



HISTORIC
FRANKLIN
TENNESSEE

ITEM #7
WRKS 09/28/2010

MEMORANDUM

September 22, 2010

TO: Board of Mayor and Aldermen

FROM: Eric S. Stuckey, City Administrator *ES*
Eric J. Gardner, P.E., Director of Engineering
David Parker, P.E., City Engineer

SUBJECT: Draft 2010 Road Impact Fee Study Update

Purpose

The purpose of this memorandum is to present to the Board of Mayor and Aldermen (BOMA) the Draft 2010 Road Impact Fee Study.

Background

The City entered into a contract (COF Contract No. 2010-0021) with Duncan Associates to study the City's Road Impact fees and make a recommendation on updated fees. The contract was approved by BOMA on March 9, 2010. The City has made the commitment to revise the road impact fee study at least every five years. The last update was in 2005.

The City's Road Impact Fee Ordinance allows developers to offset impact fees by dedicating right-of-way and/or constructing an arterial roadway. Previous updates to the Impact Fee excluded the right-of-way (ROW) costs from the impact fee calculation. This update includes options to include ROW costs as well as include collector roadways. The City provided Duncan Associates with costs for recent road improvements. Duncan Associates considered the costs for the City to make these improvements when determining what the updated fees should be. Tables 19 and 21 compare the different options with the current fees. At this time, staff has received the draft study, made comments and received the corrected draft study.

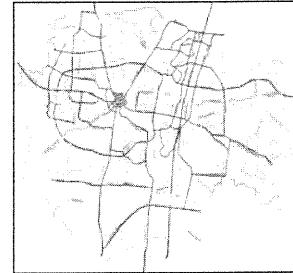
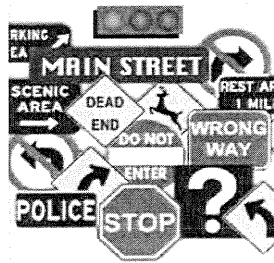
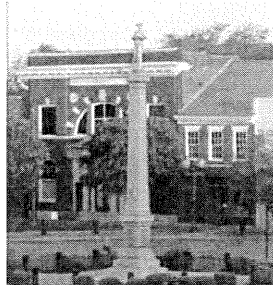
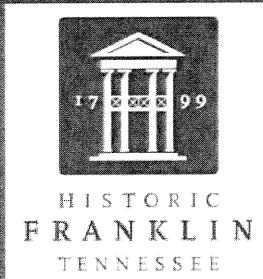
Financial Impact

An updated Road Impact Fee schedule will assist the City in recovering and funding roadway infrastructure improvements. From a process standpoint, if the Board requested Duncan Associates to attend a future Work Session and be available for a presentation or further discussion, the cost would be at a fixed fee of \$2,000.00 per person-day. This cost is anticipated within the project budget.

Recommendation

At the September Capital Improvement Committee meeting, the committee asked that a dedicated work session be held for the discussion of the draft Road Impact Fee Study. In order to facilitate this meeting, the CIC suggested the item be placed on a work session to allow the Board to identify questions and information needs from the consultant and staff.

CITY OF FRANKLIN TENNESSEE



ROAD IMPACT FEE UPDATE

duncan | associates

August 2010

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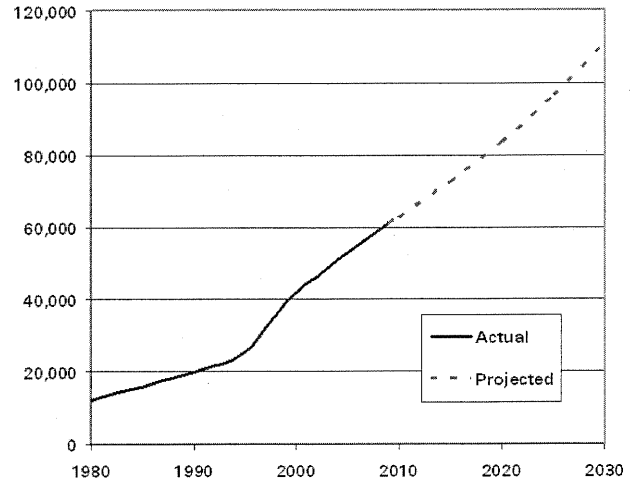
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INTRODUCTION

Impact fees are charges that are assessed on new development to help pay for the capital facility costs they impose on the community. Unlike other types of developer exactions, impact fees are based on a standard formula and a pre-determined fee schedule. Essentially, impact fees require that each new residential or commercial project pay its pro-rata share of the cost of new infrastructure facilities required to serve that development.

Impact fees are most appropriate for communities that are experiencing rapid growth. The City of Franklin more than doubled its population in the 1990s, growing from 20,098 inhabitants in 1990 to 41,842 in 2000, as illustrated in Figure 1. The City's rapid growth has continued during this decade with an overall population estimate of 61,000 residents by the end of 2009.¹

Figure 1. City Population, 1980-2030



This strong growth is projected to continue through 2030, and to necessitate numerous capacity-expanding improvements to the major roadway system. The City's *Major Thoroughfare Plan Update* projects that the population of the city and its surrounding growth area will increase from 70,280 in 2000 to 126,565 by 2025, and recommends 52 new road construction and road widening projects that will be needed to accommodate the resulting increase in traffic.

History of Franklin's Impact Fees

In 1987, the City of Franklin sought and obtained authority from the Tennessee legislature to enact road impact fees. That same year, Duncan Associates was commissioned to prepare an impact fee study to calculate the maximum road impact fees that the City could charge. Ordinance 1037 enacting road impact fees was adopted by the City in June of 1988. The fees were adopted at 60 percent of the maximum fees calculated in the original study.

Twelve years after the initial adoption, the City updated the road impact fees, based on a study prepared by Duncan Associates in 2000. The updated fees were adopted in July 2000 with the increase phased in over two years. Duncan Associates has prepared two subsequent impact fee studies for the City of Franklin, with the City adopting updated fee schedules based on those studies in 2005 and 2007.

¹City of Franklin, *2009 Development Report*, December 2009.

The road impact fee ordinance requires the City to “revise the road impact fee study and the schedule of impact fees at least once every five years.” In addition, when the impact fees were reviewed in 2005, the Board requested subsequent reviews every two to three years. The purpose of this study is to update the City of Franklin’s road impact fee based on the most appropriate methodology and the most current data.

The major changes in methodology and data inputs from the previous impact fee report are summarized as follows:

- Provide the option to include collector streets in the impact fee system.
- Provide the option to include the cost of the right-of-way along with the construction costs in the impact fee.
- Update trip generation rates based on the 2008 edition of the ITE *Trip Generation* manual.
- Update national trip length data.
- Update the road inventory to include newly annexed land, new roads, road improvements, traffic counts and collector roads.
- Update road construction costs to reflect the most recent materials and labor costs.
- Update credit components to reflect the most recent City, State and Federal funding amounts for major road construction.

Legal Authority

Franklin received special authorization to impose a road impact fee from House Bill 1311, which was passed during the 1987 session of the Tennessee legislature. While Franklin’s authorizing act provides a broad grant of authority, impact fees must also comply with constitutional standards that have been developed by the courts to ensure that local governments do not abuse their power to regulate the development of land. The courts have gradually developed guidelines for constitutionally valid impact fees, based on a “rational nexus” that must exist between the regulatory fee or exaction and the activity that is being regulated. The standards set by court cases generally require that an impact fee meet a two-part test:

- 1) The fees must be proportional to the need for new facilities created by the new development; and
- 2) The expenditure of impact fee revenues must provide benefit to the fee-paying development.

Impact fees for various types of developments should be proportional to the impact of each development on the need to construct additional or expanded facilities. The fees do not have to recover the full cost, but if the fees are reduced by a percentage from the full cost, the percentage reduction should apply evenly to all types of developments.

Impact fees were pioneered by local governments long before state legislatures passed explicit enabling acts. The authority to adopt such fees was found in local government’s “police power” to regulate development so as to protect the health, safety and welfare of its citizens. Developers challenged early impact fees, and state court decisions gradually developed a body of case law setting

out the standards that should govern impact fees. This section spells out our understanding of the general principles of impact fees and some implications for calculating Franklin's impact fees.

A fundamental principle of impact fees, rooted in both case law and norms of equity, is that impact fees should not charge new development for a higher level of service than is provided to existing development. While the impact fees could be based on a higher level of service than the one existing at the time of the adoption of the fees, two things are required if this is done. First, another source of funding other than impact fees must be identified and committed to fund the capacity deficiency created by the higher level of service. Second, the impact fees must generally be reduced to ensure that new development does not pay twice for the same level of service, once through impact fees and again through general taxes that are used to remedy the capacity deficiency for existing development. In order to avoid these complications, our general practice is to base the impact fees on the existing level of service.

A corollary principle is that new development should not have to pay twice for the same level of service. As noted above, if impact fees are based on a higher-than-existing level of service, 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. To avoid requiring new development to pay more than its proportional share, impact fees should be reduced to account for future tax payments that will retire outstanding debt on existing facilities.

In general, credit against impact fees is not required for funding that has historically been used for, or that is committed to be used for growth-related, capacity-expanding improvements. While new development may contribute toward such funding, so does existing development, and both existing and new development benefit from the higher level of service that the additional funding makes possible. However, consistent with past studies and standard impact fee practice, credit is provided in this update for State and Federal funding.

Developer Offsets

The City's road impact fee ordinance allows developers to receive offsets against their impact fees for right-of-way (ROW) dedication or construction of a thoroughfare shown on the Major Thoroughfare Plan map. In prior updates, ROW costs have been excluded from the impact fee calculation, because the City requires developers to dedicate a minimum of 60-foot ROW width without credit against the impact fee. This update includes an option to adopt a fee that includes ROW costs. Under the approach used to develop the current impact fee schedule in the prior study, developers do not need to receive credit for the value of any ROW dedicated for arterial roadways or expressways. If the fee that includes the ROW costs is adopted, the City will need to provide credit for ROW dedication. Similarly, the City currently provides developer credits only for arterial improvements; if collectors are included in the fee, developers will need to receive credit for improvements to collector roads.

TECHNICAL ANALYSIS

This section of the report contains the technical analysis used to determine the potential maximum impact fee schedule for the City of Franklin. As mentioned in the introduction, this update includes several options for the City to consider in updating the impact fee. The options explored in this update include the addition of collector roads to the impact fee calculation, and the inclusion of ROW costs along with construction costs.

