include 302 apartment dwelling units at this location. If this location were to be developed as apartments (Type A), similar in nature to the Thornwood development, approximately 50% of the apartments would likely have two bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 151 two bedroom apartment (Type A) units at an average monthly rent of \$2,299.39 per month is projected to add 2.7 GMUSD students per 100 two bedroom units. Since 26% (0.7 per 100) of these students will attend HHS, based on current student allocations, a total of one student would be projected to attend HHS once all units are fully-leased.
#6	Klycie Walters B. Jr.	Zoned "R" for Residential, the 4.1 acres at this location could have a maximum of 12 dwelling units. If the property were to be developed/redeveloped, the property should be expected to add one HHS students.
#9	Montesi Letitia D. Living Trust	Zoned "R" for Residential, the 9.5 acres at this location could have a maximum of 28 dwelling units. If the property were to be developed/redeveloped, the property should be expected to add three HHS students.
#16A	Patel	Zoned "R" for Residential, the 6.46 acres at this location could have a maximum of 18 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property should be expected to add two HHS students.
#16B	Dogwood Manor	Zoned "R" for Residential, the 4.88 acres at this location could have a maximum of 14 single-family homes. One single-family estate home is currently located on the property. If developed/redeveloped, the property should be expected to add one HHS student.
#21	Warlick Sandra H and Hulon O	Zoned "R" for Residential, the 30.07 acres at this location could have a maximum of 87 dwelling units. One single-family home is currently located on this property. If the property were to be developed/redeveloped with this number of units, nine students should be expected to attend HHS.
#23	Miti Group	Zoned "R" for Residential, the 18.28 acres at this location could have a maximum of 47 single-family homes. If developed/redeveloped with this number of units, five students should be expected to attend HHS.

#25	Steiner	Zoned "RE" for Residential Estate, the 12.81 acres at this location could have a maximum of six dwelling units. If developed/redeveloped with this number of units, one student should be expected to attend HHS.
#28	Ben Clark Property	Zoned "AG" for Agricultural, the 180.59 acres at this location could have a maximum of 36 dwelling units (at one home per five acres). One single-family estate home is currently located on this property. If developed/redeveloped under the current zoning with this number of units, four students should be expected to attend HHS.
#29	Leike Richard H Living Trust	Zoned "R" for Residential, the 5.9 acres at this location could have a maximum of 17 single-family homes. If developed, the property should be expected to add two HHS students.
#30	Fogelman Robert F Revocable Trust	Zoned "O-C" for Office – Complex, these 32.3 acres are not projected to include a residential use based on its current zoning.
#34	Bobo	Zoned "RE-1" for Residential Estate – 1 Acre, these 6.78 acres adjacent to Forest-Hill Irene Road could have a maximum of six single-family homes based on current zoning. If developed, the property should be expected to add one HHS student.
#35	Forest Bend Properties	Zoned "RE-1" for Residential Estate – 1 Acre, these 22 lots on 47.24 acres to the east of Forest Hill Irene Road has been subdivided to include a total of 22 single-family homes (18 new single-family homes). These new homes have been placed in our projection model to be constructed and occupied by 2025. If developed, the property should be expected to add two HHS students.
#36	Skoutakis Property, Estate Home	Zoned "R" for Residential, the 9.26 acres at this location could have a maximum of 26 single-family homes. If developed, the property should be expected to add three HHS students.
#38	Forest Bend Properties	Zoned "R" for Residential, the 10.27 acres at this location could have a maximum of 29 single-family homes. If developed, the property should be expected to add three HHS students.

#40	Banks	Zoned "RE-1" for Residential – 1 Acre, the 15.24 acres at this location could have a maximum of 15 single-family homes. If developed, the property should be expected to add two HHS students.
#41	Miller	Zoned "RE-1" for Residential – 1 Acre, the 19.86 acres at this location could have a maximum of 19 single-family homes. If developed, the property should be expected to add two HHS students.
#42	King Family Trust	Zoned "RE-1" for Residential, the 25 acres at this location could have a maximum of 25 single-family homes. If developed, the property should be expected to add three HHS students.
#43	Grant Property	Zoned "RE-1" for Residential, the 24.87 acres at this location could have a maximum of 24 single-family homes. If developed, the property should be expected to add two HHS students.
#45	Micaten Inc.	Zoned "T3" for Sub-Urban Zone within the Smart Code, the 7.4 acres on this site could have a maximum of seven dwelling units per acre. Apartment buildings, row houses, or duplexes are not permitted residential uses. If developed with single-family homes, the property should be expected to add five HHS students.
#47	Forest Hill Associates Phase 19 FHH	Zoned "T5" for Urban Center Zone within the Smart Code, the 17.52 acres at this location, the former site of the proposed Watermark development project, had Final Plan approval for a maximum number of 310 apartment units. This project ultimately failed to receive a development agreement with the City. If this location were to be developed in accordance with the approved and recorded Outline Plan for the site, approximately 60% of the apartments would likely have two or more bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 190 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 26% (4.0 per 100) of these students will attend HHS, based on current student allocations, a total of eight students are projected to attend HHS once all units are fully-leased.
#99A	SHG Germantown	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 5.57-acre site. For 99A, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.

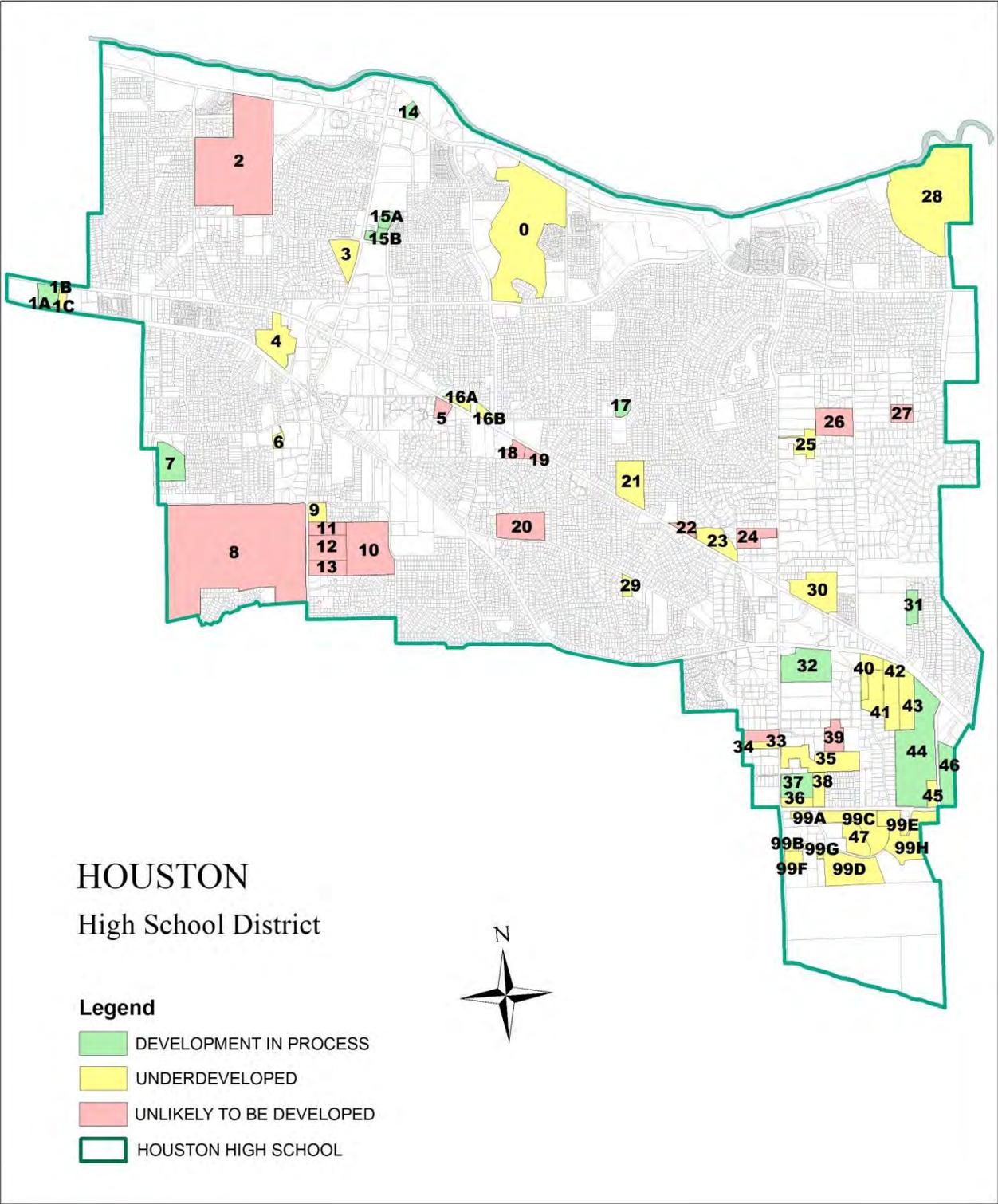
#99B	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.63-acre site. For 99B, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99C	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 34.02-acre site. For 99C, the plan called for commercial, office, and residential uses designated as part of the conceptual land use plan. 300 multi-family units were proposed on this 34.02-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, with apartments as the proposed and approved multi-family use, approximately 60% of the apartments would likely have two or more bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 180 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 26% (4.0 per 100) of these students will attend HHS, based on current student allocations, a total of seven students are projected to attend HHS once all units are fully-leased.
#99D	Forest Hill Associates	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 44.06-acre site. For 99D, the plan called for office, single-family attached and multi-family uses designated as part of the conceptual land use plan. 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) were proposed on this 44.06-acre site as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, with apartments as the proposed and approved multi-family use, approximately 60% of the apartments would likely have two or more bedrooms. Based on the non-linear regression analysis presented earlier in the study, the addition of 180 two or more bedroom apartment (Type B) units at an average monthly rent of \$1,730.79 per month is projected to add 15.3 GMSD students per 100 two or more bedroom units. Since 26% (4.0 per 100) of these students will attend HHS, based on current student allocations, a total of seven students are projected to attend HHS once all units are fully-leased. Four students are projected for HHS from the single-family attached homes (condominium-type development).
#99E	Willmar	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 2.86-acre site. For 99E, the plan called for retail, office (medical), and approximately 31 attached single-family structures (e.g. row houses similar to condominiums). If this location were to be developed in accordance with the small area plan, the property should be expected to add two HHS students.

#99F	Mascom	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 8.97-acre site. For 99F, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99G	Valenti Mid-South Realty	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 3.1-acre site. For 99G, the plan called for commercial and office uses with no residential designated as part of the conceptual land use plan.
#99H	Baptist Memorial	Zoned "T5" for Urban Center Zone within the Smart Code, the Forest Hill Heights Small Area Plan (2016) includes a mix of uses on this 41.07-acre site. For 99H, the plan called for commercial, office, and 31 single-family attached homes (e.g. row houses similar to condominiums) uses as part of the conceptual land use plan. If this location were to be developed in accordance with the small area plan, the property should be expected to add two HHS students.

Properties Unlikely To Be Developed < 10 Years:

Although categorized as "unlikely to be developed," 16 additional properties have been recognized within the study; however, development or redevelopment of these properties is not anticipated to take place by 2028. To be clear, City staff has no indication that the current property owners at these 16 locations desire or intend to change the current land use of these sites at any point in the immediate future. These properties, listed in red on Figure 27 and Table 29, were included because their total acreage fell within the general parameters established by the research team and their redevelopment could significantly increase the number of dwelling units when compared to the existing use. It should be noted that none of the properties fall within one of the Smart Code zoning districts where apartments are currently permitted.

