Public Works Project Fee Study

for the City of Brentwood, Tennessee

prepared by

Duncan Associates

July 2019

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EXECUTIVE SUMMARY

The purpose of this project is to assist the City of Brentwood in updating its road impact fees, which are called public works project fees.

Current Fees

The City's current public works project fees are summarized in Table 1. The number of average daily trip ends have been divided by two to avoid double-counting. The number of daily trips per unit is multiplied by the cost per trip to determine the fee. Retail uses are given a 20% reduction in recognition of local sales tax revenues they generate.

Table 1. Current Public Works Project Fees

Land Use	Unit	Trip Ends	Trips	Cost/ Trip	Retail Factor	Fee per Unit
Single-Family	Dwelling	9.57	4.785	$257	100%	$1,230
Continuing Care Retirement Comm.	Dwelling	2.81	1.405	$257	100%	$360
Hotel/Motel	Room	9.02	4.510	$257	80%	$930
Shopping Center / Retail	1,000 sq. ft.	42.94	21.470	$257	80%	$4,415
Formal Restaurant	1,000 sq. ft.	89.95	44.975	$257	80%	$9,250
High Turnover Restaurant	1,000 sq. ft.	127.15	63.575	$257	80%	$13,070
Gasoline/Service Station w/Conv. Mkt	1,000 sq. ft.	96.37	48.185	$257	80%	$9,910
Gasoline/Service Station	Pumps	15.65	7.825	$257	80%	$1,610
General Office Building	1000 sq. ft.	23.57	11.785	$257	100%	$3,030
Golf Course	Acre	5.04	2.520	$257	100%	$650
Racquet/Tennis Club	Court	38.7	19.350	$257	100%	$4,975
Health/Fitness Club	1,000 sq. ft.	4.05	2.025	$257	100%	$520
Recreational / Community Center	1,000 sq. ft.	1.62	0.810	$257	100%	$210
Elementary School	Student	1.29	0.645	$257	100%	$170
Middle School / Junior High School	Student	1.62	0.810	$257	100%	$210
High School	Student	1.71	0.855	$257	100%	$220
Junior/Community College	Student	1.2	0.600	$257	100%	$155
Day Care Center	Student	4.48	2.240	$257	100%	$575
Hospital	Bed	11.81	5.905	$257	100%	$1,520
Nursing Home	Bed	2.37	1.185	$257	100%	$305
Assisted Living	Bed	2.74	1.370	$257	100%	$350
Warehousing	1,000 sq. ft.	4.96	2.480	$257	100%	$640

Source: City of Brentwood web site, Public Works Project Fee Schedule, downloaded November 18, 2018.

Update Overview

Methodology. The major recommendation for this update is to base the fees on a "demand-driven" methodology. The City's current fees were calculated using a "plan-based" methodology. Plan-based methodologies are simple to calculate (total planned improvement costs divided by new trips), but they are difficult to do right. A simple list of improvements is not a sufficient basis for a plan-based fee calculation. The plan-based methodology requires a master plan that can demonstrate that the

cost of improvements needed over the planning horizon are attributable to the amount of growth projected to occur over that period. The City's current *Major Thoroughfare Plan* does not contain the level of data and analysis needed to establish the nexus between the projected growth and the need for the improvements. Consequently, this update uses the alternative "demand-driven" 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-driven 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 also the average length of those trips. They also need to exclude pass by trips, which do not add additional VMT. These adjustments 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. Some of the current fee categories are assessed on characteristics that are sometimes difficult to quantify, such as number of students or beds. This update uses the square footage of the building for assessing uses such as schools, day care centers, hospitals and nursing homes. Current and proposed land use categories are summarized in Figure 4 in the Methodology chapter, and suggested definitions are provided in the appendix.

Privilege Tax. The City has the authority to impose a construction privilege tax for road improvements in addition to its road impact fee. If the City is interested in pursuing the idea, there are ways to avoid any overlap between the types of road improvements funded by the two revenue sources. For example, the construction privilege tax revenues could be used for right-of-way acquisition and sidewalk construction without any overlap, because those costs have been excluded from the calculation of the updated fees (see discussion in Legal Framework chapter).

Updated Fees

The updated fees are shown in Table 2 on the following page. Current fees for comparable land uses are also shown. The wide variation in percentage changes between land use categories reflects changes in travel demand factors, including the inclusion of trip lengths and percentage of pass by trips. The potential fee increases are greatest for residential uses, primairly because shorter trip lengths and higher pass by factors than the current 20% reduction for retail trips kept nonresidential fees from rising as much.

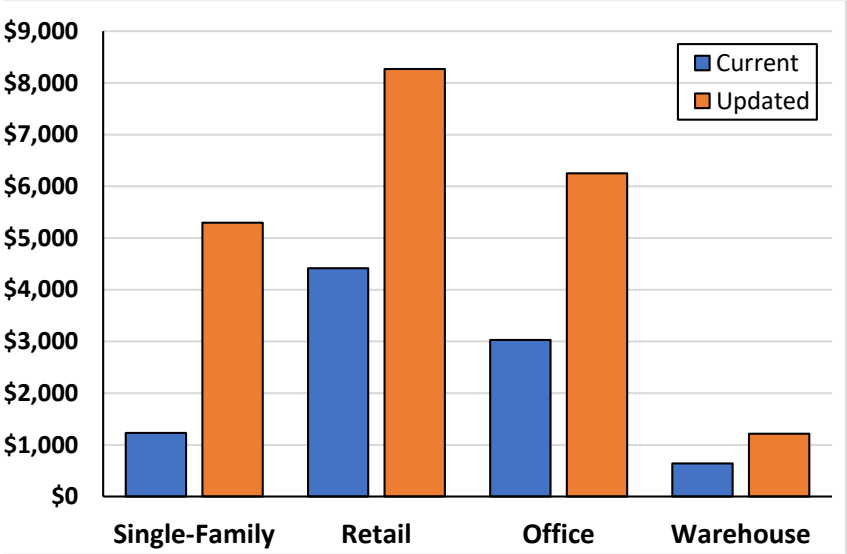
The City could adopt the updated fees at some percentage less than 100%, but the adotion percentage should be the same for all land uses to preserve the proportionality of the fees to the impact of the development. The City could also phase-in the updated fees over a period of time.

