

Road Impact Fee Study

FINAL REPORT
December 2007

PREPARED FOR

Town of Westfield



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CERTIFICATION

I certify that this Road Impact Fee Study has been conducted by me or under my direct supervision and that I have training and experience in the field of traffic and transportation engineering.

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1 Introduction

1.1 Study Purpose

The Town of Westfield, Indiana is experiencing rapid growth in both population and employment. This growth causes increased demand on the Town's infrastructure, including its road network. Westfield currently assesses a road impact fee on new development to help fund the roadway capital improvements necessary to serve this growing traffic demand. The Town has commissioned this study to update its existing road impact fee and the supporting documentation. The study identifies Westfield's anticipated roadway capital improvement needs in light of the latest projections for land-use development in the area between 2007 and 2017. It also establishes the road impact fees and assessment rates that should be applied to new development in order to help fund roadway those capital improvements. In accordance with the Indiana Code requirements for impact fees,¹ which are shown in **Appendix A**, this report:

- Designates geographic "impact zones" for road impact fees to be collected by Westfield.
- Describes the nature and location of existing infrastructure in the impact zones.
- Establishes "community level of service" criteria by which to assess whether roads in the impact zones are providing adequate service to users.
- Estimates the nature and location of development that is expected to occur in the impact zones during the next 10 years.
- Estimates the nature, location, timing and cost of road improvements that are needed to meet community level of service criteria both now and through 2017 with anticipated new development.
- Identifies revenue sources and estimated amounts that Westfield has spent on roads in the previous 5 years and intends to spend on capital improvements through 2017.

A TransCAD computerized travel demand model was developed for the Westfield area and used to conduct this impact fee study. The use of this model is expected to make future updates of the impact fee study easier to implement. The model is also expected to provide benefits beyond the impact fee study, by allowing the Town to more easily evaluate the potential impacts of proposed land use or roadway changes on the entire transportation network.

1.2 Study Area

The Westfield Road Impact Fee Study analyzes roadway improvement needs within the Town of Westfield and the surrounding unincorporated areas of Washington Township. **Figure 1-1** is a map of the existing study area road network. **Figure 1-2** is the Westfield Thoroughfare Plan,

¹ IC 36-7-4-1300 Series, Impact Fees

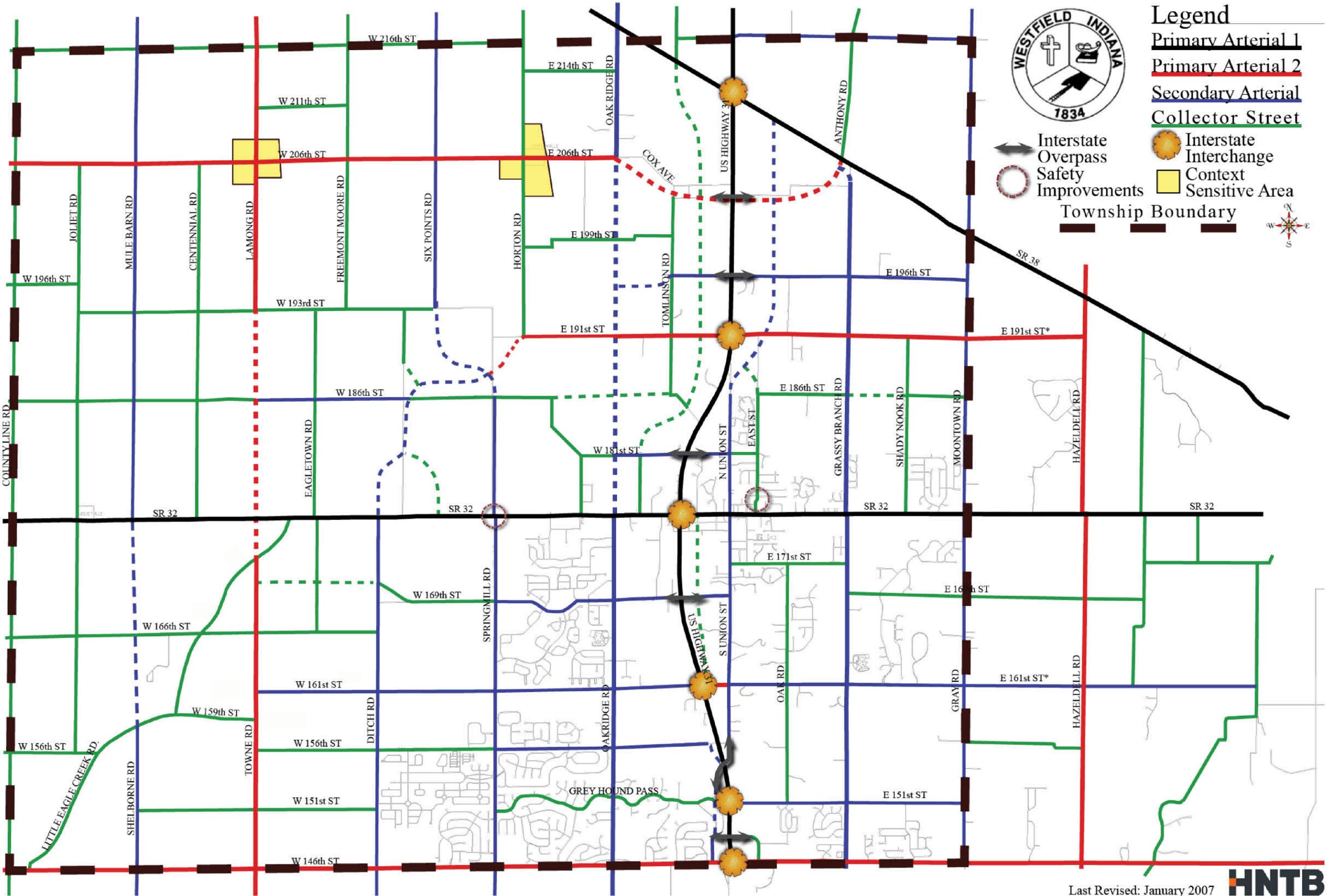


which shows the intended future roadway network and the relative importance of roads in the study area.

The Town of Westfield Public Works Department is responsible for construction and maintenance of public roads within the corporate limits of the Town of Westfield, with the following exceptions:

- The Indiana Department of Transportation is responsible for construction and maintenance on the federal and state routes—US 31, SR 32 and SR 38
- The Hamilton County Highway Department is responsible for construction and maintenance on 146th Street, which runs along the southern boundary of Washington Township
- The City of Noblesville is responsible for construction and maintenance on Moontown Road within incorporated areas on the eastern boundary of Washington Township

Town of Westfield, IN: Future Thoroughfare Plan



- Legend**
- Primary Arterial 1
 - Primary Arterial 2
 - Secondary Arterial
 - Collector Street
 - Interstate Interchange
 - Safety Improvements
 - Context Sensitive Area
 - Township Boundary

Last Revised: January 2007 **HNTB**



1.3 Historical Funding Sources

The Town of Westfield has used four sources of funding for road construction and maintenance over the past five years. These include impact fees collected under the current ordinance, state distributions of funds from the Local Road and Street account and the Motor Vehicle Highway account, and tax increment financing (TIF). The TIF funds have been used only for projects in the designated TIF district surrounding the Village Park Plaza shopping center. **Table 1-1** shows the amount of funding expended from each source.

Table 1-1: Funding Sources for Road Construction and Maintenance—2003 to 2007

	Road Impact Fees	LRS State Distribution	MVH State Distribution	Tax Increment Financing	Total
2003	\$101,507	\$108,799	\$264,407	\$0	\$474,713
2004	\$586,209	\$108,635	\$299,133	\$0	\$993,977
2005	\$908,082	\$134,210	\$303,255	\$0	\$1,345,547
2006	\$909,895	\$162,190	\$362,496	\$904,408	\$2,338,989
2007*	\$992,376	\$246,903	\$416,423	\$1,150,029	\$2,805,731
TOTAL	\$3,498,069	\$760,737	\$1,645,714	\$2,054,437	\$7,958,957

* 2007 numbers represent total appropriated amounts rather than actual expenditures



2 Community Level of Service Criteria

The term “community level of service” is defined by Indiana Code as “a quantitative measure of the service provided by the infrastructure that is determined by a unit to be appropriate.”¹ This section of the report describes the measures used for determining the appropriate level of service for Westfield’s road infrastructure. Separate criteria for traffic operations and roadway cross section are used to measure the levels of service provided on road segments and at intersections.

2.1 Road Segment Levels of Service

Traffic Operations

The primary Level of Service (LOS) measure applied to roadway segments in Washington Township is the Highway Capacity Level of Service measured using the methods of the Transportation Research Board *Highway Capacity Manual (HCM)*². This document provides methods to quantify the quality of traffic operations perceived by users of many different types of transportation facilities. These methods are commonly used by traffic engineers when they are planning, designing and analyzing transportation facilities. The specific LOS criteria and calculation methods differ depending on the type of transportation facility being analyzed. However, a scale of “A” to “F” is established for each facility type, based on the quantitative LOS values. An LOS of “A” represents the best quality of service, while an LOS of “F” represents the worst. For Westfield, an LOS of “D” is established as the minimum acceptable for the operational analysis of roadway segments.

The road segments under study in Westfield fall into three separate facility categories as defined by the HCM, each with separate LOS criteria and calculation methods. Road segments that have a signalized intersection spacing of 2 miles or less are analyzed as urban streets, with LOS measured in terms of average travel speed over a segment. Two-lane highway segments with signal spacing greater than 2 miles are analyzed as rural highways, with LOS measured both by the percent time spent following other vehicles and by the average travel speed over a roadway segment. For multi-lane roadway segments (two or more travel lanes per direction) with signal spacing greater than 2 miles, LOS is measured in terms of average travel speed and the density of traffic flow on the road.

For this study, tables developed by the Florida Department of Transportation for its *Quality/Level of Service Handbook*³ were used to estimate roadway segment LOS under current and projected conditions. These tables were developed for infrastructure planning purposes by using the methods of the HCM with some default parameters. While these tables would not be

² Transportation Research Board, *Highway Capacity Manual*, National Research Council, Washington, DC, 2000

³ Florida Department of Transportation, *Quality/Level of Service Handbook*, Tallahassee, 2002



considered appropriate for facility design or detailed operational analysis, they are appropriate for generalized identification of problem locations, especially under future conditions of uncertain travel demand. These tables were used to identify roadway facilities with unacceptable traffic operations LOS based on the facility type, number of through lanes and current or forecast traffic volumes. Daily volumes were used for this analysis, as they are considered to be more reliable than estimates of future hourly volumes.

Appendix B contains the tables from the *Florida Quality/Level of Service Handbook* that were used for this study.

