Road and Park Impact Fee Study

for the Town of Thompson's Station, Tennessee

prepared by

Duncan Associates

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Review Draft

Table of Contents

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List of Tables

EXECUTIVE SUMMARY

The purpose of this project is to assist the Town of Thompson's Station in an update of the Town's impact fees. The current fees are used only for road improvements. This update updates the road impact fees and calculates potential park impact fees.

Current Road Impact Fees

The Town's current road impact fee ordinance is Ordinance No. 13-016, which became effective on September 10, 2013. As the ordinance notes, authority to adopt impact fees is provided under Tennessee statutes for General Law Mayor-Aldermanic Charter municipalities. The ordinance lays out the general methodology by which the fees are to be calculated, and the fee schedule is adopted by separate resolution. The current fee schedule is shown Table 1. Average daily trip ends are divided by two to avoid double-counting. The number of daily trips per unit rate is multiplied by the base trip cost to determine the fee (the residential trip rate and fee shown in the table is for a single-family detached dwelling, but the fees are assessed on all residential based on $1 per square foot.) As set forth in the ordinance, the base trip cost is determined by dividing the total cost of planned improvements designated by the Board of Mayor and Aldermen (BOMA) by the total number of daily trips estimated to be generated by all land uses in the previous year by the Planning and Codes Department. Retail uses are given a 20% reduction in recognition of sales tax revenues they generate.

Table 1. Current Road Impact Fees

Land Use Category	Unit	Avg. Rate	Demand	Base Trip	Retail Adjustment	Unit Rate
Residential*	Dwelling	9.57	4.785	$262.75	100%	$1,257.27
Hotel/Motel	Room	9.02	4.510	$262.75	80%	$948.01
Golf Course	Acre	5.04	2.520	$262.75	100%	$662.14
Recreational Facility	1,000 sq. ft.	1.62	0.810	$262.75	100%	$212.83
Elementary Schoool	Student	1.29	0.645	$262.75	100%	$169.48
Middle School	Student	1.62	0.810	$262.75	100%	$212.83
High School	Student	1.71	0.855	$262.75	100%	$224.65
Community Co9llege	Student	1.20	0.600	$262.75	100%	$157.65
Day Care Center	Student	4.48	2.240	$262.75	100%	$588.57
Hospital	Bed	11.81	5.905	$262.75	100%	$1,551.56
Assisted Living	Bed	2.74	1.370	$262.75	100%	$359.97
General Office Building	1,000 sq. ft.	23.57	11.785	$262.75	100%	$3,096.54
General Retail Building	1,000 sq. ft.	42.94	21.470	$262.75	80%	$4,513.05
Restaurant	1,000 sq. ft.	89.95	44.975	$262.75	80%	$9,453.75
High Turnover Restaurant	1,000 sq. ft.	127.15	63.575	$262.75	80%	$13,363.62
Gas Station w/Conv. Mkt	1,000 sq. ft.	96.37	48.185	$262.75	80%	$10,128.60
Gas Station	Pump	15.65	7.825	$262.75	80%	$1,644.83
Warehousing	1,000 sq. ft.	4.96	2.480	$262.75	100%	$651.63
Church	1,000 sq. ft.	9.11	4.555	$262.75	100%	$1,196.84

* Residential impact fees to remain at $1.00 per sq. ft.

Source: "Exhibit C - Schedule of Impact Fees," Thompson's Station Town Planner, October 29, 2018.

Recommended Road Fee Changes

Methodology. The major recommendation for this update is to base the fees on a "demand-based" methodology. The Town's current impact fees were calculated using the methodology described in the ordinance. This is an unusual variation of the "plan-based" methodology, which divides total planned improvement costs by new trips generated over the same time period. In the Town's formulation, a planning horizon is not specified, and total planned costs are simply divided by existing trips. Regardless of how the calculation is performed, a list of planned improvements is not a sufficient basis for an impact fee calculation. It does not, by itself, establish that the planned improvements are necessary to serve growth, as opposed to remedying existing capacity deficiencies or increasing the level of service beyond what is currently provided to existing development. This update uses the alternative "demand-based" methodology (see the Methodology chapter for a detailed description of this approach).

Service Unit. While a plan-based fee calculation can be based on either the number of vehicle trips or vehicle-miles of travel (VMT) generated by the development, the demand-based methodology requires the use of VMT for the unit of impact, or "service unit." Consequently, the updated fees need to take into account not only the number of trips generated, but the average length of those trips. They also need to exclude pass by trips, which do not add additional VMT. These adjustments will more than compensate for the removal of the 20% reduction for retail uses, which does not appear to have an empirical basis.

Land Use Categories. The major proposed changes to the land use categories in the fee schedule are to differentiate residential fees by single-family detached and multi-family and to assess residential uses on the basis of dwelling units rather than square feet of living area. While there is some evidence that trip generation increases somewhat with dwelling unit size, available data is scant and the relationship does not appear to be linear (e.g., a unit twice as large will not generate twice as many trips).

Additional categories have been included, such as senior adult housing, golf course, industrial and mini-warehouse. Finally, some nonresidential categories (schools, day care centers, hospitals and nursing homes) that are currently assessed on characteristics that are difficult to quantify, such as number of students or beds, are proposed to be assessed on the amount of building square footage. Definitions of the proposed land use categories are provided in Appendix B.

Updated Road Fees

The updated road fees are compared to current fees in Table 2. Current residential fees, which are assessed at $1 per square foot, are assumed based on typical sizes for single-family and multifamily units. Current fees cannot be shown for new land uses or those with different assessment bases. The wide variation in percentage changes for specific land use categories reflects the inclusion of new trip factors and average trip lengths, the elimination of the 20% retail reduction, and changes in trip generation rates in the latest edition of the ITE *Trip Generation Manual*.

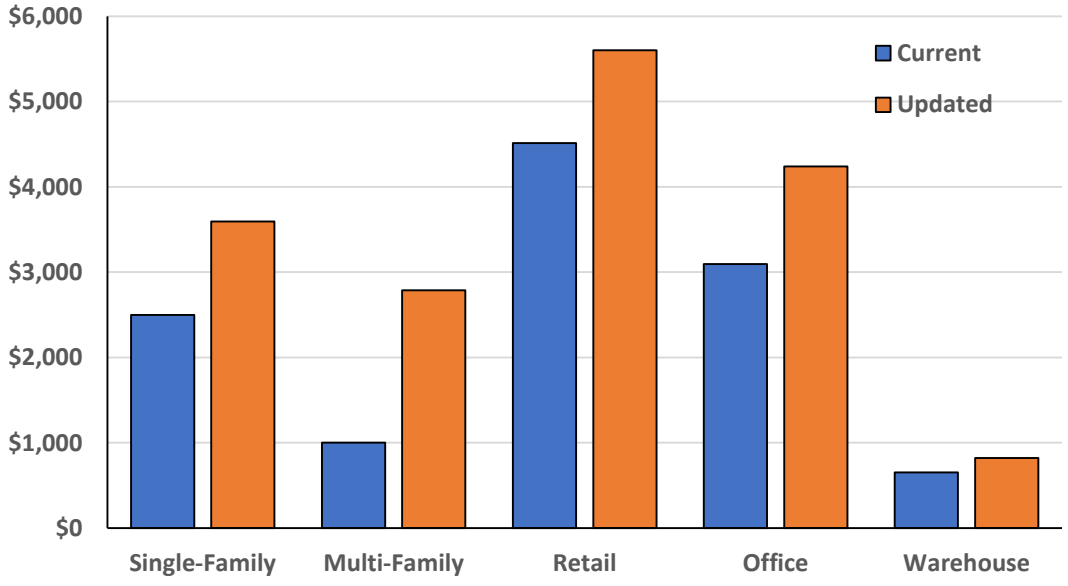
Table 2. Updated Road Impact Fees

Land Use Type	Unit	Current Fees	Updated Fees	Percent Change
Single-Family Detached*	Dwelling	$2,500	$3,593	44%
Multi-Family*	Dwelling	$1,000	$2,786	179%
Senior Adult Housing, Detached	Dwelling	n/a	$1,621	n/a
Senior Adult Housing, Attached	Dwelling	n/a	$1,408	n/a
Golf Course	Hole	n/a	$1,028	n/a
Hotel/Motel	Room	$948	$2,230	135%
Retail/Commercial/Shopping Center	1,000 sf	$4,513	$5,601	24%
Restaurant, Standard	1,000 sf	$9,454	$10,744	14%
Restaurant, Drive-Through	1,000 sf	n/a	$23,904	n/a
Gas Station w/Convenience Mkt.	1,000 sf	$10,129	$9,274	-8%
Office/Institutional	1,000 sf	$3,097	$4,238	37%
Elementary/Secondary School	1,000 sf	n/a	$1,312	n/a
Community College	1,000 sf	n/a	$2,963	n/a
Day Care Center	1,000 sf	n/a	$3,487	n/a
Hospital	1,000 sf	n/a	$3,275	n/a
Nursing Home	1,000 sf	n/a	$1,997	n/a
Place of Worship	1,000 sf	$1,197	$2,119	77%
Industrial	1,000 sf	n/a	$1,590	n/a
Warehouse	1,000 sf	$652	$823	26%
Mini-Warehouse	1,000 sf	$652	$711	9%

* current fee is $1 per square foot; unit sizes of 2,500 sq. ft. single-family and 1,000 sq. ft. multi-family are assumed for comparison purposes.

Source: Current fees from Table 1; updated fees from Table 16.