Table 2. Updated Public Works Project Fees

Land Use Type	Unit	Updated Fees	Current Fees	Percent Change
Single-Family Detached	Dwelling	$5,297	$1,230	331%
Single-Family Attached	Dwelling	$4,107	n/a	n/a
Senior Adult Housing, Detached	Dwelling	$2,389	$360	564%
Senior Adult Housing, Attached	Dwelling	$2,075	$360	476%
Golf Course	Hole	$1,519	$650	134%
Hotel/Motel	Room	$3,287	$930	253%
Retail/Commercial/Shopping Center	1,000 sf	$8,269	$4,415	87%
Restaurant, Standard	1,000 sf	$15,860	$9,250	71%
Restaurant, Drive-Through	1,000 sf	$35,264	n/a	n/a
Gas Station w/Convenience Mkt.	1,000 sf	$13,682	$9,910	n/a
Office/Institutional	1,000 sf	$6,252	$3,030	106%
Elementary/Secondary School	1,000 sf	$1,940	n/a	n/a
Junior/Community College	1,000 sf	$4,375	n/a	n/a
Day Care Center	1,000 sf	$5,151	n/a	n/a
Hospital	1,000 sf	$4,837	n/a	n/a
Nursing Home	1,000 sf	$2,950	n/a	n/a
Place of Worship	1,000 sf	$3,130	n/a	n/a
Industrial	1,000 sf	$2,346	n/a	n/a
Warehouse	1,000 sf	$1,214	$640	90%
Mini-Warehouse	1,000 sf	$1,046	n/a	n/a

Source: Current fees from Table 1; updated fees from Table 17.

Figure 1. Current and Updated Public Works Project Fees, Major Land Uses



Comparative 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. Some studies have found that 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 road impact fees.

The City's current and updated public works project fees are compared to road impact fees charged by four nearby Tennessee municipalities in Table 3. Spring Hill's newly adopted fees will go to 100% in 2020. Smyrna's fees were adopted in 2017 at 70%.

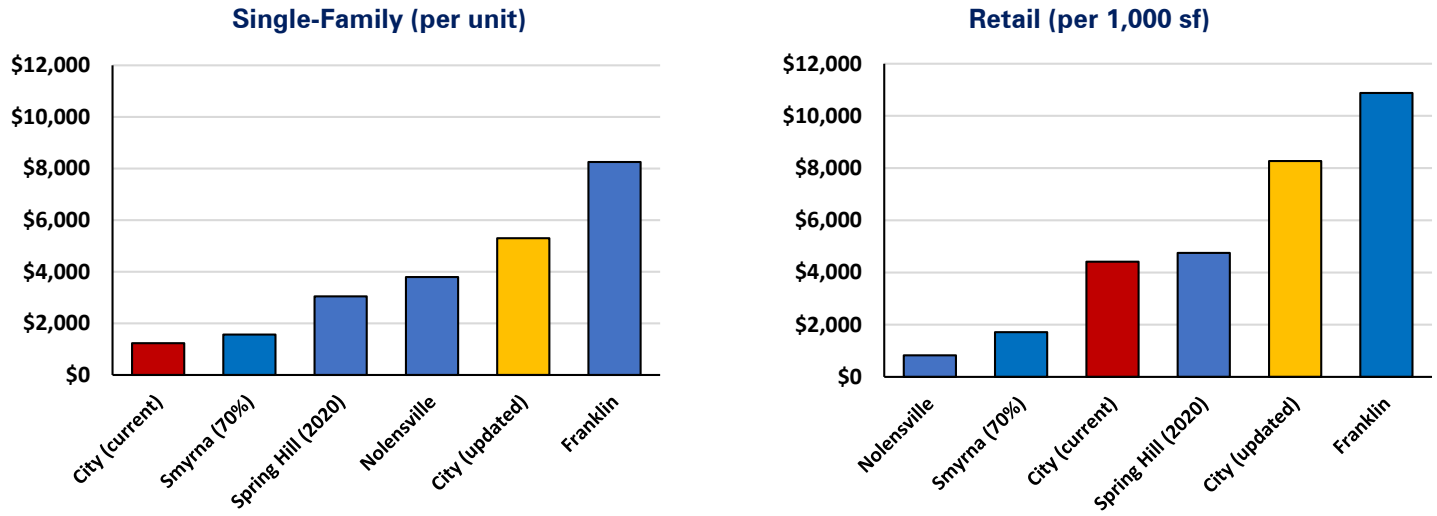
Table 3. Comparative Road Impact Fees

Municipality	Single-Family (unit)	Retail (1,000 sf)	Rest-aurant (1,000 sf)	Office (1,000 sf)	Ware-house (1,000 sf)
City (current)	$1,230	$4,415	$9,250	$3,030	$640
City (updated)	$5,297	$8,269	$15,860	$6,252	$1,214
Franklin	$8,251	$10,878	$20,255	$7,801	$3,187
Nolensville	$3,796	$825	$825	$944	$306
Smyrna (70%)	$1,567	$1,712	$1,712	$2,435	$651
Spring Hill (2020)	$3,048	$4,753	$9,118	$3,599	$697

Source: Current and updated City 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 fees from the table above are illustrated in Figure 2.

Figure 2. Comparative Single-Family and Retail Fees



LEGAL FRAMEWORK

The City of Brentwood's public works project fee is an impact fee imposed on new development to pay for road 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

In 1987, the Tennessee Legislature passed three private acts that give the City of Brentwood authority to enact impact fees and privilege taxes on new development for transportation purposes, as described below. The City's public works project fee was adopted under the impact fee authority. The City has not adopted a construction privilege tax or adequate facilities tax.

Municipal Construction Impact Fee. Chapter 115 of the Private Acts of Tennessee passed by the General Assembly in 1987 authorizes municipalities having a 1980 population of 9,430 to 9,440 to collect impact fees from new development for their fair share of the cost of road, water, sewer, and stormwater improvements needed to accommodate new development. The 1980 U.S Census enumerated 9,431 residents in the Brentwood, giving the City the authority to impose such impact fees. The act provides that the impact fee may not be imposed prior to the issuance of a building permit, and that the fees collected must be kept in a separate fund and used only for the types of improvements for which they were collected. The municipality must establish an impact fee formula that requires developers "to pay an impact fee that does not exceed the pro rata share of the reasonably anticipated cost for the public improvements created by the new land development activity."