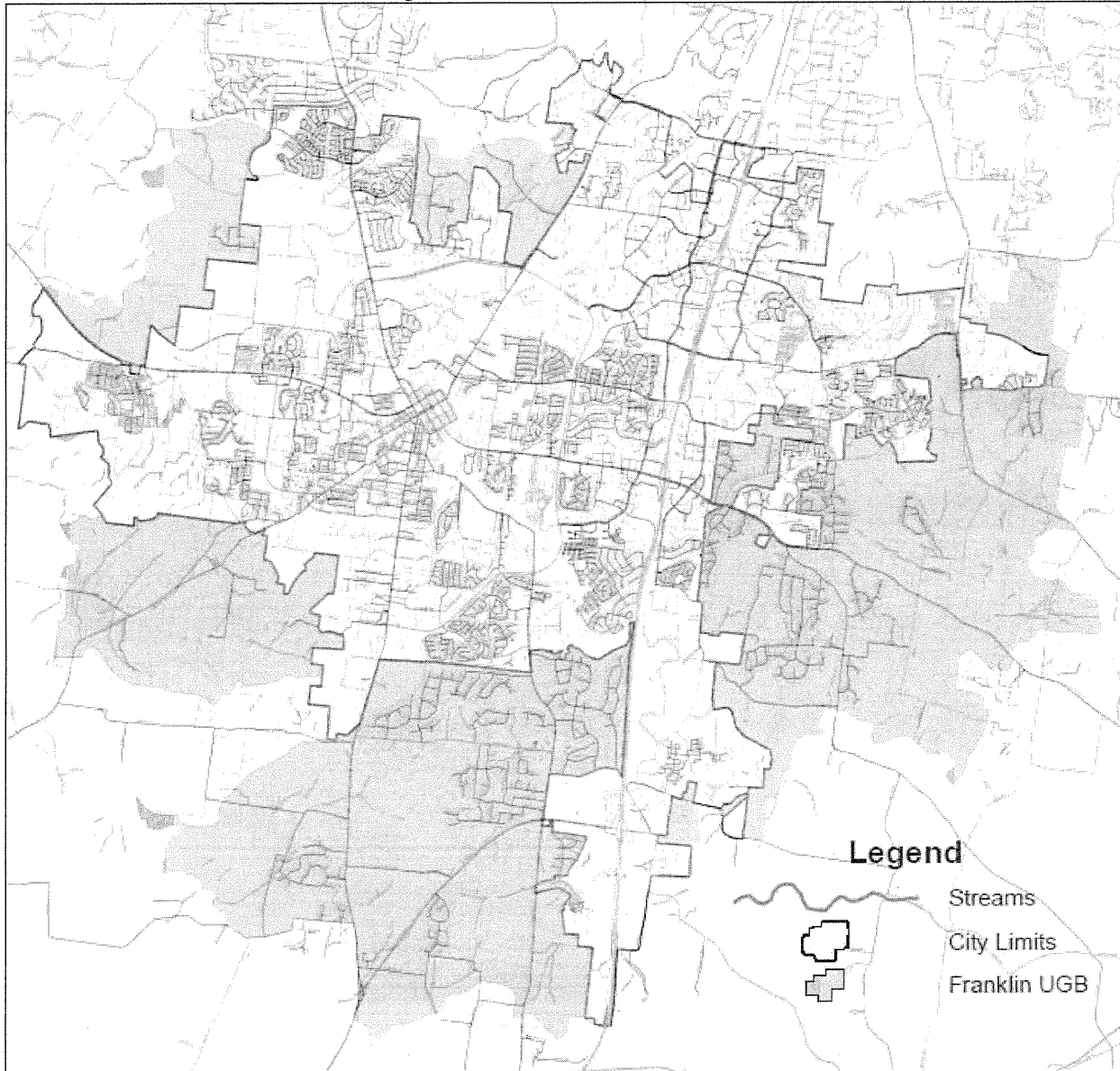
Benefit Districts

Impact fee case law states that impact fees must be spent so as to provide a reasonable benefit to the fee-paying development. One way of ensuring reasonable benefit is to create multiple benefit districts to ensure that the development fees paid by a development are spent closer to the development than would be the case under a single jurisdiction-wide benefit district. The need for multiple benefit districts increases with the geographic size of the community. On the other hand, the larger the number of benefit districts, the more difficult it is to accumulate sufficient funds in any one district to make any significant improvements. Deciding on the appropriate number and location of benefit districts requires balancing the need to show reasonable benefit to fee payers with the need to maintain sufficient flexibility in impact fee expenditures to address priority improvement needs.

The City's current impact fee ordinance designates the entire area within the corporate boundaries as a single benefit district. The fact that the City's road impact fees are currently limited to funding improvements to major thoroughfares strengthens the case for a single benefit district. Major thoroughfares are designed to move traffic from one part of the city to another, and the entire network acts as an integrated system. In the event that the City decided to expand the road impact fee to cover collector roads, the City may wish to consider dividing its jurisdiction into two or more benefit districts. For example, Highway 96 (Murfreesboro Road) could be used as the boundary to divide the city into north and south benefit districts.

In sum, while the City may wish to consider dividing the community into multiple benefit districts, we do not believe that such a course is necessary for the legal defensibility of the ordinance. Franklin's current city limits and the larger urban growth area are shown in Figure 2.

Figure 2. Franklin City Limits



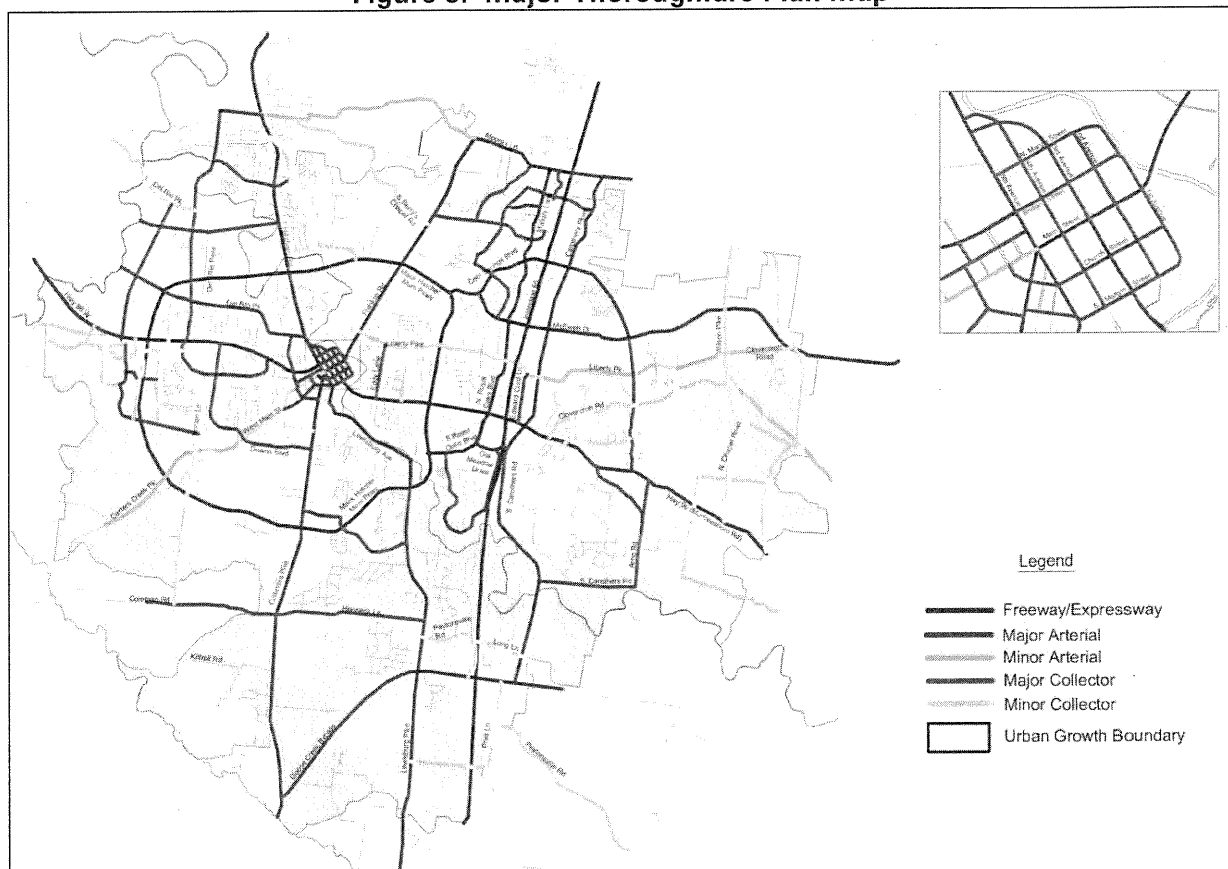
Major Roadway System

A road impact fee system should include a clear definition of the major roadway system that is to be funded with the impact fees. In the City's current ordinance, the use of impact fee proceeds is restricted to arterial road improvements, which is defined as "any capital improvement, including but not limited to new roads, additional lanes, widened lanes, intersection improvements, turn lanes, bridges, traffic signals, intelligent transportation system (ITS) improvements, and associated drainage facilities, that expands the capacity of the city's arterial road system." The arterial road system is defined as "all existing and planned arterials, excluding Interstate 65, identified on the city's adopted

Major Thoroughfare Plan map.” The major roadway system includes State roads as well as City roads. The current ordinance and impact fee excludes major and minor collector roads from the impact fee calculations. As mentioned in the introduction, this study includes the option of expanding the impact fee to include collector roads. Including collector roads in the calculation of the impact fee in this update will allow the City to program future impact fee revenue for planned collector road improvements. If this option is adopted, the City would need to amend the impact fee ordinance to allow for the expenditure of impact fee funds for major and minor collector road improvements by amending the definition of major roadway system.

The major roadway system is thus currently defined as existing and planned arterials identified on the adopted Major Thoroughfare Plan map (see Figure 3) within the city limits. Interstate 65, which primarily serves through traffic rather than local traffic, is excluded from the arterial roadway system to be funded with the road impact fees. The Major Thoroughfare Plan map also identifies the major and minor collector roads that are included in this update. Currently, capacity-expanding improvements include any improvements to arterial roadways, including signalization and intersection improvements, which primarily have the effect of expanding capacity of the arterial roadway system, rather than providing greater access to a particular development or promoting safety.