Figure 1. Current and Updated Road Impact Fees, Major Land Uses



Comparative Road Fees

Communities in the process of updating impact fees are naturally interested in knowing what nearby or comparable jurisdictions are charging. However, often-expressed concerns about the need to be "competitive" with other jurisdictions are not necessarily well-founded. Studies have found differences in impact fees between cities or counties in a state or region had no measurable effect on the rates of development. This is not surprising, given the myriad other market and regulatory factors that differ between jurisdictions besides impact fees.

The Town's current and updated road impact fees are compared to road impact fees currently charged by four nearby Tennessee municipalities in Table 3. Brentwood is currently in the process of updating its fees, which were last adjusted in 2007. Spring Hill's fees were updated earlier this year and after a phase-in will be at 100% in 2020.

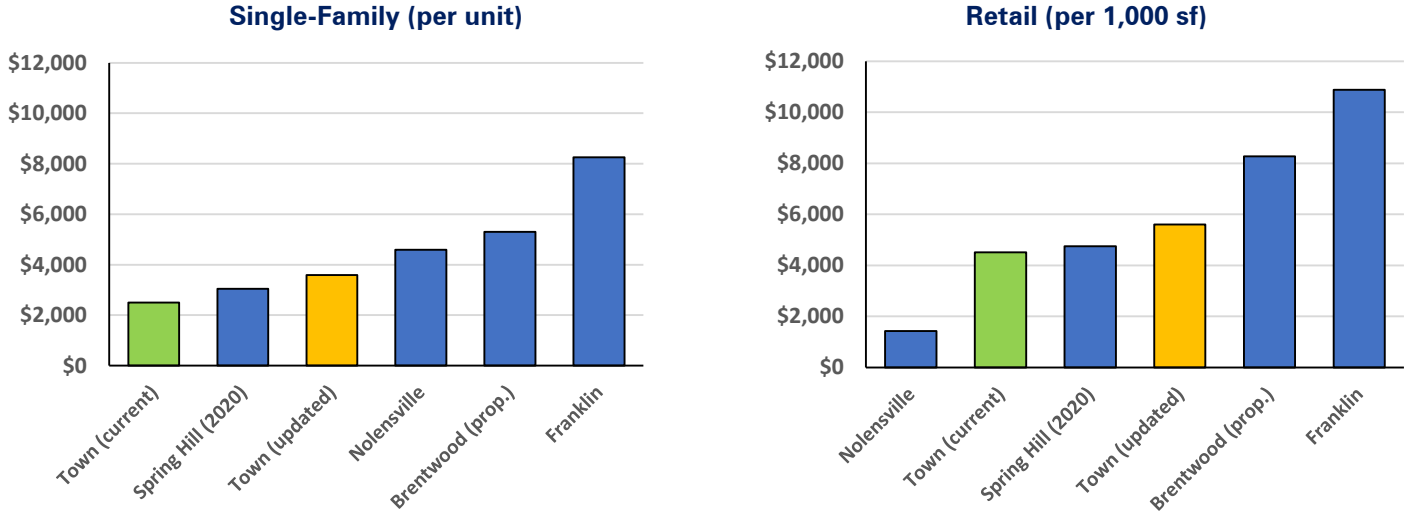
Table 3. Comparative Road Impact Fees

Municipality	Single-Family (unit)	Multi-Family (unit)	Retail (1,000 sf)	Office (1,000 sf)	Industrial (1,000 sf)	Ware-house (1,000 sf)	Rest-aurant (1,000 sf)
Town (current)	$2,500	$1,000	$4,513	$3,097	n/a	$652	$9,454
Town (updated)	$3,593	$2,786	$5,601	$4,238	$1,590	$823	$10,744
Brentwood (proposed)	$5,297	$4,107	$8,269	$6,252	$2,346	$1,214	$15,860
Franklin	$8,251	$5,233	$10,878	$7,801	$6,120	$3,187	$20,255
Nolensville	$4,594	$2,527	$1,424	$2,619	$1,470	$551	$1,424
Spring Hill (2020)	$3,048	$2,364	$4,753	$3,599	$1,350	$697	$9,118

Source: Current and updated Town fees from Table 2; other fees from Duncan Associates internet survey (Spring Hill fees shown are 100% of fees calculated in 2019 study, which become effective July 1, 2020 – current fees are at 33%).

Single-family and retail road impact fees from the table above are illustrated in Figure 2.

Figure 2. Comparative Single-Family and Retail Road Impact Fees



Potential Park Fees

The Town does not currently assess park impact fees. This study calculates potential park impact fees of $488 per single-family detached and $327 per multi-family unit (see Table 27 in Parks chapter). Park impact fee revenue could be used to acquire additional park land, construct new park improvements, or retire existing debt on existing park facilities.

Potential Impact Fee Revenue

Development in Thompson's Station is predominately residential, and consists mostly of new single-family detached units. The Town has issued an average of 204 residential permits annually for the last nine years, which can be rounded down to 200 permits per year. The proposed 44% increase in road fees, coupled with new park fees, would generate about $800,000 annually, compared to about $500,000 under the current road fees, or over 60% more revenue.

Table 4. Potential Road and Park Impact Fee Revenue

	Roads	Parks	Total
Current Fee per Unit	$2,500	$0	$2,500
Proposed Fee per Unit	$3,593	$488	$4,081
x Units Permitted per Year	200	200	200
Annual Revenue under Current Fees	$500,000	$0	$500,000
Annual Revenue under Proposed Fees Fees	$718,600	$97,600	$816,200
Percent Increase	44%	n/a	63%

Source: Current and proposed fees per single-family detached unit from Table 2 (roads) and Table 27 (parks); annual residential permits from 2010 through 2018 derived from Table 28.

LEGAL FRAMEWORK

Impact fees are imposed on new development to pay for improvements necessitated by growth. Impact fees are a way for local governments to require new developments to pay a proportionate share of the infrastructure costs they impose on the community. In contrast to "negotiated" developer exactions, impact fees are charges assessed on new development using a standard formula based on objective characteristics, such as the number and type of dwelling units constructed. The fees are a one-time, up-front charge, with the payment made at the time of building permit issuance. Impact fees require that each new development project pay a pro-rata share of the cost of new capital facilities required to serve that development.

Statutory Authority

State law provides mayor-aldermanic charter municipalities like the Town of Thompson's Station with very broad authority to levy taxes and fees. The general powers enumerated in Tennessee Code, Title 66, Chapter 2, Part 2, Section 6-2-201 have been interpreted to include the authority to impose impact fees. The enumerated powers do not contain the term "impact fee" or otherwise provide any guidance about how such fees should be calculated. For this we need to turn to case law.

Case Law

Impact fees were pioneered in states that lacked specific enabling legislation, and the authority to impose them has generally been based on local government's broad "police power" to regulate land development in order to protect the health, safety and welfare of the community. In general, it is necessary to meet the following requirements to qualify as an impact fee and to avoid having the fee struck down as an illegal tax.

Proportionality

One of the fundamental legal principles of impact fee case law is that the fees for each individual land use type should be proportional to the impact of that use. Policy reductions or waivers for selected land use categories or types of development weaken that relationship and should be avoided or at least strictly limited. At a minimum, the impact fee fund should be reimbursed for the lost revenue from general fund sources. In addition, a revenue credit may need to be provided for other land uses not subject to the reduction. Even if the targeted reductions are replaced with general funds, new development that is not eligible for the reduction will generate future general fund revenues that will be used to pay for the reduced fees for future development. This could arguably amount to new development that is not eligible paying more than its proportionate share of transportation improvement costs. While this issue has not been litigated, the prudent course would be either not to apply targeted fee reductions or else make up the lost revenue and calculate an appropriate revenue credit for non-eligible development types.

Developer Credits

Another fundamental requirement articulated in impact fee case law is the need to avoid double-charging new development through impact fees and other requirements or taxes. Developers should not be required to make site-specific dedications or improvements that meet the same need being addressed by the impact fees, while also being required to pay the fee. In general, impact fees should be reduced by the value of dedications or improvements required of developers for the same type of improvements that would be eligible to be funded with the impact fees. These reductions are referred to as developer credits.

It is reasonable to have some restrictions on the types of improvements that are eligible for credit. Granting credits is essentially spending future impact fees, and the fees should be spent for priority improvements that benefit the community at large. Developers should not be allowed to monopolize the fees for localized improvements if they choose to develop in areas that lack adequate infrastructure. For example, credit eligibility could be restricted to contributions related to projects identified in an adopted list of planned road improvements. However, developers should be eligible for credits for required improvements related to projects that are consistent with the jurisdiction's land use and capital plans.

Revenue Credits

A revenue credit is a reduction from the cost per service unit designed to equalize the burden between existing and new development arising from the expenditure of future revenues that can be attributed in part to new development. While developer credits are provided on a case-by-case basis, revenue credits must be addressed in the fee calculation study.

As noted previously, if there are existing deficiencies with respect to the level of service used in the fee calculation, the fees should be reduced by a credit that accounts for the contribution of new development toward remedying the existing deficiencies. A similar situation arises when the existing level of service has not been fully paid for. Outstanding debt on existing facilities that are counted in the existing level of service will be retired, in part, by revenues generated from new development. Given that new development will pay impact fees to provide the existing level of service for itself, the fact that new development may also be paying for the facilities that provide that level of service for existing development could amount to paying for more than its proportionate share. Consequently, impact fees should be reduced to account for future payments that will retire outstanding debt on existing facilities that provide the level of service on which the fees are based for existing development.