Figure 27: Houston High Property Analysis Map



HOUSTON HIGH								School Year																	
								18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29							
Enrollment Projections from Existing Dwelling Units								Demographer Enrollment Forecast % Increase/Decrease																	
								0.7%	1.2%	1.7%	2.3%	0.4%	1.3%	-2.3%	1.1%	1.6%	0.0%	0.0%							
								Forecasted Enrollment using 18/19 Geocoding Actuals																	
								1483	1501	1526	1561	1568	1588	1552	1569	1594	1594	1594							
Enrollment Ratio Per 100 2+ Bedroom Units By Dwelling								Apartments A (2.7 x 26%)		APTA	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7				
								Apartments B (15.3 x 26%)		APT B	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
								Single Family Homes (HHS SFH ratio)		SFH	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2
								Condominiums (17.7 x 28%)		CO	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Property #	Property Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	# of 2+ Bedroom Units	Dwelling Type	Additional Students from New Residential Development																	
Developments in Process																									
1A	Carrefour	T6	10.12	20	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0						
7	Allelon Subdivision	R	25.68	2.904	50	50	SFH	0	0	5	5	5	5	5	5	5	5	5	5						
14	Avenida Senior Living Apartments	R-H	5.3	31	162	-	AL	0	0	0	0	0	0	0	0	0	0	0	0						
15A	TW Residences & Market Row Lofts	T5	7.09	39	276	138	APT A	0	1	1	1	1	1	1	1	1	1	1	1						
15B	Thornwood (Undeveloped Lot 5)	T5	2.98	99	294	147	APT A	0	0	0	1	1	1	1	1	1	1	1	1						
17	Piper's Gardens	R	5.58	2.904	8	8	SFH	0	0	1	1	1	1	1	1	1	1	1	1						
31	Chapel Cove Phase II	R	10.29	2.904	22	22	SFH	0	0	2	2	2	2	2	2	2	2	2	2						
32	Reaves-John Duke	R	36.4	2.904	77	77	SFH	0	0	8	8	8	8	8	8	8	8	8	8						
37	Cheatham Property	R	18.05	2.904	34	34	SFH	0	0	3	3	3	3	3	3	3	3	3	3						
44	Goodwin Farms	R	101.3	2.904	232	232	SFH	0	0	2	5	7	9	12	14	16	19	21	21						
46	Viridian Apartments	T4	24.45	12	299	179	APT B	0	0	0	7	7	7	7	7	7	7	7	7						
Underdeveloped Properties																									
0	Germantown Country Club	R	178.6	2.904	261	261	SFH	0	0	0	3	5	8	11	13	16	19	21	21						
1B	Bank of Bartlett	T6	1	20	20	10	APT A	0	0	0	0	0	0	0	0	0	0	0	0						
1C	Kirby Professional Buildings	T5/T6	2.64	15	40	20	APT A	0	0	0	0	0	0	0	0	0	0	0	0						
3	Owen Jack R Revocable Trust	R	13.6	2.904	39	39	SFH	0	0	0	4	4	4	4	4	4	4	4	4						
4	Arthur Tract	T5	32.86	15	302	151	APT A	0	0	0	1	1	1	1	1	1	1	1	1						
6	Klycie Walters B Jr.	R	4.1	2.904	12	12	SFH	0	0	0	0	0	0	0	1	1	1	1	1						
9	Montesi Letitia D Living Trust	R	9.5	2.904	28	28	SFH	0	0	0	0	0	0	0	3	3	3	3	3						
16A	Patel	R	6.46	2.904	18	18	SFH	0	0	0	2	2	2	2	2	2	2	2	2						
16B	Dogwood Manor	R	4.88	2.904	14	14	SFH	0	0	0	1	1	1	1	1	1	1	1	1						
21	Warlick Sandra H and Hulon O	R	30.07	2.904	87	87	SFH	0	0	0	0	0	9	9	9	9	9	9	9						
23	Miti Group	R	18.28	2.904	47	47	SFH	0	0	0	0	0	5	5	5	5	5	5	5						
25	Steiner	RE	12.81	0.5	6	6	SFH	0	0	0	0	0	0	0	1	1	1	1	1						
28	Ben Clark Property	AG	180.59	0.2	36	36	SFH	0	0	0	0	0	4	4	4	4	4	4	4						
29	Leike Richard H Living Trust	R	5.9	2.904	17	17	SFH	0	0	0	0	0	2	2	2	2	2	2	2						
30	Fogelman Robert F Revocable Trust	O-C	32.3	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0						
34	Bobo	RE-1	6.78	1	6	6	SFH	0	0	0	0	0	1	1	1	1	1	1	1						
35	Forest Bend Properties	RE-1	47.24	1	18	18	SFH	0	0	0	0	0	0	0	2	2	2	2	2						
36	Skoutakis Property, Estate Home	R	9.26	2.904	26	26	SFH	0	0	0	0	0	3	3	3	3	3	3	3						
38	Forest Bend Properties (Vacant)	R	10.27	2.904	29	29	SFH	0	0	0	0	0	3	3	3	3	3	3	3						
40	Banks	RE-1	15.24	1	15	15	SFH	0	0	0	0	0	2	2	2	2	2	2	2						
41	Miller	RE-1	19.86	1	19	19	SFH	0	0	0	0	0	2	2	2	2	2	2	2						
42	King Family Trust	RE-1	25	1	25	25	SFH	0	0	0	0	0	3	3	3	3	3	3	3						
43	Grant Property	RE-1	24.87	1	24	24	SFH	0	0	0	0	0	2	2	2	2	2	2	2						
45	Micaten Inc.	T3	7.4	7	52	52	SFH	0	0	0	0	0	5	5	5	5	5	5	5						
47	Forest Hill Associates - Phase 19	T5	17.69	17.52	310	190	APT B	0	0	0	0	0	8	8	8	8	8	8	8						
99A	SHG Germantown	T5	5.57	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0						
99B	Forest Hill Associates	T5	2.63	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0						
99C	Forest Hill Associates	T5	34.02	0	300	180	APT B	0	0	0	0	0	7	7	7	7	7	7	7						
99D	Forest Hill Associates	T5	44.06	0	300	180	APT B	0	0	0	0	0	7	7	7	7	7	7	7						
		T5		0	75	75	CO	0	0	0	0	0	4	4	4	4	4	4							
99E	Willmar	T5	2.86	0	31	31	CO	0	0	0	0	0	2	2	2	2	2	2	2						
99F	Mascom	T5	8.97	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0						
99G	Valenti Mid-South Realty	T5	3.1	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0						
99H	Baptist Memorial	T5	41.07	0	31	31	CO	0	0	0	0	0	2	2	2	2	2	2	2						
Properties Unlikely To Be Developed < 10 Yrs																									
2	Fullmer Estate	R	190.62	2.904	554	554	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
5	Bowman	R	7.32	2.904	21	21	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
8	Melanie Taylor Marital Trust	R	310	2.904	900	900	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
10	Andrew McFadden	R	60.8	2.904	177	177	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
11	James McFadden	R	12.89	2.904	37	37	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
12	Nancy McFadden	R	25.39	2.904	74	74	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
13	John McFadden	R	14.3	2.904	42	42	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
18	Barzizza	R	7.01	2.904	20	20	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
19	Fite	R	4	2.904	12	12	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
20	Smith Sarah S Family Trust	R	178.6	2.904	99	99	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
22	Lankford	R	6.09	2.904	18	18	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
24	Grizzard	RE	16.26	0.5	16	16	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
26	Herring	RE	27	0.5	13	13	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
27	Selman	RE-1	10	1	10	10	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
33	Monsarrat	RE-1	11.5	1	11	11	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
39	Bruns	RE-1	13.94	1	13	13	SFH	0	0	0	0	0	0	0	0	0	0	0	0						
Projected Number of Total Resident Students: Houston High								1483	1502	1548	1605	1616	1712	1682	1710	1740	1746	1750							
Programmatic Capacity ----								2100	Additional Capacity																
Change in Annual Student Enrollment								Existing Dwelling Units			18	26	35	6	20	-37	17	25	0	0					
								New Residential Development			1	22	44	48	124	130	141	146	152	156					
Net increase/decrease in student population from 2018-19									19	65	122	133	229	199	227	257	263	267							
Additional Students By New Residential Development Type																									
Apartments								0	1	1	10	10	32	32	32	32	32	32							
Single-Family Homes								0	0	21	34	38	84	90	101	106	112	116							
Condominiums								0	0	0	0	0	8	8	8	8	8	8							
Annual Totals								0	1	22	44	48	124	130	141	146	152	156							

Table 29. Houston High: Future Enrollment Projections

Student Enrollment Projection Summary: Houston High

Existing Dwelling Units

Using the demographer's forecasted enrollment percentage changes for Houston High School, student enrollment from existing dwelling units is projected to peak at 1,594 resident students in the 2026-27 school year. This figure is only 76% of total student capacity (1,594/2,100).

Developments in Process

Six single-family developments with a combined total of 423 homes have some level of approval within the HHS attendance zone (city-wide). Based on the study's construction phasing projections, HHS should expect 41 students from these developments by the 2028-29 school year. A total of two HHS students are projected from the Thornwood development, one from the 138 two bedroom apartment units at The Residences and Market Row Lofts, and one from the undeveloped Lot 5, if it were to be proposed, approved, and developed with an additional 147 two bedroom apartment units. If the Viridian development proceeds through the approval process and is constructed and has 179 fully-leased, two or more bedroom apartment units, an added seven students should be expected from this location. Therefore, GMSD should expect a total of 49 HHS students from developments in process by the 2028-29 school year.

Underdeveloped Properties

Based on the current land use zoning, a total of 779 new single-family home units were included on 20 underdeveloped properties within the HHS attendance zone, including single-family homes on the current Germantown Country Club property. Also, a total of 731 two or more bedroom apartment units and 137 single-family attached (condominium-style) homes were included within the Smart Code zoning districts. If these properties were to be developed/redeveloped in accordance with the scenario presented, an added 107 HHS students should be expected by the 2028-29 school year.

Attendance Zone Summary

As illustrated in Table 29, a residential build-out scenario of an added 3,642 new dwelling units (2,534 two or more bedroom units) over the next ten years does not appear to create enrollment concerns for HHS for the foreseeable future. A maximum net increase of 267 resident students is projected for HHS by the 2028-29 school year.

Apartment Impact

Houston High

What are the likely impacts of future apartments and apartment building development on Houston High?

Each of the five existing apartment complexes and all potential future apartment dwelling units within the three Smart Code zoning districts will have an impact on HHS enrollment numbers.

Central Business District

#15A: For the 2019-20 school year, the 138 two bedroom apartment units (classified as Type A apartments in this study) at The Residences at Thornwood and Market Row Lofts are projected to add one HHS student, once all units are fully occupied. As mentioned previously, with around 35% occupancy at the time of this report, one child has been enrolled with GMSD from this location.

#15B: As of the release date of this report, a final proposed use for the remaining 2.98-acres of Lot 5 (Phase 6) of the Thornwood development has yet to be submitted by the developer. The Outline Plan for Phase 6, as originally submitted and approved, includes a possible 294 multi-family units for this location. However, final site plan approval by the Planning Commission and the BMA is still required. For the purposes of understanding the maximum potential impact apartments could have on GMSD, 147 two bedroom units were included as apartments (classified as Type A apartments in this study) for future student enrollment projection calculations. If the developer were to propose and receive approval for this number of apartments, one HHS student should be expected from this location.

#4: Although the Carter development was referenced in the moratorium, as of December 2018, representatives for the Carter project have not proceeded past an initial Planning Commission Outline Plan approval and the Planning Commission approval has expired. However, because it was specifically listed within the moratorium as a development that had received some form of approval during the development consideration process, student enrollment numbers from these 32.86 acres were included in our enrollment projection model. If a developer were to propose and receive approval of a project (including Type A apartments) that was consistent with the Carter proposal, a projected number of one HHS student should be expected from this location upon completion.

West Poplar District

#1B & #1C: The combined 3.64 acres that are currently occupied by the Bank of Bartlett and the Kirby Professional Buildings, at the corner of Poplar Ave. and Kirby Pkwy., are considered locations where a mixed-use redevelopment could occur as a result of the T5 and T6 zoning. The possible 60 multi-family apartment dwelling units (30 two bedroom units based on Type A apartment assumption) on these sites are not projected to add students to HHS.

Apartment Impact cont.

Houston High

On November 26, 2018, the Board of Mayor and Alderman approved the Carrefour at the Gateway Planned Development Outline Plan as recommended by the Planning Commission. Partially-zoned T5 and T6, the proposed Outline Plan included a mix of office, retail and hotel uses with a complimentary parking garage and civic space on this 10.12-acre site. If apartments were to be subsequently proposed at this location and made it through the final approval process, the number of total students per 100 two or more apartment units would need determined using the non-linear regression analysis (Figure 6 and Table 12) presented earlier in this study. 26% of the total student calculation would attend HHS.

Forest Hill Heights District

#46: This development, known as Viridian, was one of the four apartment developments that were exempted from the moratorium. If the developer were to proceed and receive final approval of a project that was consistent with the aforementioned details (Type B apartments), a projected number of seven HHS students should be expected from this location upon completion.

#47: Although the Watermark development was specifically referenced in the moratorium as an exemption because of an approved Outline Plan, the Project Development Contract and Final Plan did not receive the approval of the Board of Mayor and Aldermen at the July 23, 2018 meeting. Despite failing to receive this final authorization to proceed, our research team included their proposed number of 310 apartment (Type B) units based on the approved Outline Plan. If the 17.52-acre site were to be developed according to the proposed Final Plan, a projected number of eight HHS students should be expected from this location upon completion.

#99C: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 34.02-acre site was one of the locations where up to 300 multi-family units would be located. These dwelling units could be condominiums, townhomes, and/or apartments. If this location were to be developed with apartments (Type B) as the proposed and approved multi-family use, the property should be expected to add seven HHS students to enrollment numbers upon completion.

#99D: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 44.06-acre site was one of the locations where up to 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) would be located. If this location were to be developed in accordance with the small area plan with apartments (Type B) as the proposed and approved multi-family use, the property should be expected to add seven HHS students from the apartment development, and four HHS students from single-family attached homes (condominium-type development).

City-wide School Impact Analysis

Residential School Enrollment Projection Summary: ALL GMSD SCHOOLS

Existing Dwelling Units

Based on the demographer's forecasted enrollment percentage changes for GMSD, the total number of resident GMSD students coming from an existing dwelling unit will be relatively the same in 2028 (see the top of Table 31). GMSD resident student enrollment from an existing dwelling unit is forecasted to peak in the 2021-22 school year at 5,606 and then decline to 5,490 by the 2028-29 school year. Resident student enrollment in the fall of the 2018-19 school year was 5,489.

Developments in Process

Six single-family developments with a combined total of 423 homes have some level of approval within the City. Based on the study's construction phasing projections, GMSD should expect 140 students from these developments by the 2028-29 school year. A total of eight GMSD students are projected from the Thornwood development, four from the 138 two bedroom apartment units at The Residences and Market Row Lofts, and four from the undeveloped Lot 5, if it were to be proposed, approved, and developed with an additional 147 two bedroom apartment units. If the Viridian development proceeds through the approval process and is constructed and has 179 fully-leased, two or more bedroom apartment units, an added 27 students should be expected from this location. Therefore, GMSD should expect a total of 175 students from developments in process by the 2028-29 school year.

Underdeveloped Properties

Based on the current land use zoning, a total of 779 new single-family home units were included on 20 underdeveloped properties within the City, including single-family homes on the current Germantown Country Club property. Also, a total of 731 two or more bedroom apartment units and 137 single-family attached (condominium-style) homes were included within the Smart Code zoning districts. If these properties were to be developed/redeveloped in accordance with the scenario presented, an added 394 GMSD students should be expected by the 2028-29 school year.

ALL GMSD Summary

As illustrated at the bottom of Table 31, even with a projected increase of 570 net students by the 2028-29 school year under an aggressive residential build-out scenario of an added 3,642 new dwelling units (2,534 two or more bedroom units), the combined capacity of GMSD schools should remain well under programmatic capacity. The large majority of the additional capacity will be at Forest Hill Elementary and Houston High. The available capacity at Forest Hill Elementary could reduce capacity constraints at the other elementary locations through policy and attendance zoning modifications if desired. Based on the student enrollment projections from existing dwelling units and the number of students projected from an aggressive residential build-out scenario, Houston Middle is the only GMSD location projected to remain over programmatic capacity. In order to address this remaining capacity concern, GMSD is working with the City to construct an addition at this location during the summer of 2020.

Apartment Impact

ALL GMSD

What are the likely impacts of future apartments and apartment building development on GMSD?

Central Business District

#15A: For the 2019-20 school year, the 138 two bedroom apartment units (classified as Type A apartments in this study) at The Residences at Thornwood and Market Row Lofts are projected to add four GMSD students, once all units are fully occupied. As mentioned previously, with around 35% occupancy at the time of this report, one child has been enrolled with GMSD from this location.

#15B: As of the release date of this report, a final proposed use for the remaining 2.98-acres of Lot 5 (Phase 6) of the Thornwood development has yet to be submitted by the developer. The Outline Plan for Phase 6, as originally submitted and approved, includes a possible 294 multi-family units for this location. However, final site plan approval by the Planning Commission and the BMA is still required. For the purposes of understanding the maximum potential impact apartments could have on GMSD, 147 two bedroom units were included as apartments (classified as Type A apartments in this study) for future student enrollment projection calculations. If the developer were to propose and receive approval for this number of apartments, four GMSD students should be expected from this location.

#4: Although the Carter development was referenced in the moratorium, as of December 2018, representatives for the Carter project have not proceeded past an initial Planning Commission Outline Plan approval and the Planning Commission approval has expired. However, because it was specifically listed within the moratorium as a development that had received some form of approval during the development consideration process, student enrollment numbers from these 32.86 acres were included in our enrollment projection model. If a developer were to propose and receive approval of a project (including Type A apartments) that was consistent with the Carter proposal, a projected number of four GMSD students should be expected from this location upon completion.