Figure 3. Major Thoroughfare Plan Map



Service Units

Service units create the link between supply (roadway capacity) and demand (traffic generated by new development). An appropriate service unit basis for road impact fees is vehicle-miles of travel (VMT). Vehicle-miles is a combination of the number of vehicles traveling during a given time period and the distance (in miles) that these vehicles travel.

The two time periods most often used in traffic analysis are the 24-hour day (average daily trips or ADT) and the single hour of the day with the highest traffic volume (peak hour trips or PHT). As in the prior impact fee study, this update utilizes the ADT for calculating the road cost component of the impact fee and ADT for calculating the credit component of the impact fee. While peak hour trip (PHT) generation rates are appropriate for assessing the impact of a new development on the need for road improvements during the evening peak hour, they tend to be more variable than average daily trips depending on size and demographic make-up of a community. Average daily trips is also the best measure for the amount of motor fuel tax that will be generated by new development, which is used to calculate the revenue credit for each land use type. The Tennessee Department of Transportation measures traffic counts on major roads using average daily trips; as a result, utilizing the ADT for both the cost and credit component of the impact fee eliminates the need to convert available traffic counts and projected volumes into PHT. For these reasons, we recommend utilizing average daily VMT as the service unit for the road impact fee update.

Impact Fee Methodology

The methodology used in Franklin's current road impact fee system is based on a "consumption-based" approach. The consumption-based model simply charges a new development the cost of replacing the capacity that it consumes on the major roadway system. That is, for every vehicle-mile of travel (VMT) generated by the development, the road impact fee charges the net cost to construct an additional vehicle-mile of capacity (VMC). The consumption-based methodology is maintained in this update, and credits continue to be provided for outstanding road-related debt and outside funding.

Since travel is never evenly distributed throughout a roadway system, actual roadway systems require more than one unit of capacity for every unit of demand in order for the system to function at an acceptable level of service. Suppose for example, that the City completes a major arterial widening project. The completed arterial is likely to have a significant amount of excess capacity for some period of time. If the entire system has just enough capacity to accommodate all of the vehicle-miles of travel, then the excess capacity on this segment must be balanced by another segment being over-capacity. Clearly, roadway systems in the real world need more total aggregate capacity than the total aggregate demand, because the traffic does not always precisely match the available capacity. Consequently, the standard consumption-based model generally underestimates the full cost of accommodating new development at the existing level of service. Nevertheless, it is a conservative, legally-defensible methodology that is simpler to update and provides more flexibility in the expenditure of funds than the alternative improvements-driven approach.

In most rapidly growing communities, some of the roadways will be experiencing an unacceptable level of congestion at any given point in time. However, it is not necessary to address segment-

specific existing deficiencies in a consumption-based system, which, unlike an improvements-driven system, is not really designed to recover the full costs to maintain the desired LOS on all roadway segments. Instead, it is only designed to maintain a minimum one-to-one overall ratio between system demand and system capacity. As discussed above, virtually all major roadway systems have more capacity (VMC) than demand (VMT) on a system-wide basis. Consequently, under a consumption-based system, the level of service standard is really a system-wide VMC/VMT ratio of one. Since Franklin's major roadway system currently operates at better than this level of service (see Table 11), there are no existing deficiencies on a system-wide basis. The recommended impact fee formula is presented Figure 4.

Figure 4. Road Impact Fee Formula

Impact Fee = VMT x NET COST/VMT VMT = TRIPS x %NEW x LENGTH/2 NET COST/VMT = COST/VMC x VMC/VMT - CREDIT/VMT <u>Where:</u> TRIPS = Trip ends during an average weekday 2 = Dividing by two avoids double-counting trips for origin and destination % NEW = Percent of trips that are primary trips, as opposed to pass-by or diverted-linked trips LENGTH = Average length of a trip on the major road system COST/VMC = Average cost to add a new daily vehicle-mile of capacity VMC/VMT = System-wide ratio of VMC to VMT on major road system (assumed 1:1) CREDIT/VMT = Revenue credit per VMT
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Roadway Capacity

Nationally-accepted transportation level of service (LOS) categories have been developed by the transportation engineering profession. Six categories, ranging from LOS A to LOS F, generally describe driving conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. LOS A represents free flow, while LOS F represents the breakdown of traffic flow, characterized by stop-and-go conditions.

In contrast to LOS, service volume capacity is a quantitative measure, expressed in terms of the rate of flow (vehicles passing a point during a period of time). Service volume capacity represents the maximum rate of flow that can be accommodated by a particular type of roadway while still maintaining a specified LOS. The service volume capacity at LOS E represents the maximum volume that can be accommodated before the flow breaks down into stop-and-go conditions that characterize LOS F, and thus represents the ultimate capacity of the roadway.

As stated in the City's Major Thoroughfare Plan Update, "Within the City of Franklin, LOS C is generally considered to be the minimum acceptable LOS for adequate traffic operations." This is consistent with the City's road impact fees, which are based on LOS C. The City's Major

Thoroughfare Plan Update identifies maximum daily service volumes at LOS C that are appropriate for planning purposes for a wide variety of roadway facilities (see Table 1).

Table 1. Road Capacity by Classification

Functional Classification	No. of Lanes	Vehicles/Day (LOS C)	Capacity/Lane
Collector	2	9,100	4,550
Collector	3	11,300	3,767
Collector	4	14,900	3,725
Collector	5	19,000	3,800
Arterial	2	11,600	5,800
Arterial	3	14,400	4,800
Arterial	4	19,000	4,750
Arterial	5	21,900	4,380
Expressway	2	28,100	14,050
Expressway	4	56,200	14,050
Expressway	6	84,300	14,050

Source: RPM Transportation Consultants, *City of Franklin Major Thoroughfare Plan Update*, August 2004.

Travel Demand Factors

The travel demand generated by specific land use types is a product of three factors: 1) trip generation, 2) percent primary trips and 3) trip length. The first two factors are well documented in the professional literature, and the average trip generation characteristics identified in studies of communities around the nation should be reasonably representative of trip generation characteristics in Franklin. 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 were 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 from the site of a land use. Thus, a one-way trip from home to work counts as one trip end for the residence and one trip end for the work place. To avoid over-counting, all trip rates have been divided by two. This places the burden of travel equally between the origin and destination of the trip and eliminates double-charging for any particular trip.

Primary Trip Factor

Trip rates also need to be adjusted by a "primary trip factor" to exclude pass-by and diverted trips. This adjustment is intended to reduce the possibility of over-counting additional travel induced by the new 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 trips utilized in this study was drawn from the ITE *Trip Generation Handbook* and other published information.

Average Trip Length

The average trip length is the most difficult travel demand factor to determine. In the context of a road impact fee using a consumption-based methodology, the relevant input is the average length of a trip on the major roadway system within the city limits. The average trip length can be approximated by dividing the total VMT on the major roadway system by the total number of trips generated by existing development in the city. 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 primary trip factors and dividing by two) and summing for all existing development in the city limits.

In the context of a road impact fee based on a consumption-based methodology, we are interested in determining the average length of a trip generated by a new development on the major roadway system within Franklin's city limits. This will be done by using national data for average trip length for specific land uses and trip purposes. However, these trip lengths may not be representative of travel on the City's major roadway system. An adjustment factor can be derived by dividing the VMT actually observed on the major roadway system by the VMT that would be expected using national average trip lengths and trip generation rates.

The first step in developing the adjustment factor for the local trip length is to estimate the total VMT that would be expected on Franklin's major roadway system based on national travel demand characteristics. Existing land use data for the City were compiled using information from the Franklin Planning Department. Existing land uses are multiplied by trip generation rates, percent primary trips and average trip lengths and summed to estimate total city-wide VMT. As shown in Table 2, existing land uses within the city limits, using national trip length data, would be expected to generate approximately 2.2 million VMT every day.

Table 2. Expected Vehicle-Miles of Travel

Land Use Type	Unit	Existing Units	Trip Rates	Primary Trips	Daily Trips	Length (miles)	Daily VMT
Single-Family Detached	Dwelling	15,942	4.79	100%	76,362	9.22	704,058
Multi-Family	Dwelling	8,692	3.33	100%	28,944	8.68	251,234
Mobile Home	Dwelling	408	2.50	100%	1,020	8.68	8,854
Gen. Retail/Commercial	1,000 Sq. Ft.	11,854	21.47	43%	109,437	6.79	743,077
Office/Institutional	1,000 Sq. Ft.	8,045	5.51	75%	33,246	10.24	340,439
Industrial/Warehouse	1,000 Sq. Ft.	5,329	3.48	95%	17,618	10.24	180,408
Total					266,627		2,228,070

Source: Existing residential and nonresidential units from City of Franklin, 2009 Development Report, December 2009; daily trip rates and primary trip factors from Table 6; daily trips is product of trip rate and primary trips; national average trip length from Table 5; daily VMT is product of trips and trip length.

The next step in developing the local trip length adjustment factor is to determine actual daily VMT on the City's major roadway system. An inventory of the existing major roadway system was prepared as part of this study (see Table 22 in the Appendix). Roadway segment lengths and recent traffic volumes are used to estimate actual daily VMT. Since counts were not available for all

segments, total VMT must be estimated from VMT for segments for which counts are available. As shown in Table 3, the City's major roadway system has an estimated 1.1 million total daily VMT.

Table 3. Actual Existing Vehicle-Miles of Travel

Functional Classification	Road Segments with Counts			Total	Total
	VMT	Ln-Mi.	Veh./Ln	Ln-Mi.	VMT
Expressway	132,869	17.60	7,549	17.60	132,862
Major Arterial	574,759	102.92	5,585	120.79	674,612
Minor Arterial	57,824	10.22	5,658	26.62	150,616
Subtotal, Arterial VMT					958,090
Major Collector	5,658	3.66	1,546	55.44	85,710
Minor Collector	1,528	1.54	993	35.30	35,053
Total Arterial/Collector VMT					1,078,853

Source: VMT and lane-miles of segments with traffic counts and total lane-miles from Table 22 in the Appendix; vehicles per lane is VMT on segments with counts divided by lane-miles with counts; total VMT is product of vehicles per lane and total lane-miles.