The issue is less clear-cut when it comes to other types of revenue that may be used to make capacity-expanding capital improvements of the same type being funded by impact fees. The clearest case occurs when general fund tax revenues are programmed for capacity-expanding improvements on an "as available" basis because impact fees are insufficient to fund all needed growth-related improvements. These general fund contributions could be booked as a loan to the impact fee fund, to be repaid when sufficient impact fee funds are available.

Similar considerations apply to dedicated funding sources, such as special taxes that can only be used for the same type of facilities as the impact fees. Like discretionary revenue, these types of dedicated revenue sources are typically not specifically dedicated only for capacity-expanding improvements, and even if they are, their use to fund capacity-related improvements improves the level of service for both existing and new development.

Outside funding or grants for capacity-expanding improvements to major roads that can reasonably be anticipated in the future could warrant a credit, but again this is not clear-cut. In addition to the argument made above (i.e., the additional funding raises the level of service and benefits both new development and existing development), two additional arguments can be made against providing credits for such funding. First, new development in a community does not directly pay for State and Federal grants in the same way they pay local gasoline and property taxes. Second, future grant funding is far more uncertain than dedicated revenue streams.

While these arguments are compelling, they have not been litigated, and the law on whether revenue credits may be warranted in situations other than existing deficiencies or outstanding debt on existing facilities is currently unclear. This update incorporates revenue credits for Federal/State funding anticipated to be available to help fund growth-related transportation improvements.

Summary

The Town derives its authority to impose impact fees from the statutory powers granted to mayor-aldermanic municipalities. The principles derived from impact fee case law can be stated briefly as follows:

1) Don't charge new development for a higher level of service than is provided to existing development;
2) Make the fee proportional to the impact of the development;
3) Don't charge twice through other taxes or fees for the same improvements;
4) Give developers credit for the value of their contributions to projects programmed in the long-range plan; and
5) Spend the funds on improvements that benefit new development.

ROADS

This chapter calculates updated road impact fees. The updated fees are based on a different methodology from the one used to calculate the current fees.

Methodology

The methodology used to calculate an impact fee should comply with the legal principles described in the Legal Framework chapter. In impact fee analysis, existing and projected development is translated into "service units," which is a common indicator of demand (such as vehicle trips). Fees are based on the cost per service unit, which is then multiplied by service units generated per development unit (e.g., dwelling unit or 1,000 square feet) to calculate the fee schedule.

A methodology is defined by how the cost per service unit is calculated. There are two basic types of methodologies: plan-based and demand-based. The Town's current fees were calculated using a variation of the plan-based methodology. The consultant recommends switching to a demand-based methodology in this update. Regardless of the methodology used, the final fee calculations may need to reduce the fees to ensure there is no double-charging, as discussed in the revenue credits section of the Legal Framework chapter.

Plan-Based Methodology

A plan-based methodology calculates the cost per service unit by dividing planned improvement costs over a fixed time horizon by the anticipated growth in service units over the same period. Dividing anticipated growth costs by anticipated new service units yields the cost per service unit to accommodate growth. A plan-based road impact fee methodology may utilize either vehicle trips or vehicle-miles of travel as the service unit. As the name implies, the plan-based methodology presupposes the existence of a plan.

The legal requirements for impact fees set a relatively high bar for a plan-based methodology. The plan must create a tight nexus between the amount of growth projected over a specified period and the improvements needed to serve that growth. The list of planned improvements must be developed using a rigorous analysis, such as the modeling used to develop a transportation master plan, to establish the required nexus between the anticipated growth and the specific list of improvements required to serve that growth. The Town does not have a long-range transportation master plan that would meet this requirement.

The Town's ordinance specifies an unusual variation of the plan-based approach that divides planned costs by existing trips (see description in Executive Summary). There is no available analysis of existing levels of service, identification of existing deficiencies, or documentation on how the cost per service unit was determined. The method for calculating the current fees does not appear to demonstrate the strong nexus between planned growth and improvement needs required to support a plan-based methodology.

Demand-Based Methodology

The alternative to the plan-based methodology is referred to as "demand-based" (also called "consumption-based" when used for road fees). This approach is probably more commonly-used in Tennessee than the plan-based approach. It bases the fee on the average cost to replace major roadway capacity consumed by new development. It does not depend on having a list of planned improvements or growth projections, although planned improvement costs may be used to determine the average cost to add new roadway capacity, credit against the fee may be restricted to the list of planned improvements, and growth projections may be used to forecast future revenues. It allows fee revenues to be used for any needed capacity-expanding improvement, although expenditures could be limited to a pre-determined list of projects. It is based on a level of service expressed as a system-wide capacity to demand ratio (i.e., vehicle-miles of capacity per vehicle-miles of travel, or VMC/VMT). If the fees are based on a ratio no higher than the existing one, there are no deficiencies. The consultant recommends using this methodology in the update.

The service unit for the demand-based methodology must be in terms of vehicle-miles of travel (VMT), because it is not possible to determine the capacity needed to accommodate a trip without considering the length of the trip. VMT (trips times trip length) takes into account not only the number of trips, but the average length of those trips. Retail trips, for example, tend to be shorter than trips to office or industrial uses. Adding the trip length component more accurately assesses road impacts by land use. Trips for retail and certain other land uses should also be reduced to recognize pass-by traffic; that is, trips that are stopping at the use on their way to another primary destination. Pass-by trips do not place any additional burden on the road system.

An issue that arises with the demand-based road fee methodology is what the appropriate level of service (LOS) should be. The "standard" demand-based road methodology multiplies the cost of a vehicle-mile of capacity (VMC) by the vehicle-miles of travel (VMT) generated by a development to calculate the fee. However, a VMC is not the same as a VMT. In mathematical terms, the cost per VMC must be multiplied by the VMC/VMT ratio to get the cost per VMT. The standard demand-based approach implicitly assumes that the VMC/VMT ratio is one. That is, it assumes that the roadway system can function adequately with every road carrying exactly its full capacity. In the real world, however, travel is not evenly distributed proportional to roadway capacity. Drivers may try to avoid driving on congested roadways, but they will always have limited options. Under conditions of full system-wide utilization, any roadway with some excess capacity will be balanced by a roadway that is over-capacity. Reasonably functioning roadways systems must have more aggregate capacity than aggregate demand (e.g., VMC/VMT ratios considerably higher than one-to-one).

The "modified" demand-based approach recognizes this by explicitly using the VMC/VMT ratio in the formula. It either uses the actual existing VMC/VMT ratio, or a lower ratio that is greater than one. If the existing ratio is used, that makes the modified approach conceptually similar to the incremental expansion approach often used for types of facilities for which capacity is more difficult to measure, because it basically says that existing roadway capacity must be expanded in direct proportion to the increase in travel demand to maintain an adequate level of service. Few studies use this approach, however, particularly in less-developed jurisdictions, because the VMC/VMT ratio tends to decline as the community matures. This update incorporates the VMC/VMT ratio.

The formula for the demand-based methodology used in this study is summarized in Figure 3 on the following page. The maximum fee amount calculated with this methodology is the number of service units (VMT) that will be generated by the development times the net cost per service unit.

Figure 3. Demand-Based Road Impact Fee Formula

IMPACT FEE	**=**	**VMT x NET COST/VMT**
Where:		
VMT	=	**TRIPS x % NEW x LENGTH**
TRIPS	=	Trip ends during average weekday ÷ 2
% NEW	=	Percent of trips that are primary trips, as opposed to pass by or diverted-link trips
LENGTH	=	Average length of a trip on the major roadway system
NET COST/VMT	=	**COST/VMT - CREDIT/VMT**
COST/VMT	=	COST/VMC x VMC/VMT
COST/VMC	=	Average cost to add a vehicle-mile of capacity
VMC/VMT	=	Ratio of system-wide capacity to demand in the major roadway system
CREDIT/VMT	=	Credit for certain future revenues to be generated by new development