West Poplar District

#1B & #1C: The combined 3.64 acres that are currently occupied by the Bank of Bartlett and the Kirby Professional Buildings, at the corner of Poplar Ave. and Kirby Pkwy., are considered locations where a mixed-use redevelopment could occur as a result of the T5 and T6 zoning. The possible 60 multi-family apartment dwelling units (30 two bedroom units based on Type A apartment assumption) on these sites are not projected to add students to GMSD.

On November 26, 2018, the Board of Mayor and Alderman approved the Carrefour at the Gateway Planned Development Outline Plan as recommended by the Planning Commission. Partially-zoned T5 and T6, the proposed Outline Plan included a mix of office, retail and hotel uses with a complimentary parking garage and civic space on this 10.12-acre site. If apartments were to be subsequently proposed at this location and made it through the final approval process, the number of total students per 100 two or more apartment units would need determined using the non-linear regression analysis (Figure 6 and Table 12) presented earlier in this study.

Apartment Impact cont.

ALL GMSD

APARTMENTS - ALL ATTENDANCE ZONES				School Year	GMSD Student Enrollment (2028)			
Property #	Project Name / Project Owner	# of units possible or approved	# of 2+ Bedroom Units	Dwelling Type	ELEMENTARY	MIDDLE	HIGH	TOTAL
Developments in Process								
15A	TW Residences & Market Row Lofts	276	138	APT A	2	1	1	4
15B	Thornwood (Undeveloped Lot 5)	294	147	APT A	2	1	1	4
46	Viridian Apartments	299	179	APT B	13	7	7	27
Underdeveloped Properties								
1B	Bank of Bartlett	20	10	APT A	0	0	0	0
1C	Kirby Professional Buildings	40	20	APT A	0	0	0	0
4	Arthur Tract	302	151	APT A	2	1	1	4
47	Forest Hill Associates - Phase 19	310	190	APT B	14	8	8	30
99C	Forest Hill Associates	300	180	APT B	13	7	7	27
99D	Forest Hill Associates	300	180	APT B	13	7	7	27
		2,141	1,195		59	32	32	123

Table 30. ALL GMSD: Apartment Student Enrollment for 2028

Forest Hill Heights District

#46: This development, known as Viridian, was one of the four apartment developments that were exempted from the moratorium. If the developer were to proceed and receive final approval of a project that was consistent with the aforementioned details (Type B apartments), a projected number of 27 GMSD students should be expected from this location upon completion.

#47: Although the Watermark development was specifically referenced in the moratorium as an exemption because of an approved Outline Plan, the Project Development Contract and Final Plan did not receive the approval of the Board of Mayor and Aldermen at the July 23, 2018 meeting. Despite failing to receive the authorization to proceed, our research team included their proposed number of 310 apartment (Type B) units based on the approved Outline Plan. If the 17.52-acre site were to be developed according to the proposed Final Plan, a projected number of 30 GMSD students should be expected from this location upon completion.

#99C: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 34.02-acre site was one of the locations where up to 300 multi-family units would be located. These dwelling units could be condominiums, townhomes, and/or apartments. If this location were to be developed with apartments (Type B) as the proposed and approved multi-family use, the property should be expected to add 27 GMSD students to enrollment numbers upon completion.

#99D: Because the conceptual land use plan emphasized a mix of commercial, office, and residential, this 44.06-acre site was one of the locations where up to 300 multi-family units and 75 single-family attached homes (e.g. row houses similar to condominiums) would be located. If this location were to be developed in accordance with the small area plan with apartments (Type B) as the proposed and approved multi-family use, the property should be expected to add 27 GMSD students from the apartment development and 13 GMSD students from the single-family attached homes (condominium-type development).

ALL GMSD			School Year					18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29
			Total GMSD Resident Students Combined From Existing Dwelling Units					5489	5573	5591	5606	5599	5595	5551	5512	5490	5490	5490
Property #	Property Name / Project Owner	Zoning Designation	Acreage	Dwelling Units Per Acre	# of units possible or approved	# of 2+ Bedroom Units	Dwelling Type	Additional Students from New Residential Development										
Developments in Process																		
1A	Carrefour	T6	10.12	20	0	0	n/a	0	0	0	0	0	0	0	0	0	0	
7	Allelon Subdivision	R	25.68	2.904	50	50	SFH	0	0	17	17	17	17	17	17	17	17	
14	Avenida Senior Living Apartments	R-H	5.3	31	162	-	AL	0	0	0	0	0	0	0	0	0	0	
15A	TW Residences & Market Row Lofts	T5	7.09	39	276	138	APT A	0	4	4	4	4	4	4	4	4	4	
15B	Thornwood (Undeveloped Lot 5)	T5	2.98	99	294	147	APT A	0	0	0	4	4	4	4	4	4	4	
17	Piper's Gardens	R	5.58	2.904	8	8	SFH	0	0	4	4	4	4	4	4	4	4	
31	Chapel Cove Phase II	R	10.29	2.904	22	22	SFH	0	0	7	7	7	7	7	7	7	7	
32	Reaves-John Duke	R	36.4	2.904	77	77	SFH	0	0	28	28	28	28	28	28	28	28	
37	Cheatham Property	R	18.05	2.904	34	34	SFH	0	0	11	11	11	11	11	11	11	11	
44	Goodwin Farms	R	101.3	2.904	232	232	SFH	0	0	8	17	25	32	41	50	57	66	
46	Viridian Apartments	T4	24.45	12	299	179	APT B	0	0	0	27	27	27	27	27	27	27	
Underdeveloped Properties																		
0	Germantown Country Club	R	178.6	2.904	261	261	SFH	0	0	0	11	21	32	43	53	64	75	
1B	Bank of Bartlett	T6	1	20	20	10	APT A	0	0	0	0	0	0	0	0	0	0	
1C	Kirby Professional Buildings	T5/T6	2.64	15	40	20	APT A	0	0	0	0	0	0	0	0	0	0	
3	Owen Jack R Revocable Trust	R	13.6	2.904	39	39	SFH	0	0	0	14	14	14	14	14	14	14	
4	Arthur Tract	T5	32.86	15	302	151	APT A	0	0	0	4	4	4	4	4	4	4	
6	Klycie Walters B Jr.	R	4.1	2.904	12	12	SFH	0	0	0	0	0	0	0	3	3	3	
9	Montesi Letitia D Living Trust	R	9.5	2.904	28	28	SFH	0	0	0	0	0	0	0	10	10	10	
16A	Patel	R	6.46	2.904	18	18	SFH	0	0	0	8	8	8	8	8	8	8	
16B	Dogwood Manor	R	4.88	2.904	14	14	SFH	0	0	0	5	5	5	5	5	5	5	
21	Warlick Sandra H and Hulon O	R	30.07	2.904	87	87	SFH	0	0	0	0	0	35	35	35	35	35	
23	Miti Group	R	18.28	2.904	47	47	SFH	0	0	0	0	0	19	19	19	19	19	
25	Steiner	RE	12.81	0.5	6	6	SFH	0	0	0	0	0	0	0	3	3	3	
28	Ben Clark Property	AG	180.59	0.2	36	36	SFH	0	0	0	0	0	15	15	15	15	15	
29	Leike Richard H Living Trust	R	5.9	2.904	17	17	SFH	0	0	0	0	0	7	7	7	7	7	
30	Fogelman Robert F Revocable Trust	O-C	32.3	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	
34	Bobo	RE-1	6.78	1	6	6	SFH	0	0	0	0	0	3	3	3	3	3	
35	Forest Bend Properties	RE-1	47.24	1	18	18	SFH	0	0	0	0	0	0	7	7	7	7	
36	Skoutakis Property, Estate Home	R	9.26	2.904	26	26	SFH	0	0	0	0	0	10	10	10	10	10	
38	Forest Bend Properties (Vacant)	R	10.27	2.904	29	29	SFH	0	0	0	0	0	11	11	11	11	11	
40	Banks	RE-1	15.24	1	15	15	SFH	0	0	0	0	0	5	5	5	5	5	
41	Miller	RE-1	19.86	1	19	19	SFH	0	0	0	0	0	7	7	7	7	7	
42	King Family Trust	RE-1	25	1	25	25	SFH	0	0	0	0	0	9	9	9	9	9	
43	Grant Property	RE-1	24.87	1	24	24	SFH	0	0	0	0	0	8	8	8	8	8	
45	Micaten Inc.	T3	7.4	7	52	52	SFH	0	0	0	0	0	18	18	18	18	18	
47	Forest Hill Associates - Phase 19	T5	17.69	17.52	310	190	APT B	0	0	0	0	0	30	30	30	30	30	
99A	SHG Germantown	T5	5.57	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	
99B	Forest Hill Associates	T5	2.63	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	
99C	Forest Hill Associates	T5	34.02	0	300	180	APT B	0	0	0	0	0	27	27	27	27	27	
99D	Forest Hill Associates	T5	44.06	0	300	180	APT B	0	0	0	0	0	27	27	27	27	27	
		T5		0	75	75	CO	0	0	0	0	0	13	13	13	13		
99E	Willmar	T5	2.86	0	31	31	CO	0	0	0	0	0	5	5	5	5	5	
99F	Mascom	T5	8.97	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	
99G	Valenti Mid-South Realty	T5	3.1	0	0	0	n/a	0	0	0	0	0	0	0	0	0	0	
99H	Baptist Memorial	T5	41.07	0	31	31	CO	0	0	0	0	0	5	5	5	5	5	
Properties Unlikely To Be Developed < 10 Yrs																		
2	Fullmer Estate	R	190.62	2.904	554	554	SFH	0	0	0	0	0	0	0	0	0	0	
5	Bowman	R	7.32	2.904	21	21	SFH	0	0	0	0	0	0	0	0	0	0	
8	Melanie Taylor Marital Trust	R	310	2.904	900	900	SFH	0	0	0	0	0	0	0	0	0	0	
10	Andrew McFadden	R	60.8	2.904	177	177	SFH	0	0	0	0	0	0	0	0	0	0	
11	James McFadden	R	12.89	2.904	37	37	SFH	0	0	0	0	0	0	0	0	0	0	
12	Nancy McFadden	R	25.39	2.904	74	74	SFH	0	0	0	0	0	0	0	0	0	0	
13	John McFadden	R	14.3	2.904	42	42	SFH	0	0	0	0	0	0	0	0	0	0	
18	Barzizza	R	7.01	2.904	20	20	SFH	0	0	0	0	0	0	0	0	0	0	
19	Fite	R	4	2.904	12	12	SFH	0	0	0	0	0	0	0	0	0	0	
20	Smith Sarah S Family Trust	R	178.6	2.904	99	99	SFH	0	0	0	0	0	0	0	0	0	0	
22	Lankford	R	6.09	2.904	18	18	SFH	0	0	0	0	0	0	0	0	0	0	
24	Grizzard	RE	16.26	0.5	16	16	SFH	0	0	0	0	0	0	0	0	0	0	
26	Herring	RE	27	0.5	13	13	SFH	0	0	0	0	0	0	0	0	0	0	
27	Selman	RE-1	10	1	10	10	SFH	0	0	0	0	0	0	0	0	0	0	
33	Monsarrat	RE-1	11.5	1	11	11	SFH	0	0	0	0	0	0	0	0	0	0	
39	Bruns	RE-1	13.94	1	13	13	SFH	0	0	0	0	0	0	0	0	0	0	
Projected Number of Total Resident Students: ALL GMSD								5489	5577	5670	5767	5778	6046	6022	6025	6021	6041	6059
Programmatic Capacity ----				6665	Additional Capacity				1088	995	898	887	619	643	640	644	624	606
Change in Annual Student Enrollment				Existing Dwelling Units				84	18	15	-7	-4	-44	-39	-22	0	0	
				New Residential Development				4	79	161	179	451	471	513	531	551	569	
Net increase/decrease in student population from 2018-19					88	181	278	289	557	533	536	532	552	570				
Additional Students By New Residential Development Type																		
Apartments				0	4	4	39	39	123	123	123	123	123	123	123	123		
Single-Family Homes				0	0	75	122	140	305	325	367	385	405	423				
Condominiums				0	0	0	0	0	23	23	23	23	23	23				
Annual Totals				0	4	79	161	179	451	471	513	531	551	569				

Table 31. ALL GMSD: Future Enrollment Projections

RESOLUTION NO. 18R03

A RESOLUTION INSTITUTING AN EIGHTEEN MONTH MORATORIUM ON NEW APARTMENT AND APARTMENT BUILDING DEVELOPMENT IN THE SMART CODE ZONING DISTRICTS.

WHEREAS, the City of Germantown, Tennessee (“City”), a Tennessee municipal corporation, has been vested with substantial power to regulate the use and zoning of real property for the purposes of maintaining the health, morals, safety, security, peace, and general public welfare of the City and its residents, which includes the governmental purpose of implementing moratoria for the reasons stated herein; and,

WHEREAS, the City’s Board of Mayor and Aldermen (“Board”) considers it paramount that land use regulation continue in the most orderly and predictable fashion with the least amount of disturbance to landowners and City residents; and,

WHEREAS, the concept of general public welfare is broad and inclusive and it is within the power and prerogative of the Board to determine and ensure that development be implemented in the best interests of the City as whole; and,

WHEREAS, comparatively dense developments, such as apartments and apartment buildings, could result in disproportionate impacts on City resources and services (including water, utility, and sewer demands, traffic impacts, schools, public safety demands, etc.) compared to other forms of residential development; and,

WHEREAS, the Board, accordingly, has significant concerns regarding the potential impact of further apartment and apartment building development in the Smart Code Zoning Districts; and,

WHEREAS, the Board has determined it to be in the best interests of the City and its residents to impose an eighteen (18) month moratorium, as set forth in more detail below, temporarily halting both the acceptance of new applications and the processing of applications for apartment and apartment building development (including any locations within mixed use projects or planned developments) in the Smart Code Zoning Districts. Excepted from the moratorium are multi-family development applications in the Smart Code Zoning Districts that have already been approved at any stage of the development process by the City, including any of its boards, departments, or commissions, specifically Thornwood, Watermark, Viridian, and the Carter mixed use development; and,

WHEREAS, the purpose of the temporary moratorium is to allow the City an opportunity to study, research, analyze and/or assess the likely impacts and nature of any future apartment and apartment building development in the Smart Code Zoning Districts, including, without limitation and as the City deems appropriate, development and demographic trends, aesthetic qualities, burdens upon and access to City services, resources, schools, infrastructure, utilities, parks, public areas/facilities, and emergency and police services, traffic congestion, public safety, and neighborhood characteristics; and,

WHEREAS, said moratorium is in the best interests of the health, welfare, and safety of the City and its residents, and also wholly consistent with the police and other powers vested in the City.