Comparing the results of the last two tables, it can be seen that expected VMT using existing land use data and national travel demand characteristics significantly over-estimates VMT actually observed on the major roadway system. This result is not surprising, since the VMT estimate does not include travel on local roads, the Interstate or on any roadways outside of the Franklin city limits; the difference between the two adjustment factors reflects the share of traffic attributable to collector roads. Consequently, it is necessary to develop an adjustment factor to account for this variation. The local travel demand adjustment factor is the ratio of actual to expected VMT on the major roadway system. As shown in Table 4, the national average trip length should be multiplied by a local adjustment factor of 0.484 if all collector roads are included in the impact fee and 0.430 if collectors are excluded from the fee.

Table 4. Local Trip Length Adjustment Factors

	Arterials/ Collectors	Arterials Only
Actual Daily Vehicle-Miles of Travel (VMT)	1,078,853	958,090
÷ Expected Daily Vehicle-Miles of Travel (VMT)	2,228,070	2,228,070
Local Adjustment Factor	0.484	0.430

Source: Actual VMT from Table 3; expected VMT from Table 2.

The national average trip lengths derived from the U.S. Department of Transportation's 2001 *National Household Travel Survey* for a variety of trip purposes, including home-to-work, doctor/dentist, school/church, shopping, and other personal trips, have been adjusted by the local trip length adjustment factor. Since this study provides an option to include collector roads, the study will include two separate travel demand schedules: one that reflects travel on both arterial and collector roads and one that reflects travel on arterial roads only. The localized trip lengths are shown in Table 5.

Table 5. Average Trip Length by Trip Purpose

Trip Purpose	National Trip Length (miles)	Arterials/Collectors		Arterials Only	
		Local Adjustment Factor	Local Trip Length (miles)	Local Adjustment Factor	Local Trip Length (miles)
To or from work	11.99	0.484	5.80	0.430	5.16
Office/Industrial	10.24	0.484	4.96	0.430	4.40
Medical/Dental	9.77	0.484	4.73	0.430	4.20
Average	9.65	0.484	4.67	0.430	4.15
Single-Family Det.	9.22	0.484	4.46	0.430	3.96
Multi-Family	8.68	0.484	4.20	0.430	3.73
School/Church	7.36	0.484	3.56	0.430	3.16
Family/Personal	7.12	0.484	3.45	0.430	3.06
Shopping	6.79	0.484	3.29	0.430	2.92

Source: National trip lengths from U.S. Department of Transportation, *National Household Travel Survey*, 2001 (office/industrial is 25% work trip length and 75% average trip length); local adjustment factors from Table 4.

The result of combining trip generation rates, primary trip factors and average trip lengths is a travel demand table that establishes the vehicle-miles of travel (VMT) during the average weekday generated by various land use types per unit of development. The recommended travel demand schedules associated with both of the road impact fee options are presented in Table 6.

Table 6. Travel Demand by Land Use

Land Use Type	Unit	ADT	Primary Trips	Arterials/Collectors		Arterials Only	
				Trip Length	Daily VMT	Trip Length	Daily VMT
Single-Family Detached	Dwelling	4.79	100%	4.46	21.36	3.96	18.97
Multi-Family	Dwelling	3.33	100%	4.20	13.99	3.73	12.42
Mobile Home Park	Site	2.50	100%	4.20	10.50	3.73	9.33
Congregate Care Facility	Dwelling	1.01	100%	4.73	4.78	4.20	4.24
Hotel/Motel	Room	3.45	100%	3.45	11.90	3.06	10.56
Retail/Commercial							
Shopping Center/General Retail	1000 sq. ft.	21.47	43%	3.29	30.37	2.92	26.96
Restaurant, Quality	1000 sq. ft.	44.98	38%	3.29	56.23	2.92	49.91
Restaurant, Fast Food	1000 sq. ft.	248.06	30%	1.10	81.86	0.97	72.19
Office/Institutional							
Office, General	1000 sq. ft.	5.51	75%	4.96	20.50	4.40	18.18
Hospital	1000 sq. ft.	8.25	75%	4.73	29.27	4.20	25.99
Nursing Home	1000 sq. ft.	3.79	75%	4.73	13.45	4.20	11.94
Church	1000 sq. ft.	4.56	75%	3.56	12.18	3.16	10.81
Elementary/Secondary School	1000 sq. ft.	7.02	24%	3.56	6.00	3.16	5.32
Industrial							
Manufacturing	1000 sq. ft.	1.91	95%	4.96	9.00	4.40	7.98
Industrial Park	1000 sq. ft.	3.48	95%	4.96	16.40	4.40	14.55
Business Park	1000 sq. ft.	6.38	95%	4.96	30.06	4.40	26.67
Warehouse	1000 sq. ft.	1.78	95%	4.96	8.39	4.40	7.44
Mini-Warehouse	1000 sq. ft.	1.25	95%	3.45	4.10	3.06	3.63

Source: "ADT" is 1/2 average daily trip ends on a weekday ITE, *Trip Generation*, 8th ed., 2008 (hotel/motel based on average of two; elementary/secondary based on average of elementary, middle and high school); "primary trips" is percent of all trips that are primary trips from ITE, *Trip Generation Handbook*, June 2004; primary trip percentage for schools based on Preston Hitchens, "Trip Generation for Day Care Centers," ITE 1990 *Compendium of Technical Papers*, 1990; average trip length from Table 6 (fast food restaurant assumes one-third shopping trip length).

Cost per Vehicle-Mile

The cost per vehicle-mile in this update is based on a set of historic and current major road construction projects that add capacity to the roadway system. As in the previous update, the road construction costs exclude the costs of design; however, this update provides the City with the option of adopting a fee that includes right-of-way (ROW) costs. Recent and current road improvement project costs are summarized in Table 7. The projects included in the cost analysis add capacity to the roadway system and are typical of road projects that will be funded by the impact fee. The road projects used for developing the cost for all major roads include the 3rd Avenue extension, which is a collector road project. The road projects exclude two recent projects, one on Hillsboro Road and another on North Royal Oaks Boulevard that only added one additional lane of traffic (both project costs were significantly higher per lane-mile than other capacity-adding projects).

Table 7. Road Improvement Costs

Project Name	Project Description	Year	Construction	ROW	Total Cost
Carothers Parkway, Phase 1	New 3 & 4-Lane	2007	\$7,013,119	\$817,017	\$7,830,136
Carothers Parkway, Phase 2	New 4-Lane Divided	2009	\$6,307,945	\$4,000,000	\$10,307,945
Carothers Parkway, Nissan	New 4-Lane Divided	2008	\$9,522,368	\$842,000	\$10,364,368
Mack Hatcher, Hillsboro-96W	New 4-Lane Divided	2012	\$70,000,000	\$12,500,000	\$82,500,000
McEwen Dr., Jordan-Cool Spr.	Widen 2-4 Lane	2008	\$1,271,104	\$237,680	\$1,508,784
McEwen Dr., Phase 3	New 4-Lane Divided	2011	\$11,238,887	\$1,439,809	\$12,678,696
South Carothers Parkway	New 4-Lane Divided	2012	\$13,493,000	\$1,942,000	\$15,435,000
Subtotal, Expressway/Arterial			\$118,846,423	\$21,778,506	\$140,624,929
3rd Avenue Extension	New 2-Lane	2011	\$3,138,000	\$721,900	\$3,859,900
Total, All Major Roads			\$121,984,423	\$22,500,406	\$144,484,829

Source: City of Franklin, Engineering Department, June 8, 2010.

The average cost to create an additional lane-mile of roadway can be derived by dividing the cost of the capacity-expanding road improvement projects by the additional lane-miles created by the improvements. Based on the cost of recent and current arterial and collector road improvements, the average costs per lane-mile are calculated in Table 8.

Table 8. Road Improvement Cost per Lane-Mile

Project Name	Miles	New Lanes	Lane-Miles	Cost per Lane-Mile	
				Construction	Ttl. w/ROW
Carothers Parkway, Phase 1	0.71	4	2.84	\$2,056,633	\$2,296,228
	0.19	3	0.57		
Carothers Parkway, Phase 2	0.74	4	2.96	\$2,131,063	\$3,482,414
Carothers Parkway, Nissan	0.64	4	2.56	\$3,719,675	\$4,048,581
Mack Hatcher Ext., Hillsboro-96W	3.22	4	12.88	\$5,434,783	\$6,405,280
McEwen Dr., Jordan Rd.-Cool Spr.	0.15	2	0.30	\$4,237,013	\$5,029,280
McEwen Dr., Phase 3	0.95	4	3.80	\$2,957,602	\$3,336,499
South Carothers Parkway	1.70	4	6.80	\$1,984,265	\$2,269,853
Subtotal, Arterials	8.30		32.71	\$3,658,585	\$4,327,164
3rd Avenue Extension	0.25	2	0.50	\$6,276,000	\$7,719,800
Total, Arterials & Collectors	8.55		33.21	\$3,697,992	\$4,378,243

Source: Miles and number of lanes from City of Franklin Engineering Department, June 8, 2010; lane-miles is product of new lanes and miles; cost per lane-mile is cost from Table 7 divided by lane-miles.

The average cost per unit of capacity added to the major roadway system can be determined by dividing the average cost of a new lane-mile by the average daily capacity per lane at LOS C. The average new daily capacities per new lane added by the set of recent and current projects is calculated in Table 9.

Table 9. Average Capacity per Lane

Project Name	Improvement	Miles	New Capacity	New VMC	New Ln-Mi.	Capacity/Lane
Carothers Parkway, Ph 1 (part)	New 4 Lane	0.71	19,000	13,490	2.84	4,750
Carothers Parkway, Ph 1 (part)	New 3 Lane	0.19	14,400	2,736	0.57	4,800
Carothers Parkway, Phase 2	New 4 Lane	0.74	19,000	14,060	2.96	4,750
Carothers Parkway, Nissan	New 4 Lane	0.64	19,000	12,160	2.56	4,750
Mack Hatcher Ext., Hillsboro-96W	New 4 Lane	3.22	56,200	180,964	12.88	14,050
McEwen Dr., Jordan Rd.-Cool Spr.	Widen 2-4	0.15	7,400	1,110	0.30	3,700
McEwen Dr., Phase 3	New 4 Lane	0.95	19,000	18,050	3.80	4,750
South Carothers Parkway	New 4 Lane	1.70	19,000	32,300	6.80	4,750
Subtotal, Expressway/Arterial				274,870	32.71	8,403
3rd Avenue Extension	New 2 Lane	0.25	9,100	2,275	0.50	4,550
Total, All Major Roads				277,145	33.21	8,345

Source: Improvement length and new lane-miles from Table 8; new capacity added derived from Table 1; new VMC is product of miles and new capacity; capacity per lane is new VMC divided by new lane-miles.