Construction Privilege Tax. Chapter 86 of the Private Acts of Tennessee passed by the General Assembly in 1987 authorizes the City of Brentwood to levy a construction privilege tax on new development for transportation-related projects made necessary by growth, not to exceed $0.50 per square foot for residential development and $1.50 per square foot for nonresidential development within the city limits. Public buildings and places of worship are exempt from any such transportation development tax. The tax is collected at time of building permit issuance, and the funds collected are restricted to be expended only on transportation-related improvements reasonably related to the need to serve new development. The act states that the authority to impose the tax is in addition to the authority to impose other taxes or fees on new development authorized by private acts, and "shall not be deemed to constitute double taxation."

Adequate Facilities Tax. Chapter 119 of the Private Acts of Tennessee passed by the General Assembly on May 7, 1987 authorizes municipalities having a 1980 population of 9,430 to 9,440 to levy an adequate facilities tax of up to $1.00 per square foot of residential and $2.00 per square foot of

nonresidential construction. It specifically provides that the City may vary the amount of the tax for different types of residential and nonresidential development. It had to be adopted by the local governing body within five months by a two-thirds majority, and the City ratified the authority with Resolution 87-19 on July 13, 1987. This tax can be used for a wide variety of improvements, including roads, parks, jails, law enforcement facilities, schools, libraries, government buildings, fire stations, sanitary landfills, water, wastewater and drainage projects, airport facilities and other governmental capital improvements. Prior to imposing the tax, the City would need to adopt a capital improvements program indicating the need for the cost of public facilities anticipated to be funded. The City would also need to make a finding that the need for such public facilities is reasonably related to new development.

Pro Rata Share. The City's impact fee authority requires that the fees do not exceed the "pro rata share" of the growth-related improvement costs, but it does not provide guidance on how the pro rata share is to be determined. This guidance is provided by a body of case law dealing with impact fees (see Case Law section below). 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; and
4) Spend the funds to benefit new development.

Imposing a Privilege or Facilities Tax for Roads. The City has the authority to impose a construction privilege tax or an adequate facilities tax for road improvements in addition to the current road impact fee. Both the privilege and adequate facilities tax acts specifically say this authority is "in addition" to any other authority for "taxes or fees," and "shall not be deemed to constitute double taxation." But it's not clear that the City could adopt the maximum allowable impact fee for new development's share of future major road expansions, while also adopting a privilege or adequate facilities tax on new construction that is dedicated to the same types of improvements. That might run afoul of the case law requirement that impact fees should not require new development to pay twice through other taxes or fees. However, if the City is interested in pursuing the idea, there are ways to avoid any overlap between the types of road improvements funded by the two revenue sources. For example, the construction privilege tax revenues could be used for right-of-way acquisition and sidewalk construction without any overlap, because those costs have been excluded from the calculation of the updated fees.

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 governments' broad "police power" to regulate land development in order to protect the health, safety and welfare of the community.

Rational Nexus Standard

To ensure that local governments do not impose an unauthorized tax in the guise of an impact fee, the courts have developed guidelines for constitutionally-valid impact fees, based on the "rational nexus" standard.[1] The standard essentially requires that fees must be proportional to the need for additional infrastructure created by the new development, and the fees must be spent to provide that same type of infrastructure to benefit new development.

The Need Test. To meet the first prong of the dual rational nexus test, it is necessary to demonstrate that new development creates the need for additional roadway facilities. The demand on roadways created by new developments of different types is quantified in the form of trip generation rates per housing unit and per various measures of nonresidential development. Transportation impact fees are designed to be proportional to the additional capacity needed to accommodate each new development.

The Benefit Test. To meet the second prong of the dual rational nexus test, it is necessary to demonstrate that new development subject to the fee will benefit from the expenditure of the impact fee funds. One requirement is that the fees be used to fill the need that serves as the justification for the fees under the first part of the test. The fees should also be spent in a reasonable amount of time so as to provide meaningful benefit to the fee-paying development, typically 6-10 years, or be refunded.

Level of Service

The rational nexus standard requires that the fees not exceed the cost directly related to the proposed development, and that they not be used to remedy any existing deficiency. The concept of "level of service" is implicit in establishing the relationship of the cost of improvements to the new development, as well as in determining existing deficiencies. These requirements get to the heart of one of the most fundamental principles established in impact fee case law, which is that impact fees should not charge new development for a higher level of service than is provided to existing development. Basing the fees on a higher level of service (LOS) than is being provided to existing development means there is a deficiency in existing facilities to provide the same LOS new development is paying for through the impact fee. Such a deficiency needs to be paid for in such a way that it does not burden new development. The methodology used in this study results in a fee that does not exceed the cost to maintain the existing LOS.

[1] Some of the major cases are City of Dunedin v. Contractors and Builders Association of Pinellas County (FL 1975); Banberry Development Corp. v. South Jordan City (UT 1981); Hollywood, Inc. v. Broward County (FL 1983); Home Builders Assoc. of Dayton and the Miami Valley, et. al. v. City of Beavercreek (OH, 2000)

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. It is necessary to meet the court-imposed requirement that impact fees be proportional to impact to avoid having the fee struck down as an illegal tax. This update meets this requirement by basing the fees for different land uses on studies of trip generation and average trip length.

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 should probably 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 some types of development. This could arguably amount to new development that is not eligible paying more than its proportionate share of road 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 the *Major Thoroughfare Plan* or an adopted list of planned road improvements. But 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 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.

METHODOLOGY

The methodology used to calculate an impact fee must comply with the "pro rata" legal requirements 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-driven. The City's current fees were calculated using a plan-based methodology. The consultant recommends switching to a demand-driven methodology is this update. Regardless of the methodology used, the final fee schedule 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 City's 2030 Major Thoroughfare Plan, adopted in 2016, falls short of this requirement. Traffic projections are not modeled based on a set of growth projections by small areas, but rather on trends in historical traffic counts. This makes the City's current plan difficult to use as the foundation for a plan-based fee calculation.