Appendix A

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF MAYOR AND ALDERMEN OF THE CITY OF GERMANTOWN, TENNESSEE, that, except as otherwise provided herein, an eighteen (18) month moratorium is hereby imposed, effective upon the adoption of this resolution, to (1) temporarily halt the acceptance of applications for apartment and apartment building development (including any locations within mixed use projects or planned developments) in the Smart Code Zoning Districts, and (2) temporarily halt the processing of applications and issuance of building permits for apartment and apartment building development (including any locations within mixed use projects or planned developments) in the Smart Code Zoning Districts.

BE IT FURTHER RESOLVED, that, notwithstanding the foregoing, this moratorium shall not apply to the multi-family development applications in the Smart Code Zoning Districts that have already been approved at any stage of the development process by the City, including any of its boards, departments, or commissions, specifically Thornwood, Watermark, Viridian, and the Carter mixed use development. However, said developments and proposed developments remain subject to all existing approval requirements of the City.

BE IT FURTHER RESOLVED, that, unless further extended, this moratorium shall expire on July 8, 2019.

Approved and adopted this 8th day of January, 2018.

Mayor Mike Palazzolo

Attest:

City Clerk/Recorder

Multi-Family/Multi-Use (Including Apartments) Utility Impact Spreadsheet

MULTI-FAMILY MULTI-USE (INCLUDING APARTMENTS) UTILITY IMPACT									
IMPACT AREA	EXISTING/FUTURE	WATER				SEWER			
		Project Title	Consultant/Contractor	Funding (\$)	Board of Mayor & Aldermen Approval Date	Project Title	Consultant/Contractor	Funding (\$)	Board of Mayor & Aldermen Approval Date
Forest Hill Heights	Existing	Professional Services Agreement-Forest Hill Water	Allen & Hoshall	40,000	12/8/08				
		Forest Hill Water Construction	B & C Construction Company	315,170	6/8/09				
	Future	FY19: Annexation Area Water Main Construction – Phase I		1,140,000		FY19: Forest Hill Heights Sanitary Sewer Upgrades		100,000	
		FY19: Water Main for Elevated Water Tower		243,100		FY20: Forest Hill Heights Sanitary Sewer Upgrades		900,000	
		FY20: Elevated Water Tower - East of New School		2,357,000					
		FY20: Annexation Area Water Main Construction– Phase II		1,034,000					
		FY20: Water System Upgrade Cost Share for Goodwin Farms		54,100					
FY21: Water System Acquisition Funding South of Winchester		200,000							
West Poplar Avenue District	Existing	Poplar Pike Water Mains-Construction	Argo Construction	574,200	8/13/01	Professional Services Agreement- Western Gateway	Allen & Hoshall	184,000	10/26/15
		Poplar Pike Water Mains-Construction (C/O #1)	Argo Construction	15,177	10/28/02	Professional Services Agreement- Western Gateway	Allen & Hoshall	189,000	8/14/17
	Future					FY19: Western Gateway Sewer Improvements		2,000,000	
Central Business District	Existing	Smart Growth Development Impact Study	Allen & Hoshall	30,000	1/28/08	Smart Growth Sanitary Sewer Evaluation- Saddle Creek II Basin	Allen & Hoshall	2,450	10/9/07
						Professional Services Agreement- Miller Farm Basin Improvements	Allen & Hoshall	73,000	12/8/09
						Property/Easement Purchase	Fulmer/Riverdale Limited Partnership	70,400	12/13/10
						Miller Farms Sewer/Pump Station Construction	Madden Phillips Construction Company	1,127,827	3/12/12
						Res. Inspection - Lift Station	Allen & Hoshall	9,000	3/21/12
						Apple Valley Lift Station	Allen & Hoshall	33,750	10/8/12

Appendix C

Impact Fee Outline

Below is an outline for the steps that the City might take and the different factors to consider for the establishment of impact fees.

- 1. What are Impact Fees?**
 - a) Definition
 - b) Purpose
 - c) Examples of common impact fees and what they are typically used to address
 - d) General pros and cons of impact fees
- 2) What fees have the City of Germantown previously collected?**
 - a) Background/History of development fee collection in the City
 - i) What fees are currently collected, how are they collected, where do the funds from these fees go?
 - ii) What policy is currently in-place that supports fee collection?
 - b) How might impact fees be beneficial / detrimental to the City of Germantown?
 - i) Possible pros and cons for City of Germantown
- 3) What are the policy considerations for instating impact fees?**
 - a) Policy decisions
 - i) What should the policy address?
 - (1) Levied to all residents or just commercial development?
 - (2) What will the funding received be used to support?
 - (a) New facilities, utilities, transportation, etc.
 - (i) Infrastructure Financing Methodologies
 1. Average-cost pricing method, marginal-cost pricing system
 - (3) When will the impact fee be collected?
 - (a) Flow chart of impact fee process
 - ii) What would be the process for instating such a policy?
 - (1) Steps before approving as referendum/resolution
 - (a) Who would be involved in this process?
 - (i) Staff, policy makers, departments impacted, citizens
 - (2) How long would this process take?
 - (a) Construct possible timeline
- 4) What are the economic considerations for instating impact fees?**
 - a) Cost/Benefit Analysis
 - i) What would be the ROI of impact fees?
 - b) How will the fee be structured and what will it impact?
- 5) What are the legal considerations for instating impact fees?**
 - a) What are the legal ramifications of impact fees and what must they address?
 - i) Constitutional tests
 - b) What does the state of Tennessee dictate in regards to impact fees?
- 6) What other plans/analyses are required prior to instating impact fees?**
 - a) Comprehensive Plan, Capital Improvement Plans, Life-Cycle Infrastructure Analysis
- 7) How would impact fees aid the City in the current moratorium discussion?**
 - a) Possible provisions from impact fees
 - i) Funding for infrastructure improvements
 - ii) Delay property tax increases
- 8) Case Studies and City Comparisons for Impact Fees**
 - a) Town of Collierville, City of Franklin, City of Brentwood
 - i) How did these cities approach, process, and instate impact fees?
- 9) Conclusions**
 - a) Considerations for impact fees
 - b) Provide steps for moving forward
 - c) Provide necessary information for policy makers to make an informed decisions

Appendix D

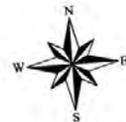
Police District #1: Single-Family Home Sample



Legend

Number of SFR on each street. Count includes both Road and Cove addresses

● Miller Farms	79	● Hazelton	17
● Poplar Estates	108	● Oak Hill	46
● Tuscany Way	26	● Ainsworth	18
● Corsica	41	● Bent Creek	25
● Brookside	92	● Churchill Downs	59
● Great Oaks	45	● Hunters Hill	27