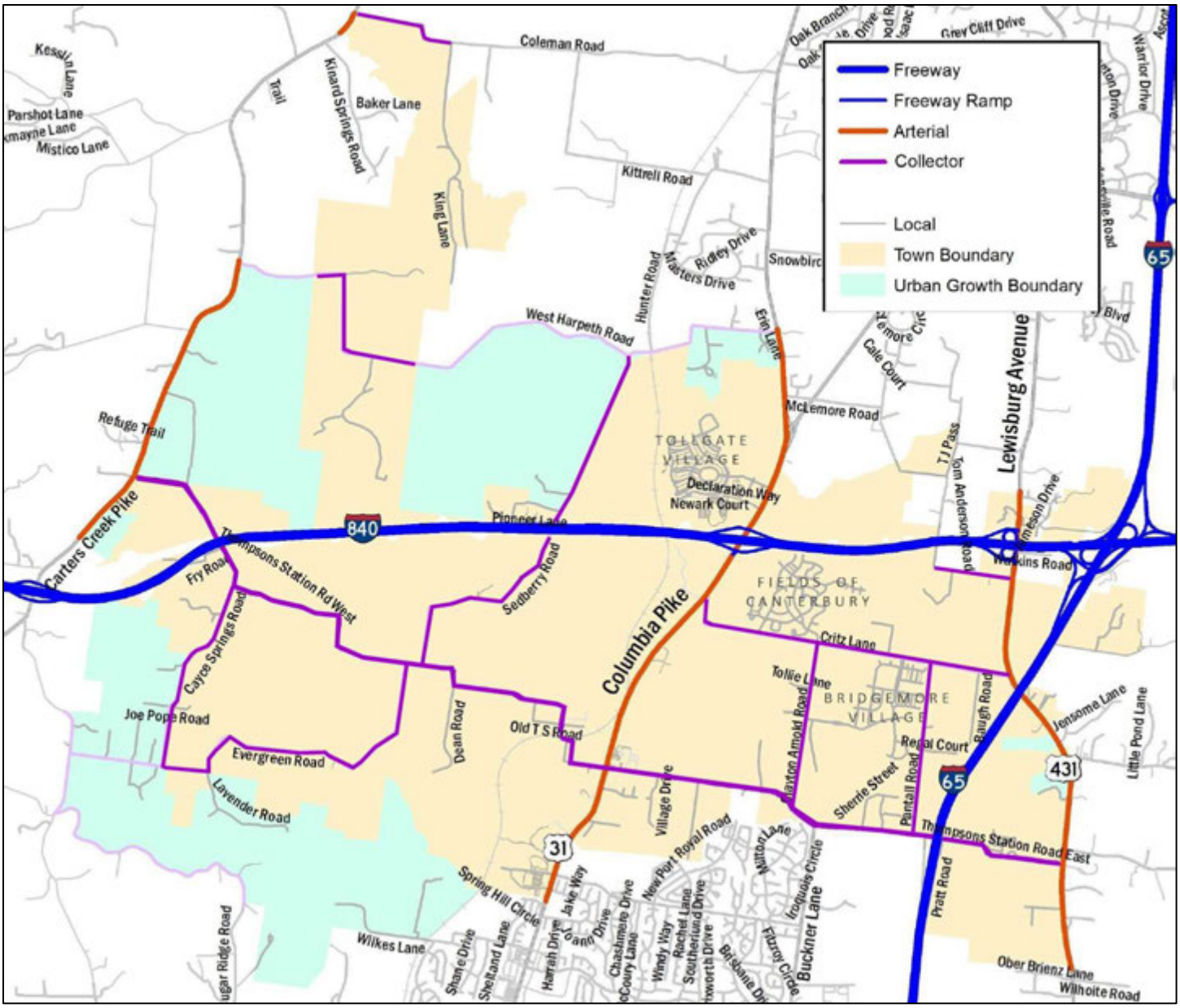
Major Roadway System

A road impact fee program should include a clear definition of the major roadway system that is to be funded with the impact fees. There is no such definition in the Town road impact fee ordinance – presumably the fees could be spent to improve any roadway within the Town limits, including local residential streets of the type typically installed by developers within new subdivisions. Such minor roadways primarily serve to provide access to individual properties and seldom experience capacity constraints. Most road impact fees are restricted to improving major roads that may provide access to adjacent properties but primarily serve to convey traffic over larger areas. Major roads can be categorized as expressways, arterials, and collectors. Major roads within the Town are illustrated in Figure 4.

Expressways are often excluded from municipal road impact fees because cities and towns rarely use the funds for improvements to these facilities, which predominately serve through traffic rather than trips generated by local development. Expressways within Thompson's Station include I-65 and I-640, and these are excluded from the major roadway system as defined in this update. State and Federal roads are often included, because municipal funds are often provided by municipalities for such improvements,[1] and although they may carry a significant amount of through traffic, locally-generated traffic also impacts such roads in adjacent communities. The arterial roads within Thompson's Station are Columbia Pike (US 31/SR 6) and Lewisburg Pike (US 431/SR 106). The collector roads within the Town are all Town roads. Arterial and collector roads are included in the major roadway system as defined in this update.

[1] Spring Hill, for example, has spent close to $11 million in recent years on the widening of Duplex Road (SR 24), while Brentwood has spent about $4 million on widening projects for Franklin Road (US 31) and Concord Road (SR 253).

Figure 4. Existing Major Roads



The characteristics of the Town's existing major roadway system are summarized in Table 5 below. The data are largely drawn from the Town's 2019 *Major Thoroughfare Plan* (MTP). The exception is daily volumes. We compared the model-generated 2018 volumes provided in the MTP with actual 2018 traffic counts conducted by the Tennessee Department of Transportation for eight roadway segments that had estimates from both sources. The modeled volumes averaged 1.5 times as many trips as the counts. The table below contains the TDOT counts that are available, as well as 0.67 (inverse of 1.5) times the modeled volumes for segments where counts are not available (indicated by italics).

Table 5. Existing Major Roadway Inventory

Road		Miles	Lanes	Daily Trips	Capa-city	VMT	VMC
Carters Creek Pike	Coleman Rd to S of Coleman	0.15	2	*2,182*	18,700	327	2,805
Carters Creek Pike	Thompson's Stn Rd to S Limits	0.56	2	4,492	18,700	2,516	10,472
Columbia Pike (US 31/SR 6)	S Town Lmt to Thompson's Stn	1.08	2	*21,299*	18,700	23,003	20,196
Columbia Pike (US 31/SR 6)	Thompson's Stn to Critz Ln	1.35	2	22,396	18,700	30,235	25,245
Columbia Pike (US 31/SR 6)	Critz Lane to I-840	0.57	5	*23,485*	35,300	13,386	20,121
Columbia Pike (US 31/SR 6)	I-840 to Tollgate Blvd	0.44	5	*18,226*	35,300	8,019	15,532
Columbia Pike (US 31/SR 6)	Tollgate Blvd to Goose Crk Bypass	0.47	2	*17,125*	18,700	8,049	8,789
Columbia Pike (US 31/SR 6)	Goose Crk Bypass to N Town Limi	0.49	2	14,690	18,700	7,198	9,163
Lewisburg Pike (US 431/SR 106)	S Limits to Thompson's Stn Rd	0.87	2	6,188	18,700	5,384	16,269
Lewisburg Pike (US 431/SR 106)	Thompson's Stn Rd to Critz Ln	1.57	2	*12,668*	18,700	19,889	29,359
Lewisburg Pike (US 431/SR 106)	Critz Lane to I-840	0.98	2	*16,572*	18,700	16,183	18,261
Lewisburg Pike (US 431/SR 106)	I-840 to N Town Limits	0.41	2	8,330	18,700	3,433	7,707
Subtotal, Arterials		8.94				137,622	183,919
Cayce Springs Road	Thompson's Stn to Evergreen Rd	0.71	2	*235*	18,700	167	13,277
Clayton Arnold Road	Thompson's Stn tp Critz Ln	1.26	2	*8,566*	14,700	10,793	18,522
Coleman Road	Carters Crk Pike to King Ln	0.81	2	*1,675*	18,700	1,357	15,147
Critz Lane	Columbia Pike to Clayton Arnold	0.97	2	*9,872*	14,700	9,576	14,259
Critz Lane	Clayton Arnold to Pantail Rd	0.87	2	*3,551*	14,700	3,089	12,789
Critz Lane	Pantail Rd to Lewisburge Pike	0.59	2	*7,457*	14,700	4,400	8,673
Evergreen Road	Thompson's Stn-Cayce Spgs Rd	2.50	2	*463*	18,700	1,158	46,750
Harpeth Rd W	Town Limits to W of Sedberry	1.38	2	*543*	18,700	749	25,806
Pantall Road	Thompson's Stn Rd to Critz Ln	1.29	2	*4,938*	14,700	6,370	18,963
Sedberry Road	Thompson's Stn to W Harpeth Rd	1.80	2	*1,146*	18,700	2,063	33,660
Thompson's Station Rd W	Carters Crk to Cayce Spgs Rd	1.25	2	1,424	18,700	1,780	23,375
Thompson's Station Rd W	Cayce Spgs to Evergreen Rd	1.58	2	*2,285*	18,700	3,610	29,546
Thompson's Station Rd W	Evergreen to Sedberry Rd	0.11	2	*1,856*	18,700	204	2,057
Thompson's Station Rd W	Sedberry to Columbia Pike	1.95	2	3,568	14,700	6,958	28,665
Thompson's Station Rd E	Columbia Pike to Clayton Arnold	1.46	2	4,009	14,700	5,853	21,462
Thompson's Station Rd E	Clayton Arnold to Pantall Rd	0.95	2	*10,301*	14,700	9,786	13,965
Thompson's Station Rd E	Pantall Rd to Lewisburg Pike	0.18	2	*5,996*	14,700	1,079	2,646
Tom Anderson Rd	Lewisburg Pike to jog in road	0.61	2	*1,675*	14,700	1,022	8,967
Subtotal, Collectors		20.27				70,014	338,529
Total		29.21				207,636	522,448

Source: Segment descriptions, number of lanes and daily capacities from Town of Thompson's Station *Major Thoroughfare Plan* (MTP), adopted by Planning Commission on August 27, 2019; daily trips are 2018 annual average day trip counts from Tennessee Department of Transportation website (trips in italics are two-thirds modeled daily volumes from Table 1 of the MTP – see explanation above); capacities are service volume thresholds at LOS E from Table 2 of the MTP (5- and 6-lane arterial capacities are switched in the table per Barge Design Solutions, October 9, 2019).

As described in the Methodology section, the appropriate level of service for a demand-based fee is the system-wide ratio of capacity (VMC) to demand (VMT). The existing system-wide ratio for the arterial/collector system is 2.52 VMC per VMT, well above the 1.00 ratio used in the standard demand-based methodology. The recommended level of service used to calculate the updated road impact fees is a VMC/VMT ratio of 1.25. This is somewhat lower than the existing level of service for arterial roads, and only about one-half the system-wide average level of service. As long as the updated fees are not based on a higher level of service than currently provided to existing development, there is no existing deficiency on a system-wide basis.