As shown in Table 10, the average cost per service unit for construction is \$443 per VMC when all major roads are considered and \$435 per VMC when collectors are excluded. If ROW is included, the cost per VMC for all major road types is \$525 and \$515 when collectors are excluded. The lower cost per VMC associated with arterials and expressways reflects the greater capacity added by improvements of these road types.

Table 10. Cost per Vehicle-Mile of Capacity

	Construction Cost Only	Total Cost w/ ROW
Arterials & Collectors		
Average Cost per Lane-Mile	\$3,697,992	\$4,378,243
÷ Average Daily Capacity per Lane at LOS C	8,345	8,345
Average Cost per Vehicle-Mile of Capacity (VMC)	\$443	\$525
Arterials Only		
Average Cost per Lane-Mile	\$3,658,585	\$4,327,164
÷ Average Daily Capacity per Lane at LOS C	8,403	8,403
Average Cost per Vehicle-Mile of Capacity (VMC)	\$435	\$515

Source: Average cost per lane-mile from Table 8; average daily capacity per lane from Table 9.

Dividing the road capacity (VMC) by demand (VMT) calculated earlier yields the system-wide VMC/VMT ratio, as well as the ratio for each type of major road category. As shown in Table 11, the major roadway system provides 1.04 units of capacity (at LOS C) for every unit of demand on the arterial system, and 1.30 when collectors are included. This represents the current system-wide level of service, defined at the system-wide level. Some roads may be functioning better than LOS C, and some roads may be functioning at a lower level of service. Indeed, the VMC/VMT ratio

varies among the major road categories, with major arterial roads operating at a somewhat lower level of service than other major road types.

Table 11. Existing System-Wide Capacity/Demand Ratio

Functional Classification	Total VMC	Total VMT	VMC/VMT
Expressway	247,280	132,862	1.86
Major Arterial	601,169	674,612	0.89
Minor Arterial	149,896	150,616	1.00
Subtotal, Arterials	998,345	958,090	1.04
Major Collector	238,836	85,710	2.79
Minor Collector	160,615	35,053	4.58
Total	1,397,796	1,078,853	1.30

Source: Estimated total daily VMT from Table 3; actual total daily VMC from Table 22 in the Appendix.

As discussed in the methodology section, the modified consumption-based approach does not calculate the cost to have all roadways functioning at LOS C, only the cost to replace capacity consumed so that the existing system-wide ratio of capacity to demand is maintained. Under this approach, there are no existing deficiencies on a system-wide basis as long as the VMC/VMT ratio is greater than one. The cost per VMC does not need to be adjusted by the actual VMC/VMT ratio if it is greater than one-to-one, since a ratio of one-to-one is assumed in this study. Thus the cost per VMT is the same as the cost per VMC calculated above.

Net Cost per Vehicle-Mile

As with the prior impact fee updates, credit will be given for dedicated revenues that will be generated by new development and used to pay for capacity-related capital improvements. In addition to Federal and State funding for major road improvements in the City of Franklin, the City utilizes debt, impact fee revenue and State Street Aid funding for capital improvements. In the update of the impact fee, credit is given for the portion of Federal and State fuel taxes that are being used to fund capacity-expanding improvements to the major roadway system. In addition, this update includes a credit for outstanding road-related debt.

The amount of intergovernmental revenue that is applied toward funding capacity-expanding capital improvements in Franklin is based on recent and planned funding over the six-year period from FY 2008-2013 as shown in the current adopted regional Transportation Improvement Program (TIP) as well as the draft TIP. Only improvements that are both capacity-expanding and on the major road network are eligible for credit. For example, improvements on I-65 do not occur on the major roadway system used in this study. The non-local share of funding includes funds programmed from the portion of State gas tax revenues that the City receives through the State Street Aid program. The improvements and funding are summarized in Table 12 below. The creditable funding over the six-year period totals \$113.8 million.

Table 12. Road Improvements and Funding, FY 2008-2013

Project Name	Description	Cost	Non-Local	Creditable
			Share	
Carothers Parkway Ext to McEwen	Extend Existing Road	\$3,821,500	\$0	\$0
Franklin Greenway & Harpeth RWalk	Paved Trail & Greenway	\$204,668	\$163,734	\$0
Franklin Traffic Operations Center	Install Field Hardware	\$557,500	\$446,000	\$446,000
Harpeth River Walk	Bike/Ped Greenway	\$78,750	\$63,000	\$0
Hillsboro Rd, Del Rio to Mack Hatcher	Widen to 3 Lanes, Bike Lns	\$130,000	\$0	\$0
Hillsboro Rd, Hwy 96-Del Rio Pike	Widen to 5 Lanes	\$170,000	\$0	\$0
Lewisburg Pike, Goose Ck-Old Peyton	Widen to 4 Lane Divided	\$4,106,000	\$0	\$0
McEwen Dr, Cool Spr-Wilson Pike	New 4 Lane Road	\$14,315,000	\$0	\$0
McEwen Dr, Cool Spr-Mallory	New 4 Lane Road	\$4,690,350	\$0	\$0
Riverbend Greenway	New Greenway	\$1,147,500	\$630,000	\$0
Columbia South, Downs to SR 397	New Road	\$5,000,000	\$0	\$0
Franklin Greenway	Multi-Use Path	\$1,147,500	\$630,000	\$0
Franklin Traffic Operations	ITS Infrastructure	\$6,000,000	\$4,800,000	\$4,800,000
Goose Creek Bypass at I-65	New Interchange	\$30,000,000	\$30,000,000	\$0
Goose Creek Bypass	New Road	\$2,050,000	\$0	\$0
Hillsboro Rd, Hwy 96-M. Hatcher	New Road	\$25,000,000	\$1,250,000	\$1,250,000
I-65 Widening from SR 96-SR840	Freeway Widening	\$70,000,000	\$70,000,000	\$0
Mack Hatcher NE Widening	Widen Road	\$15,800,000	\$15,800,000	\$15,800,000
Mack Hatcher NW Extension	Extend Existing Road	\$76,500,000	\$76,500,000	\$76,500,000
Mack Hatcher SE Widening	Widen Road	\$15,000,000	\$15,000,000	\$15,000,000
McEwen Drive Phase 3	Widen Existing Road	\$15,000,000	\$0	\$0
McEwen Drive Phase 4	Widen Existing Road	\$17,500,000	\$0	\$0
McEwen Drive Extension	Extend Existing Road	\$12,500,000	\$0	\$0
Lewisburg Pike, SR 397-Donnellson	Widen Existing Road	\$2,800,000	\$0	\$0
Lewisburg Pike, Donnellson-Old Peyton	Widen Existing Road	\$1,000,000	\$0	\$0
Lewisburg Pike, Old Peyton-Goose Ck	Widen to 4 Lane Divided	\$8,010,000	\$0	\$0
Total, FY 2008-2013		\$332,528,768	\$215,282,734	\$113,796,000

Source: Nashville Area Metropolitan Planning Organization (MPO), adopted *Transportation Improvement Program, FY 2008-2011* (for FY 2008-2010 funding); Nashville MPO, *Preliminary Amended FY 2011-2014 TIP Program*, provided by City of Franklin, Engineering Department, May 19, 2010 (for FY 2011-2013 funding).

The State and Federal funding credit is shown in Table 13. At the current cost of borrowing, the present value of State and Federal gas tax funding revenue that can be anticipated over the next 20 years, which is the typical long-term debt repayment period, is about \$226 per daily vehicle-mile of travel on the major roadway system and \$254 per VMT when collectors are excluded.

Table 13. State/Federal Funding Credit

	Arterials/ Collectors	Arterials Only
Total Federal/State Capacity Funding 2008-2013	\$113,796,000	\$113,796,000
÷ Years	6	6
Annual Federal/State Capacity Funding	\$18,966,000	\$18,966,000
÷ Daily Vehicle-Miles of Travel (VMT)	1,078,853	958,090
Average Annual Funding per VMT	\$17.58	\$19.80
x Net Present Value Factor (20 Years @ 4.65%)	\$12.84	\$12.84
State/Federal Funding Credit per VMT	\$226	\$254

Source: Total Federal/State capacity funding from Table 12; daily VMT from Table 3; present value factor based on 20 years at 4.65% discount rate based on three-month average interest rate on state and local bonds (March to May 2010) from the Federal Reserve at <http://www.federalreserve.gov/releases/h15/data/monthly>.

The City of Franklin currently has five outstanding debt issues that have been used to fund improvements on the major roadway system. As shown in Table 14, the road-related balance for the five outstanding debt issues is \$24.7 million.

Table 14. Outstanding Road Debt Issues

Bond Issue	Outstanding Balance	Road-Related	Road-Related Balance
General Obligation Public Improve Refund Bond	\$525,000	100%	\$525,000
General Purpose Public Works, 2005 (McEwan Rd.)	\$3,795,000	40%	\$1,518,000
Series 2002 General Improvement Refunding Bonds	\$4,875,000	55%	\$2,681,250
Road Bonds 2007	\$10,000,000	100%	\$10,000,000
New Road Bonds 2009	\$10,000,000	100%	\$10,000,000
Outstanding Road Debt			\$24,724,250

Source: Outstanding road-related debt issues from City of Franklin, *Comprehensive Financial Report, FY 2009*, p. 45; road-related share of outstanding balance derived from City of Franklin, *Annual Operating Budget, FY 2010*, p. 205 "Debt Service Fund" and City of Franklin Finance Department data from March 14, 2007.

To avoid double payment issues, the impact fees should be reduced to account for the amount that new development will pay to retire the debt on existing road facilities. A simple method that ensures that new development is not required to pay for existing facilities, through property tax or other funds used for debt retirement, as well as new facilities, is to calculate the credit by dividing the outstanding debt by existing service units. Reducing the impact fee by this amount places new development on an equal footing with existing development in terms of debt funding of capacity improvements. As shown in Table 15, the debt credit is \$23 per VMT for all major roads and \$26 per VMT if collectors are excluded.