Demand-Driven Methodology

The alternative to the plan-based methodology is referred to as "demand-driven" (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, 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-driven 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 average 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 some 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. The City currently addresses this by applying a 20% reduction factor for retail uses. The latest ITE trip generation manual supports bigger reductions. If you also factor out diverted-linked trips (those that make a short diversion to the pass-by stop), the reduction would be closer to 55% for shopping centers and 60% for restaurants.

An issue that arises with the demand-driven road fee methodology is what the appropriate level of service (LOS) should be. The "standard" demand-driven 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-driven 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-driven 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, but to be conservative continues to use the one-to-one ratio of capacity to demand implicit in the traditional demand-driven approach.

The formula for the demand-driven methodology used in this study is summarized in Figure 3. 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-Driven 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

Land Use Categories

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. Recommended definitions of all the categories are provided in the Appendix to assist in classifying proposed land uses.

- Add a single-family attached category.

- Replace continuing care community with senior adult housing, attached and detached. The senior adult housing categories are better defined and are based on more recent and robust data.

- Combine elementary, middle, and high school categories and change the assessment basis from students to square footage, which is more easily determined.

- Change the assessment bases for junior/community college and day care center from students to square feet, and for nursing home and hospital from beds to square feet.

- Add a new place of worship category. Churches and other places of worship have traffic impacts and should be assessed impact fees.

- Drop gasoline service station, racquet/tennis club, recreation/community center, and health/fitness club as separate categories and assess at the retail rate.

The current and proposed land use categories are summarized in Figure 4. The italicized notes on the right side of the figure refer to the current land use category in the left-hand column

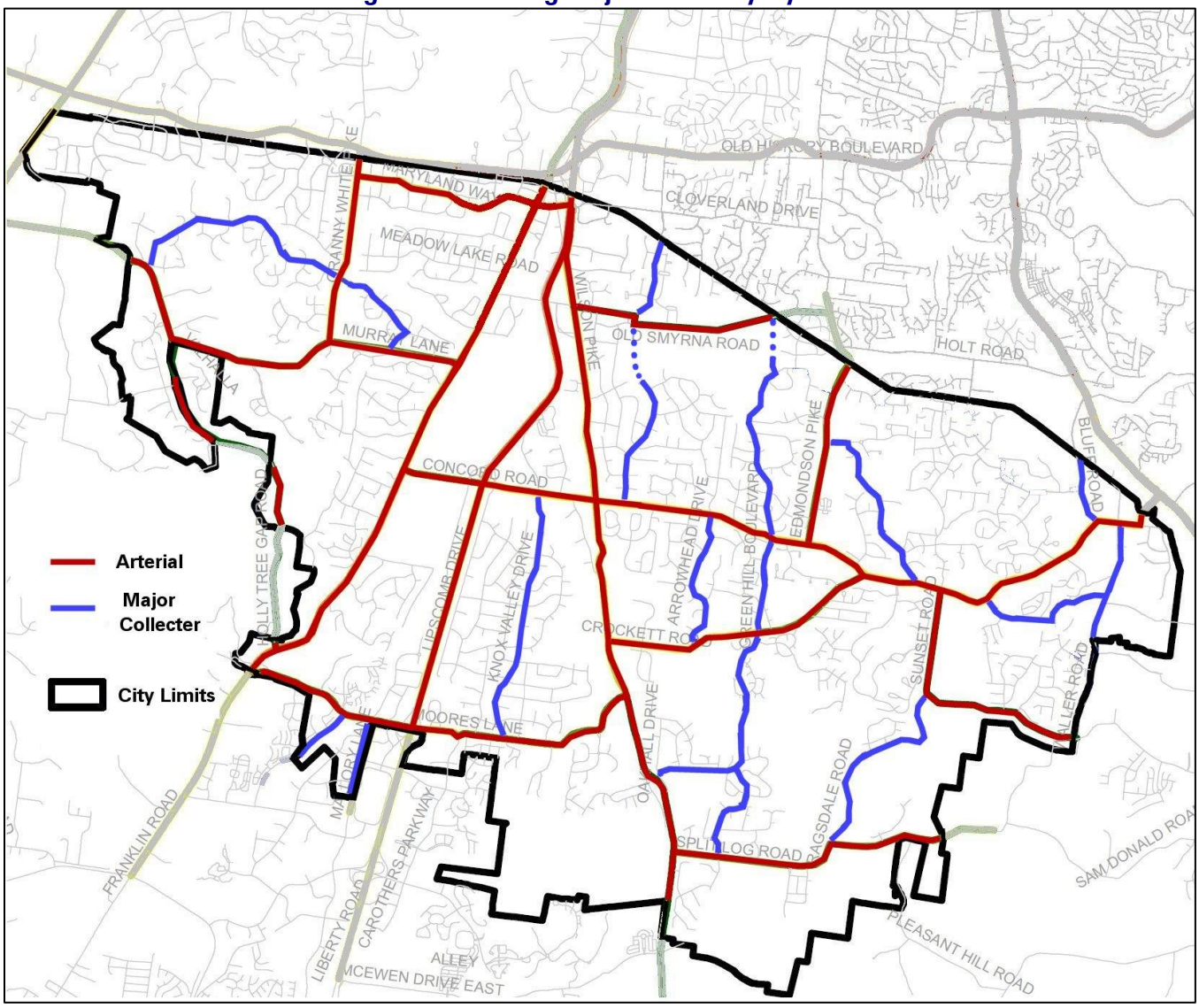
Figure 4. Current and Proposed Land Use Categories