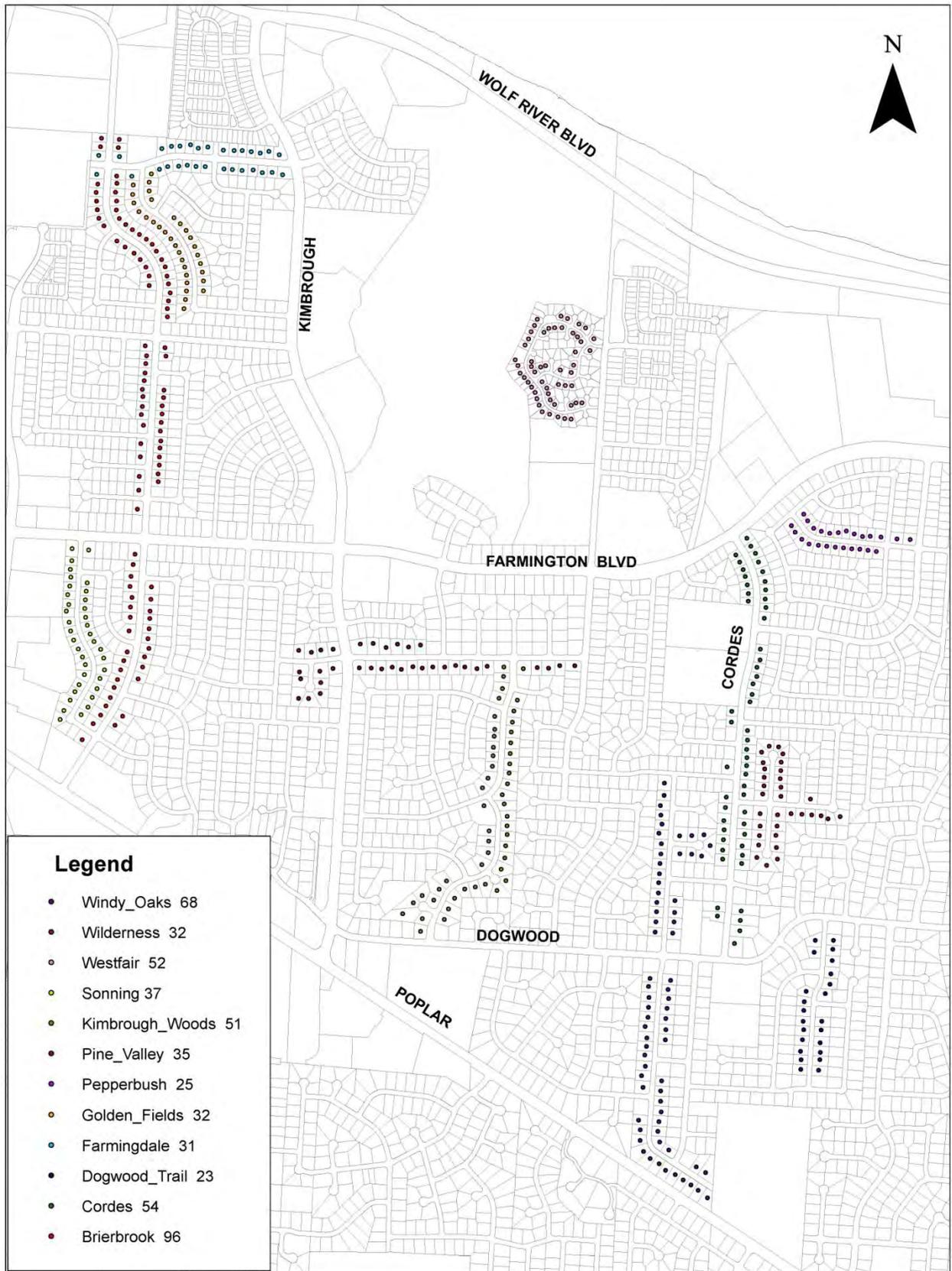
Appendix D

Police District #2: Single-Family Home Sample



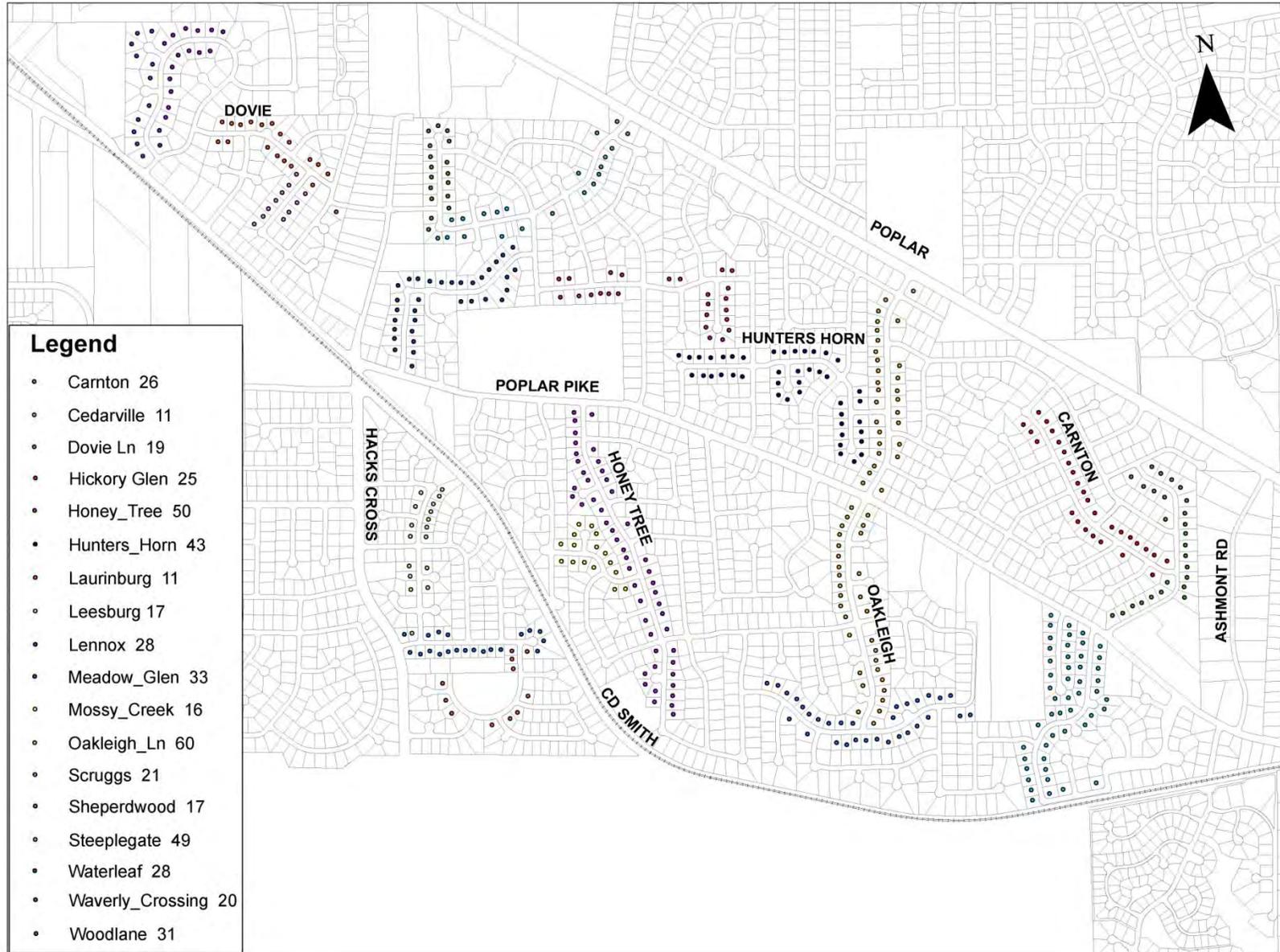
Appendix D

Police District #3: Single-Family Home Sample



Appendix D

Police District #4: Single-Family Home Sample



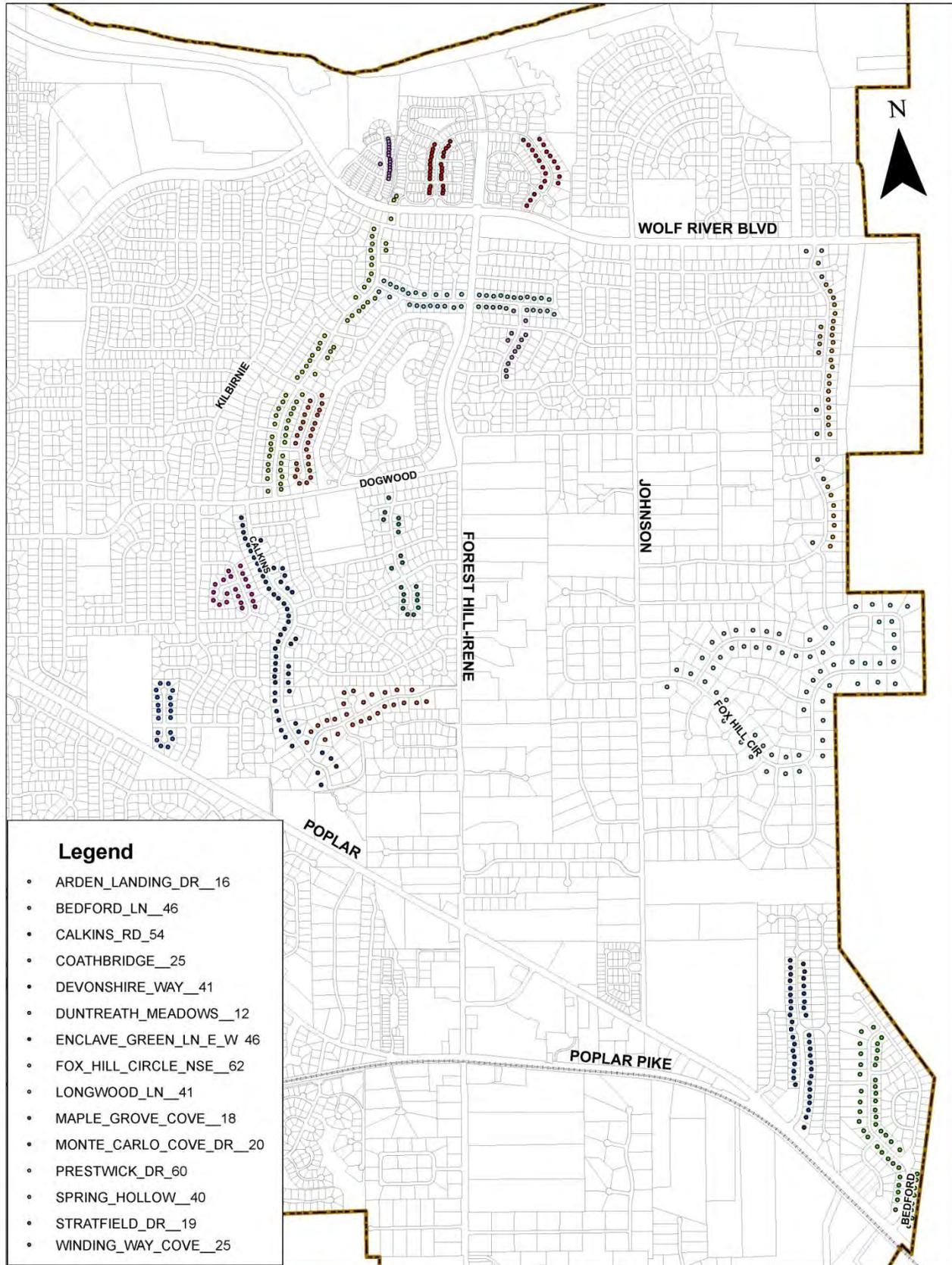
Appendix D

Police District #6: Single-Family Home Sample



Appendix D

Police District #7: Single-Family Home Sample



Appendix E

Listing of Incident Types included in study:

911 Investigations
Abandoned Vehicle
Abandoned Vehicle with Hazards
Alarm (audible)
Alarm (commercial)
Alarm (residential)
Alarm Burglary
Alarm Hold Up
Alarm Medical
All Other Offenses
Ambulance Only
Animal Complaint
Annoying Phone Calls
Armed Person
Assault (Domestic)
Assault (Simple)
Assist Fire Department
Assist Other Agency
Assist Police
Attempted Break-in
Bomb Threat
Booking Prisoner
Building Check
Burglary (Business)
Burglary (Residential)
Carjacking
Check on Welfare
Child Abuse
City Deposits
City Ordinance Violation
Civil Matter
Co Detector (Emergency)
Co Detector (Routine)
Commercial Fire Alarm
Commercial Hazard
Commercial, Multi-Family Fire Complaint
Court
Courtesy Transport
Criminal Assault Rape
Criminal Investigation
Death Investigation
Diabetic Emergency
Disorderly Conduct
Disturbance-Non Domestic
Domestic Disturbance (Verbal)
Drug Investigation
DUI

EDP
Entrapment/Extrication
ER Report
Escort
Evading Arrest (on foot)
Flight
Fire
Fire Trash/Dumpster
Follow up
Forgery
Found Property
Fraud
Fuel Spill (no fire)
Gas Odor
Grass/Brush Fire
Harassment
Hazardous Material
Hit and Run
Holding Prisoner
House Fire, Single Family
HQ
Identity Theft
Indecent Exposure
Inside Gas Leak
Intoxicated Person
Juveniles Disturbing
Kidnapping
Lost/Found Property
Masked
Medical Call
Mentally Ill
Missing Adult
Missing Juvenile
Motor Vehicle Theft
MVC (private property)
New Call
Non Call
Officer in Trouble
Other
Other Fire Call
Other Fire Service Call
Reckless Driving
Residential Fire
Residential Fire Alarm
Residential Hazardous Condition
Robbery
Routine Investigation
Sex Offense
Shooting
Shoplifting
Shots Fired
Sick/Injured Person

Solicitor
Special Assignment
Special Detail
Stabbing
Suicide Attempts/Threats
Suicide Investigation
Suspicious Activity
Suspicious Person
Suspicious Vehicle
Theft
Theft from Motor Vehicle
Training
Transport
Vandalism
VC
Vehicle Fire
Vehicle Maintenance
Warrant Pickup
Welfare Concern
Wing
Robbery in Progress
Unknown

Listing of Incident Types not included in study:

Assist Motorist
Meal Break
MVC (Property Damage)
MVC with Train
MVC with Injuries
MVC with No injuries
MVC with Unknown injuries
Traffic Complaint
Traffic Detail
Traffic Obstruction
Traffic Stop

Appendix E

Listing of Criminal Offenses included in study:

Arson
Assault (Aggravated)
Assault (Domestic)
Assault (Simple)
Bomb Threat
Burglary (Business)
Burglary (Residential)
Carjacking
Child Abuse
City Ordinance Violation
Custodial Interference
Disorderly Conduct
Domestic Disturbance (Verbal)
Drug Law Violation
Evading Arrest (Motor Vehicle)
Evading Arrest (On Foot)
False Reporting to Police
Forgery
Fraud
Harassment
Homicide
Identity Theft
Incident Exposure
Motor Vehicle Theft
Observation Without Consent
Pornography
Protection Order Violation
Rape (Forcible)
Rape (Statutory)
Reckless Endangerment (Felony)
Reckless Endangerment
(Misdemeanor)
Robbery
Sexual Battery
Stalking
Theft From a Motor Vehicle
Theft of Motor Vehicle Parts
Theft of Property
Theft of Services
Trespass of Real Property
Unauthorized Use of a Vehicle
Vandalism
Weapon Law Violation

Listing of Criminal Offenses included in study:

All Other Offenses
Animal Complaint
Death Investigation
Emotionally Disturbed Person
Found Property
Lost Property
Matter of Record
Missing Adult
Missing Juvenile
Resisting Arrest
Suicide Investigation
Traffic Complaint
Converted
Unknown

Appendix F

Police: Apartment 5-Year Data (2014 - 2018)

Apartment	Calls for Service		# of Units	Incident Avg per location	Crime Avg per location
	Incidents	Crimes			
Farmington Gates	61	9	182	34.5	6.6
Farmington Gates	79	12	182		
Farmington Gates	68	17	182		
Farmington Gates	68	12	182		
Farmington Gates	38	10	182		
The Retreat	58	10	280	25.5	4.1
The Retreat	58	7	280		
The Retreat	99	20	280		
The Retreat	74	9	280		
The Retreat	68	12	280		
The Bridges	24	3	252	19.5	3.7
The Bridges	65	9	252		
The Bridges	65	7	252		
The Bridges	49	17	252		
The Bridges	43	11	252		
The Vineyards	42	5	200	29.7	4.8
The Vineyards	91	13	200		
The Vineyards	60	8	200		
The Vineyards	39	7	200		
The Vineyards	65	15	200		
Westminster	93	9	100	79.6	13.4
Westminster	67	10	100		
Westminster	92	19	100		
Westminster	76	14	100		
Westminster	70	15	100		

Police: Age Restricted, Independent and Assisted Living 5-Year Data (2014 - 2018)

Year	Apartment	Calls for Service		# of Units	Incident Avg per 100 units	Crime Avg per 100 units	Incident Avg per location	Crime Avg per location
		Incidents	Crimes					
2014	Brookdale - Poplar	4	0	50	8.0	0.0	11.5	0.0
2015	Brookdale - Poplar	8	0	50	16.0	0.0		
2016	Brookdale - Poplar	7	0	50	14.0	0.0		
2017	Brookdale - Poplar	4	0	50	8.0	0.0		
2018	Brookdale - Poplar	8	4	50	16.0	8.0		
2014	Brookdale - Dogwood Creek	33	3	182	18.1	1.6	17.2	3.2
2015	Brookdale - Dogwood Creek	28	9	182	15.4	4.9		
2016	Brookdale - Dogwood Creek	29	8	182	15.9	4.4		
2017	Brookdale - Dogwood Creek	35	3	182	19.2	1.6		
2018	Brookdale - Dogwood Creek	31	0	182	17.0	0.0		
2014	Gardens of Germantown	7	2	48	14.6	4.2	15.1	5.2
2015	Gardens of Germantown	7	3	48	14.6	6.3		
2016	Gardens of Germantown	13	4	48	27.1	8.3		
2017	Gardens of Germantown	2	1	48	4.2	2.1		
2018	Gardens of Germantown	7	0	48	14.6	0.0		

Appendix F

2014	Germantown Plantation	12	1	108	11.1	0.9	9.7	1.6
2015	Germantown Plantation	5	2	108	4.6	1.9		
2016	Germantown Plantation	15	1	108	13.9	0.9		
2017	Germantown Plantation	10	3	108	9.3	2.8		
2018	Germantown Plantation	11	2	108	10.2	1.9		
2014	Villages of Germantown	13	4	248	5.2	1.6	10.2	2.4
2015	Villages of Germantown	33	9	248	13.3	3.6		
2016	Villages of Germantown	34	10	301	11.3	3.3		
2017	Villages of Germantown	37	3	333	11.1	0.9		
2018	Villages of Germantown	23	8	333	6.9	2.4		

Police: Condominiums 5-Year Data (2014 - 2018)

Year	Condominium	Calls for Service		# of Units	Total Avg per 100 units	100 unit Avg per location
		Incidents	Crimes			
2014	Allenby Green	0	0	30	8.3	0.8
2015	Allenby Green	2	0	30		
2016	Allenby Green	1	1	30		
2017	Allenby Green	7	0	30		
2018	Allenby Green	4	0	30		
2014	Bavarian Village	43	11	76	52.6	11.5
2015	Bavarian Village	40	8	76		
2016	Bavarian Village	40	9	76		
2017	Bavarian Village	37	7	76		
2018	Bavarian Village	35	12	76		
2014	Farmington Blvd Townhomes	3	0	8	40.6	12.5
2015	Farmington Blvd Townhomes	1	1	8		
2016	Farmington Blvd Townhomes	4	0	8		
2017	Farmington Blvd Townhomes	5	3	8		
2018	Farmington Blvd Townhomes	1	0	8		
2014	Farmington Glen	15	2	67	27.6	4.5
2015	Farmington Glen	28	6	67		
2016	Farmington Glen	16	3	67		
2017	Farmington Glen	15	1	67		
2018	Farmington Glen	14	4	67		
2014	Fountain Square	158	23	275	71.4	13.5
2015	Fountain Square	243	41	275		
2016	Fountain Square	190	40	275		
2017	Fountain Square	194	45	275		
2018	Fountain Square	189	31	275		
2014	Galway Green	7	0	42	17.9	0.0
2015	Galway Green	9	0	42		
2016	Galway Green	7	0	42		
2017	Galway Green	7	0	42		
2018	Galway Green	8	1	42		
2014	Greenleaf Condo	20	1	54	31.9	2.3
2015	Greenleaf Condo	23	1	54		
2016	Greenleaf Condo	15	2	54		
2017	Greenleaf Condo	11	1	54		
2018	Greenleaf Condo	21	2	54		

Appendix F

2014	Hobbits Glen	22	0	93	23.7	3.0
2015	Hobbits Glen	22	1	93		
2016	Hobbits Glen	27	5	93		
2017	Hobbits Glen	17	5	93		
2018	Hobbits Glen	7	4	93		
2014	Kimbrough Farm	0	0	7	21.4	3.6
2015	Kimbrough Farm	1	0	7		
2016	Kimbrough Farm	3	1	7		
2017	Kimbrough Farm	2	0	7		
2018	Kimbrough Farm	3	0	7		
2014	Kimbrough Forest	9	0	72	18.1	1.4
2015	Kimbrough Forest	12	0	72		
2016	Kimbrough Forest	14	1	72		
2017	Kimbrough Forest	17	3	72		
2018	Kimbrough Forest	7	0	72		
2014	Kimbrough Green	5	0	24	30.2	1.0
2015	Kimbrough Green	7	1	24		
2016	Kimbrough Green	11	0	24		
2017	Kimbrough Green	6	0	24		
2018	Kimbrough Green	4	0	24		
2014	Kimbrough Park Place	10	1	44	21.6	4.0
2015	Kimbrough Park Place	13	4	44		
2016	Kimbrough Park Place	9	2	44		
2017	Kimbrough Park Place	6	0	44		
2018	Kimbrough Park Place	5	0	44		
2014	Park Place	6	0	24	17.7	4.2
2015	Park Place	5	3	24		
2016	Park Place	2	0	24		
2017	Park Place	4	1	24		
2018	Park Place	5	0	24		
2014	Riverdale Farms	27	5	82	47.0	5.2
2015	Riverdale Farms	58	8	82		
2016	Riverdale Farms	28	1	82		
2017	Riverdale Farms	41	3	82		
2018	Riverdale Farms	17	2	82		
2014	West Rock	19	1	140	20.9	2.9
2015	West Rock	28	3	140		
2016	West Rock	32	9	140		
2017	West Rock	38	3	140		
2018	West Rock	42	6	140		
2014	Wicklow Cluster Homes	11	0	72	17.4	0.7
2015	Wicklow Cluster Homes	14	2	72		
2016	Wicklow Cluster Homes	9	0	72		
2017	Wicklow Cluster Homes	16	0	72		
2018	Wicklow Cluster Homes	15	0	72		
2014	Woodshire Townhomes	25	4	88	33.8	3.4
2015	Woodshire Townhomes	28	3	88		
2016	Woodshire Townhomes	31	3	88		
2017	Woodshire Townhomes	35	2	88		
2018	Woodshire Townhomes	30	1	88		