Table 15. Road Debt Credit

	Arterials/ Collectors	Arterials Only
Outstanding Road Debt	\$24,724,250	\$24,724,250
÷ Daily Vehicle-Miles of Travel (VMT)	1,078,853	958,090
Debt Credit per VMT	\$23	\$26

Source: Outstanding road-related debt from Table 14; VMT from Table 3.

This study provides four options for updating the impact fee. As shown in Table 16, reducing the cost per service unit associated with all major roads (arterials and collectors) by the State and Federal fuel tax credit and debt credit leaves a net cost of \$194 per VMT based on construction cost and \$276 per VMT including ROW. The net cost for the option that includes the only arterial roads is \$155 per VMT without ROW (this option is the same as the basis for the current fee) and \$235 with ROW costs included.

Table 16. Net Cost per Vehicle-Mile of Travel

	Construction Only	Total w/ROW
Arterials & Collectors		
Average Cost per VMT	\$443	\$525
- State/Federal Funding Credit per VMT	-\$226	-\$226
- Debt Credit per VMT	-\$23	-\$23
Net Cost per Daily VMT	\$194	\$276
Arterials Only		
Average Cost per VMT	\$435	\$515
- State/Federal Funding Credit per VMT	-\$254	-\$254
- Debt Credit per VMT	-\$26	-\$26
Net Cost per Daily VMT	\$155	\$235

Source: Average cost per VMT based on cost per VMC from Table 10; State/Federal funding credit from Table 13; debt credit from Table 15.

Potential Fee Schedule

The options presented in this update result in four potential impact fee schedules. The net cost per unit is the product of daily vehicle-miles of travel generated by a unit of development and the net cost per VMT. The first two options are presented in Table 17; these options are based on the net cost per VMT and the travel demand schedule associated with all major roads (arterials and collectors). One of the options is based on construction costs only, and the other ("total") includes right-of-way costs.

Table 17. Potential Fee Schedule, Arterials and Collectors

Land Use Type	Unit	Daily VMT	Net Cost/VMT		Potential Fee	
			Constr.	Total	Constr.	Total
Single-Family Detached	Dwelling	21.36	\$194	\$276	\$4,144	\$5,895
Multi-Family	Dwelling	13.99	\$194	\$276	\$2,714	\$3,861
Mobile Home Park	Site	10.50	\$194	\$276	\$2,037	\$2,898
Congregate Care Facility	Dwelling	4.78	\$194	\$276	\$927	\$1,319
Hotel/Motel	Room	11.90	\$194	\$276	\$2,309	\$3,284
Retail/Commercial						
Shopping Center/General Retail	1000 sq. ft.	30.37	\$194	\$276	\$5,892	\$8,382
Restaurant, Quality	1000 sq. ft.	56.23	\$194	\$276	\$10,909	\$15,519
Restaurant, Fast Food	1000 sq. ft.	81.86	\$194	\$276	\$15,881	\$22,593
Office/Institutional						
Office, General	1000 sq. ft.	20.50	\$194	\$276	\$3,977	\$5,658
Hospital	1000 sq. ft.	29.27	\$194	\$276	\$5,678	\$8,079
Nursing Home	1000 sq. ft.	13.45	\$194	\$276	\$2,609	\$3,712
Church	1000 sq. ft.	12.18	\$194	\$276	\$2,363	\$3,362
Elementary/Secondary School	1000 sq. ft.	6.00	\$194	\$276	\$1,164	\$1,656
Industrial						
Manufacturing	1000 sq. ft.	9.00	\$194	\$276	\$1,746	\$2,484
Industrial Park	1000 sq. ft.	16.40	\$194	\$276	\$3,182	\$4,526
Business Park	1000 sq. ft.	30.06	\$194	\$276	\$5,832	\$8,297
Warehouse	1000 sq. ft.	8.39	\$194	\$276	\$1,628	\$2,316
Mini-Warehouse	1000 sq. ft.	4.10	\$194	\$276	\$795	\$1,132

Source: Daily VMT from Table 6; net cost per VMT from Table 16.

The two options associated with the potential fee for arterial roads only (i.e., excluding collector roads) are presented in Table 18. The fee option that excludes ROW costs is most similar to the basis for the current fee calculated in the prior impact fee update.

Table 18. Potential Fee Schedule, Arterials Only

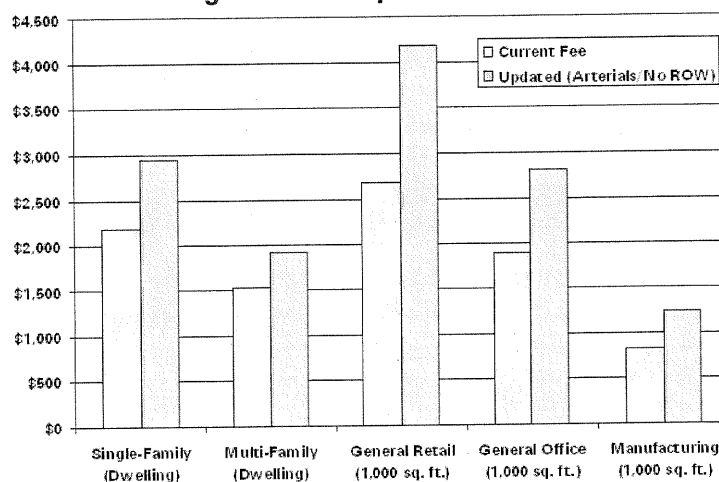
Land Use Type	Unit	Daily VMT	Net Cost/VMT		Potential Fee	
			Constr.	Total	Constr.	Total
Single-Family Detached	Dwelling	18.97	\$155	\$235	\$2,940	\$4,458
Multi-Family	Dwelling	12.42	\$155	\$235	\$1,925	\$2,919
Mobile Home Park	Site	9.33	\$155	\$235	\$1,446	\$2,193
Congregate Care Facility	Dwelling	4.24	\$155	\$235	\$657	\$996
Hotel/Motel	Room	10.56	\$155	\$235	\$1,637	\$2,482
Retail/Commercial						
Shopping Center/General Retail	1000 sq. ft.	26.96	\$155	\$235	\$4,179	\$6,336
Restaurant, Quality	1000 sq. ft.	49.91	\$155	\$235	\$7,736	\$11,729
Restaurant, Fast Food	1000 sq. ft.	72.19	\$155	\$235	\$11,189	\$16,965
Office/Institutional						
Office, General	1000 sq. ft.	18.18	\$155	\$235	\$2,818	\$4,272
Hospital	1000 sq. ft.	25.99	\$155	\$235	\$4,028	\$6,108
Nursing Home	1000 sq. ft.	11.94	\$155	\$235	\$1,851	\$2,806
Church	1000 sq. ft.	10.81	\$155	\$235	\$1,676	\$2,540
Elementary/Secondary School	1000 sq. ft.	5.32	\$155	\$235	\$825	\$1,250
Industrial						
Manufacturing	1000 sq. ft.	7.98	\$155	\$235	\$1,237	\$1,875
Industrial Park	1000 sq. ft.	14.55	\$155	\$235	\$2,255	\$3,419
Business Park	1000 sq. ft.	26.67	\$155	\$235	\$4,134	\$6,267
Warehouse	1000 sq. ft.	7.44	\$155	\$235	\$1,153	\$1,748
Mini-Warehouse	1000 sq. ft.	3.63	\$155	\$235	\$563	\$853

Source: Daily VMT from Table 6; net cost per VMT from Table 16.

Comparative Fees

The maximum potential road impact fees calculated in this report for arterial roadways are compared to the City's current fees in Table 19. The option that excludes the ROW costs is most similar to the basis of the City's current road impact fee, and is illustrated in Figure 5.

Figure 5. Comparative Fees



Under the option that excludes ROW costs, the potential fees would increase by about one-quarter to one-third for residential uses and by about half for most nonresidential uses. The variation among the fee increases for the uses reflect updated travel demand data used in this study. The fees would more than double for most land uses under this option when ROW costs are included.

Table 19. Impact Fee Comparison, Arterials Only

Land Use Type	Unit	Arterial with ROW				Arterial w/out ROW		
		Current Fee	Potential Fee	Change	Percent Change	Potential Fee	Change	Percent Change
Single-Family Detached	Dwelling	\$2,191	\$4,458	\$2,267	103%	\$2,940	\$749	34%
Multi-Family	Dwelling	\$1,537	\$2,919	\$1,382	90%	\$1,925	\$388	25%
Mobile Home Park	Site	\$1,144	\$2,193	\$1,049	92%	\$1,446	\$302	26%
Congregate Care Facility	Dwelling	\$440	\$996	\$556	126%	\$657	\$217	49%
Hotel/Motel	Room	\$1,126	\$2,482	\$1,356	120%	\$1,637	\$511	45%
Retail/Commercial								
Shopping Center/General Retail	1000 sq. ft.	\$2,681	\$6,336	\$3,655	136%	\$4,179	\$1,498	56%
Restaurant, Quality	1000 sq. ft.	\$4,964	\$11,729	\$6,765	136%	\$7,736	\$2,772	56%
Restaurant, Fast Food	1000 sq. ft.	\$7,177	\$16,965	\$9,788	136%	\$11,189	\$4,012	56%
Office/Institutional								
Office, General	1000 sq. ft.	\$1,891	\$4,272	\$2,381	126%	\$2,818	\$927	49%
Hospital	1000 sq. ft.	\$2,867	\$6,108	\$3,241	113%	\$4,028	\$1,161	40%
Nursing Home	1000 sq. ft.	\$996	\$2,806	\$1,810	182%	\$1,851	\$855	86%
Church	1000 sq. ft.	\$1,127	\$2,540	\$1,413	125%	\$1,676	\$549	49%
Elementary/Secondary School	1000 sq. ft.	\$543	\$1,250	\$707	130%	\$825	\$282	52%
Industrial								
Manufacturing	1000 sq. ft.	\$830	\$1,875	\$1,045	126%	\$1,237	\$407	49%
Industrial Park	1000 sq. ft.	\$1,513	\$3,419	\$1,906	126%	\$2,255	\$742	49%
Business Park	1000 sq. ft.	\$2,773	\$6,267	\$3,494	126%	\$4,134	\$1,361	49%
Warehouse	1000 sq. ft.	\$1,078	\$1,748	\$670	62%	\$1,153	\$75	7%
Mini-Warehouse	1000 sq. ft.	\$388	\$853	\$465	120%	\$563	\$175	45%

Source: Potential fee based on arterial only fee options from Table 18; current fee from City of Franklin.