Current Category	Unit	Proposed Category	Unit
Residential/Lodging		**Residential/Lodging**	
Single-Family	Dwelling	Single-Family Detached	Dwelling
		Single-Family Attached	Dwelling
Continuing Care Retirement Community	Dwelling	Senior Adult Housing, Detached	Dwelling
		Senior Adult Housing, Attached	Dwelling
Hotel/Motel	Room	Hotel/Motel	Room
Retail/Commercial		**Retail/Commercial**	
Shopping Center/Retail	1,000 sq. ft.	Retail/Commercial/Shopping Center	1,000 sq. ft.
General Office Building	1,000 sq. ft.	Office/Institutional	1,000 sq. ft.
Formal Restaurant	1,000 sq. ft.	Restaurant w/o Drive-Thru	1,000 sq. ft.
High Turnover Restaurant	1,000 sq. ft.	Restaurant with Drive-Thru	1,000 sq. ft.
Gas/Service Station with Conv. Mkt	1,000 sq. ft.	Convenience Market w/Gas	1,000 sq. ft.
Gasoline/Service Station	Pump	*assess as shopping center/retail*	
Golf Course	Acre	Golf Course	Acre
Racquet/Tennis Club	Court	*assess as shopping center/retail*	
Recreational/Community Center	1,000 sq. ft.	*assess as shopping center/retail*	
Health/Fitness Club	1,000 sq. ft.	*assess as shopping center/retail*	
Public/Institutional		**Public/Institutional**	
Elementary School	Student	Elementary/Secondary School	1,000 sq. ft.
Middle School / Junior High School	Student	*included in above category*	
High School	Student	*included in above category*	
Junior/Community College	Student	Junior/Community College	1,000 sq. ft.
Day Care Center	Student	Day Care Center	1,000 sq. ft.
Hospital	Bed	Hospital	1,000 sq. ft.
Nursing Home	Bed	Nursing Home	1,000 sq. ft.
Assisted Living	Bed	*included in above category*	
		Place of Worship	1,000 sq. ft.
Industrial/Warehousing		**Industrial/Warehousing**	
		Industrial	1,000 sq. ft.
Warehousing	1,000 sq. ft.	Warehousing	1,000 sq. ft.
		Mini-Warehouse (self-storage)	1,000 sq. ft.

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. The major roadway system is defined as arterial and major collector roadways (see Figure 5). Major collectors are those that provide regional connectivity (or will when extended), typically by connecting two arterials. Many of the City's arterials are State roads and Federal highways. These are included because they are an essential component of the major roadway system, and the City contributes toward the cost of such improvements. Over the last ten years, the City spent about $7.8 million for engineering and right-of-way for the Franklin Road/US 31 and Concord Road/SR 253 widening projects.

Figure 5. Existing Major Roadway System



An inventory of the existing major roadway system is provided in Table 4 below.

Table 4. Existing Major Roadway Inventory

Major Thoroughfare	Segment	Mi.	# Lns.	2017 AADT	Daily Cap.	VMT	VMC
Carothers Pkwy N	Moores Ln-S City Limits	0.19	4	25,784	34,500	4,899	6,555
Church St E	Franklin Rd-E City Limits	0.61	5	18,588	37,500	11,339	22,875
Concord Road (SR 253)	Frandklin Rd to I-65	0.70	5	20,340	37,500	14,238	26,250
Concord Road (SR 253)	I-65 to Jones Pkwy	1.26	5	28,966	37,500	36,497	47,250
Concord Road (SR 253)	Jones Pkwy-Edmonson Pike	1.69	3	21,802	23,300	36,845	39,377
Concord Road (SR 253)	Edmondson Pike-E City Lmt	3.37	3	13,389	23,300	45,121	78,521
Crockett Rd	Wilson Pike-Green Hills Blvd	1.38	2	10,410	16,300	14,366	22,494
Crockett Rd	Green Hills Blvd-Concord Rd	1.07	2	6,552	16,300	7,011	17,441
Edmondson Pike	Concord Rd.-N City Limit	1.72	3	6,881	17,100	11,835	29,412
Franklin Rd (US 31)	N City Limit-Murray Ln	1.82	5	26,999	37,500	49,138	68,250
Franklin Rd (US 31)	Murray Ln-Concord Rd	1.07	5	38,258	37,500	40,936	40,125
Franklin Rd (US 31)	Concord Rd-Moores Ln	2.31	2	19,243	18,700	44,451	43,197
Granny White Pike	Murray Ln-N City Limit	1.62	3	14,438	17,100	23,390	27,702
Green Hill Boulevard	Crockett Rd-Concord Rd	0.85	2	2,456	17,100	2,088	14,535
Green Hill Boulevard	Concord Rd-Bathwick Dr	1.55	2	1,316	17,100	2,040	26,505
Hillsboro Rd (US 431)	S of Old Hickory-City Limit	0.46	3	17,267	23,300	7,943	10,718
Holly Tree Gap Rd.	Franklin Rd-Murray Ln	1.60	2	3,794	16,300	6,070	26,080
Mallory Lane	Moores Lane-S City Limits	0.69	5	24,542	37,500	16,934	25,875
Maryland Way	Frandklin Rd-Granny White	1.66	5	22,193	37,500	36,840	62,250
Moores Lane (SR 441)	Franklin Rd to I-65	1.53	5	20,282	37,500	31,031	57,375
Moores Lane (SR 441)	I-65 to Carothers Pkwy	0.43	5	21,720	37,500	9,340	16,125
Moores Lane (SR 441)	Carothers Pkwy-Wilson Pike	1.70	3	19,910	23,300	33,847	39,610
Murray Lane	Franklin Rd-Granny White Pk	1.16	5	15,821	37,500	18,352	43,500
Murray Lane	Granny White Pike-W City Lt	2.50	2	7,256	16,300	18,140	40,750
Old Smyrna Road	Wilson Pike-E City Limit	1.97	2	3,370	16,300	6,639	32,111
Ragsdale Road	Sunset Rd-Split Log Rd	1.79	2	3,293	18,700	5,894	33,473
Raintree Parkway	Crockett Rd-Wilson Pike	2.22	2	*2,456*	18,700	5,452	41,514
Split Log Road	Wilson Pike-E City Limit	2.57	3	11,071	17,100	28,452	43,947
Sunset Road	Concord Rd-E City Limit	2.35	2	6,322	16,300	14,857	38,305
Waller Road	Concord Rd-S City Limit	1.99	2	*2,185*	18,700	4,348	37,213
Wilson Pike (SR 252)	N City Limit-Concord Rd	2.63	3	10,713	17,100	28,175	44,973
Wilson Pike (SR 252)	Concord Rd-Crockett Rd	1.26	2	10,713	16,300	13,498	20,538
Wilson Pike (SR 252)	S. of Crockett Rd	2.66	2	10,713	16,300	28,497	43,358
Subtotal, Arterials		52.38				658,503	1,168,204
Arrowhead Drive	Crockett Rd-Concord Rd	1.32	2	985	18,700	1,300	24,684
Belle Rive Dr/Johnson Chapel	Murray Ln-Granny White Pk	2.16	2	3,661	18,700	7,908	40,392
Bluff Road	Concord Rd-N City Limit	0.73	2	2,952	18,700	2,155	13,651
Charity Dr	Split Log Rd-Raintree Pkwy	0.96	2	*1,000*	18,700	960	17,952
Concord Pass	Concord Rd-Waller Rd	1.26	2	*1,000*	18,700	1,260	23,562
Jones Parkway	Old Smyrna Rd-N City Lmt	0.80	2	*500*	18,700	400	14,960
Knox Valley Drive	Moores Ln-Crockett Rd	2.27	2	2,781	18,700	6,313	42,449
Wilson Pike Circle	Franklin Rd-N City Limit	1.39	2	4,603	18,700	6,398	25,993
Subtotal, Major Collectors		10.89				26,694	203,643
Grand Total		63.27				**685,197**	**1,371,847**