Roadway Cross Section

Traffic operations analysis by itself does not adequately reflect the level of service that Westfield's roads should provide to users. Much of the roadway infrastructure in Washington Township was constructed with pavement width and design appropriate for rural, low volume conditions and not for the traffic volumes that are expected over the next 10 years. As traffic volumes on these roads increase, there will be impacts to safety and pavement condition in addition to capacity.

To help minimize traffic crashes and excessive roadway maintenance on 2-lane roadways with inadequate design, a cross section LOS standard is also applied to roadway segments. Acceptable LOS per this standard is that any road segments carrying a volume of at least 5,000 vehicles per day will have a minimum of 11-foot wide travel lanes and 2-foot wide shoulders.

Roadway segments that were identified as having either existing 2007 or projected 2017 daily traffic volumes of at least 5,000 vehicles were surveyed in the field to determine whether they have a pavement width of at least 22 feet. Those segments with insufficient pavement width were identified for improvement.

2.2 Intersection Level of Service

As with roadway segment traffic operations, intersection traffic operations LOS was determined based on the procedures of the HCM. A minimum acceptable LOS of "D" is required for each intersection approach and traffic movement with significant volumes. For each analyzed intersection, the lane configuration necessary to achieve acceptable LOS was determined using the Synchro traffic simulation⁴ software, which can evaluate LOS using the HCM methods. In some instances, an LOS of "E" or "F" will be tolerated for individual low volume traffic movements if the overall approach LOS is acceptable or the intersection does not warrant additional traffic control. Intersections on proposed new road segments and on existing segments that warrant reconstruction to meet cross section LOS standards were assumed to

⁴ Trafficware, Ltd., Synchro plus SimTraffic Traffic Signal Coordination Software, Version 7, 2007



include auxiliary lanes per Indiana Department of Transportation and Town of Westfield design standards.

In order to identify the roadway improvements required to provide adequate LOS at each intersection, it was also necessary to determine the appropriate traffic control at that intersection. Appropriate intersection traffic control was determined by using the traffic signal and multi-way stop control warrant procedures of the Indiana Manual on Uniform Traffic Control Devices (MUTCD)⁵. **Table 2-1** shows the minimum average daily traffic volumes on the intersecting roads required by the Indiana MUTCD to warrant installation of a traffic signal. Signal warrants based on average daily traffic volumes are provided in the MUTCD to warrant the temporary installation of traffic signals where a new intersection is to be constructed or where existing traffic is expected to change significantly. The use of current or projected daily traffic volumes is not a substitute for a full warrant analysis with hourly volume data and is used in this study only to indicate where new traffic signals are likely to be required.

Table 2-1: Traffic Signal Warrants Based on Daily Volumes

Approach Lanes		Daily Approach Volumes From Both Directions			
		Condition A1 -- Minimum Vehicular Volume		Condition A2 -- Interruption of Continuous Traffic	
Major Street	Minor Street	Major Street	Minor Street	Major Street	Minor Street
1	1	8,300	4,600	12,500	2,300
2	1	10,000	4,600	15,000	2,300
2	2	10,000	6,000	15,000	3,100
1	2	8,300	6,000	12,500	3,100

Source: Indiana MUTCD, Table 4C-1a

Table 2-2 shows the minimum average daily traffic volumes used in this study to indicate the need for multi-way stop control at intersection. The MUTCD does not contain multi-way stop warrants based on daily traffic volumes, but they were estimated for this study using the same ratio of hourly to daily volumes as was used for traffic signal warrants provided in the MUTCD.

⁵ Indiana Manual on Uniform Traffic Control Device, Indiana Department of Transportation, available online at <http://www.in.gov/dot/div/contracts/design/mutcd/mutcd.html>

**Table 2-2: Multi-way Stop Warrants Based on Daily Volumes**

Daily Volumes Approaching From Both Directions			
Each of 8 hours		Estimated Daily*	
Major Street	Minor Street	Major Street	Minor Street
300	200	4,980	3,320

*Not official MUTCD Warrants

The Town of Westfield is interested in the use of roundabouts as an intersection traffic control alternative to multi-way stop control and traffic signals. A roundabout is currently being designed for the intersection of 151st Street and Carey Road. While it is recognized that the Town may ultimately decide to construct roundabouts as an alternative method of traffic control at particular intersections, the traffic control recommendations and costs for this study were based on the construction of signalized or stop-controlled intersections.



3 2007 Existing Conditions and Needs Assessment

3.1 Traffic Volumes

Recent roadway segment and turning movement counts were obtained from various sources, including the Town of Westfield, the Hamilton County Highway Department, The Indiana Department of Transportation, the City of Carmel, and the Boone County Highway Department. Additional 24-hour segment counts and peak period intersection turning movement counts were collected at key network locations as part of this study.

Where recent road segment counts were not available or collected as part of this study, segment traffic volumes were estimated based on the counts from adjacent segments. Where peak hour turning movement volumes were not available or collected, these volumes were estimated from the volumes on the intersection approach links using methods described in Chapter 8 of National Cooperative Highway Research Project Report 255⁶ and Chapter 10 of the Highway Capacity Manual.

Figure 3-1 shows the existing daily traffic volumes on the study area road network segments. Existing peak hour turning movement volumes at intersections are provided in **Appendix C**.

⁶ Pederson, N.J., and D.R. Samdahl, Highway Traffic Data for Urbanized Area Project Planning and Design National Cooperative Highway Research Program Report 255, Transportation Research Board, Washington, D.C., 1982.



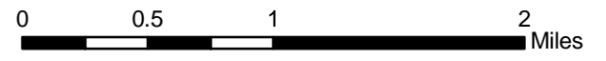
3.2 Intersection Traffic Control

The existing lane configuration and traffic control at each study area intersection was determined through field inventory. In addition, warrants for traffic signals and multi-way stop control were evaluated based on existing intersection traffic volumes. **Figure 3-2** shows existing and warranted intersection traffic control based on 2007 conditions.

Westfield Road Impact Fee Study

Figure 3-2 Existing & 2007 Warranted Traffic Control Devices

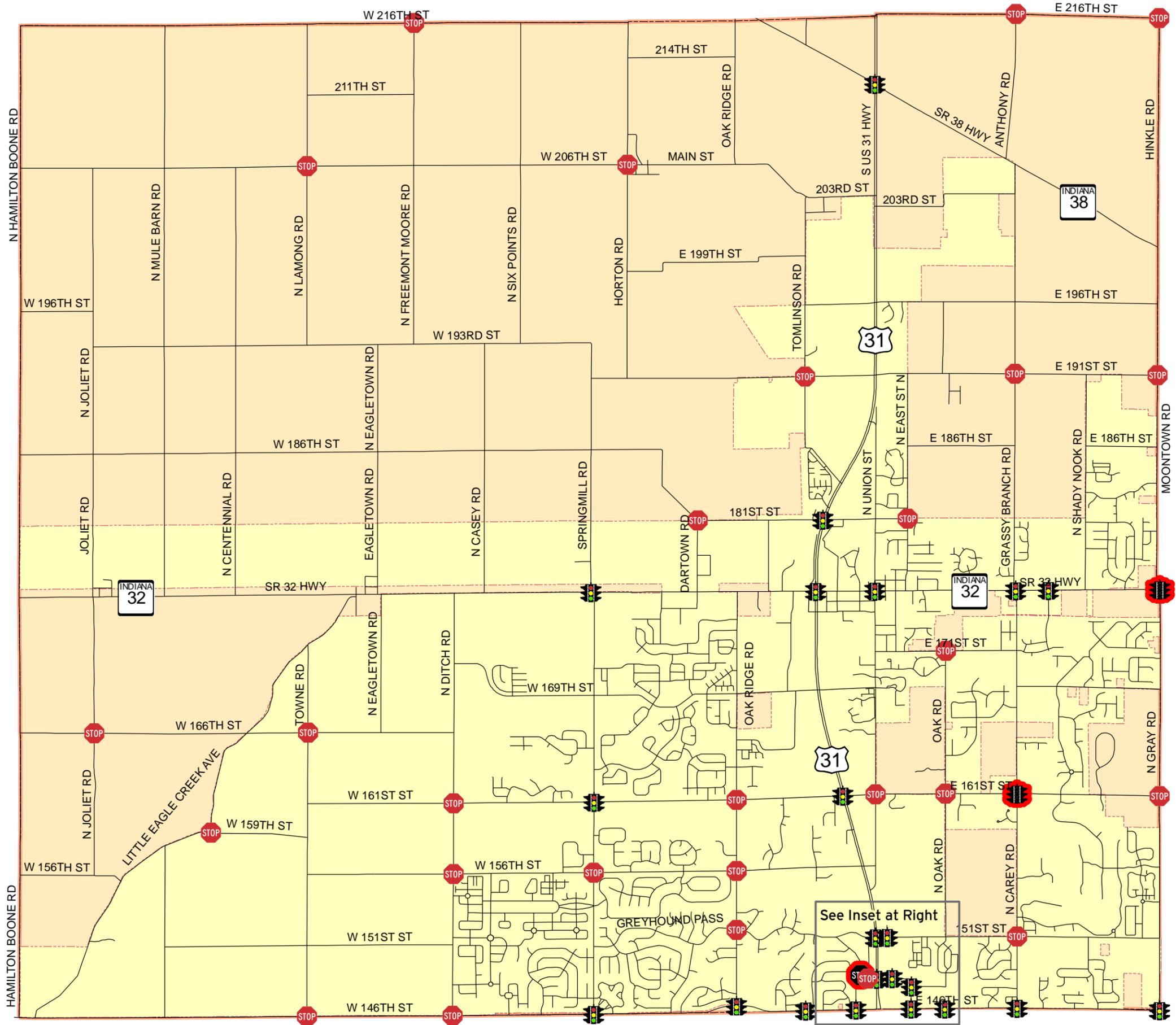
-  Existing Traffic Signal
-  Daily Volumes Warrant New Traffic Signal
-  Existing All-way Stop
-  Daily Volumes Warrant New All-way Stop
-  Town of Westfield
-  Washington Township



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Greyhound Pass Area Inset



3.3 Levels of Service and Infrastructure Needs

Roadway segment and intersection levels of service were determined under existing 2007 conditions using the criteria and methods described in Section 2, Community Level of Service Criteria. **Table 3-1** lists the roadway segments that currently do not meet the roadway cross section LOS criterion of a 22-foot minimum paved width for segments carrying at least 5,000 vehicles per day. **Figure 3-3** shows the intersections and segments in the study area that do not meet minimum acceptable traffic operations LOS under existing conditions. Finally, **Figure 3-4** summarizes the existing roadway improvement needs for roads that are currently or anticipated to be the responsibility of the Town of Westfield.