The factors responsible for the change associated with the arterial impact fee without ROW costs are summarized in Table 20; the comparison uses the fee variable from the impact fee option that excludes collector roads and ROW costs, since this option is most similar to the basis for the current fee calculated in the prior impact fee update. The most significant overall change is that the construction cost per lane-mile has increased by about two-thirds since the last update. This was due primarily to the inclusion of a major improvement to Mack Hatcher, which is reasonable since additional such improvements are planned for the near future. The cost per VMT grew only 21%, since the capacity added by Mack Hatcher expressway improvement offset to a large extent the greater cost per lane-mile (in fact, overall the inclusion of the Mack Hatcher improvement reduced rather than increased the cost per VMT). The credits increased, but less rapidly than costs, so that the net cost per VMT increased by 38%. If the travel demand factors had remained unchanged, the fees for all land uses would have increased by this percentage.

Table 20. Comparison of Study Variables

	2007 Study	Current Study*	Percent Change
Cost per Lane-Mile	\$2,209,000	\$3,658,585	66%
÷ Average Capacity per Lane	6,138	8,403	37%
Cost per VMT	\$360	\$435	21%
– Outside Funding Credit per VMT	-\$239	-\$254	6%
– Debt Credit per VMT	-\$9	-\$26	189%
Net Cost per VMT	\$112	\$155	38%
Per Single-Family Unit:			
Net Cost per VMT	\$112	\$155	38%
x Daily VMT per Unit	19.54	18.97	-3%
Net Cost per Unit	\$2,191	\$2,940	34%

*Current study variables based on costs, capacities, trip lengths and credits associated with the major roads excluding collectors and ROW costs.

Source: 2007 study variables from Duncan Associates, *Road Impact Fee Update*, City of Franklin, July 2007.

For comparison, the potential fees for both of the options associated with the arterial and collector road impact fee are provided in Table 21. Both of these options would result in a higher rate of increase than the options associated with the arterial-only fee.

Table 21. Impact Fee Comparison, Arterials and Collectors

Land Use Type	Unit	Arterial/Collector w/ROW				Arterial/Collector No ROW		
		Current Fee	Potential Fee	Change	Percent Change	Potential Fee	Change	Percent Change
Single-Family Detached	Dwelling	\$2,191	\$5,895	\$3,704	169%	\$4,144	\$1,953	89%
Multi-Family	Dwelling	\$1,537	\$3,861	\$2,324	151%	\$2,714	\$1,177	77%
Mobile Home Park	Site	\$1,144	\$2,898	\$1,754	153%	\$2,037	\$893	78%
Congregate Care Facility	Dwelling	\$440	\$1,319	\$879	200%	\$927	\$487	111%
Hotel/Motel	Room	\$1,126	\$3,284	\$2,158	192%	\$2,309	\$1,183	105%
Retail/Commercial								
Shopping Center/General Retail	1000 sq. ft.	\$2,681	\$8,382	\$5,701	213%	\$5,892	\$3,211	120%
Restaurant, Quality	1000 sq. ft.	\$4,964	\$15,519	\$10,555	213%	\$10,909	\$5,945	120%
Restaurant, Fast Food	1000 sq. ft.	\$7,177	\$22,593	\$15,416	215%	\$15,881	\$8,704	121%
Office/Institutional								
Office, General	1000 sq. ft.	\$1,891	\$5,658	\$3,767	199%	\$3,977	\$2,086	110%
Hospital	1000 sq. ft.	\$2,867	\$8,079	\$5,212	182%	\$5,678	\$2,811	98%
Nursing Home	1000 sq. ft.	\$996	\$3,712	\$2,716	273%	\$2,609	\$1,613	162%
Church	1000 sq. ft.	\$1,127	\$3,362	\$2,235	198%	\$2,363	\$1,236	110%
Elementary/Secondary School	1000 sq. ft.	\$543	\$1,656	\$1,113	205%	\$1,164	\$621	114%
Industrial								
Manufacturing	1000 sq. ft.	\$830	\$2,484	\$1,654	199%	\$1,746	\$916	110%
Industrial Park	1000 sq. ft.	\$1,513	\$4,526	\$3,013	199%	\$3,182	\$1,669	110%
Business Park	1000 sq. ft.	\$2,773	\$8,297	\$5,524	199%	\$5,832	\$3,059	110%
Warehouse	1000 sq. ft.	\$1,078	\$2,316	\$1,238	115%	\$1,628	\$550	51%
Mini-Warehouse	1000 sq. ft.	\$388	\$1,132	\$744	192%	\$795	\$407	105%

Source: Potential fee based on arterial only fee options from Table 17; current fee from City of Franklin.

APPENDIX

Table 22. Existing Major Roadway Inventory

Roadway	From	To	Ln	Mi	Lane-Miles		Cap.	ADT	VMT	VMC
					Total	Count				
Mack Hatcher	Hillsboro Rd	Franklin Rd	4.00	1.70	6.80	6.80	56,200	18,653	31,710	95,540
Mack Hatcher	Franklin Rd	Liberty Pike	2.00	1.50	3.00	3.00	28,100	21,177	31,766	42,150
Mack Hatcher	Liberty Pike	Murfreesboro	2.00	0.85	1.70	1.70	28,100	14,930	12,691	23,885
Mack Hatcher	Murfreesboro	Lewisberg Av	2.00	1.30	2.60	2.60	28,100	24,232	31,502	36,530
Mack Hatcher	Lewisberg Av	Columbia Av	2.00	1.75	3.50	3.50	28,100	14,401	25,202	49,175
Subtotal Expressway				7.10	17.60	17.60			132,869	247,280
5th Ave, N	4th St	Bridge St	4.00	0.31	1.24	1.24	19,000	19,000	5,890	5,890
5th Ave, N	Bridge St	Main St	4.00	0.10	0.40	0.40	19,000	13,818	1,382	1,900
5th Ave, S	Main St	S Margin St	2.00	0.30	0.60	0.60	11,600	6,118	1,835	3,480
Carothers Pkwy	Moore Lane	Cool Springs	4.00	1.40	5.60	5.60	19,000	22,252	31,153	26,600
Carothers Pkwy	Cool Springs	Murfreesboro	4.00	2.47	9.88	9.88	19,000	7,647	18,888	46,930
S. Carothers Rd	Murfreesboro	Franklin Com	4.00	0.25	1.00	0.00	19,000	n/a	n/a	4,750
S. Carothers Rd	Franklin Com	S City Limit	3.00	1.10	3.30	3.30	14,400	6,066	6,673	15,840
Columbia Ave	Mack Hatcher	Fairground St	3.00	1.00	3.00	3.00	14,400	20,891	20,891	14,400
Columbia Ave	Fairground St	Five Points	3.00	1.00	3.00	3.00	14,400	11,725	11,725	14,400
Columbia Pike	S Boundary	Mack Hatcher	2.00	1.50	3.00	3.00	11,600	14,524	21,786	17,400
Cool Springs	Carothers	E Terminus	4.00	1.40	5.60	0.00	19,000	n/a	n/a	26,600
Cool Springs	Mack Hatcher	Carothers Pky	4.00	2.25	9.00	9.00	19,000	26,754	60,197	42,750
Franklin Rd	E Main St	Mack Hatcher	2.00	1.51	3.02	3.02	11,600	16,281	24,584	17,516
Franklin Rd	Mack Hatcher	Moore Lane	2.00	2.11	4.22	4.22	11,600	14,295	30,162	24,476
Goose Creek By	Lewisburg Pike	I-65	2.00	0.86	1.72	1.72	11,600	9,199	7,911	9,976
McEwen Dr	Cool Springs	Carothers Pky	4.00	1.32	5.28	0.00	19,000	n/a	n/a	25,080
Murfreesboro Rd	S Margin St	Mack Hatcher	2.00	1.70	3.40	3.40	11,600	18,494	31,440	19,720
Murfreesboro Rd	Mack Hatcher	I-65	5.00	1.10	5.50	5.50	21,900	28,815	31,697	24,090
Murfreesboro Rd	I-65	E Boundary	2.00	0.70	1.40	1.40	11,600	19,501	13,651	8,120
Hwy 96 W	W Bndry	11th Ave	2.00	1.50	3.00	3.00	11,600	18,555	27,833	17,400
Hwy 96 W	11th Ave	5th Ave	3.00	0.43	1.29	0.00	14,400	20,601	8,858	6,192
Hillsboro Rd	4th Ave	Mack Hatcher	3.00	1.10	3.30	0.00	11,600	19,000	20,900	12,760
Hillsboro Rd	Mack Hatcher	Blackhorse Pkwy	5.00	1.00	5.00	5.00	21,900	18,547	18,547	21,900
Hillsboro Rd	Blackhorse Pkwy	N Boundary	5.00	0.93	4.65	4.65	21,900	15,448	14,367	20,367
Main St	Harpeth River	5th Ave	2.00	0.40	0.80	0.80	11,600	10,409	4,164	4,640
Mallory Lane	Moore Lane	Cool Springs	4.00	1.40	5.60	5.60	19,000	27,184	38,058	26,600
Mallory Lane	Cool Springs	Liberty Pike	4.00	1.50	6.00	6.00	19,000	26,639	39,959	28,500
Lewisburg Ave	S Margin St	City Limits	2.00	3.80	7.60	7.60	11,600	6,068	23,058	44,080
Lewisburg Ave	City Limits	S. Boundary	2.00	0.47	0.94	0.94	11,600	8,932	4,198	5,452
Lynnwood	City Limits	Franklin	2.00	0.70	1.40	0.00	11,600	n/a	n/a	8,120
E Main St	1st Ave	Franklin	2.00	0.25	0.50	0.50	11,600	4,794	1,199	2,900
W Main St	Murfreesboro	5th Ave	2.00	1.00	2.00	2.00	11,600	10,409	10,409	11,600
N Royal Oaks	Liberty Pike	Hwy 96	3.00	0.85	2.55	2.55	14,400	16,291	13,847	12,240
S Royal Oaks	Hwy 96	Mack Hatcher	4.00	1.50	6.00	6.00	19,000	19,666	29,499	28,500
Subtotal Major Arterial				39.21	120.79	102.92			574,759	601,169
Lancaster	Traffic Circle	W. Terminus	2.00	0.50	1.00	0.00	11,600	n/a	n/a	5,800
W Main St	5th Ave	11th Ave	2.00	0.50	1.00	1.00	11,600	8,034	4,017	5,800
W Main St	11th Ave	Carters Crk Pike	2.00	1.50	3.00	3.00	11,600	7,426	11,139	17,400
W Main St	Carters Crk Pike	E Boundary	2.00	0.56	1.12	0.00	11,600	8,034	4,499	6,496
McEwen Dr	Carothers	Wilson Pike	2.00	2.60	5.20	5.34	11,600	4,638	12,059	30,160
Carters Crk Pike	West Main St	S Boundary	2.00	0.40	0.80	0.00	11,600	7,426	2,970	4,640