Source: 2017 annual average daily trips (AADT) from Tennessee DOT (italics indicate estimates); generalized maximum daily capacities (maximum service volumes at "LOS E") from KCI Technologies, August 9, 2018;

As described in the Methodology chapter, the appropriate level of service for a demand-driven fee is the system-wide ratio of capacity (VMC) to demand (VMT). The system-wide ratio for the arterial/collector system is 2.00 VMC per VMT. Most of the existing travel is on the arterial system, which has a 1.77 ratio, well above the 1.00 ratio used in the standard demand-driven methodology. Consequently, the updated fees are not based on a higher level of service than currently provided to existing development, and there is no existing deficiency with respect to the level of service of 1.00 VMC/VMT on which the updated fees are based.

Table 5. Existing Roadway Level of Service

	Arterials	Collectors	Total
Existing Daily Vehicle-Miles of Capacity (VMC)	1,168,204	203,643	1,371,847
÷ Existing Daily Vehicle-Miles of Travel (VMT)	658,503	26,694	685,197
Existing VMC/VMT Ratio	1.77	7.63	2.00

Note: VMC based on maximum daily volumes at LOS E.
Source: Table 4.

SERVICE UNITS

As described in the Methodology chapter, the demand-driven road impact fee methodology requires that the service unit be expressed in terms of vehicle-miles of travel (VMT). 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 Brentwood. 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 work place, 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 transportation impact fee using a demand-driven 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. 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 City limits.

Existing land use information was compiled from the 2010 Census, City 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 for major categories are multiplied by average daily trip generation rates and summed to determine a reasonable estimate of total daily trips within the service area. As shown in Table 6, existing land uses within the City are estimated to generate 132,921 average daily trips.

Table 6. Existing Average Daily Trips

Land Use	ITE Code	Unit	Existing Units	Trips/ Unit	Daily Trips
Single-Family Detached	210	Dwelling	13,508	4.72	63,758
Single-Family Attached	220/221	Dwelling	931	3.66	3,407
Subtotal, Residential			14,439		67,165
Retail/Commercial	820	1,000 sq. ft.	3,531	8.30	29,307
Office	710	1,000 sq. ft.	5,139	4.87	25,027
Church	560	1,000 sq. ft.	946	3.47	3,283
School	520/22/30	1,000 sq. ft.	1,724	2.15	3,707
Nursing Home	620	1,000 sq. ft.	833	3.27	2,724
Government	710	1,000 sq. ft.	258	4.87	1,256
Industrial/Warehouse	130/150	1,000 sq. ft.	353	1.28	452
Subtotal, Nonresidential			12,784		65,756
Total					132,921

Source: Existing residential units from 2010 Census and 2010-2018 City building permits; nonresidential square feet from William County property assessor data for non-tax-exempt uses and City Planning and Codes Department for tax-exempt uses; trips per unit from Table 9.

A reasonable estimate of the average trip length in Brentwood can be derived by dividing total daily VMT on the major road system by the total number of daily trips generated by existing development within the City. This calculation, presented in Table 7, indicates that the average trip length on the major roadway system is 5.15 miles.

Table 7. Average Trip Length

Daily VMT on Major Roads	685,197
÷ Daily Trips	132,921
Average Trip Length (Miles)	5.15

Source: VMT from Table 4; trips from Table 6.

Average trip lengths by trip purpose for the southern region are available from the U.S. Department of Transportation's 2017 *National Household Travel Survey*. The regional average trip length is considerably longer than the local average. This is to be expected, because the regional average trip length includes travel on local streets, minor collectors, and roads outside local jurisdictional boundaries. Using the 0.535 local-to-regional trip length ratio, local trip lengths are derived for specific trip purposes, including home-to-work trips, shopping, school/church and other personal trips (see Table 8 on the following page).

Table 8. 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	0.535	6.41
Residential	9.62	0.535	5.15
Doctor/Dentist	11.01	0.535	5.89
School/Church	7.74	0.535	4.14
Family/Personal	6.98	0.535	3.73
Shopping	8.55	0.535	4.57
All Trips	9.62	0.535	5.15

Source: Regional average trip lengths for the South Census Region from US. Department of Transportation, *National Household Travel Survey*, 2017; (residential trip length assumed same as overall average); "all trips" local trip length from Table 7; local/regional ratio is "all trips" local-to-regional ratio; local trip length is 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 updated 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 the City's major roadway system. The updated travel demand schedule is presented in Table 9 on the following page. For each land use, daily VMT is the product of trip generation rate, new trip factor, and average trip length.