Appendix F

Police: Single-Family Homes 5-Year Data (2014 – 2018)

Year		Calls for Service		# of Units (Sample)	# of Units (Actual)	Estimated # of Incidents	Estimated # of Crimes	Incident Avg. per 100 units	Crime Avg. per 100 units
		Incidents	Crimes						
2014	Single Family Homes	1585	132	2929	13148	7115	593	54.1	4.5
2015	Single Family Homes	1920	152	2929	13148	8619	682	65.6	5.2
2016	Single Family Homes	1735	142	2929	13148	7788	637	59.2	4.8
2017	Single Family Homes	1704	179	2929	13148	7649	804	58.2	6.1
2018	Single Family Homes	1515	159	2929	13148	6801	714	51.7	5.4

Police: Apartment 5-Year Data by Year (2014 – 2018)

Year	Property Name	Calls for Service			Total Avg. Incident Calls	Total Avg. Crime Calls
		Incidents	Crimes	# of Units		
2014	Farmington Gates	61	9	182	27.4	3.6
	Retreat	58	10	280		
	Bridges	24	3	252		
	Vineyard	42	5	200		
	Westminster	93	9	100		
2015	Farmington Gates	79	12	182	35.5	5.0
	Retreat	58	7	280		
	Bridges	65	9	252		
	Vineyard	91	13	200		
	Westminster	67	10	100		
2016	Farmington Gates	68	17	182	37.9	7.0
	Retreat	99	20	280		
	Bridges	65	7	252		
	Vineyard	60	8	200		
	Westminster	92	19	100		
2017	Farmington Gates	68	12	182	30.2	5.8
	Retreat	74	9	280		
	Bridges	49	17	252		
	Vineyard	39	7	200		
	Westminster	76	14	100		
2018	Farmington Gates	38	10	182	28.0	6.2
	Retreat	68	12	280		
	Bridges	43	11	252		
	Vineyard	65	15	200		
	Westminster	70	15	100		

Appendix F

Police: Age Restricted, Independent and Assisted Living 5-Year Data by Year (2014 – 2018)

Year	Property Name	Calls for Service			Incidents Per 100 Units	Crimes Per 100 Units	Total Avg. Incident Calls per unit	Total Avg. Crime Calls per unit
		Incidents	Crimes	# of Units				
2014	Brookdale - Poplar	4	0	50	8.0	0.0	10.8	1.6
	Brookdale - Dogwood Creek	33	3	182	18.1	1.6		
	Gardens of Germantown	7	2	48	14.6	4.2		
	Germantown Plantation	12	1	108	11.1	0.9		
	Villages of Germantown	13	4	248	5.2	1.6		
2015	Brookdale - Poplar	8	0	50	16.0	0.0	12.7	3.6
	Brookdale - Dogwood Creek	28	9	182	15.4	4.9		
	Gardens of Germantown	7	3	48	14.6	6.3		
	Germantown Plantation	5	2	108	4.6	1.9		
	Villages of Germantown	33	9	248	13.3	3.6		
2016	Brookdale - Poplar	7	0	50	14.0	0.0	14.2	3.3
	Brookdale - Dogwood Creek	29	8	182	15.9	4.4		
	Gardens of Germantown	13	4	48	27.1	8.3		
	Germantown Plantation	15	1	108	13.9	0.9		
	Villages of Germantown	34	10	301	11.3	3.3		
2017	Brookdale - Poplar	4	0	50	8.0	0.0	12.2	1.4
	Brookdale - Dogwood Creek	35	3	182	19.2	1.6		
	Gardens of Germantown	2	1	48	4.2	2.1		
	Germantown Plantation	10	3	108	9.3	2.8		
	Villages of Germantown	37	3	333	11.1	0.9		
2018	Brookdale - Poplar	8	4	50	16.0	8.0	11.1	1.9
	Brookdale - Dogwood Creek	31	0	182	17.0	0.0		
	Gardens of Germantown	7	0	48	14.6	0.0		
	Germantown Plantation	11	2	108	10.2	1.9		
	Villages of Germantown	23	8	333	6.9	2.4		

Police: Condominiums 5-Year Data by Year (2014 – 2018)

Year	Property Name	Calls for Service			Total Avg. Incident Calls	Total Avg. Crime Calls
		Incidents	Crimes	# of Units		
2014	Allenby Green	0	0	30	31.7	4.0
	Bavarian Village	43	11	76		
	Farmington Blvd Townhomes	3	0	8		
	Farmington Glen	15	3	67		
	Fountain Square	158	22	275		
	Galway Green	7	0	42		
	Greenleaf Condo	20	1	54		
	Hobbits Glen	22	0	93		
	Kimbrough Farm	0	0	7		
	Kimbrough Forest	9	0	72		
	Kimbrough Green	5	0	24		
	Kimbrough Park Place	10	1	44		

Appendix F

	Park Place	6	0	24					
	Riverdale Farms	27	5	82					
	West Rock	19	1	140					
	Wicklow Cluster Homes	11	0	72					
	Woodshire Townhomes	25	4	88					
2015	Allenby Green	2	0	30	44.6	6.8			
	Bavarian Village	40	8	76					
	Farmington Blvd Townhomes	1	1	8					
	Farmington Glen	28	6	67					
	Fountain Square	243	41	275					
	Galway Green	9	0	42					
	Greenleaf Condo	23	1	54					
	Hobbits Glen	22	1	93					
	Kimbrough Farm	1	0	7					
	Kimbrough Forest	12	0	72					
	Kimbrough Green	7	1	24					
	Kimbrough Park Place	13	4	44					
	Park Place	5	3	24					
	Riverdale Farms	58	8	82					
	West Rock	28	3	140					
	Wicklow Cluster Homes	14	2	72					
	Woodshire Townhomes	28	3	88					
	2016	Allenby Green	1	1			30	36.6	6.4
		Bavarian Village	40	9			76		
Farmington Blvd Townhomes		4	0	8					
Farmington Glen		16	3	67					
Fountain Square		190	40	275					
Galway Green		7	0	42					
Greenleaf Condo		15	2	54					
Hobbits Glen		27	5	93					
Kimbrough Farm		3	1	7					
Kimbrough Forest		14	1	72					
Kimbrough Green		11	0	24					
Kimbrough Park Place		9	2	44					
Park Place		2	0	24					
Riverdale Farms		28	1	82					
West Rock		32	9	140					
Wicklow Cluster Homes		9	0	72					
Woodshire Townhomes	31	3	88						
2017	Allenby Green	7	0	30	38.2	6.2			
	Bavarian Village	37	7	76					
	Farmington Blvd Townhomes	5	3	8					
	Farmington Glen	15	1	67					
	Fountain Square	194	45	275					
	Galway Green	7	0	42					
	Greenleaf Condo	11	1	54					
	Hobbits Glen	17	5	93					
	Kimbrough Farm	2	0	7					
	Kimbrough Forest	17	3	72					
	Kimbrough Green	6	0	24					
	Kimbrough Park Place	6	0	44					
	Park Place	4	1	24					
	Riverdale Farms	41	3	82					

Appendix F

	West Rock	38	3	140		
	Wicklow Cluster Homes	16	0	72		
	Woodshire Townhomes	35	2	88		
2018	Allenby Green	4	0	30	34.0	5.3
	Bavarian Village	35	12	76		
	Farmington Blvd Townhomes	1	0	8		
	Farmington Glen	14	4	67		
	Fountain Square	189	31	275		
	Galway Green	8	1	42		
	Greenleaf Condo	21	2	54		
	Hobbits Glen	7	4	93		
	Kimbrough Farm	3	0	7		
	Kimbrough Forest	7	0	72		
	Kimbrough Green	4	0	24		
	Kimbrough Park Place	5	0	44		
	Park Place	5	0	24		
	Riverdale Farms	17	2	82		
	West Rock	42	6	140		
	Wicklow Cluster Homes	15	0	72		
	Woodshire Townhomes	30	1	88		

Appendix G

Fire: Apartment 5-Year Data (2014 – 2018)

Year	Apartment	Calls for Service			# of Units	Total Avg. per 100 units	100 unit Avg. per location
		EMS	Non-EMS	Total			
2014	The Bridges	4	6	10	252	3.97	4.76
2015	The Bridges	5	4	9	252	3.57	
2016	The Bridges	9	6	15	252	5.95	
2017	The Bridges	7	7	14	252	5.56	
2018	The Bridges	9	3	12	252	4.76	
2014	Farmington Gates	8	6	14	182	7.69	9.78
2015	Farmington Gates	14	1	15	182	8.24	
2016	Farmington Gates	12	3	15	182	8.24	
2017	Farmington Gates	20	3	23	182	12.64	
2018	Farmington Gates	19	3	22	182	12.09	
2014	The Retreat	2	3	5	280	1.79	4.93
2015	The Retreat	7	10	17	280	6.07	
2016	The Retreat	6	4	10	280	3.57	
2017	The Retreat	8	5	13	280	4.64	
2018	The Retreat	16	8	24	280	8.57	
2014	The Vineyards	1	2	3	200	1.50	5.60
2015	The Vineyards	5	7	12	200	6.00	
2016	The Vineyards	3	7	10	200	5.00	
2017	The Vineyards	8	6	14	200	7.00	
2018	The Vineyards	11	6	17	200	8.50	
2014	Westminster	6	3	9	100	9.00	10.20
2015	Westminster	4	0	4	100	4.00	
2016	Westminster	10	3	13	100	13.00	
2017	Westminster	10	12	22	100	22.00	
2018	Westminster	3	0	3	100	3.00	

Fire: Age Restricted, Independent and Assisted Living 5-Year Data (2014 – 2018)

Year	Independent & Assisted Living	Calls for Service			# of Units	Total per 100 units	100 Unit Avg per location
		EMS	Non-EMS	Total			
2014	Brookdale - Poplar	31	23	54	50	108.0	97.6
2015	Brookdale - Poplar	24	11	35	50	70.0	
2016	Brookdale - Poplar	23	16	39	50	78.0	
2017	Brookdale - Poplar	38	12	50	50	100.0	
2018	Brookdale - Poplar	50	16	66	50	132.0	
2014	Brookdale - Dogwood Creek	154	17	171	182	94.0	107.6
2015	Brookdale - Dogwood Creek	167	34	201	182	110.4	
2016	Brookdale - Dogwood Creek	136	37	173	182	95.1	
2017	Brookdale - Dogwood Creek	217	27	244	182	134.1	
2018	Brookdale - Dogwood Creek	166	24	190	182	104.4	
2014	Gardens of Germantown	26	5	31	48	64.6	88.3
2015	Gardens of Germantown	38	6	44	48	91.7	
2016	Gardens of Germantown	41	7	48	48	100.0	
2017	Gardens of Germantown	23	6	29	48	60.4	
2018	Gardens of Germantown	59	1	60	48	125.0	
2014	Germantown Plantation	49	1	50	108	46.3	54.6
2015	Germantown Plantation	52	5	57	108	52.8	
2016	Germantown Plantation	49	8	57	108	52.8	

Appendix G

2017	Germantown Plantation	63	2	65	108	60.2	
2018	Germantown Plantation	62	4	66	108	61.1	
2014	Villages of Germantown	71	22	93	248	37.5	46.0
2015	Villages of Germantown	93	28	121	248	48.8	
2016	Villages of Germantown	93	19	112	248	45.2	
2017	Villages of Germantown	94	26	120	301	39.9	
2018	Villages of Germantown	178	18	196	333	58.9	

Fire: Condominiums 5-Year Data (2014 - 2018)

Year	Condominium	Calls for Service			# of Units	Total Avg per 100 unit	100 Unit Avg per location
		EMS	Non-EMS	Total			
2014	Allenby Green	0	0	0	30	0.0	0.7
2015	Allenby Green	0	0	0	30	0.0	
2016	Allenby Green	0	0	0	30	0.0	
2017	Allenby Green	0	0	0	30	0.0	
2018	Allenby Green	1	0	1	30	3.3	
2014	Bavarian Village	4	0	4	76	5.3	3.7
2015	Bavarian Village	0	0	0	76	0.0	
2016	Bavarian Village	1	1	2	76	2.6	
2017	Bavarian Village	1	5	6	76	7.9	
2018	Bavarian Village	1	1	2	76	2.6	
2014	Farmington Blvd Townhomes	0	0	0	8	0.0	10.0
2015	Farmington Blvd Townhomes	0	1	1	8	12.5	
2016	Farmington Blvd Townhomes	1	1	2	8	25.0	
2017	Farmington Blvd Townhomes	1	0	1	8	12.5	
2018	Farmington Blvd Townhomes	0	0	0	8	0.0	
2014	Farmington Glen	0	0	0	67	0.0	5.7
2015	Farmington Glen	0	2	2	67	3.0	
2016	Farmington Glen	5	2	7	67	10.4	
2017	Farmington Glen	4	1	5	67	7.5	
2018	Farmington Glen	3	2	5	67	7.5	
2014	Fountain Square	12	7	19	275	6.9	10.2
2015	Fountain Square	15	9	24	275	8.7	
2016	Fountain Square	17	8	25	275	9.1	
2017	Fountain Square	20	8	28	275	10.2	
2018	Fountain Square	33	11	44	275	16.0	
2014	Galway Green	0	0	0	42	0.0	0.0
2015	Galway Green	0	0	0	42	0.0	
2016	Galway Green	0	0	0	42	0.0	
2017	Galway Green	0	0	0	42	0.0	
2018	Galway Green	0	0	0	42	0.0	
2014	Greenleaf Condo	0	0	0	54	0.0	4.8
2015	Greenleaf Condo	2	1	3	54	5.6	
2016	Greenleaf Condo	5	0	5	54	9.3	
2017	Greenleaf Condo	1	1	2	54	3.7	
2018	Greenleaf Condo	2	1	3	54	5.6	
2014	Hobbits Glen	2	1	3	93	3.2	5.6
2015	Hobbits Glen	2	2	4	93	4.3	
2016	Hobbits Glen	0	3	3	93	3.2	
2017	Hobbits Glen	4	3	7	93	7.5	
2018	Hobbits Glen	8	1	9	93	9.7	