Table 3-1: 2007 Roadway Segment Cross Section Deficiencies

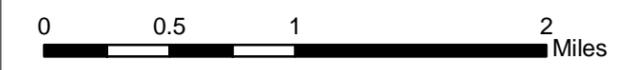
Road	Begin	End	Average Daily Traffic Volume	Typical Paved Width (feet)
Carey Road	Springmeadow Ln	151st Street	6100	21
Carey Road	151st Street	161st Street	9300	21
Springmill Road	Merrimac Dr	Greyhound Pass	7700	21
Springmill Road	Greyhound Pass	156th Street	8300	21
Springmill Road	156th Street	161st Street	6200	21
Springmill Road	161st Street	169th Street	5500	21
Springmill Road	169th Street	SR 32	5100	21

Westfield Road Impact Fee Study

Figure 3-4 2007 Roadway Improvement Needs

-  Widen & Overlay - 2 Lanes
-  New Traffic Signal or Roundabout

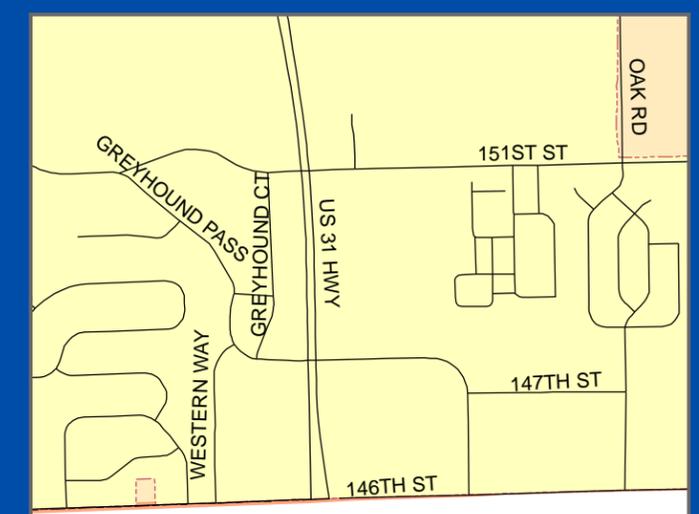
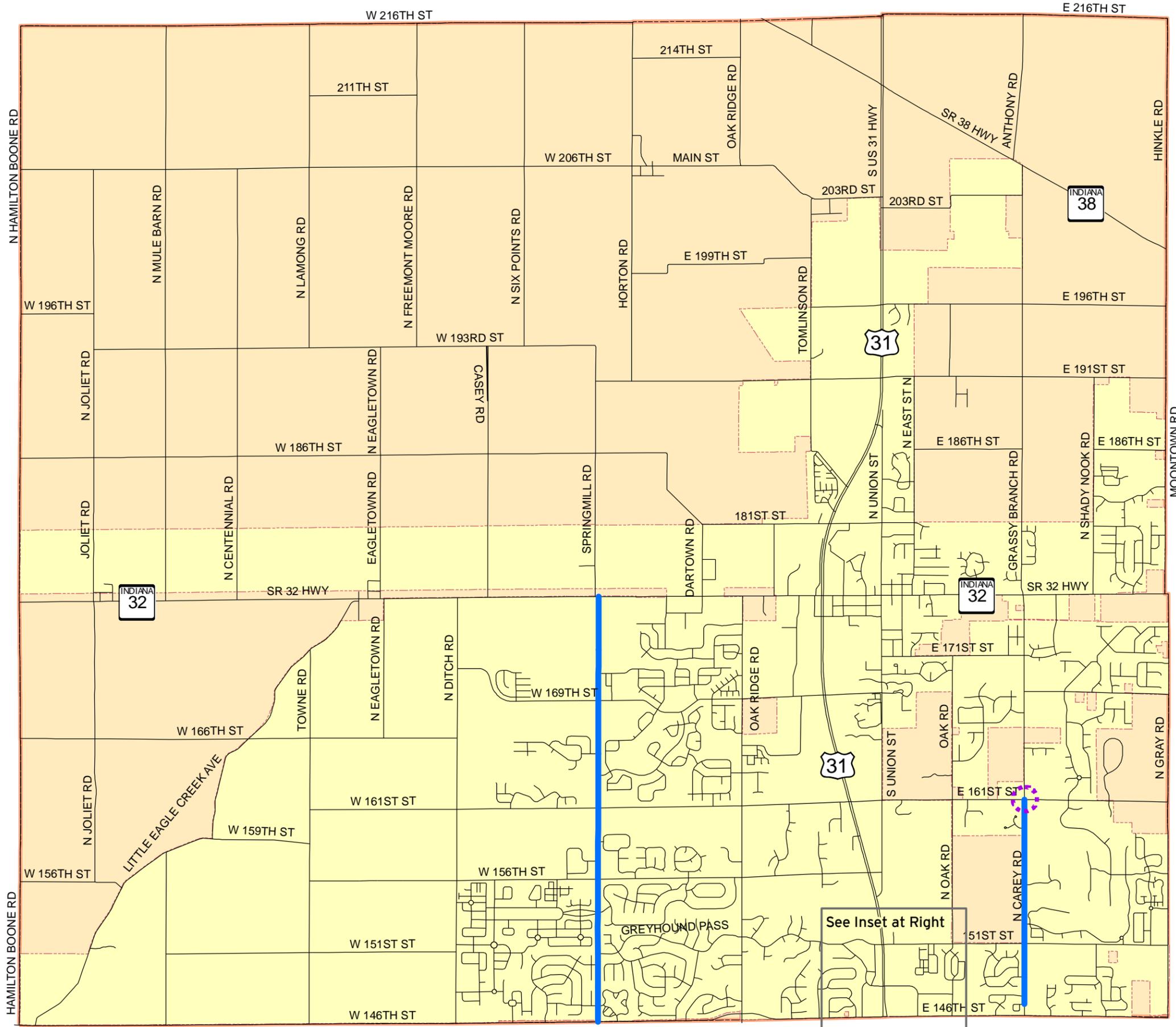
-  Town of Westfield
-  Washington Township



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Greyhound Pass Area Inset



4 2017 Travel Demand Forecast

4.1 Forecast Method

To allow for consistent system-wide traffic forecasting for Westfield and Washington Township, a travel demand model was developed for the area. A travel demand model uses a four-step process of trip generation, trip distribution, mode choice, and route assignment to forecast future traffic volumes based on user-defined inputs. In Westfield, because public transit represents a very small share of total trips, the model excludes the mode choice step and assumes all trips are made by automobiles and trucks.

To ensure adequate model performance in all of Washington Township, the Westfield travel demand model was developed to cover an area larger than the study area itself. The modeled area is bounded by: Hazel Dell Parkway, Little Chicago Road, and Cammack Road on the east; 236th Street and SR 47 on the north; Boone County Road 1000 East and US 421 on the west; and 131st Street on the south. In addition to Washington Township, this area includes portions of Clay, Noblesville, Jackson, and Adams Townships in Hamilton County and Marion, Union, and Eagle Townships in Boone County. **Figure 4-1** shows the model area in relation to Westfield and Washington Township.

The modeled area is divided into small areas called Traffic Analysis Zones (TAZs), which are assumed to be reasonably homogeneous. **Figure 4-2** shows the TAZs for the portions of the model lying in Washington Township. For each TAZ, household and employment totals were calculated and broken into categories (such as retail, service, and basic employment) for trip generation purposes. The other major input to the model is the roadway network—for the Westfield model, this includes all existing streets shown on the Thoroughfare Plan. Data such as facility type/functional classification, number of lanes, type of access control, and existing traffic were entered into the model for each roadway in the network.

The main output generated by the model is a daily traffic volume forecast for each roadway link in the model network. The model is also designed to provide link volumes for the AM and PM peak hours. This information is used as an input to the needs analysis discussed in Section 5. For more detailed information on the modeling process used in this analysis, refer to **Appendix D**.

Westfield Road Impact Fee Study

Figure 4-1 Study Modeling Area

-  Model Area Boundary
-  Model Network Roads

 Town of Westfield

 Township Boundaries

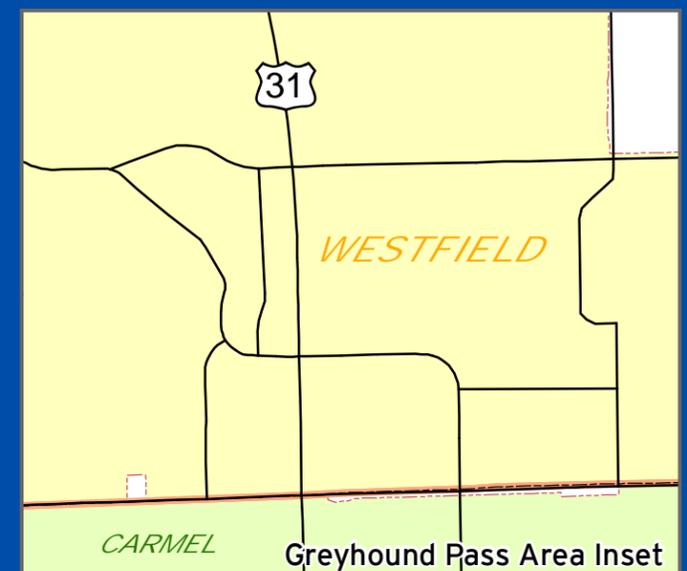
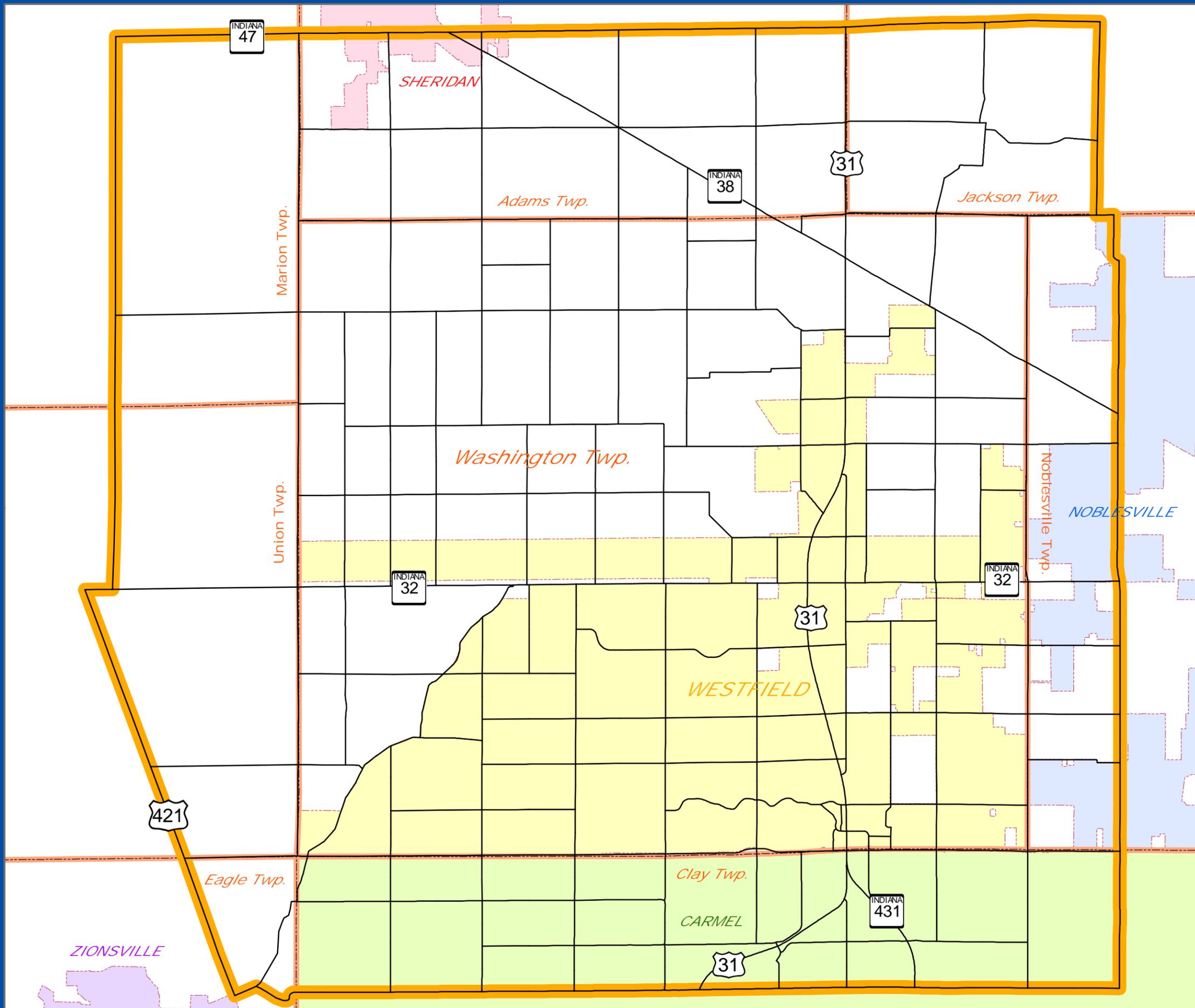
 N