Table 9. 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	5.15	**24.30**
220	Single-Family Attached	Dwelling	7.32	3.66	100%	3.66	5.15	**18.84**
251	Senior Adult Housing, Detached	Dwelling	4.27	2.13	100%	2.13	5.15	**10.96**
252	Senior Adult Housing, Attached	Dwelling	3.70	1.85	100%	1.85	5.15	**9.52**
430	Golf Course	Acre	3.74	1.87	100%	1.87	3.73	**6.97**
310/320	Hotel/Motel	Room	5.86	2.93	100%	2.93	5.15	**15.08**
820	Retail/Commercial/Shopping Center	1,000 sf	37.75	18.87	44%	8.30	4.57	**37.93**
931	Restaurant, Standard	1,000 sf	83.84	41.92	38%	15.92	4.57	**72.75**
934	Restaurant, Drive-Through	1,000 sf	470.95	235.47	30%	70.64	2.29	**161.76**
853	Gas Station w/Convenience Mkt.	Pump	322.50	161.25	17%	27.41	2.29	**62.76**
710	Office/Institutional	1,000 sf	9.74	4.87	100%	4.87	5.89	**28.68**
520/22/30	Elementary/Secondary School	1,000 sf	17.92	8.96	24%	2.15	4.14	**8.90**
540	Junior/Community College	1,000 sf	20.25	10.12	48%	4.85	4.14	**20.07**
565	Day Care Center	1,000 sf	47.62	23.81	24%	5.71	4.14	**23.63**
610	Hospital	1,000 sf	10.72	5.36	100%	5.36	4.14	**22.19**
620	Nursing Home	1,000 sf	6.54	3.27	100%	3.27	4.14	**13.53**
560	Place of Worship	1,000 sf	6.95	3.47	100%	3.47	4.14	**14.36**
130	Industrial	1,000 sf	3.37	1.68	100%	1.68	6.41	**10.76**
150	Warehouse	1,000 sf	1.74	0.87	100%	0.87	6.41	**5.57**
151	Mini-Warehouse	1,000 sf	1.51	0.75	100%	0.75	6.41	**4.80**

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 8 (drive-through restaurant and convenience store are one half retail); VMT is product of new trips and 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. This section describes both components used to calculate the average cost per service unit.

Cost per Mile

Roadway systems consist of more than just the vehicle travel lanes. Intersection configurations, signals, and signalization timing infrastructure are other critical components of vehicular capacity. Roadways also require rights-of-way and ancillary components, including sidewalks, bike lanes, etc. These component costs are typically part of improvements that add vehicular capacity.

The cost to construct a mile of new two-lane road provides a reasonable estimate of the cost to add roadway capacity. Planning-level cost estimates prepared as part of the City's *Major Thoroughfare Plan* indicate an average cost of $7.43 million per mile, as shown in Table 10.

Table 10. Planning-Level Cost per Mile, New Two-Lane Road

Segment Description	Miles	Total Cost	Cost/Mile
Jones Pkwy, Extension to Old Smyrna Rd	0.50	$2,554,000	$5,108,000
Green Hill Blvd Extension	0.33	$2,059,000	$6,239,394
McEwen Dr Extension	3.37	$28,698,000	$8,515,727
Charity Dr Extension	0.94	$5,622,000	$5,980,851
Ivy Crest Dr Extension	0.57	$3,478,000	$6,101,754
Total, New Two-Lane Road	5.71	$42,411,000	$7,427,496

Source: KCI Technologies, August 9, 2018.

The City of Spring Hill recently developed a generalized cost estimate for the construction of a mile of two-lane undivided roadway, using Tennessee Department of Transportation cost estimation data and procedures. The $7.61 million-per-mile estimate includes the cost of preliminary engineering, right-of-way, pavement, curb and gutter, sidewalk, and construction engineering and inspection (CEI). as shown in Table 11.

Table 11. TDOT Generalized Cost per Mile, New Two-Lane Road

Right-of-Way Cost per Mile	$1,091,000
Preliminary Engineering Cost per Mile	$529,000
Roadway Construction Cost per Mile	$5,290,000
Sidewalk/Multi-Use Path Cost per Mile	$168,960
Construction Engineering and Inspection Cost per Mile	$529,000
Total Cost per Mile, New Two-Lane Road	$7,607,960

Source: City of Spring Hill and Volkert, based on Tennessee Department of Transportation costing tool, December 29, 2018.

Cost per Service Unit

The two estimates of the cost to construct a mile of new two-lane road are very close to each other. The average cost estimate from the *Major Thoroughfare Plan* is slightly lower ($7.43 million per mile) than the generalized estimate using the State's transportation costing tool ($7.61 million per mile). To be conservative, this study will use an estimate of $6.35 million per mile, derived from the State's generalized cost estimate by excluding right-of-way and sidewalk costs. Right-of-way is the most variable cost component, and many of the City's current major roadways do not have sidewalks. Dividing this estimated cost by the capacity of a two-lane road yields an estimated cost of $389 per vehicle-mile of capacity (VMC). Multiplying by the 1.00 VMC/VMT ratio simply converts this into the cost per vehicle-mile of travel (VMT), as summarized in Table 12.

Table 12. Road Cost per Service Unit

Total Generalized Cost per Mile, New Two-Lane Road	$7,607,960
– Right-of-Way Cost per Mile	-$1,091,000
– Sidewalk/Multi-Use Path Cost per Mile	-$168,960
Cost per Mile without ROW or Sidewalk/Path	$6,348,000
÷ Maximum Capacity of Two-Lane Road	16,300
Cost per Vehicle-Mile of Capacity (VMC)	$389
x VMC/VMT Ratio	1.00
Cost per Vehicle-Mile of Travel (VMT)	$389

Source: Generalized costs from Table 11; maximum daily capacity (maximum service volume at "LOS E") from KCI Technologies, August 9, 2018; 1.00 VMC/VMT ratio converts cost per VMC to cost per VMT.

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 traffic impact fees, because the fees are based on a level of service that is lower than what is currently provided to existing development. However, the City does have some outstanding debt related to past arterial road capacity improvements, and State/Federal funds have historically been available to help fund capacity improvements to State/Federal highways within the City limits.

Debt Credit

The City has $17.9 million in outstanding debt related to past major road improvements to Split Log Road, Franklin Road, Sunset Road, Concord Road, and Edmondson Pike. While this debt arguably represents the cost of some excess capacity built to accommodate growth, in which case a credit is not required, a credit is provided in this update. Nevertheless, the City would be able to retire some or all this debt with fee revenue, because the cost of the capacity it represents is not being included in the fee calculations.