Table 22 Continued

Roadway	From	To	Ln	Mi	Lane-Miles		Cap.	ADT	VMT	VMC
					Total	Count				
Liberty Pike	Mallory Lane	I-65	2.00	0.20	0.40	0.00	11,600	n/a	n/a	2,320
Liberty Pike	Traffic Circle	E Terminus	2.00	0.70	1.40	0.00	11,600	n/a	n/a	8,120
Liberty Pike	I-65	Traffic Circle	2.00	2.10	4.20	0.00	11,600	n/a	n/a	24,360
Liberty Pike	Mallory Lane	Sycamore Dr	3.00	1.50	4.50	0.00	14,400	13,370	20,055	21,600
Liberty Pike	Sycamore Dr	Franklin Rd	2.00	0.70	1.40	0.00	11,600	n/a	n/a	8,120
Old Liberty Pike	Liberty Pike	Franklin Rd	2.00	0.44	0.88	0.88	11,600	7,010	3,084	5,104
Wilson Pike	N Boundary	S Boundary	2.00	0.86	1.72	0.00	11,600	n/a	n/a	9,976
Subtotal Minor Arterial				12.56	26.62	10.22			57,824	149,896
1st Ave N	N. Margin	E. Main St	2.00	0.22	0.44	0.00	9,100	n/a	n/a	2,002
1st Ave S	E. Main St	S. Margin St	2.00	0.12	0.24	0.24	9,100	2,861	343	1,092
2nd Ave N	Bridge St	E. Main St	2.00	0.22	0.44	0.00	9,100	n/a	n/a	2,002
2nd Ave S	E. Main St	S. Margin St	2.00	0.12	0.24	0.24	9,100	2,461	295	1,092
3rd Ave N	Bridge St	E. Main St	2.00	0.22	0.44	0.00	9,100	n/a	n/a	2,002
3rd Ave S	E. Main St	S. Margin St	2.00	0.22	0.44	0.00	9,100	n/a	n/a	2,002
3rd Ave S	S. Margin St	Murfreesboro	3.00	0.12	0.36	0.36	11,300	2,922	351	1,356
9th Ave N	Mt. Hope	W. Main St	2.00	0.35	0.70	0.70	9,100	4,382	1,534	3,185
9th Ave S	W. Main St.	Columbia	2.00	0.18	0.36	0.36	9,100	5,963	1,073	1,638
11th Ave N	Mount Hope	Main	2.00	0.44	0.88	0.00	9,100	n/a	n/a	4,004
11th Ave S	Main	Natchez	2.00	0.17	0.34	0.00	9,100	n/a	n/a	1,547
Boyd Mill Ave	Murfreesboro	Downs	2.00	0.99	1.98	0.00	9,100	n/a	n/a	9,009
Boyd Mill Ave	Downs	Murfreesboro	2.00	1.09	2.18	0.00	9,100	n/a	n/a	9,919
Bakers Bridge Ave	Mallory	Broadwell	4.00	1.16	4.64	0.00	14,900	n/a	n/a	17,284
Bridge St.	5th Ave N	1st Ave N	2.00	0.33	0.66	0.00	9,100	n/a	n/a	3,003
Church St. W	5th Ave S	3rd Ave S	2.00	0.17	0.34	0.00	9,100	n/a	n/a	1,547
Church St. E	3rd Ave S	1st Ave S	2.00	0.17	0.34	0.00	9,100	n/a	n/a	1,547
Del Rio Pk	Carlisle	Hillsboro	2.00	2.58	5.16	0.00	9,100	n/a	n/a	23,478
Donelson Crk Pwy	Mack Hatcher	Lewisburg	2.00	1.09	2.18	0.00	9,100	n/a	n/a	9,919
Downs Blvd	Murfreesboro	Rucker	2.00	1.65	3.30	0.00	9,100	n/a	n/a	15,015
Downs Blvd	Rucker	Main	3.00	0.14	0.42	0.00	11,300	n/a	n/a	1,582
Downs Blvd	Main	Columbia	2.00	0.99	1.98	0.00	9,100	n/a	n/a	9,009
Eddy Lane	Liberty Park	Murfreesboro	2.00	0.88	1.76	1.76	9,100	2,343	2,062	8,008
Fair St	11th Ave N	5th Ave N	2.00	0.43	0.86	0.00	9,100	n/a	n/a	3,913
Forrest Crossing	Royal Oaks	Culpepper	4.00	0.47	1.88	0.00	14,900	n/a	n/a	7,003
Gen. Patton Dr	City Limits	Mallory Station	2.00	0.87	1.74	0.00	9,100	n/a	n/a	7,917
Magnolia Dr	Del Rio Pike	Murfreesboro	2.00	0.53	1.06	0.00	9,100	n/a	n/a	4,823
Mallory Station Rd	Franklin	Mallory Ln	3.00	1.51	4.53	0.00	11,300	n/a	n/a	17,063
N Margin St.	5th Ave N	1st Ave N	2.00	0.35	0.70	0.00	9,100	n/a	n/a	3,185
S Margin St.	5th Ave S	1st Ave S	2.00	0.35	0.70	0.00	9,100	n/a	n/a	3,185
Natchez St	W Main St	9th Ave N	2.00	0.58	1.16	0.00	9,100	n/a	n/a	5,278
Oak Meadow Dr	Royal Oaks	Driveway	3.00	0.27	0.81	0.00	11,300	n/a	n/a	3,051
Oak Meadow Dr	Driveway	Riverview	2.00	0.95	1.90	0.00	9,100	n/a	n/a	8,645
Riverview Dr	Forest Crossing	Oak Meadow	2.00	1.40	2.80	0.00	9,100	n/a	n/a	12,740
Seaboard Ln	City Limits	Aspen Grove	3.00	1.38	4.14	0.00	11,300	n/a	n/a	15,594
Southeast Pwy	Columbia	Mack Hatcher	2.00	0.73	1.46	0.00	9,100	n/a	n/a	6,643
Southeast Pwy Ct	Southeast Pkwy	End	2.00	0.28	0.56	0.00	9,100	n/a	n/a	2,548
Westhaven Blvd	Murfreesboro	Acadia	2.00	0.66	1.32	0.00	9,100	n/a	n/a	6,006
Subtotal, Major Collector				24.38	55.44	3.66			5,658	238,836

Table 22 Continued

Roadway	From	To	Ln	Mi	Lane-Miles		Cap.	ADT	VMT	VMC
					Total	Count				
Acadia Ave	Championship	Eliot	2.00	0.40	0.80	0.00	9,100	n/a	n/a	3,640
Addison Ave	Addison	Prospect	2.00	0.57	1.14	0.00	9,100	n/a	n/a	5,187
Battle Ave	Main	Columbia	2.00	0.71	1.42	0.00	9,100	n/a	n/a	6,461
Championship Blvd	Stonewater	Acadia	2.00	0.70	1.40	0.00	9,100	n/a	n/a	6,370
Clovercroft Rd	Murfreesboro	Wilson Pike	2.00	1.68	3.36	0.00	9,100	n/a	n/a	15,288
Horton Ct	Horton Ln	End	2.00	0.11	0.22	0.00	9,100	n/a	n/a	1,001
Horton Ln	Boyd Mill	Main	2.00	1.16	2.32	0.00	9,100	n/a	n/a	10,556
Jewell Ave	Unnamed	Unnamed	2.00	0.44	0.88	0.00	9,100	n/a	n/a	4,004
Long Ln	Peytonsville Rd	City Limits	2.00	2.08	4.16	0.00	9,100	n/a	n/a	18,928
Market St	Liberty Pike	Clovercroft	2.00	0.30	0.60	0.00	9,100	n/a	n/a	2,730
Old Peytonsville	Lewisburg Pike	Peytonsville Rd	2.00	1.41	2.82	0.00	9,100	n/a	n/a	12,831
Oxford Glen Dr	McEwen	Clovercroft	2.00	1.05	2.10	0.00	9,100	n/a	n/a	9,555
Peytonsville Rd	Old Peytonsville	Pratt	2.00	1.10	2.20	0.00	9,100	n/a	n/a	10,010
Pratt Ln	Peytonsville Rd	City Limits	2.00	1.28	2.56	0.00	9,100	n/a	n/a	11,648
Ralston Ln.	Liberty Pike	Murfreesboro	2.00	0.77	1.54	1.54	9,100	1,985	1,528	7,007
Spencer Creek Rd	Fieldstone	Mack Hatcher	2.00	1.73	3.46	0.00	9,100	n/a	n/a	15,743
State Blvd	Championship	Westhaven	2.00	0.55	1.10	0.00	9,100	n/a	n/a	5,005
Stonewater Blvd	Murfreesboro	Fleetwood	2.00	0.55	1.10	0.00	9,100	n/a	n/a	5,005
Stream Valley Blvd	Lewisburg Pike	Shade Tree	2.00	0.60	1.20	0.00	9,100	n/a	n/a	5,460
Streamside Ln	New Road	New Road	2.00	0.21	0.42	0.00	9,100	n/a	n/a	1,911
Townsend Blvd	Cheltenham	Eliot	2.00	0.25	0.50	0.00	9,100	n/a	n/a	2,275
Subtotal, Minor Collector				17.65	35.30	1.54			1,528	160,615
Total				100.90	255.75	135.94			772,638	1,397,796

Source: Duncan Associates analysis of City of Franklin Geographic Information System files provided by City of Franklin, Engineering Department, May 28, 2010; daily traffic counts (ADT) from Tennessee Department of Transportation traffic history (<http://www3.tdot.state.tn.us/TrafficHistory/template/viewer.htm?co=94>); "VMT" is vehicle-miles of travel, which is product of miles and ADT; "VMC" is vehicle-miles of capacity, which is product of daily capacity and ADT.