 0 0.5 1 2 3 Miles

December 2007

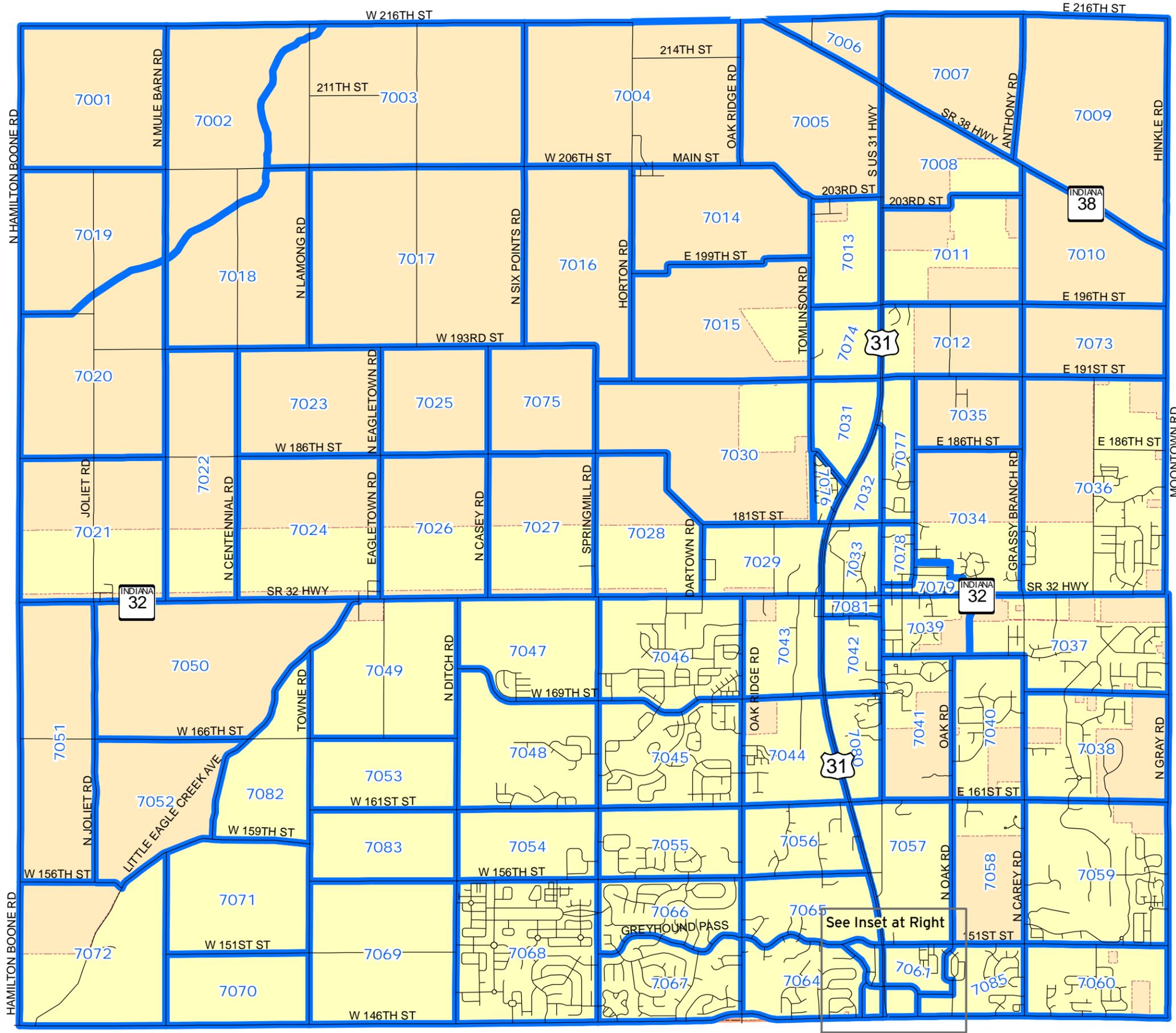


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Westfield Road Impact Fee Study

Figure 4-2 Washington Township Traffic Analysis Zones



Traffic Analysis Zones (TAZs)

Town of Westfield

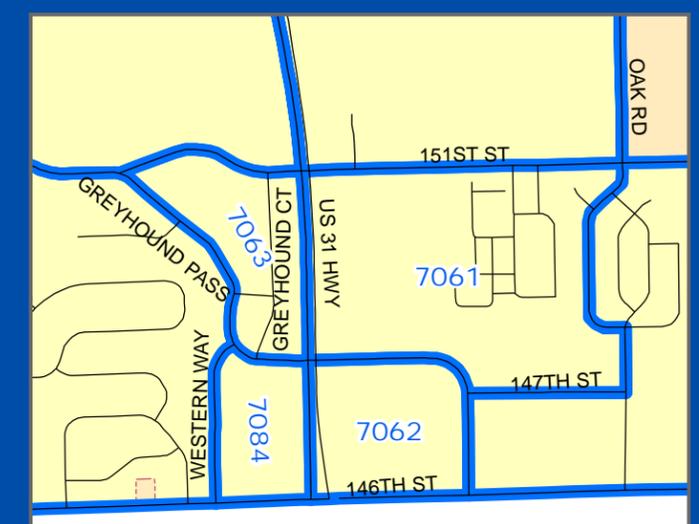
Washington Township



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Greyhound Pass Area Inset



4.2 Travel Demand Model Calibration

In principle, a travel demand model should be able to replicate existing traffic patterns when given existing housing, employment, and road network inputs. Calibration is the process of modifying the assumptions made about input data and the internal model calculations to ensure that the model is capable of replicating existing conditions within a certain variance. Once the model replicates existing conditions within this acceptable range, the model is validated and can be used to forecast future conditions.

For the Westfield model, calibration was performed by adjusting internal model calculations, such as trip generation rates, and by adjusting road network attributes, such as the location of centroid connectors and the facility types of roads. For more detailed information on model calibration, and for validation statistics, refer to **Appendix D**.

4.3 Housing and Employment Growth Forecast

Household data for 2007 was estimated by taking block-level household totals from the 2000 Census and aggregating these to the TAZ level. Aerial photography and parcel information available from Hamilton County was used to update the 2000 Census figures to 2007. Additional household information necessary for modeling—such as workers, vehicles, and persons per household—was estimated by assuming the proportion between households and these other items remained constant from 2000 to 2007. Employment data for 2007 was developed based on point-level employment data obtained from Claritas. This information was error-checked for major omissions, double-counts, and erroneous business locations, and corrected as necessary.

Two main sources of information form the basis for the forecasts of households and employment to the year 2017. The first of these is a collection of plans and reports related to Planned Unit Developments (PUDs) in Westfield. Detailed site plans and traffic studies have been completed for many of these developments, allowing site-specific household and employment estimates to be developed. These PUDs account for 9,035 new housing units planned for construction by the year 2017. Assuming 80% occupancy of these new homes by that date, this represents 7,228 added households. Estimated employment growth in the PUDs is based on square footage (or acreage) information for commercial or industrial land uses multiplied by standard ratios of employees-to-area for various types of businesses. The total number of new employees generated by this calculation is 5,923. For more detailed information on the assumptions for planned developments, refer to **Appendix E**.

The second source of guidance on future development in Westfield is the Comprehensive Plan. This plan indicates general areas that are likely to become developed in the future, as well as the likely type and intensity of development to occur. Calculation of housing and employment growth based only on the information from specific PUDs would not address any other potential



development outside of these areas. To account for anticipated growth in other areas designated in the Comprehensive Plan, Ten percent of PUD growth (723 households and 593 employees) was shifted to other zones where growth is likely to occur within the next 10 years. **Table 4-1** summarizes the household and employment projections for each TAZ in Washington Township; **Figure 4-3** and **Figure 4-4** show this information in a graphic format. For more information on household and employment projections in areas outside Washington Township, refer to **Appendix D.**, which describes travel demand modeling procedures.