Table 6. Roadway Level of Service

	Arterials	Collectors	Total
Existing Daily Vehicle-Miles of Capacity (VMC)	183,919	338,529	522,448
÷ Existing Daily Vehicle-Miles of Travel (VMT)	137,622	70,014	207,636
Existing VMC/VMT Ratio	1.34	4.84	2.52
Recommended VMC/VMT Ratio			1.25

Source: Table 5.

Travel Demand

The travel demand generated by specific land use types is a product of three factors: 1) trip generation, 2) percent new trips, and 3) average trip length. The first two factors are well documented in the professional literature – the average trip generation characteristics identified in studies of communities around the nation should be reasonably representative of trip generation characteristics in Thompson's Station. In contrast, trip lengths are much more likely to vary between communities, depending on the geographic size and shape of the community and its major roadway system.

Trip Generation

Trip generation rates are based on information published in the most recent edition of the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. Trip generation rates represent trip ends, or driveway crossings at the site of a land use. Thus, a single trip from home to work counts as one trip end for the residence and one trip end for the workplace, for a total of two trip ends. To avoid over-counting, all trip rates are divided by two. This allocates travel equally between the origin and destination of the trip and avoids double charging. This update utilizes the most current edition of the ITE manual (the 10th edition published in 2017).

New Trip Factor

Trip rates must also be adjusted by a "new trip factor" to exclude pass by and diverted-linked trips. This adjustment is intended to reduce the possibility of over-counting by only including primary trips generated by the development. Pass by trips are those trips that are already on a particular route for a different purpose and simply stop at a development on that route. For example, a stop at a convenience store on the way home from the office is a pass by trip for the convenience store. A pass by trip does not create an additional burden on the street system and therefore should not be counted in the assessment of impact fees. A diverted-linked trip is similar to a pass by trip, but a diversion is made from the regular route to make an interim stop. The reduction for pass by and diverted-linked trips is drawn from ITE manual and other published information.

Average Trip Length

In the context of a road impact fee using a demand-based methodology, it is necessary to determine the average length of a trip on the major roadway system. The average trip length can be determined by dividing the total vehicle-miles of travel (VMT) on the major roadway system by the total number of trips generated by existing development in the service area. Total VMT on the major roadway system is estimated by multiplying the length of each road segment by the current traffic volume on that segment and summing for the entire system. Total trips can be estimated by multiplying existing land uses by the appropriate trip generation rates (adjusted for new trip factors and divided by two) and summing for all existing development within the Town limits.

Existing land use information was compiled from the 2010 Census, residential building permits since 2010, property assessor data for nonresidential non-tax-exempt uses, and scaled estimates of square footage from aerial photography for exempt uses such as government facilities, schools, and churches. Existing land uses in six general categories are multiplied by average daily trip generation rates and summed to determine a reasonable estimate of total daily trips. As shown in Table 7, existing land uses within the Town are estimated to generate 17,284 average daily trips.

Table 7. Existing Average Daily Trips

Land Use	ITE Code	Unit	Existing Units	Trips/ Unit	Daily Trips
Single-Family Detached	210	Dwelling	2,137	4.72	10,087
Multi-Family	220/221	Dwelling	540	3.66	1,976
Subtotal, Residential			2,677		12,063
Retail/Commercial	820	1,000 sq. ft.	246	8.30	2,042
Office	710	1,000 sq. ft.	42	4.87	205
Industrial/Warehouse	130/150	1,000 sq. ft.	168	2.58	433
Public/Institutional	620	1,000 sq. ft.	777	3.27	2,541
Subtotal, Nonresidential			1,233		5,221
Total					17,284

Source: Existing development units from Table 28 (residential) and Table 29 (nonresidential) in Appendix A; trips per unit from Table 10.

A reasonable estimate of the average trip length in the Town can be derived by dividing total daily VMT on the collector road system by the total number of daily trips generated by existing development within the Town. This is conservative, because it excludes travel on the arterials, which carry two-thirds of major roadway traffic. However, given the relatively undeveloped nature of the Town, it is likely that much of the current travel on Columbia and Lewisburg Pikes is through traffic. As presented in Table 8, the average trip length on the major roadway system is estimated to be 4.05 miles.

Table 8. Average Trip Length

Daily VMT on Collector Roads	70,014
÷ Daily Trips	17,284
Average Trip Length (Miles)	4.05

Source: VMT from Table 5; trips from Table 7.

Average trip lengths by trip purpose for the southern region of the U.S. are available from the U.S. Department of Transportation's 2017 *National Household Travel Survey*. Note that the regional average trip length is considerably longer than the local average. This is to be expected, since the regional trip lengths include travel on local streets, expressways, and roads outside to any particular jurisdictional boundary. Using the local-to-regional trip length ratio, reasonable local trip lengths can be derived for specific trip purposes, including home-to-work trips, shopping, school/church and other personal trips, as shown in Table 9.

Table 9. Average Trip Lengths by Trip Purpose

Trip Purpose	Regional Trip Length (miles)	Local/ Regional Ratio	Local Trip Length (miles)
To or from work	11.99	0.421	5.04
Residential	9.62	0.421	4.05
Doctor/Dentist	11.01	0.421	4.63
School/Church	7.74	0.421	3.25
Family/Personal	6.98	0.421	2.93
Shopping	8.55	0.421	3.59
All Trips*	9.62	0.421	4.05

* weighted average (not simple average of trip purposes shown)

Source: Regional average trip lengths for the South Census Region from U.S. Department of Transportation, *National Household Travel Survey*, 2017 (residential trip length assumed same as overall average); "all trips" local trip length from Table 8; local/regional ratio is all trips local to regional trip length; local trip length by trip purpose is the product of regional trip length and local/regional ratio.

Travel Demand Summary

The result of combining trip generation rates, new trip factors, and average trip lengths is the travel demand schedule. The travel demand schedule establishes the average daily vehicle-miles of travel (VMT) generated by various land use types per unit of development on the major roadway system. The updated demand schedule reflects trip generation rates from the Institute of Transportation Engineers (ITE), *Trip Generation*, 10th edition, 2017. Average trip lengths are from the 2017 *National*

Household Travel Survey, calibrated to reflect the average trip length on Thompson's Station's major roadway system. For each land use, daily VMT is the product of trip rate, new trip factor, and trip length. The updated travel demand schedule is presented in Table 10 below.

Some modifications to the land use categories are made in this update to better reflect available data and to simplify the process of fee determination and collection. The major proposed change is to differentiate residential fees by single-family detached and multi-family, and to assess on residential uses on the basis of dwelling units rather than square feet of living area. While there is some evidence that trip generation increases somewhat with dwelling unit size, available data is scant and the relationship does not appear to be linear (i.e., a unit twice as large will not generate twice as many trips). Some additional categories have also been included, such as senior adult housing, golf course, industrial and mini-warehouse. Finally, some nonresidential categories (schools, day care centers, hospitals and nursing homes) that are currently assessed on characteristics that are difficult to quantify, such as number of students or beds, are proposed to be assessed based on building square footage. Definitions of the proposed land use categories are provided in Appendix B to assist Town staff in classifying proposed land uses.

Table 10. Travel Demand Schedule

ITE Code	Land Use	Unit	Trip Ends/ Unit	Trips/ Unit	% New Trips	New Trips/ Unit	Trip Length (mi.)	VMT/ Unit
210	Single-Family Detached	Dwelling	9.44	4.72	100%	4.72	4.05	19.11
220	Multi-Family	Dwelling	7.32	3.66	100%	3.66	4.05	14.82
240	Mobile Home Park	Pad	5.00	2.50	100%	2.50	4.05	10.12
251	Senior Adult Housing, Detached	Dwelling	4.27	2.13	100%	2.13	4.05	8.62
252	Senior Adult Housing, Attached	Dwelling	3.70	1.85	100%	1.85	4.05	7.49
430	Golf Course	Acre	3.74	1.87	100%	1.87	2.93	5.47
310/320	Hotel/Motel	Room	5.86	2.93	100%	2.93	4.05	11.86
820	Retail/Commercial/Shopping Center	1,000 sf	37.75	18.87	44%	8.30	3.59	29.79
931	Restaurant, Standard	1,000 sf	83.84	41.92	38%	15.92	3.59	57.15
934	Restaurant, Drive-Through	1,000 sf	470.95	235.47	30%	70.64	1.80	127.15
853	Gas Station w/Convenience Mkt.	Pump	322.50	161.25	17%	27.41	1.80	49.33
710	Office/Institutional	1,000 sf	9.74	4.87	100%	4.87	4.63	22.54
520/22/30	Elementary/Secondary School	1,000 sf	17.92	8.96	24%	2.15	3.25	6.98
540	Community College	1,000 sf	20.25	10.12	48%	4.85	3.25	15.76
565	Day Care Center	1,000 sf	47.62	23.81	24%	5.71	3.25	18.55
610	Hospital	1,000 sf	10.72	5.36	100%	5.36	3.25	17.42
620	Nursing Home	1,000 sf	6.54	3.27	100%	3.27	3.25	10.62
560	Place of Worship	1,000 sf	6.95	3.47	100%	3.47	3.25	11.27
130	Industrial	1,000 sf	3.37	1.68	100%	1.68	5.04	8.46
150	Warehouse	1,000 sf	1.74	0.87	100%	0.87	5.04	4.38
151	Mini-Warehouse	1,000 sf	1.51	0.75	100%	0.75	5.04	3.78

Source: Daily trip ends from Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 10th Edition, 2017; trips per unit is ½ of trip ends to avoid double-counting; new trip percentages from ITE, *Trip Generation Handbook*, 3rd Edition, 2017; new trip percentage for day care and schools based on Preston Hitchens, "Trip Generation of Day Care Centers," *1990 ITE Compendium* (new trips for community college estimated to be double); average trip lengths from Table 9 (drive-through restaurant and convenience store are one-half retail); VMT is product of new trips per unit and average trip length.