Appendix G

2014	Kimbrough Farm	0	1	1	7	14.3	2.9
2015	Kimbrough Farm	0	0	0	7	0.0	
2016	Kimbrough Farm	0	0	0	7	0.0	
2017	Kimbrough Farm	0	0	0	7	0.0	
2018	Kimbrough Farm	0	0	0	7	0.0	
2014	Kimbrough Forest	0	0	0	72	0.0	3.6
2015	Kimbrough Forest	0	1	1	72	1.4	
2016	Kimbrough Forest	1	2	3	72	4.2	
2017	Kimbrough Forest	1	2	3	72	4.2	
2018	Kimbrough Forest	5	1	6	72	8.3	
2014	Kimbrough Green	0	0	0	24	0.0	5.0
2015	Kimbrough Green	0	0	0	24	0.0	
2016	Kimbrough Green	0	0	0	24	0.0	
2017	Kimbrough Green	2	3	5	24	20.8	
2018	Kimbrough Green	0	1	1	24	4.2	
2014	Kimbrough Park Place	0	0	0	44	0.0	1.4
2015	Kimbrough Park Place	2	1	3	44	6.8	
2016	Kimbrough Park Place	0	0	0	44	0.0	
2017	Kimbrough Park Place	0	0	0	44	0.0	
2018	Kimbrough Park Place	0	0	0	44	0.0	
2014	Park Place	1	0	1	24	4.2	3.3
2015	Park Place	1	0	1	24	4.2	
2016	Park Place	2	0	2	24	8.3	
2017	Park Place	0	0	0	24	0.0	
2018	Park Place	0	0	0	24	0.0	
2014	Riverdale Farms	2	3	5	82	6.1	4.6
2015	Riverdale Farms	2	1	3	82	3.7	
2016	Riverdale Farms	2	0	2	82	2.4	
2017	Riverdale Farms	2	0	2	82	2.4	
2018	Riverdale Farms	4	3	7	82	8.5	
2014	West Rock	1	0	1	140	0.7	4.0
2015	West Rock	2	1	3	140	2.1	
2016	West Rock	4	2	6	140	4.3	
2017	West Rock	3	3	6	140	4.3	
2018	West Rock	7	5	12	140	8.6	
2014	Wicklow Cluster Homes	1	0	1	72	1.4	2.2
2015	Wicklow Cluster Homes	1	1	2	72	2.8	
2016	Wicklow Cluster Homes	0	3	3	72	4.2	
2017	Wicklow Cluster Homes	2	0	2	72	2.8	
2018	Wicklow Cluster Homes	0	0	0	72	0.0	
2014	Woodshire Townhomes	0	1	1	88	1.1	3.2
2015	Woodshire Townhomes	2	0	2	88	2.3	
2016	Woodshire Townhomes	1	2	3	88	3.4	
2017	Woodshire Townhomes	3	1	4	88	4.5	
2018	Woodshire Townhomes	0	4	4	88	4.5	

Appendix G

Fire: Single-Family Homes 5-Year Data (2014 – 2018)

Year		Calls for Service			# of Units	Total Avg per 100 units	100 Unit Avg
		EMS	Non-EMS	Total			
2014	Single Family Homes	949	576	1525	12956	11.8	12.4
2015	Single Family Homes	1074	567	1641	13002	12.6	
2016	Single Family Homes	1003	528	1531	13047	11.7	
2017	Single Family Homes	1078	634	1712	13120	13.0	
2018	Single Family Homes	977	680	1657	13148	12.6	
5-Year Total Averages						12.4	

Fire: Apartment 10-Year Data by Year (2009 – 2018)

Year	Property Name	Calls for Service			# of Units	Total per 100 units	Total Avg. Annual Calls per 100 units
		EMS	Non-EMS	Total			
2009	Farmington Gates	6	1	7	182	3.8	3.3
	Retreat	7	3	10	280	3.6	
	Bridges	2	10	12	252	4.8	
	Vineyard	1	3	4	200	2.0	
	Westminster	0	0	0	100	0.0	
2010	Farmington Gates	11	5	16	182	8.8	5.7
	Retreat	8	3	11	280	3.9	
	Bridges	7	11	18	252	7.1	
	Vineyard	6	1	7	200	3.5	
	Westminster	6	0	6	100	6.0	
2011	Farmington Gates	14	2	16	182	8.8	4.2
	Retreat	6	3	9	280	3.2	
	Bridges	2	2	4	252	1.6	
	Vineyard	2	4	6	200	3.0	
	Westminster	7	1	8	100	8.0	
2012	Farmington Gates	7	4	11	182	6.0	5.0
	Retreat	1	4	5	280	1.8	
	Bridges	4	11	15	252	6.0	
	Vineyard	7	6	13	200	6.5	
	Westminster	6	1	7	100	7.0	
2013	Farmington Gates	10	1	11	182	6.0	7.3
	Retreat	6	3	9	280	3.2	
	Bridges	12	10	22	252	8.7	
	Vineyard	10	4	14	200	7.0	
	Westminster	15	3	18	100	18.0	
2014	Farmington Gates	8	6	14	182	7.7	4.0
	Retreat	2	3	5	280	1.8	
	Bridges	4	6	10	252	4.0	
	Vineyard	1	2	3	200	1.5	
	Westminster	6	3	9	100	9.0	
2015	Farmington Gates	14	1	15	182	8.2	5.6
	Retreat	7	10	17	280	6.1	
	Bridges	5	4	9	252	3.6	
	Vineyard	5	7	12	200	6.0	
	Westminster	4	0	4	100	4.0	

Appendix G

2016	Farmington Gates	12	3	15	182	8.2	6.2
	Retreat	6	4	10	280	3.6	
	Bridges	9	6	15	252	6.0	
	Vineyard	3	7	10	200	5.0	
	Westminster	10	3	13	100	13.0	
2017	Farmington Gates	20	3	23	182	12.6	8.5
	Retreat	8	5	13	280	4.6	
	Bridges	7	7	14	252	5.6	
	Vineyard	8	6	14	200	7.0	
	Westminster	10	12	22	100	22.0	
2018	Farmington Gates	19	3	22	182	12.1	7.7
	Retreat	16	8	24	280	8.6	
	Bridges	9	3	12	252	4.8	
	Vineyard	11	6	17	200	8.5	
	Westminster	3	0	3	100	3.0	

Fire: Age Restricted, Independent and Assisted Living 10-Year Data by Year (2009 – 2018)

Year	Property Name	Calls for Service			# of Units	Total Calls Per 100 Units	Total Avg. Annual Calls per 100 units
		EMS	Non-EMS	Total			
2009	Brookdale - Poplar	7	6	13	50	26.0	28.82
	Germantown Plantation	29	11	40	108	37.0	
	Villages of Germantown	51	13	64	248	25.8	
2010	Brookdale - Poplar	24	6	30	50	60.0	32.38
	Gardens of Germantown	0	1	1	48	2.1	
	Germantown Plantation	62	1	63	108	58.3	
	Villages of Germantown	36	17	53	248	21.4	
2011	Brookdale - Poplar	20	18	38	50	76.0	45.81
	Gardens of Germantown	22	1	23	48	47.9	
	Germantown Plantation	73	5	78	108	72.2	
	Villages of Germantown	54	15	69	248	27.8	
2012	Brookdale - Poplar	20	16	36	50	72.0	42.95
	Gardens of Germantown	10	1	11	48	22.9	
	Germantown Plantation	77	3	80	108	74.1	
	Villages of Germantown	59	9	68	248	27.4	
2013	Brookdale - Poplar	18	9	27	50	54.0	43.55
	Brookdale - Dogwood Creek	64	17	81	182	44.5	
	Gardens of Germantown	16	2	18	48	37.5	
	Germantown Plantation	62	4	66	108	61.1	
	Villages of Germantown	74	11	85	248	34.3	
2014	Brookdale - Poplar	31	23	54	50	108.0	62.74
	Brookdale - Dogwood Creek	154	17	171	182	94.0	
	Gardens of Germantown	26	5	31	48	64.6	
	Germantown Plantation	49	1	50	108	46.3	
	Villages of Germantown	71	22	93	248	37.5	
2015	Brookdale - Poplar	24	11	35	50	70.0	72.01
	Brookdale - Dogwood Creek	167	34	201	182	110.4	
	Gardens of Germantown	38	6	44	48	91.7	
	Germantown Plantation	52	5	57	108	52.8	
	Villages of Germantown	93	28	121	248	48.8	
2016	Brookdale - Poplar	23	16	39	50	78.0	62.26

Appendix G

	Brookdale - Dogwood Creek	136	37	173	182	95.1	
	Gardens of Germantown	41	7	48	48	100.0	
	Germantown Plantation	49	8	57	108	52.8	
	Villages of Germantown	93	19	112	301	37.2	
2017	Brookdale - Poplar	38	12	50	50	100.0	70.46
	Brookdale - Dogwood Creek	217	27	244	182	134.1	
	Gardens of Germantown	23	6	29	48	60.4	
	Germantown Plantation	63	2	65	108	60.2	
	Villages of Germantown	94	26	120	333	36.0	
2018	Brookdale - Poplar	50	16	66	50	132.0	80.17
	Brookdale - Dogwood Creek	166	24	190	182	104.4	
	Gardens of Germantown	59	1	60	48	125.0	
	Germantown Plantation	62	4	66	108	61.1	
	Villages of Germantown	178	18	196	333	58.9	

Fire: Condominiums 10-Year Data by Year (2009 - 2018)

Year	Property Name	Calls for Service			# of Units	Total per 100 units	Total Avg. Annual Calls per 100 units
		EMS	Non-EMS	Total			
2009	Allenby Green	0	0	0	30	0.0	4.8
	Bavarian Village	0	0	0	76	0.0	
	Farmington Blvd Townhomes	0	0	0	8	0.0	
	Farmington Glen	0	0	0	67	0.0	
	Fountain Square	41	15	56	275	20.4	
	Galway Green	0	0	0	42	0.0	
	Greenleaf Condo	0	0	0	54	0.0	
	Hobbits Glen	0	0	0	93	0.0	
	Kimbrough Farm	0	0	0	7	0.0	
	Kimbrough Forest	0	0	0	72	0.0	
	Kimbrough Green	0	0	0	24	0.0	
	Kimbrough Park Place	0	0	0	44	0.0	
	Park Place	0	0	0	24	0.0	
	Riverdale Farms	0	0	0	82	0.0	
	West Rock	1	1	2	140	1.4	
	Wicklow Cluster Homes	0	0	0	72	0.0	
Woodshire Townhomes	0	0	0	88	0.0		
2010	Allenby Green	0	0	0	30	0.0	4.0
	Bavarian Village	1	0	1	76	1.3	
	Farmington Blvd Townhomes	0	0	0	8	0.0	
	Farmington Glen	2	2	4	67	6.0	
	Fountain Square	25	9	34	275	12.4	
	Galway Green	0	0	0	42	0.0	
	Greenleaf Condo	0	0	0	54	0.0	
	Hobbits Glen	1	0	1	93	1.1	
	Kimbrough Farm	0	0	0	7	0.0	
	Kimbrough Forest	2	0	2	72	2.8	
	Kimbrough Green	0	0	0	24	0.0	
	Kimbrough Park Place	0	0	0	44	0.0	
	Park Place	0	0	0	24	0.0	
	Riverdale Farms	1	0	1	82	1.2	
West Rock	1	2	3	140	2.1		

Appendix G

	Wicklow Cluster Homes	0	0	0	72	0.0	
	Woodshire Townhomes	1	1	2	88	2.3	
2011	Allenby Green	0	1	1	30	3.3	5.2
	Bavarian Village	3	0	3	76	3.9	
	Farmington Blvd Townhomes	1	0	1	8	12.5	
	Farmington Glen	2	0	2	67	3.0	
	Fountain Square	23	7	30	275	10.9	
	Galway Green	0	0	0	42	0.0	
	Greenleaf Condo	0	0	0	54	0.0	
	Hobbits Glen	2	4	6	93	6.5	
	Kimbrough Farm	0	0	0	7	0.0	
	Kimbrough Forest	3	0	3	72	4.2	
	Kimbrough Green	1	0	1	24	4.2	
	Kimbrough Park Place	1	0	1	44	2.3	
	Park Place	0	0	0	24	0.0	
	Riverdale Farms	2	2	4	82	4.9	
	West Rock	0	1	1	140	0.7	
	Wicklow Cluster Homes	4	0	4	72	5.6	
	Woodshire Townhomes	4	1	5	88	5.7	
2012	Allenby Green	1	1	2	30	6.7	5.0
	Bavarian Village	4	0	4	76	5.3	
	Farmington Blvd Townhomes	1	0	1	8	12.5	
	Farmington Glen	4	0	4	67	6.0	
	Fountain Square	16	8	24	275	8.7	
	Galway Green	0	0	0	42	0.0	
	Greenleaf Condo	0	2	2	54	3.7	
	Hobbits Glen	4	1	5	93	5.4	
	Kimbrough Farm	0	0	0	7	0.0	
	Kimbrough Forest	0	4	4	72	5.6	
	Kimbrough Green	0	1	1	24	4.2	
	Kimbrough Park Place	1	0	1	44	2.3	
	Park Place	0	0	0	24	0.0	
	Riverdale Farms	1	3	4	82	4.9	
	West Rock	2	0	2	140	1.4	
Wicklow Cluster Homes	1	3	4	72	5.6		
Woodshire Townhomes	1	1	2	88	2.3		
2013	Allenby Green	1	0	1	30	3.3	3.6
	Bavarian Village	0	0	0	76	0.0	
	Farmington Blvd Townhomes	0	0	0	8	0.0	
	Farmington Glen	1	1	2	67	3.0	
	Fountain Square	10	7	17	275	6.2	
	Galway Green	1	0	1	42	2.4	
	Greenleaf Condo	0	2	2	54	3.7	
	Hobbits Glen	0	2	2	93	2.2	
	Kimbrough Farm	0	0	0	7	0.0	
	Kimbrough Forest	4	2	6	72	8.3	
	Kimbrough Green	0	2	2	24	8.3	
	Kimbrough Park Place	1	0	1	44	2.3	
	Park Place	0	1	1	24	4.2	
	Riverdale Farms	2	0	2	82	2.4	
	West Rock	1	0	1	140	0.7	
	Wicklow Cluster Homes	2	1	3	72	4.2	
Woodshire Townhomes	1	1	2	88	2.3		