Table 4-1: Household and Employment Projections

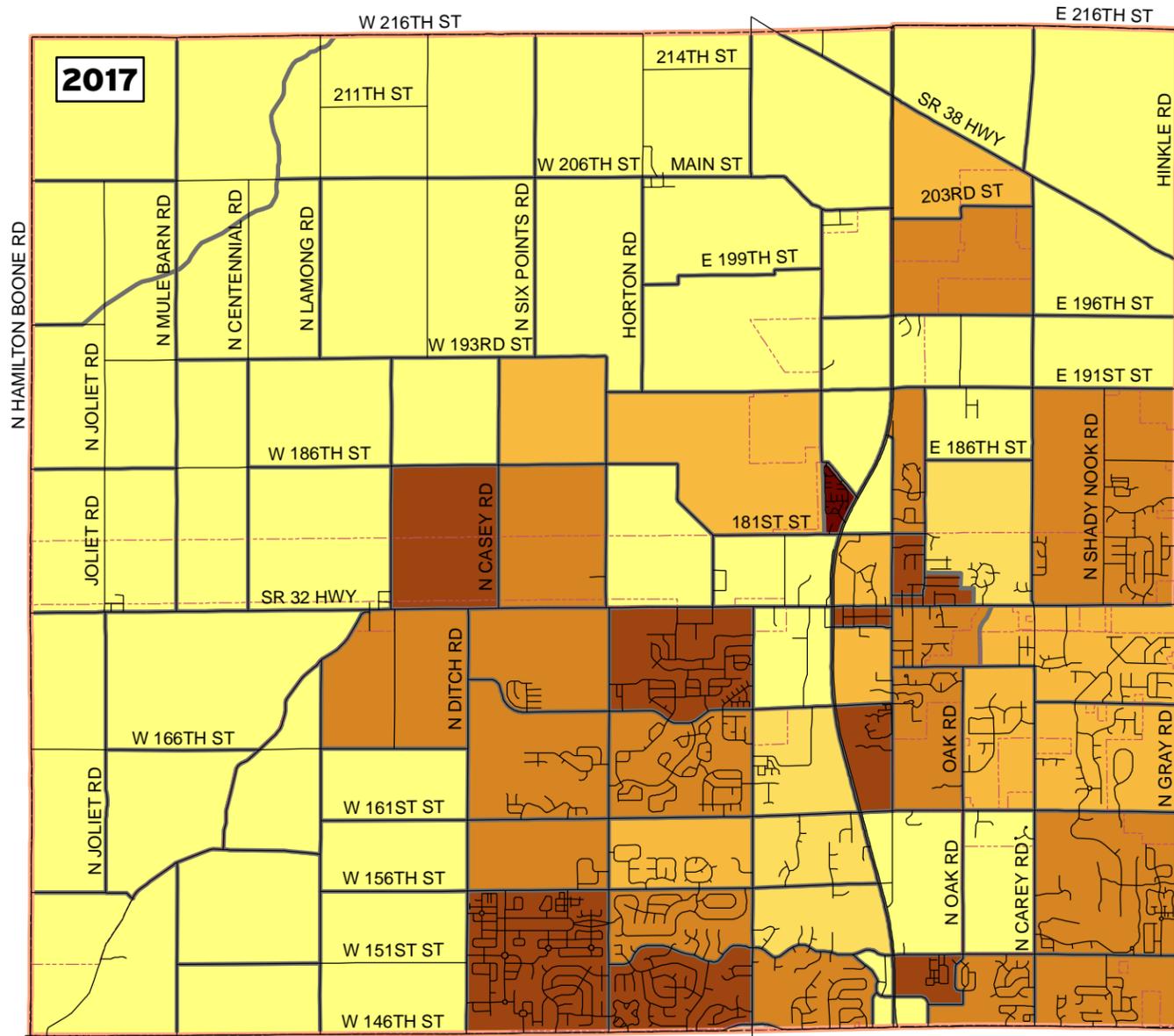
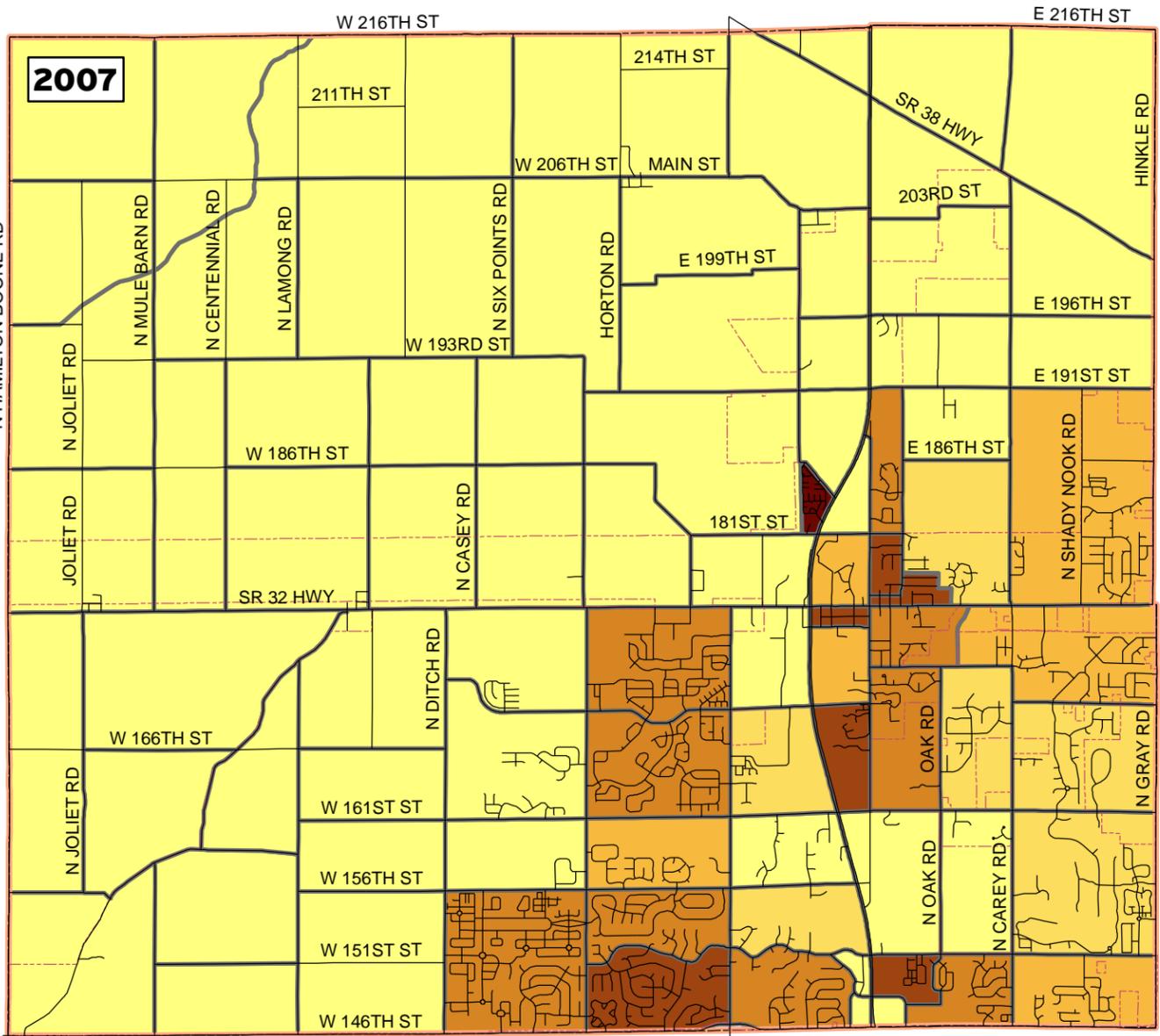
TAZ	2007 Households	2017 Households	Hous. Growth	2007 Employment	2017 Employment	Emp. Growth
7001	20	20	0	0	0	0
7002	14	14	0	0	0	0
7003	43	43	0	4	4	0
7004	61	61	0	3	3	0
7005	30	30	0	0	75	75
7006	9	9	0	0	0	0
7007	23	23	0	17	17	0
7008	17	276	259	3	203	200
7009	28	28	0	11	11	0
7010	22	62	40	1	1	0
7011	13	426	413	367	1907	1540
7012	35	50	15	4	34	30
7013	10	10	0	8	43	35
7014	54	79	25	10	10	0
7015	38	68	30	11	11	0
7016	17	22	5	17	17	0
7017	28	28	0	2	2	0
7018	40	40	0	4	4	0
7019	7	7	0	10	10	0
7020	36	36	0	1	1	0
7021	82	82	0	37	47	10
7022	17	17	0	0	0	0
7023	15	55	40	13	13	0
7024	49	89	40	63	525	462
7025	24	24	0	3	3	0
7026	69	915	846	37	834	797
7027	8	452	444	225	915	690
7028	13	23	10	127	192	65



TAZ	2007 Households	2017 Households	Hous. Growth	2007 Employment	2017 Employment	Emp. Growth
7029	6	6	0	608	658	50
7030	23	513	490	15	92	77
7031	8	8	0	15	49	34
7032	0	0	0	76	76	0
7033	94	94	0	374	374	0
7034	213	228	15	195	195	0
7035	57	72	15	2	2	0
7036	498	1060	562	76	134	58
7037	335	376	41	462	497	35
7038	171	257	86	107	107	0
7039	214	214	0	442	442	0
7040	116	196	80	32	32	0
7041	561	561	0	18	18	0
7042	100	100	0	189	189	0
7043	23	23	0	882	882	0
7044	131	131	0	359	359	0
7045	743	743	0	98	98	0
7046	817	947	130	380	562	182
7047	6	476	470	93	209	116
7048	73	694	621	11	21	10
7049	31	729	698	25	232	207
7050	53	190	137	196	281	85
7051	59	59	0	24	24	0
7052	28	28	0	4	4	0
7053	18	38	20	24	24	0
7054	70	353	283	102	102	0
7055	221	221	0	27	37	10
7056	51	171	120	19	19	0
7057	37	52	15	238	238	0
7058	50	65	15	0	0	0
7059	317	659	342	68	68	0
7060	248	528	280	35	859	824
7061	243	243	0	1096	1096	0
7062	0	0	0	750	750	0
7063	1	1	0	292	292	0
7064	312	332	20	98	98	0
7065	82	132	50	205	205	0



TAZ	2007 Households	2017 Households	Hous. Growth	2007 Employment	2017 Employment	Emp. Growth
7066	512	512	0	16	16	0
7067	825	825	0	181	181	0
7068	1185	1280	95	223	223	0
7069	21	61	40	2	2	0
7070	9	29	20	0	0	0
7071	26	66	40	0	0	0
7072	79	79	0	9	9	0
7073	9	29	20	0	0	0
7074	38	38	0	21	46	25
7075	8	271	263	15	60	45
7076	243	243	0	132	132	0
7077	180	180	0	290	290	0
7078	187	187	0	291	291	0
7079	136	136	0	200	200	0
7080	338	338	0	111	373	262
7081	87	87	0	134	134	0
7082	19	63	44	0	0	0
7083	8	59	51	10	10	0
7084	0	0	0	226	226	0
7085	318	318	0	543	543	0
Total	11060	18288	7228	11019	16942	5923



Westfield Road Impact Fee Study

Figure 4-3 Household Growth

- | | | | |
|--|------------------------------------|---|---------------------------------|
|  | Less than 0.25 Households per Acre |  | 1 - 2 Households per Acre |
|  | 0.25 - 0.5 Households per Acre |  | 2 - 3 Households per Acre |
|  | 0.5 - 1 Households per Acre |  | More than 3 Households per Acre |