Cost per Service Unit

There are two components to determining the average cost to add a unit of capacity to the major roadway system: the cost of constructing the roadway improvement, and the capacity added by the improvement. Roadway systems do not solely consist of travel lanes. Intersection configurations, signals, and signalization timing infrastructure are other critical components of vehicular capacity. Roadways also require rights-of-way and often multi-modal components, including sidewalks, bike lanes, and multi-use paths. These component costs are often included in improvements that add vehicular capacity.

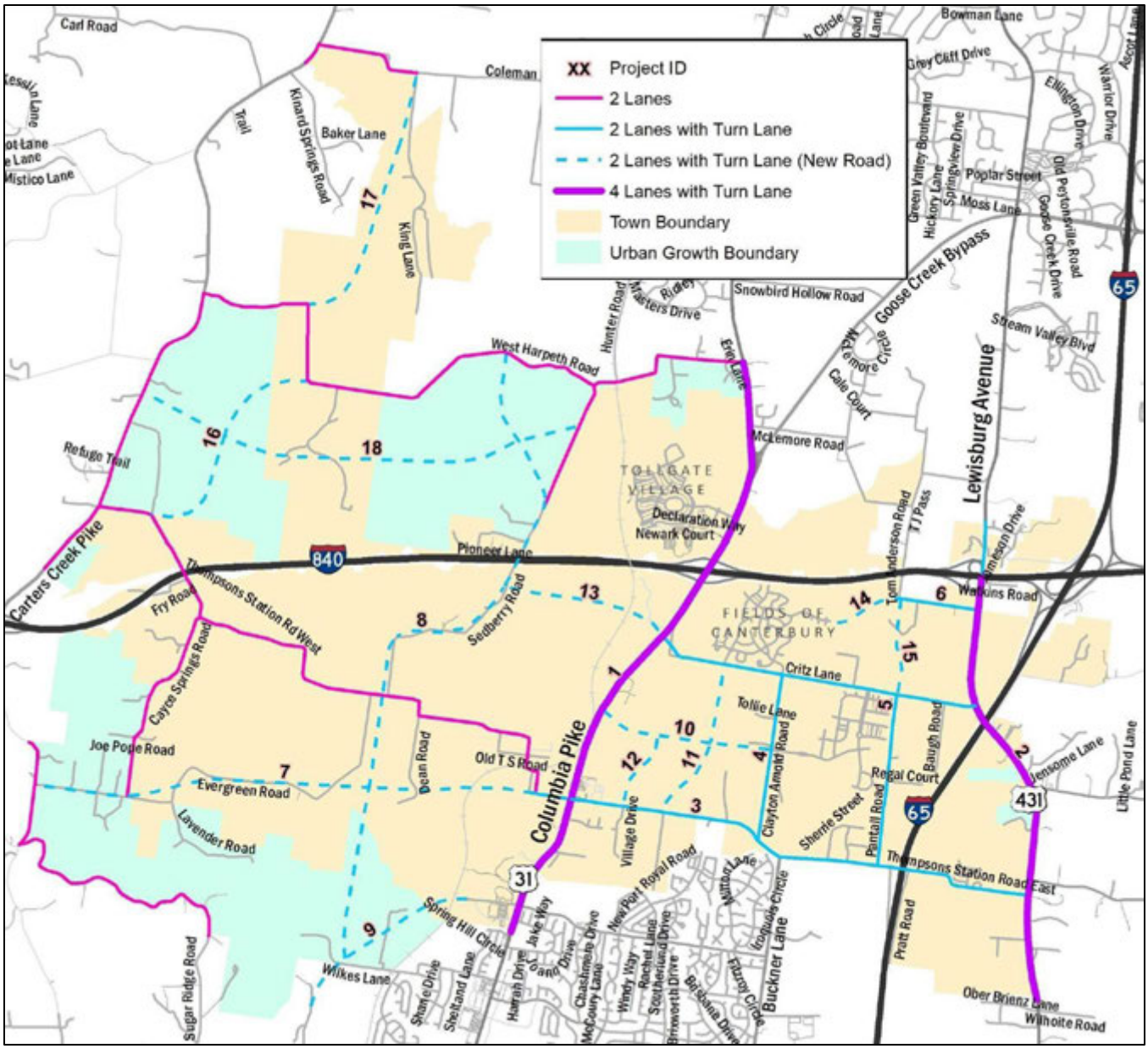
Supporting analysis for the *Major Thoroughfare Plan* (MTP) recently approved by the Planning Commission includes cost estimates for planned projects. These planning-level cost estimates, which include engineering, right-of-way and construction, were prepared by the Town's transportation consultant using Tennessee Department of Transportation cost estimation data and procedures. Planned MTP projects are summarized in Table 11 and illustrated in Figure 5.

Table 11. Major Thoroughfare Plan Projects

ID		Func.		No. of Lanes			New	
No.	Project	Class.	Miles	Ex.	Fut.	New	Ln/Mi.	Total Cost
1	Columbia Pike Widening	Arterial	4.59	2	5	3	13.77	$26,699,800
2	Lewisburg Pike Widening	Arterial	3.70	2	5	3	11.10	$25,818,100
3	Thompson's Stn Rd E Imprvmnts	Maj Coll	3.59	2	2	0	n/a	$17,895,800
4	Clayton Arnold Rd Improvements	Min Coll	1.26	2	2	0	n/a	$4,243,900
5	Pantall Road Improvements	Min Coll	1.29	2	2	0	n/a	$4,492,500
6	Tom Anderson Rd Improvements	Min Coll	0.61	2	2	0	n/a	$2,490,200
7	Evergreen Rd Realign//Extension	Maj Coll	4.05	2	2	0	n/a	$18,568,800
8	Sedberry Rd Realign/Extension	Maj Coll	5.32	2	2	0	n/a	$22,336,300
9	Buckner Road Extension	Maj Coll	1.53	0	3	3	5.00	$8,689,200
10	Columbia Pk-Clayton Arnold Connect	Min Coll	1.31	0	3	3	4.00	$6,622,300
11	Thompson's. Stn-Critz Ln Connector	Min Coll	1.24	0	3	3	4.00	$5,798,800
12	Thompson's. Stn-Project 10 Connector	Min Coll	0.61	0	3	3	2.00	$3,219,500
13	Critz Lane Extension	Min Coll	1.28	0	3	3	4.00	$6,882,400
14	Chaucer Park Lane Extension	Min Coll	0.58	0	3	3	2.00	$3,572,600
15	Critz-Tom Anderson Connector	Min Coll	0.73	0	3	3	2.00	$4,217,800
16	T.S. West-Harpeth Connector	Min Coll	1.80	0	3	3	5.00	$8,121,900
17	Harpeth -Coleman Connector	Min Coll	2.04	0	3	3	6.00	$9,058,900
18	Carters Cr.-Sedberry Connector	Min Coll	3.42	0	3	3	10.00	$13,700,100
19	Off-Street Greenways (Phase 1)	Greenwy	11.05	n/a	n/a	n/a	n/a	$11,050,000
20	Off-Street Greenways (Phase 2)	Greenwy	8.28	n/a	n/a	n/a	n/a	$8,280,000
21	Off-Street Greenways (Phase 3)	Greenwy	10.25	n/a	n/a	n/a	n/a	$10,250,000
Total			68.53					$222,008,900

Source: Barge Design Solutions, *Major Thoroughfare Plan, Appendix A: Recommended Improvement Projects* (not part of the adopted plan).

Figure 5. Locations of Major Thoroughfare Plan Projects



The average cost to add a vehicle-mile of capacity (VMC) is based on the cost estimates in the MTP for projects for which the capacity added can be readily determined. Most of these projects include greenways with multi-use paths. The weighted average cost is $319 per VMC.

Table 12. Average Cost per Vehicle-Mile of Capacity

ID No.	Project	Func. Class.	Miles	Capacity at LOS E Exist.	Future	New	New VMC	Total Cost	Cost/ VMC
1	Columbia Pike Widening	Arterial	3.39	18,700	35,300	16,600	56,274	$26,699,800	$474
2	Lewisburg Pike Widening	Arterial	3.70	18,700	35,300	16,600	61,420	$25,818,100	$420
9	Buckner Road Extension	Maj Coll	1.53	0	18,300	18,300	27,999	$8,689,200	$310
10	Columbia Pk-Clayton Arnold Connect	Min Coll	1.31	0	18,300	18,300	23,973	$6,622,300	$276
11	Thompson's. Stn-Critz Ln Connector	Min Coll	1.24	0	18,300	18,300	22,692	$5,798,800	$256
12	Thompson's. Stn-Project 10 Connector	Min Coll	0.61	0	18,300	18,300	11,163	$3,219,500	$288
13	Critz Lane Extension	Min Coll	1.28	0	18,300	18,300	23,424	$6,882,400	$294
14	Chaucer Park Lane Extension	Min Coll	0.58	0	18,300	18,300	10,614	$3,572,600	$337
15	Critz-Tom Anderson Connector	Min Coll	0.73	0	18,300	18,300	13,359	$4,217,800	$316
16	T.S. West-Harpeth Connector	Min Coll	1.80	0	18,300	18,300	32,940	$8,121,900	$247
17	Harpeth -Coleman Connector	Min Coll	2.04	0	18,300	18,300	37,332	$9,058,900	$243
18	Carters Cr.-Sedberry Connector	Min Coll	3.42	0	18,300	18,300	62,586	$13,700,100	$219
Total/Weighted Average			21.63				383,776	$122,401,400	$319

Source: Table 11, except capacities from Table 5.