Appendix G

2014	Allenby Green	0	0	0	30	0.0	3.0
	Bavarian Village	4	0	4	76	5.3	
	Farmington Blvd Townhomes	0	0	0	8	0.0	
	Farmington Glen	0	0	0	67	0.0	
	Fountain Square	12	7	19	275	6.9	
	Galway Green	0	0	0	42	0.0	
	Greenleaf Condo	0	0	0	54	0.0	
	Hobbits Glen	2	1	3	93	3.2	
	Kimbrough Farm	0	1	1	7	14.3	
	Kimbrough Forest	0	0	0	72	0.0	
	Kimbrough Green	0	0	0	24	0.0	
	Kimbrough Park Place	0	0	0	44	0.0	
	Park Place	1	0	1	24	4.2	
	Riverdale Farms	2	3	5	82	6.1	
	West Rock	1	0	1	140	0.7	
	Wicklow Cluster Homes	1	0	1	72	1.4	
	Woodshire Townhomes	0	1	1	88	1.1	
2015	Allenby Green	0	0	0	30	0.0	4.1
	Bavarian Village	0	0	0	76	0.0	
	Farmington Blvd Townhomes	0	1	1	8	12.5	
	Farmington Glen	0	2	2	67	3.0	
	Fountain Square	15	9	24	275	8.7	
	Galway Green	0	0	0	42	0.0	
	Greenleaf Condo	2	1	3	54	5.6	
	Hobbits Glen	2	2	4	93	4.3	
	Kimbrough Farm	0	0	0	7	0.0	
	Kimbrough Forest	0	1	1	72	1.4	
	Kimbrough Green	0	0	0	24	0.0	
	Kimbrough Park Place	2	1	3	44	6.8	
	Park Place	1	0	1	24	4.2	
	Riverdale Farms	2	1	3	82	3.7	
	West Rock	2	1	3	140	2.1	
Wicklow Cluster Homes	1	1	2	72	2.8		
Woodshire Townhomes	2	0	2	88	2.3		
2016	Allenby Green	0	0	0	30	0.0	5.3
	Bavarian Village	1	1	2	76	2.6	
	Farmington Blvd Townhomes	1	1	2	8	25.0	
	Farmington Glen	5	2	7	67	10.4	
	Fountain Square	17	8	25	275	9.1	
	Galway Green	0	0	0	42	0.0	
	Greenleaf Condo	5	0	5	54	9.3	
	Hobbits Glen	0	3	3	93	3.2	
	Kimbrough Farm	0	0	0	7	0.0	
	Kimbrough Forest	1	2	3	72	4.2	
	Kimbrough Green	0	0	0	24	0.0	
	Kimbrough Park Place	0	0	0	44	0.0	
	Park Place	2	0	2	24	8.3	
	Riverdale Farms	2	0	2	82	2.4	
	West Rock	4	2	6	140	4.3	
Wicklow Cluster Homes	0	3	3	72	4.2		
Woodshire Townhomes	1	2	3	88	3.4		
2017	Allenby Green	0	0	0	30	0.0	5.9
	Bavarian Village	1	5	6	76	7.9	

Appendix G

	Farmington Blvd Townhomes	1	0	1	8	12.5	
	Farmington Glen	4	1	5	67	7.5	
	Fountain Square	20	8	28	275	10.2	
	Galway Green	0	0	0	42	0.0	
	Greenleaf Condo	1	1	2	54	3.7	
	Hobbits Glen	4	3	7	93	7.5	
	Kimbrough Farm	0	0	0	7	0.0	
	Kimbrough Forest	1	2	3	72	4.2	
	Kimbrough Green	2	3	5	24	20.8	
	Kimbrough Park Place	0	0	0	44	0.0	
	Park Place	0	0	0	24	0.0	
	Riverdale Farms	2	0	2	82	2.4	
	West Rock	3	3	6	140	4.3	
	Wicklow Cluster Homes	2	0	2	72	2.8	
	Woodshire Townhomes	3	1	4	88	4.5	
2018	Allenby Green	1	0	1	30	3.3	7.8
	Bavarian Village	1	1	2	76	2.6	
	Farmington Blvd Townhomes	0	0	0	8	0.0	
	Farmington Glen	3	2	5	67	7.5	
	Fountain Square	33	11	44	275	16.0	
	Galway Green	0	0	0	42	0.0	
	Greenleaf Condo	2	1	3	54	5.6	
	Hobbits Glen	8	1	9	93	9.7	
	Kimbrough Farm	0	0	0	7	0.0	
	Kimbrough Forest	5	1	6	72	8.3	
	Kimbrough Green	0	1	1	24	4.2	
	Kimbrough Park Place	0	0	0	44	0.0	
	Park Place	0	0	0	24	0.0	
	Riverdale Farms	4	3	7	82	8.5	
	West Rock	7	5	12	140	8.6	
	Wicklow Cluster Homes	0	0	0	72	0.0	
Woodshire Townhomes	0	4	4	88	4.5		

Appendix G

Fire: Single-Family Home 10-Year Data by Year (2009 – 2018)

Year		Calls for Service			# of Units	Total Avg. Annual Calls per 100 Units
		EMS	Non-EMS	Total		
2009	Single-Family Homes	800	533	1333	12663	10.5
2010	Single-Family Homes	760	523	1283	12713	10.1
2011	Single-Family Homes	784	511	1295	12758	10.2
2012	Single-Family Homes	913	519	1432	12829	11.2
2013	Single-Family Homes	994	579	1573	12909	12.2
2014	Single-Family Homes	949	576	1525	12956	11.8
2015	Single-Family Homes	1074	567	1641	13002	12.6
2016	Single-Family Homes	1003	528	1531	13047	11.7
2017	Single-Family Homes	1078	634	1712	13120	13.0
2018	Single-Family Homes	977	680	1657	13148	12.6

Appendix H

GMSD: Apartment Breakdown (2018-19)

Development	Dwelling Type	Elementary School Zone	Middle School Zone	High School Zone	Grade Band												Total	
					K	1	2	3	4	5	6	7	8	9	10	11		12
Farmington Gates	Apartments	FES	HMS	HHS	11	10	3	9	8	5	20	9	7	10	7	13	7	119
Retreat	Apartments	FES	HMS	HHS	2	2	4	4	5	3	7	0	4	2	3	3	0	39
Bridges	Apartments	RES	RES	HHS	6	7	4	7	3	6	9	6	5	3	3	1	1	61
Vineyard	Apartments	RES	RES	HHS	2	1	5	2	5	1	1	1	2	3	3	2	4	32
Westminster	Apartments	RES	RES	HHS	9	8	12	7	5	4	10	8	3	7	5	5	5	88

GMSD: Condominium Breakdown (2018-19)

Development	Dwelling Type	Elementary School Zone	Middle School Zone	High School Zone	Grade Band												Total	
					K	1	2	3	4	5	6	7	8	9	10	11		12
Allenby Green	Condominium	FES	HMS	HHS	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Bavarian Villiage	Condominium	FES	HMS	HHS	0	1	1	2	1	1	0	3	4	1	1	0	0	15
Farmington Blvd	Condominium	FES	HMS	HHS	3	0	0	0	1	1	2	0	1	0	1	0	0	9
Farmington Glen	Condominium	FES	HMS	HHS	3	1	2	1	0	1	0	2	3	4	1	1	2	21
Fountain Square	Condominium	RES	RES	HHS	3	7	4	7	5	7	5	5	3	4	4	9	4	67
Galway Green	Condominium	FES	HMS	HHS	1	1	0	3	1	0	2	2	1	0	1	0	0	12
Greenleaf Condo	Condominium	RES	RES	HHS	0	2	0	2	0	0	0	0	0	0	0	0	0	4
Hobbits Glen	Condominium	FES	HMS	HHS	0	0	0	1	0	0	1	0	0	1	0	0	0	3
Kimbrough Farm	Condominium	FES	HMS	HHS	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Kimbrough Forest	Condominium	FES	HMS	HHS	1	0	0	0	0	3	0	1	1	2	0	2	1	11
Kimbrough Green	Condominium	FES	HMS	HHS	0	0	0	0	1	0	0	0	0	0	1	1	1	4
Kimbrough Park Place	Condominium	FES	HMS	HHS	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Park Place	Condominium	FES	HMS	HHS	0	0	0	0	1	0	0	0	1	0	0	0	1	3
Riverdale Farms	Condominium	FES	HMS	HHS	1	0	0	0	1	1	0	3	2	0	1	0	0	9
West Rock	Condominium	FES	HMS	HHS	4	3	2	1	3	2	4	2	0	3	2	0	3	29
Wicklow Cluster Homes	Condominium	FES	HMS	HHS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Woodshire Townhomes	Condominium	FES	HMS	HHS	0	0	0	0	0	2	1	2	1	2	1	2	0	11

Appendix H

GMSD: 2018-19 Student Enrollment By Zone including Forest Hill Elementary

Attendance Zone	K	1	2	3	4	5	6	7	8	9	10	11	12	Totals
Dogwood Elementary	125	113	95	142	99	133								707
Farmington Elementary	125	124	102	99	113	119								682
Forest Hill Elementary	80	80	81	83	65	54								443
Riverdale School	125	121	147	138	126	115	126	143	144					1,185
Houston Middle							304	349	336					989
Houston High										416	397	335	335	1,483

GMSD: 2018-19 Student Enrollment By Zone and Dwelling Type

		K	1	2	3	4	5	6	7	8	9	10	11	12
DES	Apt													
	Condo													
	SFH	125	113	95	142	99	133							
FES	Apt	13	12	7	13	13	8							
	Condo	14	6	5	8	10	11							
	SFH	98	106	90	78	90	100							
FHES	Apt													
	Condo													
	SFH	80	80	81	83	65	54							
RS	Apt	17	16	21	16	13	11	20	15	10				
	Condo	3	9	4	9	5	7	5	5	3				
	SFH	105	96	122	113	108	97	101	123	131				
HMS	Apt							27	9	11				
	Condo							11	15	14				
	SFH							266	325	311				
HHS	Apt										25	21	24	17
	Condo										17	13	15	12
	SFH										374	363	296	306
Total	Apt	30	28	28	29	26	19	47	24	21	25	21	24	17
	Condo	17	15	9	17	15	18	16	20	17	17	13	15	12
	SFH	408	395	388	416	362	384	367	448	442	374	363	296	306

Appendix I

Multi-Family: Apartment Data

Apartment	Year Built	Number of Units	Number of 2 + Bedroom Units	Average Monthly Rent	Avg. Monthly Rent - 2 + Bedroom Units
Bridges	1996	252	168	\$1,400.85	\$1,515.33
Farmington Gates	1973	182	138	\$1,073.48	\$1,177.58
Retreat	1995	280	172	\$1,447.31	\$1,607.94
Vineyard	1999	200	116	\$1,270.60	\$1,446.00
Westminster	1974	100	100	\$1,141.50	\$1,141.50
Thornwood	2018	276	138	\$2,079.81	\$2,299.39
Watermark	N/A	310	190	\$1,567.52	\$1,730.79

Multi-Family: Condominium Data

Condominium	Year Built	Number of Units	Number of 2 + Bedroom Units
Allenby Green	1982	30	30
Bavarian Village	1973	76	76
Farmington Blvd Townhomes	1998	8	8
Farmington Glen	1980	67	67
Fountain Square	1980	275	227
Galway Green	1987	42	42
Greenleaf Condo	1973	54	54
Hobbits Glen	1974	93	93
Kimbrough Farm	1981	7	7
Kimbrough Forest	1973	72	72
Kimbrough Green	1981	24	24
Kimbrough Park Place	1983	44	44
Park Place	1983	24	24
Riverdale Farms	1974	82	82
West Rock	1971	140	126
Wicklow Cluster Homes	1982	72	72
Woodshire Townhomes	1976	88	88

Appendix I

Multi-Family: Age-Restricted, Independent, and Assisted Living Data

Age-Restricted, Independent, and Assisted Living	Year Built	Number of Units
Brookdale - Poplar	2000	50
Brookdale - Dogwood Creek	2012	182
Gardens of Germantown	2010	48
Germantown Plantation	2005	108
Villages of Germantown	2005	333

References

Water

- Central Business District:
 - CBD West Shopping Center (1982)
 - Saddle Creek Shopping Center (87, 88, 96, 2000, 2005, 2006, 2014, and 2015)
 - Walgreens at Saddle Creek PUD (2014)
 - Whole Foods (2014)
 - Thornwood PUD (2015)
- West Poplar Avenue District:
 - Allen and Hoshall Design and Plans (2001)
 - Argo Construction Implementation (2002)
- Forest Hill Heights District:
 - Forest Hill Heights Small Area Plan: Fisher-Arnold Study (2016)
 - Southeast Germantown Water System Hydraulic Model (2018)

Sanitary Sewer

- Central Business District:
 - Sewer Capacity Study for Development of Arthur Tract (2007)
 - Smart Growth Plan Sanitary Sewer Evaluation (2008)
- West Poplar Avenue District:
 - Western Gateway Sanitary Sewer Basin Study (2016)
- Forest Hill Heights District:
 - Forest Hill Heights Small Area Plan: Fisher-Arnold Study (2016)

Traffic

- Central Business District :
 - Smart Growth Area Traffic Study (2010)
 - Medical District Traffic Study (2014)
- West Poplar Avenue District: Western Gateway Traffic Study (2016; updated in 2017)
- Forest Hill Heights District:
 - Forest Hill Heights Traffic Impact Analysis (2016)
 - Watermark at Forest Hill Heights (2017)

Bicycle/Pedestrian

- Central Business District :
 - CBD and Old Germantown Area Streetscape Plan (2017)
- West Poplar Avenue District: Western Gateway Small Area Plan (2013)

Small Area Plans and Visioning Documents

- Central Business District: <https://www.germantown-tn.gov/services/economic-and-community-development/smart-growth/central-business-district>
- West Poplar Avenue District: <https://www.germantown-tn.gov/services/economic-and-community-development/smart-growth/west-poplar-avenue-district>
- Forest Hill Heights District: <https://www.germantown-tn.gov/services/economic-and-community-development/smart-growth/forest-hill-heights>
- Vision 2020
- Forward 2030: <https://www.germantown-tn.gov/government/germantown-forward-2030>
- 2016 Bike/Pedestrian Task Force Recommendations
- APA's Sustaining Places Initiative: <https://www.planning.org/sustainingplaces/>

Works Cited

- Kaiser, Edward J., and David R. Godschalk. 1995. "Twentieth Century Land Use Planning: A Stalwart Family Tree." *Journal of the American Planning Association* 61 (3): 143
 - https://www.researchgate.net/publication/233034233_Twentieth_Century_Land_Use_Planning_A_Stalwart_Family_Tree