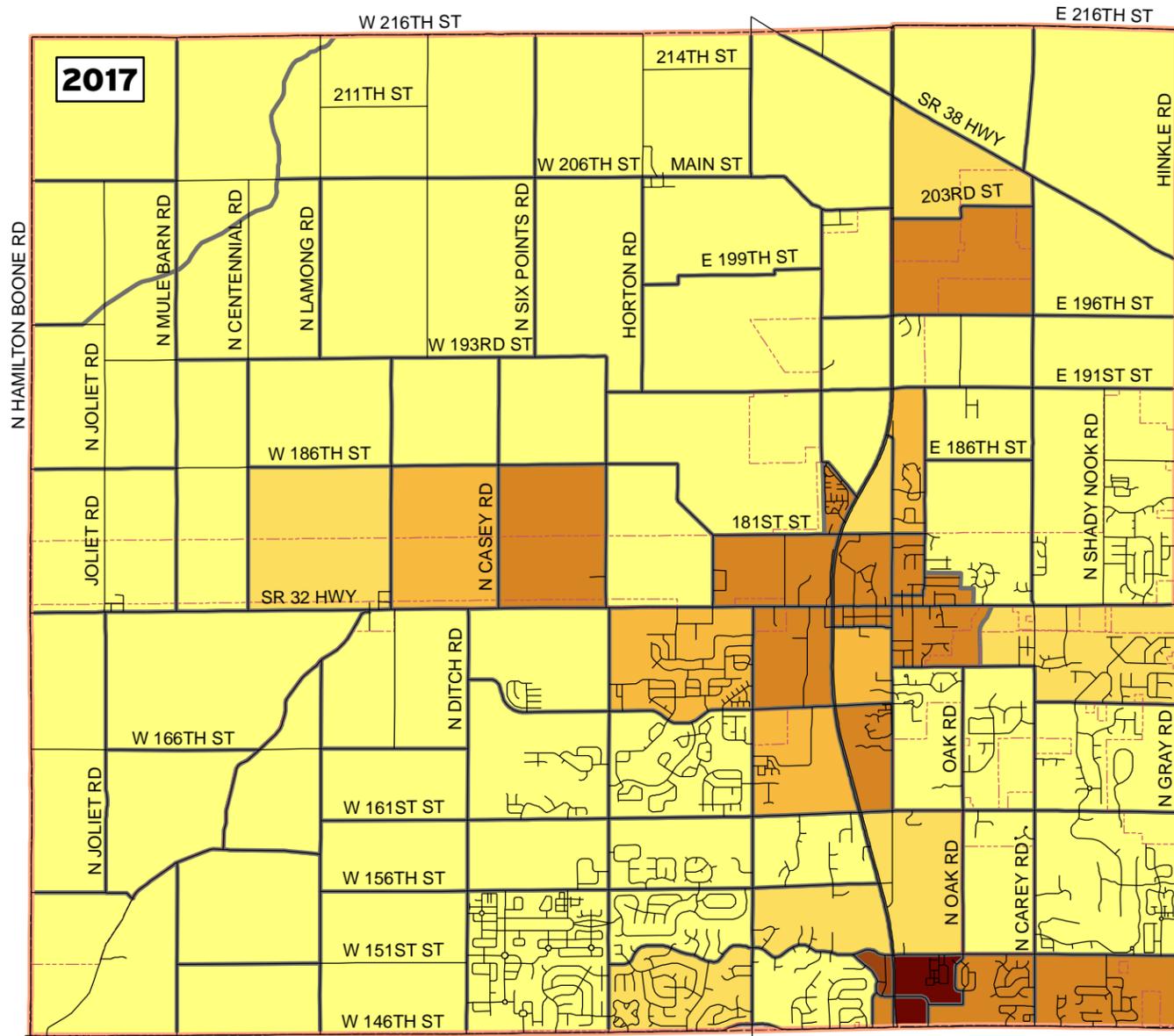
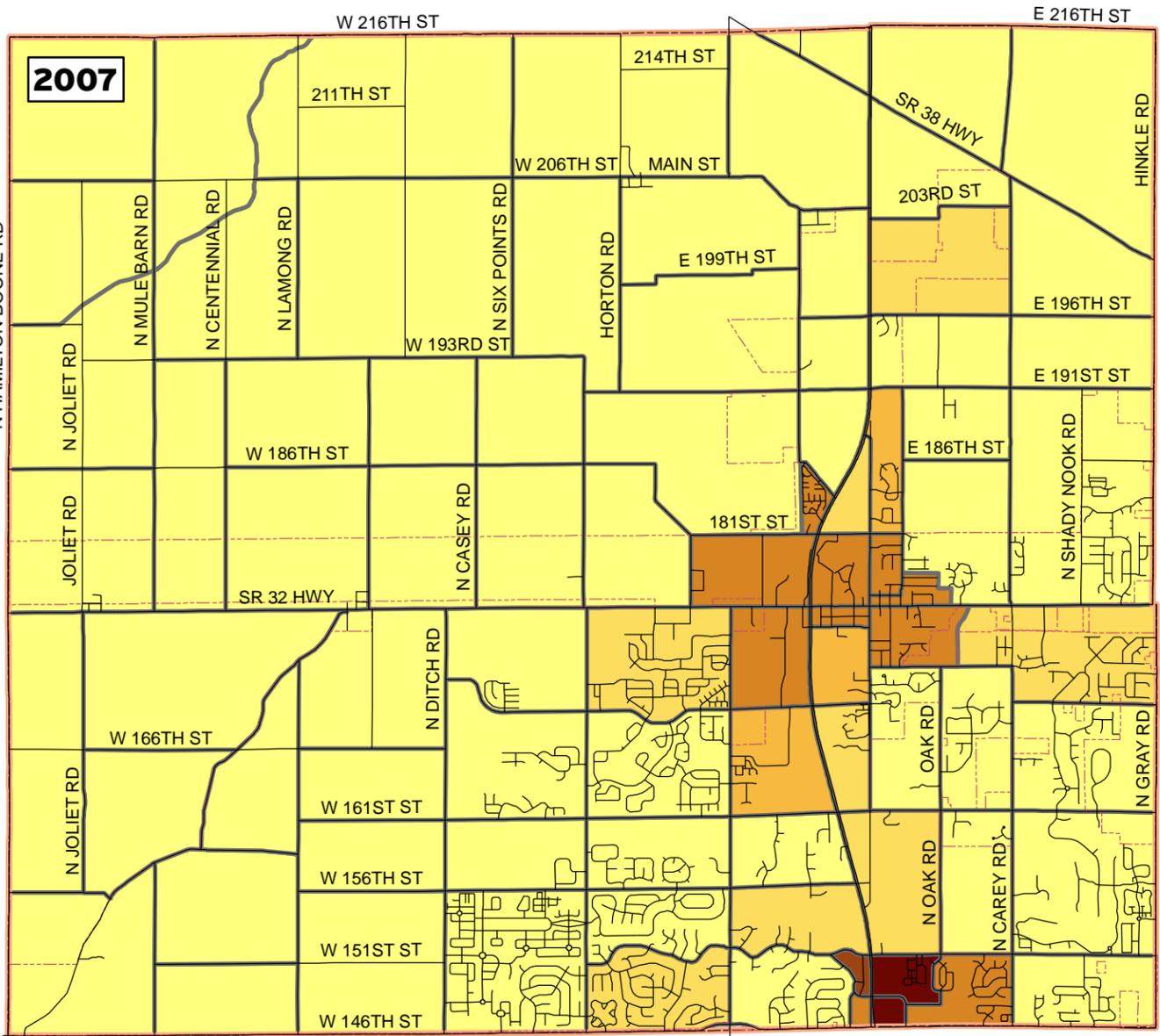


 Town of Westfield



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Westfield Traffic Impact Fee Study

Figure 4-4 Employment Growth

- Less than 0.5 Employees per Acre
- 0.5 - 1 Employees per Acre
- 1 - 2 Employees per Acre
- 2 - 5 Employees per Acre
- 5 - 10 Employees per Acre
- More than 10 Employees per Acre



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4.4 Committed Network Improvements

In order to model future roadway conditions, it is necessary to identify those transportation improvement projects that are already in the project development process and are likely to be in place by 2017. These “committed” projects are coded into the travel demand model. This allows analysis of the future network to include all planned improvements and focus on areas where there are additional improvement needs. **Table 4-2** lists each the committed projects that were coded as part of the 2017 roadway network.

The planned upgrade of US 31 to a limited access freeway facility from I-465 to SR 38 will have by far the most significant impact on travel in the Westfield area. The exact construction timing and design details (including interchange and overpass locations) of this upgrade are not yet finalized. For this analysis, the decision was made to develop two networks of committed network improvements: one with US 31 improvements, and one without.

Table 4-2: Committed Network Improvements in 2017 Travel Demand Model

Road	Location	Description	Source
US 31*	South model limit to SR 38	Upgrade to Freeway. Widen to 6 lanes. Add interchanges, frontage roads, and relocated property access points	INDOT
US 421	South model limit to 146 th St	Widen to 4/5 lanes	INDOT
SR 32	East model limit to Spring Mill Rd	Widen to 4 lanes	INDOT
Hazel Dell Pkwy	146 th St to SR 32	Widen to 4 lanes	City of Noblesville
146 th St	Spring Mill Rd to Boone County line	Widen to 4 lanes	Hamilton County
146 th St	Boone County line to US 421	Improved 2-lane section	Boone County
Towne Rd	South model limit to 146 th St	Widen to 4 lanes	City of Carmel
Greyhound Pass	US 31 to Western Way	Widen to 3/4 lanes	Westfield TIF
Western Way	Greyhound Pass to 146 th St	Widen to 3 lanes	Westfield TIF
East Access Rd	Greyhound Pass to 151 st St	New location 2-lane roadway	Westfield TIF
151 st St	Thatcher Lane to Carey Rd	Widen to 4 lanes	Westfield TIF

*US 31 improvements are included in one scenario and excluded from the other.



4.5 2017 Travel Demand

The TransCAD travel demand model was used to forecast 2017 network traffic volumes under two alternative scenarios of a committed highway network—one with US 31 upgraded to a freeway through the study area and one with no change to US 31. These two separate scenarios for the future were considered due to the significant impact that the US 31 upgrade is expected to have on traffic volumes throughout the Westfield road network and due to the uncertainty of whether this upgrade will be completed by the 2017 horizon of this study. **Figure 4-5** shows the average daily traffic volumes that are forecast for the proposed study area road network in 2017 if the US 31 freeway upgrade is complete at that time. **Figure 4-6** shows the average daily traffic volumes that are forecast for the proposed study area road network in 2017 if the US 31 freeway upgrade has not been completed. Morning and afternoon peak hour turning movement volume forecasts were developed using peak hour link forecasts from TransCAD and the turning movement estimation procedures of NCHRP Report 255. This is the same method that was used to estimate missing intersection turning movement volumes under existing conditions. 2017 forecast intersection turning movement volumes are provided in **Appendix C**.