A reasonable way to calculate the credit is to divide the amount of the debt by the current vehicle-miles of travel (VMT). This puts new development on an even footing with existing development. The credit calculations are summarized in Table 13.

Table 13. Debt Credit per Service Unit

Year Issued - Projects Funded	Original Amount	Current Outstanding
2009 - Split Log Road II	$4,335,000	$230,000
2009 - Franklin Road	$500,000	$759,900
2012 Refunding - Sunset Rd, Concord Rd ROW	$3,250,000	$2,930,000
2014 Refunding -Split Log, Franklin Rd	$3,035,000	$1,781,000
2017 Refunding - Franklin ROW, Edmondson Pk, Concord Rd	$3,030,000	$3,256,000
2018 Note - Sunset/Ragsdale Interection	$3,500,000	$8,956,900
Total Outstanding Road Debt		$17,913,800
÷ Daily VMT on Major Road System		685,197
Debt Credit per Daily VMT		$26

Source: Outstanding debt as of June 30, 2019 from City Finance Department on March 14, 2019; daily VMT from Table 4.

State/Federal Funding Credit

Future State and Federal funding of capacity improvements to the major roadway system within the City limits is hard to predict with any certainty. One indication is historical expenditures over the last decade. If these past funding patterns hold, the City would receive $7.79 annually per daily VMT, as shown in Table 14 on the following page.

Table 14. Annual State/Federal Funding per Service Unit, Brentwood

Year	Project Description	State/Fed. Funding
FY 2008	North Brentwood Signal Interconnect	$20,000
FY 2011	Concord Rd Signals (PE)	$15,000
FY 2012	Concord Rd Signals	$250,000
FY 2011	Concord Rd, Sunset-SR-11, Widening 2-3 Lns (ROW)	$3,900,000
FY 2012	Concord Rd, Sunset-SR-11, Widen 2-3 Lns	$16,600,000
FY 2011	Concord Rd, Jones Pwy-Arrowhead, Widen 2-3 Lns (ROW)	$800,000
FY 2014	Concord Rd, Jones Pwy-Arrowhead, Widen 2-3 Lns	$2,840,000
FY 2014	Franklin Rd, Concord-Moores Ln, Widen 2-5 Lns (ROW)	$3,200,000
FY 2015	Franklin Rd, Concord-Moores Ln, Widen 2-5 Lns (ROW)	$1,000,000
FY 2017	Franklin Rd, Concord-Moores Ln, Widen 2-5 Lns	$22,500,000
FY 2017	Brentwood Signal Timing Optimization Program	$177,000
Total		$51,302,000
÷ Number of Years		10
Annual State/Federal Funding		$5,130,200
÷ Daily VMT on Major Road System		658,503
Annual State/Federal Funding per Daily VMT		**$7.79**

Source: Annual funding from Nashville Area Metropolitan Planning Organization, *Transportation Improvement Programs*; VMT from Table 4.

As summarized in Table 15, the annual funding for capacity road improvements over the next 30 years is the present-value equivalent of $14.24 per VMT.

Table 15. State/Federal Funding Credit

Annual State Federal Funding per VMT	$7.79
x Present Value Factor (30 Years)	18.62
State/Federal Funding Credit per Daily VMT	$145

Source: Annual funding from Table 14; present value factor based on a discount rate of 3.40%, which was the national average yield on AAA 30-year municipal bonds from fmsbonds.com on November 16, 2018.

Net Cost Summary

The net cost per service unit is the cost per VMT less the revenue credits for outstanding debt and State/Federal funding. As shown in Table 16, the net cost per service unit is $218 per VMT.

Table 16. Net Cost per Service Unit

Cost per Vehicle-Mile of Travel	$389
– Debt Credit per VMT	-$26
– State Funding Credit per VMT	-$145
Net Cost per Daily VMT	$218

Source: Cost per VMT from Table 12; debt credit from Table 13; State/Federal funding credit from Table 15.

NET COST SCHEDULE

The updated public works project fees for the various land use categories are shown in Table 17. The 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, outstanding debt on existing facilities that will be repaid in part by new development, and future State/Federal road improvement funding that will be generated by new development to help offset growth-related costs. The comparison of the updated fees with current fees is presented in the Executive Summary.

Table 17. Updated Public Works Project Fees

Land Use Type	Unit	VMT/ Unit	Net Cost/ VMT	Net Cost per Unit
Single-Family Detached	Dwelling	24.30	$218	$5,297
Single-Family Attached	Dwelling	18.84	$218	$4,107
Senior Adult Housing, Detached	Dwelling	10.96	$218	$2,389
Senior Adult Housing, Attached	Dwelling	9.52	$218	$2,075
Golf Course	Acre	6.97	$218	$1,519
Hotel/Motel	Room	15.08	$218	$3,287
Retail/Commercial/Shopping Center	1,000 sf	37.93	$218	$8,269
Restaurant, Standard	1,000 sf	72.75	$218	$15,860
Restaurant, Drive-Through	1,000 sf	161.76	$218	$35,264
Gas Station w/Convenience Mkt.	1,000 sf	62.76	$218	$13,682
Office/Institutional	1,000 sf	28.68	$218	$6,252
Elementary/Secondary School	1,000 sf	8.90	$218	$1,940
Community College	1,000 sf	20.07	$218	$4,375
Day Care Center	1,000 sf	23.63	$218	$5,151
Hospital	1,000 sf	22.19	$218	$4,837
Nursing Home	1,000 sf	13.53	$218	$2,950
Place of Worship	1,000 sf	14.36	$218	$3,130
Industrial	1,000 sf	10.76	$218	$2,346
Warehouse	1,000 sf	5.57	$218	$1,214
Mini-Warehouse	1,000 sf	4.80	$218	$1,046

Source: VMT per unit from Table 17; net cost per VMT from Table 16.

APPENDIX: LAND USE DEFINITIONS

Recommended definitions for the land use categories in the updated public works project fee schedule are provided below. These definitions are intended to assist City 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 traffic impact fees.

Single-Family Detached means a building containing only one dwelling unit.

Single-Family Attached means a building containing two or more dwelling units, with each unit separated from adjoining units by a common wall extending through the roof.

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.

> **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 located in a shopping center or 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.