The road cost per service unit (VMT) is the cost per VMC times the recommended VMC/VMT ratio of 1.25. The result is $399 per VMT, as shown in Table 13.

Table 13. Road Cost per Service Unit

Cost per Vehicle-Mile of Capacity (VMC)	$319
x Recommended VMT/VMC Ratio	1.25
Cost per Vehicle-Mile of Travel (VMT)	$399

Source: Cost per VMC from Table 13; recommended VMC/VMT ratio from Table 6.

Net Cost per Service Unit

As discussed in the Legal Framework chapter, revenue credits may be warranted for existing deficiencies, outstanding debt, and the availability of State/Federal funding. There are no existing deficiencies from the perspective of the updated road impact fees, because the fees are based on a level of service that is lower than what is currently provided to existing development. The Town does not have any outstanding debt related to past road capacity improvements.

No State/Federal funds are currently programmed in the current (FY 2017-2022) four-year Nashville Area Transportation Improvement Program for roads within the Town limits. Future State and Federal funding of capacity improvements to the major roadway system within the Town limits is hard to predict with any certainty. However, a reasonable guide is historical expenditures over the last decade in the more developed municipalities to the north and south. As summarized in Table 14, the average historical funding for capacity road improvements in Brentwood and Spring Hill results in the present-value equivalent of $211 per VMT. This amount will be used as an estimate of the anticipated future State/Federal funding that will be attributed to new development in Thompson's Station.

Table 14. Road State/Federal Funding Credit

Annual State Federal Funding per VMT, Brentwood	$7.79
Annual State Federal Funding per VMT, Spring Hill	$11.43
Average Annual State/Federal Funding per VMT	$9.61
x Present Value Factor (30 Years)	21.94
State/Federal Funding Credit per Daily VMT	$211

Source: State/Federal funding from Nashville Area Metropolitan Planning Organization, *Transportation Improvement Programs* from FY 2008-2017; present value based on a discount rate of 2.15%, which was the national average yield on AAA 30-year municipal bonds from fmsbonds.com on September 21, 2019.

The net cost per service unit is the cost per VMT less the revenue credit for State/Federal funding. As shown in Table 15, the net cost per service unit is $188 per VMT.

Table 15. Road Net Cost per Service Unit

Cost per Vehicle-Mile of Travel	$399
– State/Federal Funding Credit per VMT	-$211
Net Cost per Daily VMT	$188

Source: Net cost per VMT from Table 13; State/Federal funding credit from Table 14.

Net Cost Schedule

The updated road impact fees for the various land use categories are shown in Table 16. The impact fee calculation for each land use category is the product of daily VMT per development unit on the major roadway system and the net cost per VMT. This takes into account the average cost to add roadway capacity as well as future revenue that will be generated by new development to help offset those costs. The comparison of the updated fees with current fees is presented in the Executive Summary.

Table 16. Updated Road Impact Fees

Land Use Type	Unit	VMT/ Unit	Net Cost/ VMT	Net Cost per Unit
Single-Family Detached	Dwelling	19.11	$188	$3,593
Multi-Family	Dwelling	14.82	$188	$2,786
Mobile Home Park	Pad	10.12	$188	$1,903
Senior Adult Housing, Detached	Dwelling	8.62	$188	$1,621
Senior Adult Housing, Attached	Dwelling	7.49	$188	$1,408
Golf Course	Acre	5.47	$188	$1,028
Hotel/Motel	Room	11.86	$188	$2,230
Retail/Commercial/Shopping Center	1,000 sf	29.79	$188	$5,601
Restaurant, Standard	1,000 sf	57.15	$188	$10,744
Restaurant, Drive-Through	1,000 sf	127.15	$188	$23,904
Gas Station w/Convenience Mkt.	1,000 sf	49.33	$188	$9,274
Office/Institutional	1,000 sf	22.54	$188	$4,238
Elementary/Secondary School	1,000 sf	6.98	$188	$1,312
Community College	1,000 sf	15.76	$188	$2,963
Day Care Center	1,000 sf	18.55	$188	$3,487
Hospital	1,000 sf	17.42	$188	$3,275
Nursing Home	1,000 sf	10.62	$188	$1,997
Place of Worship	1,000 sf	11.27	$188	$2,119
Industrial	1,000 sf	8.46	$188	$1,590
Warehouse	1,000 sf	4.38	$188	$823
Mini-Warehouse	1,000 sf	3.78	$188	$711

Source: VMT per unit from Table 10; net cost per VMT from Table 15.

PARKS

This chapter calculates a potential new impact fee for parks and recreation facilities. The Town provides a number of park facilities for the benefit of residents and will need to expand those facilities as the population grows to maintain the current level of service.

Service Units

A service unit is a standardized measure of demand. The service unit for the park impact fees is the Equivalent Dwelling Unit (EDU). An EDU represents the average number of people residing in an occupied single-family detached dwelling unit. A single-family detached unit is, by definition, one EDU. The number of EDUs per dwelling unit for other housing types is the ratio of the average household size to the average household size of a single-family detached unit.

The only U.S. Census data available on average household size by housing type comes in the form of a 5% sample data set, which an aggregation of annual 1% samples over a five year period. The most recent sample was collected between 2013 and 2017. The published data combine single-family detached and attached units, but the underlying data can be analyzed for different housing types.

Unfortunately, the census data for the Town itself are unreliable, due to small sample sizes in the various categories. However, average household sizes in Williamson County as a whole should be reasonably representative of local conditions. The results of the analysis of the census sample data for Williamson County are shown in Table 17. Mobile home is grouped with single-family detached because it has too small a sample and the two have similar household sizes. Townhomes (single-family attached) clearly have an average household size that is much closer to other forms of multi-family (duplexes, apartments and condominiums) than to single-family detached units. Townhomes and other multi-family types are grouped together because their individual sample sizes are small. The key difference here is that single-family detached and mobile home units have an average household size of almost three people, while multi-family units have only two.

Table 17. Average Household Size by Housing Type, Williamson County

Housing Type	Sample Occ. Units	Weighted Persons	Weighted Occ. Units	Average HH Size
Single-Family Detached	3,222	176,285	59,409	2.97
Mobile Home	48	3,674	1,151	3.19
Single-Family Detached/MH	3,270	179,959	60,560	**2.97**
Multi-Family (except SF Att.)	261	19,185	9,348	2.05
Single-Family Attached	184	6,062	3,252	1.86
Multi-Family	445	25,247	12,600	**2.00**
Total	3,715	205,206	73,160	2.80

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5% sample housing unit microdata for Williamson County, Tennessee.

As described above, park service units are expressed in terms of equivalent dwelling units (EDUs), based on the average number of residents compared to a single-family detached unit. A multi-family unit represents about two-thirds as many residents as a single-family unit, as shown in Table 18.

Table 18. Park Service Unit Multipliers

Housing Type	Average HH Size	EDUs/ Unit
Single-Family Detached/MH	2.97	1.00
Multi-Family	2.00	0.67

Source: Average household size from Table 17; EDUs/unit is ratio to single-family detached.

The number of existing service units is determined by multiplying the existing numbers of units of each housing type by its respective service unit multiplier and summing for all housing types. As shown in Table 19, the Town currently has an estimated 2,499 park service units.

Table 19. Existing Park Service Units

Housing Type	EDUs/ Unit	Existing Units	Existing EDUs
Single-Family Detached/MH	1.00	2,137	2,137
Multi-Family	0.67	540	362
Total			2,499

Source: EDUs per unit from Table 18; existing units from Table 28.

Cost per Service Unit

The Town currently provides 258 acres of park land, as summarized in Table 20.

Table 20. Existing Park Acres

Parks and Recreation Facility	Acres
Sarah Benson Park	25.52
Preservation Park	207.68
Gardens & Dog Park	20.92
Soccer Fields	4.13
Total Park Acres	258.25

Source: Town Planner, March 8, 2019.

Most of the existing park land is in Preservation Park. Based on the 2014 purchase of just over 100 acres, the land cost about $12,000 per acre, as shown below.

Table 21. Park Land Cost per Acre

2014 Preservation Park Purchase	$1,231,200
÷ Number of Acres	102.61
Cost per Acre	$11,999

Source: Town Finance Director, April 16, 2019.

Over the last several years, the Town has invested in several improvements to the parks, totaling about $836,000.

Table 22. Existing Park Improvements

Improvement	Year	Cost
Trails	2012	$25,298
Dog Park Improvements	2014	$111,547
Greenway Trail	2017	$648,255
Greenway Hiking Trail	2017	$50,782
Total Improvement Cost		$835,882

Source: Town Finance Director, April 17, 2019.

The total estimated replacement cost of the Town's existing parks is estimated to be about $4 million, as shown in Table 23. Dividing the replacement cost by existing service units yields a park cost of $1,574 per equivalent dwelling unit (EDU).