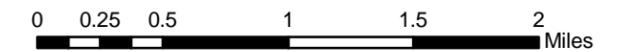
Ultimately, both sets of 2017 travel demand forecasts were considered in analyzing roadway improvement needs, as each case represents a different set of needs. Transportation patterns in and around Westfield are likely to shift appreciably when improvements are made to US 31. However, in the years between now and the time those improvements are made, traffic conditions on many roads in the area will continue to deteriorate.

Westfield Road Impact Fee Study

Figure 4-5 2017 Forecast Traffic Volumes With US 31 Freeway

Forecasted Average Daily Traffic

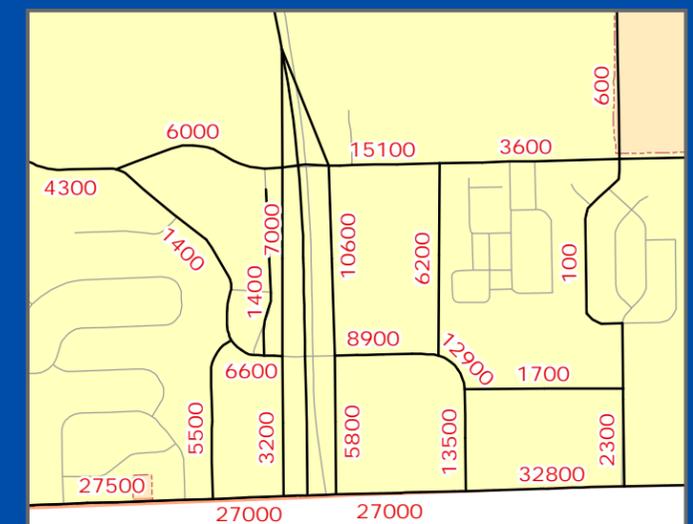
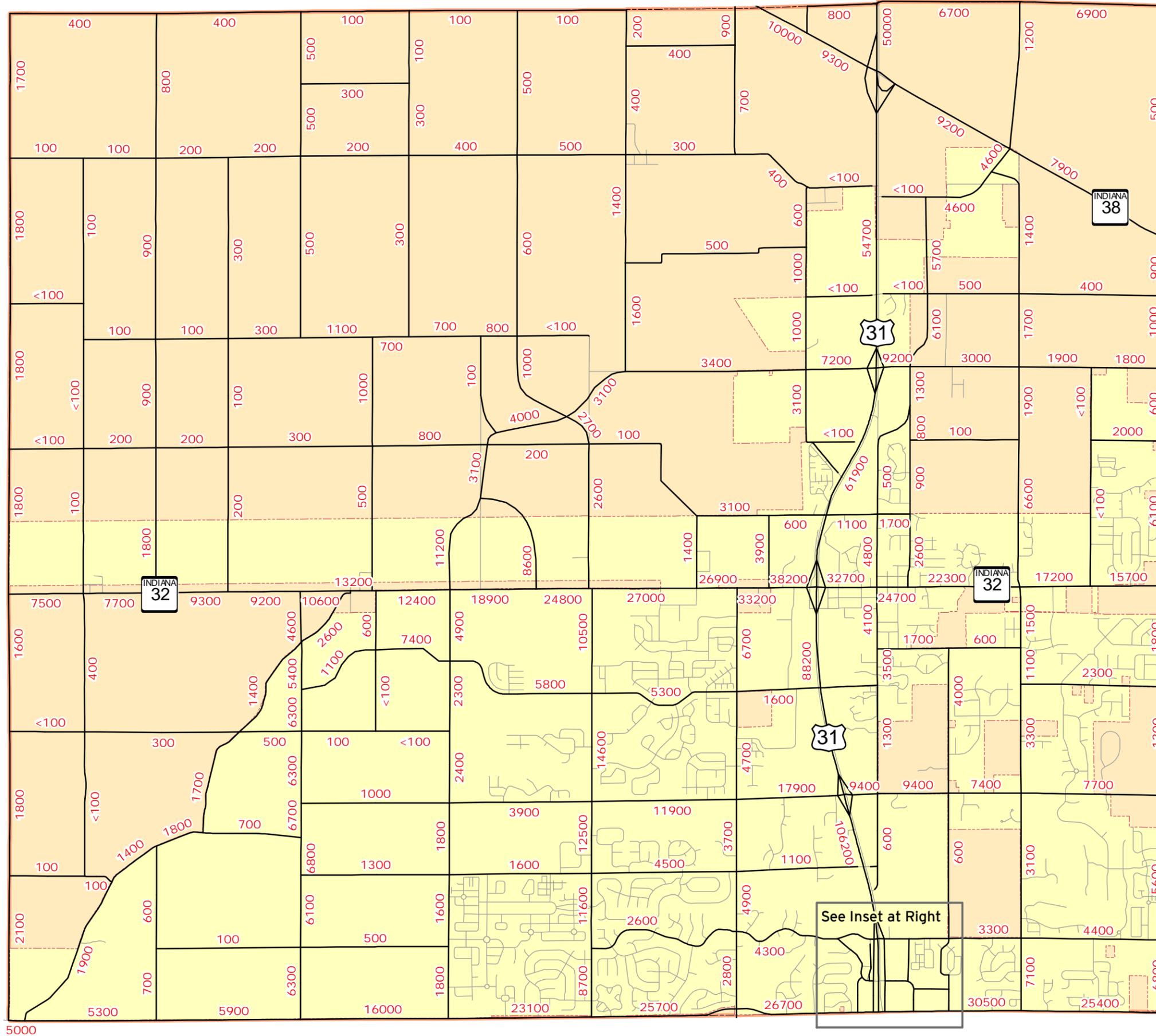
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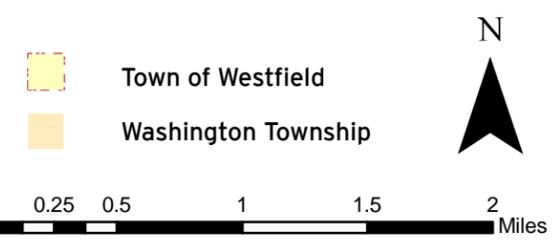