Table 23. Park Cost per Service Unit

Land Cost per Acre	$11,999
x Total Park Acres	258.25
Park Land Value	$3,098,742
Park Improvement Cost	$835,882
Total Park Replacement Value	$3,934,624
÷ Existing Service Units (EDUs)	2,499
Park Cost per EDU	$1,574

Source: Land cost per acre from Table 21; acres from Table 21; improvement cost from Table 22; existing EDUs from Table 19.

Net Cost per Service Unit

As described in the Legal Framework chapter, impact fees should be reduced by a credit to account for future revenues that will be generated by new development and used for the same facilities for which the fees are being charged. The Town has about $2.7 million in outstanding debt for the purchase of Preservation Park, as summarized in Table 24. New development will also be paying some of that debt with tax revenue that it will generate.

Table 24. Outstanding Park Debt

Debt Issuer	Date	Purpose	Orig. Amt.	Outstanding
First Farmers Bank	9/26/2013	Preservation Park - park/drip field	$1,153,000	$691,800
Franklin Synergy	5/13/2014	Hill Property - passive park/drip field	$1,000,000	$472,222
First TN Bank	3/2/2018	Preservation Park - wastwater/park facilities	$1,550,000	$1,550,000
Total			$3,703,000	$2,714,022

Source: Town Finance Director, March 8, 2019.

The cost per service unit has been calculated above based on the replacement value of all park facilities. An alternative level of service would be the cost per service unit that has been paid for by existing development. This would explicitly acknowledge that the Town's current parks have excess capacity to serve new development. However, the fee is the same either way, and the Town can use the fee revenue to either acquire and build new park facilities or pay some of the outstanding debt on existing facilities.

The debt credit is calculated as the amount of outstanding debt per service unit. Providing this credit puts new development on an equal footing with existing development. The amount of the credit is identified in Table 25.

Table 25. Park Debt Credit

Outstanding Park Debt	$2,714,022
÷ Existing Service Units (EDUs)	2,499
Park Debt Credit per EDU	$1,086

Source: Outstanding debt from Table 24; existing EDUs from Table 19.

Subtracting the debt credit from the cost per service unit yields the net cost per service unit. As shown in Table 26, the net cost to provide new development with the same level of service provided to existing development is $488 per service unit.

Table 26. Park Net Cost per Service Unit

Park Cost per Service Unit	$1,574
– Park Debt Credit per Service Unit	-$1,086
Net Park Cost per Service Unit	$488

Source: Cost per service unit from Table 23; debt credit from Table 25.

Net Cost Schedule

Park impact fees that reflect the current level of service are calculated in Table 27 by multiplying the service unit multipliers by the net cost per service unit (EDU).

Table 27. Park Net Cost Schedule

Housing Type	EDUs/ Unit	Net Cost/ EDU	Net Cost/ Unit
Single-Family Detached	1.00	$488	$488
Multi-Family	0.67	$488	$327

Source: EDUs per unit from Table 18; net cost per EDU from Table 26.

APPENDIX A: EXISTING LAND USE

Table 28. Existing Residential Units

Housing Type	2010 Units	2010-2018 Permits	2019 Estimate
Single-Family Detached	n/a	n/a	2,137
Multi-Family	n/a	n/a	540
Total	841	1,836	2,677

Source: 2019 total based on 2010 Census and residential building permits since 2010 from Town Planner, March 8, 2019; 2019 multi-family units from Town Planner; 2019 single-family detached is remainder.

Table 29. Existing Nonresidential Square Feet

Land Use Type	Sq. Feet
Retail/Commercial	246,162
Office	41,592
Industrial/Warehouse	168,228
Public/Institutional	777,270
Total Nonresidential Sq. Ft.	1,233,252

Source: Williamson County Property Assessor data for nonresidential non-tax-exempt uses; Town building permit records or scaled estimates of square footage from aerial photography for exempt uses.

APPENDIX B: LAND USE DEFINITIONS

Recommended definitions for the land use categories in the updated road impact fee schedule are provided below. These definitions are intended to assist Town staff in classifying proposed developments and assessing appropriate impact fees. If these definitions are adopted by ordinance or resolution, those that differ from or overlap with zoning or general definitions should have a disclaimer that they only apply to interpretation of the schedule for road impact fees.

Single-Family Detached means a building containing only one dwelling unit, including a mobile home not located in a mobile home park.

Multi-Family means a building containing two or more dwelling units. It includes duplexes, apartments, residential condominiums, townhouses, and timeshares.

Mobile Home/RV Park means a parcel (or portion thereof) or abutting parcels of land designed, used or intended to be used to accommodate two or more occupied mobile homes or recreational vehicles, with necessary utilities, vehicular pathways, and concrete pads or vehicle stands.

Hotel/Motel means a building or group of buildings on the same premises and under single control, consisting of sleeping rooms kept, used, maintained or advertised as, or held out to the public to be, a place where sleeping accommodations are supplied for pay to transient guests or tenants. This land use category includes rooming houses, boardinghouses, and bed and breakfast establishments.

Retail/Commercial/Shopping Center means an integrated group of commercial establishments planned, developed, owned or managed as a unit, or a free-standing retail or commercial use not otherwise listed in the impact fee schedule. Uses located on a shopping center outparcel are considered free-standing for the purposes of this definition. A retail or commercial use shall mean the use of a building or structure primarily for the sale to the public of nonprofessional services, or goods or foods that have not been made, assembled or otherwise changed in ways generally associated with manufacturing or basic food processing in the same building or structure. This category includes but is not limited to all uses located in shopping centers and the following free-standing uses:

Amusement park
Auto parts store
Auto wrecking yard
Automobile repair
Bank without drive-through facilities
Bar and cocktail lounge
Camera shop
Car wash
Convenience food and beverage store without gas pumps
Department store
Florist shop
Food store
Grocery

Hardware store
Health or fitness club
Hobby, toy and game shop
Junkyard
Laundromat
Laundry or dry cleaning
Lawn and garden supply store
Massage establishment
Music store
Newsstand
Nightclub
Racetrack
Recreation facility, commercial
Rental establishment
Repair shop, including auto repair
School, commercial
Specialty retail shop
Supermarket
Theater, indoor (including movie theater)
Used merchandise store
Variety store
Vehicle and equipment dealer

Gas Station with Convenience Market means an establishment offering the sale of motor fuels and convenience items to motorists.

Golf Course means a golf course that is not restricted primarily for use by residents of a residential development of which it is a part, including commercial uses such as pro shop or bar that are designed primarily to serve golfers on the site.

Office/Institutional means a general office, medical office or public/institutional use, as hereby defined, not located in a shopping center.

> **General Office** means a building exclusively containing establishments providing executive, management, administrative, financial, or non-medical professional services, and which may include ancillary services for office workers, such as a restaurant, coffee shop, newspaper or candy stand, or child care facilities. It may be the upper floors of a multi-story office building with ground floor retail uses. Typical uses include banks without drive-in facilities, real estate, insurance, property management, investment, employment, travel, advertising, secretarial, data processing, telephone answering, telephone marketing, music, radio and television recording and broadcasting studios; professional or consulting services in the fields of law, architecture, design, engineering, accounting and similar professions; interior decorating consulting services; and business offices of private companies, utility companies, trade associations, unions and nonprofit organizations. This category does not include an administrative office that is ancillary to a principal commercial or industrial use.

Medical Office means a building primarily used for the examination and/or treatment of patients on an outpatient basis (with no overnight stays by patients) by health professionals, and which may include ancillary services for medical office workers or a medical laboratory to the extent necessary to carry out diagnostic services for the medical office's patients. It includes the use of a site primarily for the provision of medical care and treatment of animals, which may include ancillary boarding facilities.

Public/Institutional means a governmental, quasi-public or institutional use, or a non-profit recreational use, not separately listed in the impact fee schedule. Typical uses include higher education institutions, city halls, courthouses, post offices, jails, libraries, museums, military bases, airports, bus stations, fraternal lodges, parks and playgrounds. It also includes bus terminals, fraternal clubs, adult day care centers, college dormitories, and prisons.

Restaurant, Standard means a stand-alone establishment, not located in a shopping center but may be located on an out-parcel, that sells meals prepared on site, and does not provide drive-through or drive-in service.

Restaurant, Drive-Through means a stand-alone establishment, not located in a shopping center but may be located on an out-parcel, that sells meals prepared on site, and provides drive-through or drive-in service.

Hospital means an establishment primarily engaged in providing medical, surgical, or skilled nursing care to persons, including overnight or longer stays by patients.

Nursing Home means an establishment primarily engaged in providing limited health care, nursing and health-related personal care but not continuous nursing services.

Place of Worship means a structure designed primarily for accommodating an assembly of people for the purpose of religious worship, including related religious instruction for 100 or fewer children during the week and other related functions.

Day Care Center means a facility or establishment that provides care, protection and supervision for six or more children unrelated to the operator and which receives a payment, fee or grant for any of the children receiving care, whether or not operated for profit. The term does not include public or nonpublic schools.

Elementary/Secondary School means a school offering an elementary through high school curriculum.

Industrial means an establishment primarily engaged in the fabrication, assembly or processing of goods. Typical uses include manufacturing plants, industrial parks, research and development laboratories, welding shops, wholesale bakeries, dry cleaning plants, and bottling works.

Warehouse means an establishment primarily engaged in the display, storage and sale of goods to other firms for resale, as well as activities involving significant movement and storage of products or equipment. Typical uses include wholesale distributors, storage warehouses, trucking terminals, moving and storage firms, recycling facilities, trucking and shipping operations and major mail processing centers.

Mini-Warehouse means an enclosed storage facility containing independent, fully enclosed bays that are leased to persons for storage of their household goods or personal property.