Greyhound Pass Area Inset

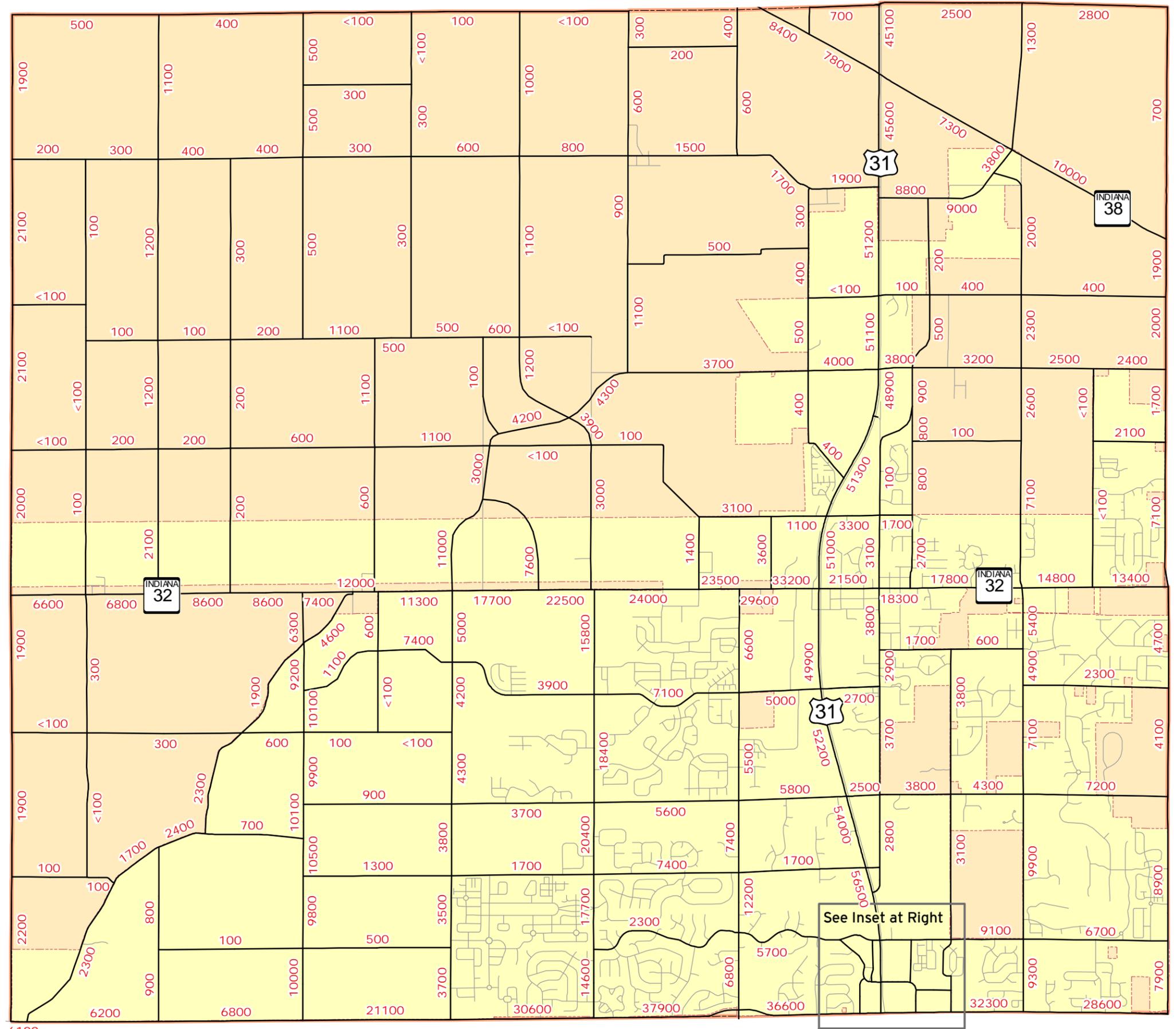
Westfield Road Impact Fee Study

Figure 4-6 2017 Forecast Traffic Volumes Without US 31 Freeway

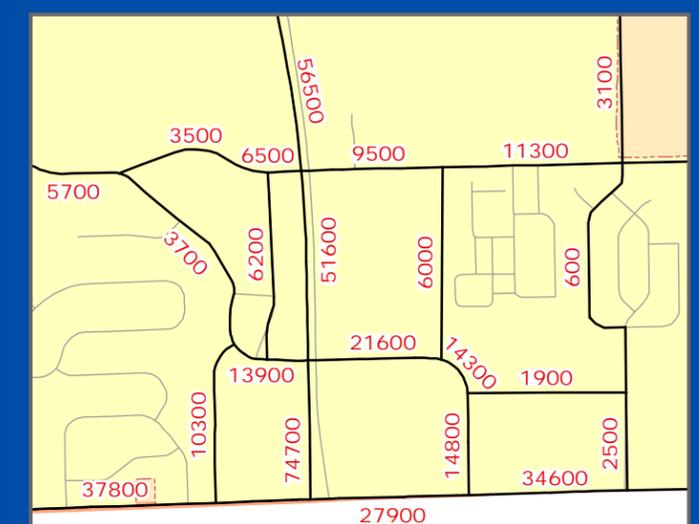
Forecasted Average Daily Traffic



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Greyhound Pass Area Inset



5 2017 Needs Assessment

Roadway capital improvements that will be necessary by 2017 were identified using the forecast 2017 traffic volumes and the same LOS criteria used to identify 2007 improvement needs. Because of the planned upgrade of US 31 to a freeway through the study area, two significantly different forecast scenarios exist for 2017. Until US 31 is upgraded to a freeway, traffic demand on parallel north-south facilities is expected to increase significantly, while traffic on east-west routes will increase to a lesser extent. Once US 31 is converted to a freeway facility, it is expected to draw traffic away from some of the parallel north-south roads, but will increase east-west traffic on local roads that lead to interchanges. Construction of the US 31 freeway is planned to occur sometime very near the 2017 horizon of this impact fee study, and the impacts to parallel north-south routes are expected to occur both before and during construction. For that reason, the 2017 needs assessment was based primarily on analysis of the forecast scenario without US 31 upgraded to a freeway. Some additional improvements to east-west roads were identified from the US 31 freeway scenario. In the future, as construction plans and timelines for the US 31 improvements become more clear, it may become necessary to update the 2017 needs identified in this study.

5.1 Intersection Traffic Control

The appropriate traffic control at each intersection under forecast 2017 traffic conditions was determined by using the traffic signal and multi-way stop control warrant procedures of the Indiana Supplement to the National MUTCD as discussed in Section 3.2. **Figure 5-1** shows the existing intersection traffic control and new traffic control that is expected to be warranted by 2017.

Westfield Traffic Impact Fee Study

Figure 5-1 2017 Warranted Traffic Control Devices

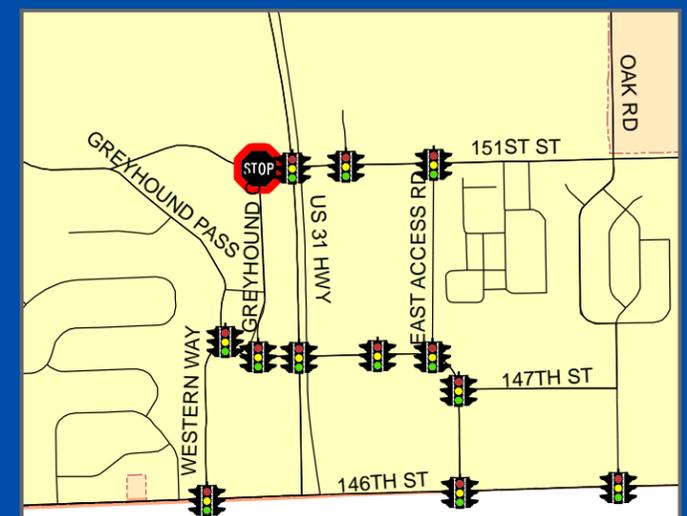
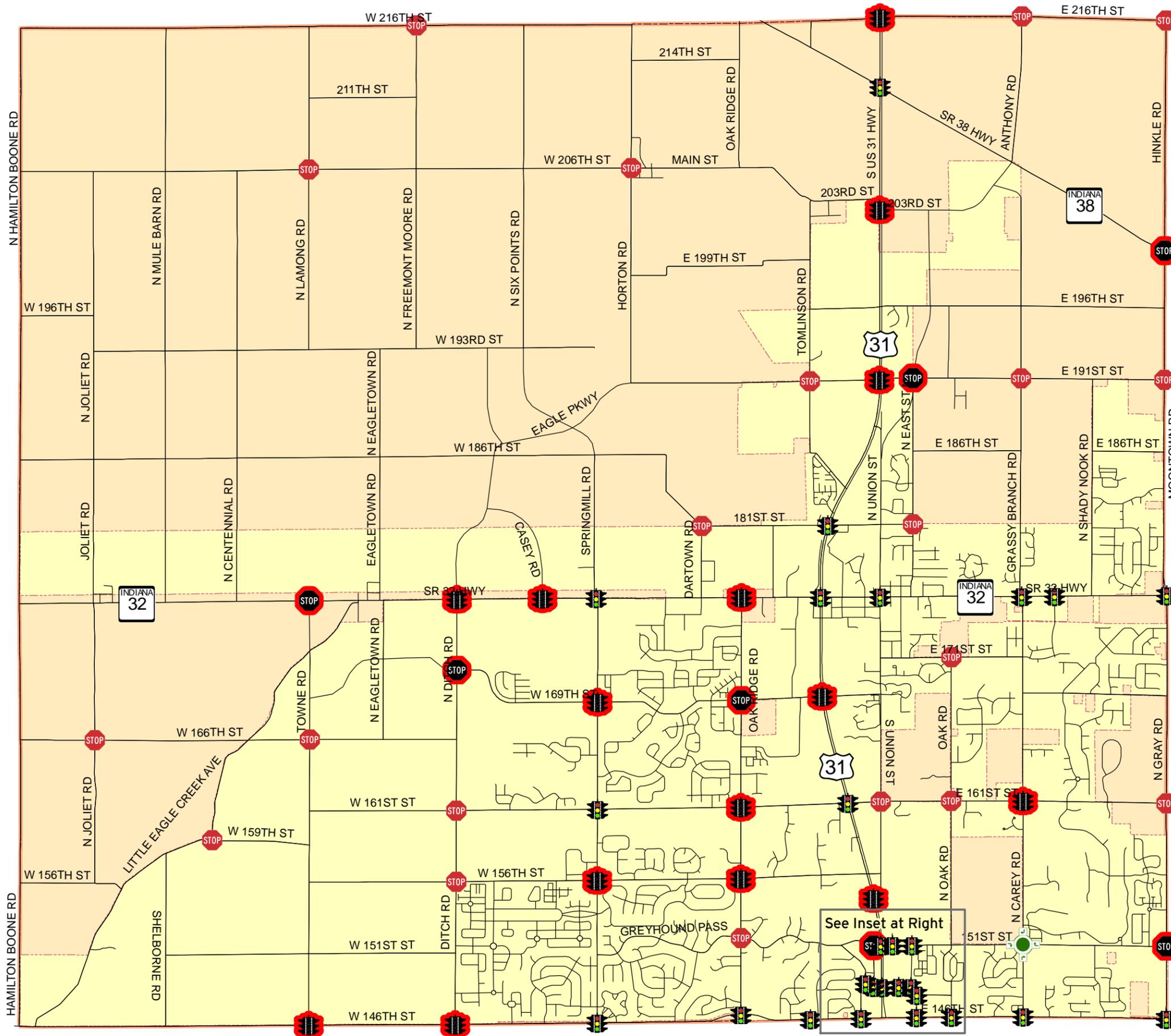
-  Existing or Committed Traffic Signal
-  Daily Volumes Warrant New Traffic Signal
-  Existing All-way Stop
-  Daily Volumes Warrant New All-way Stop
-  Committed Roundabout
-  Town of Westfield
-  Washington Township



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Greyhound Pass Area Inset



5.2 Levels of Service and Infrastructure Needs

Roadway segment and intersection levels of service were evaluated under the two 2017 scenarios of existing network plus committed improvements—with and without US 31 upgraded to a freeway. These evaluations were conducted using the criteria and methods described in Section 2, Community Level of Service Criteria. **Table 5-1** lists the roadway segments that are not expected to meet the roadway cross section LOS criterion of a 22-foot minimum paved width for segments carrying at least 5,000 vehicles per day by 2017. **Figure 5-2** shows the intersections and road segments that are not expected to meet minimum acceptable traffic operations LOS by 2017. **Figure 5-3** shows the expected 2017 roadway improvement needs for roads that are currently or anticipated to be the responsibility of the Town of Westfield. All identified deficiencies and recommended improvements are based on current expectations of development patterns and traffic demand through 2017. Changes in the location or timing of land use development could result in some variation in these identified road network improvement needs and should be considered in future updates of the impact fee study.

Table 5-1: 2017 Roadway Cross Section Deficiencies

Road	Begin	End	2017 Average Daily Traffic Volume	Typical Existing Paved Width (feet)
Carey Road	Springmeadow Ln	151st Street	9,300	21
Carey Road	151st Street	161st Street	9,900	21
Ditch Road	171st Street	SR 32	5,000	19
Grassy Branch Road	Grassy Knoll Dr	186th Street	7,100	18
Gray Road	156th Street	161st Street	8,900	20
Oakridge Road	146th Street	Greyhound Pass	6,800	20
Oakridge Road	Greyhound Pass	156th Street	12,200	20
Oakridge Road	156th Street	161st Street	7,400	19
Oakridge Road	161st Street	169th Street	5,500	19
Oakridge Road	169th Street	SR 32	6,600	18
Springmill Road	Merrimac Drive	Greyhound Pass	14,600	21
Springmill Road	Greyhound Pass	156th Street	17,700	21
Springmill Road	156th Street	161st Street	20,400	21
Springmill Road	161st Street	169th Street	18,400	21
Springmill Road	169th Street	SR 32	15,800	21
Towne Road	146th Street	151st Street	10,000	19.5
Towne Road	151st Street	156th Street	9,800	19.5



Road	Begin	End	2017 Average Daily Traffic Volume	Typical Existing Paved Width (feet)
Towne Road	156th Street	159th Street	10,100	19.5
Towne Road	159th Street	161st Street	9,900	19.5
Towne Road	161st Street	169th Street	10,100	19.5
Towne Road	169th Street	Eagle Creek Ave.	9,200	19.5
151st Street	Carey Road	Setters Run	6,700	21
161st Street	Springmill Road	Oakridge Road	11,900	19
161st Street	Oakridge Road	US 31	17,900	20
169th Street	Oakridge Road	US 31	5,000	20
191st Street	Tomlinson Road	US 31	7,200	18
202nd Street	US 31	East Street	8,800	15

Westfield Road Impact Fee Study

Figure 5-2 2017 Traffic Operation Levels of Service

- Overall Intersection Level of Service "E" or "F" in Either AM or PM Peak Hour
- Roadway Segment Level of Service "E" or "F" based on Daily Volumes

US 31 Level of Service reflects conditions without freeway upgrade.

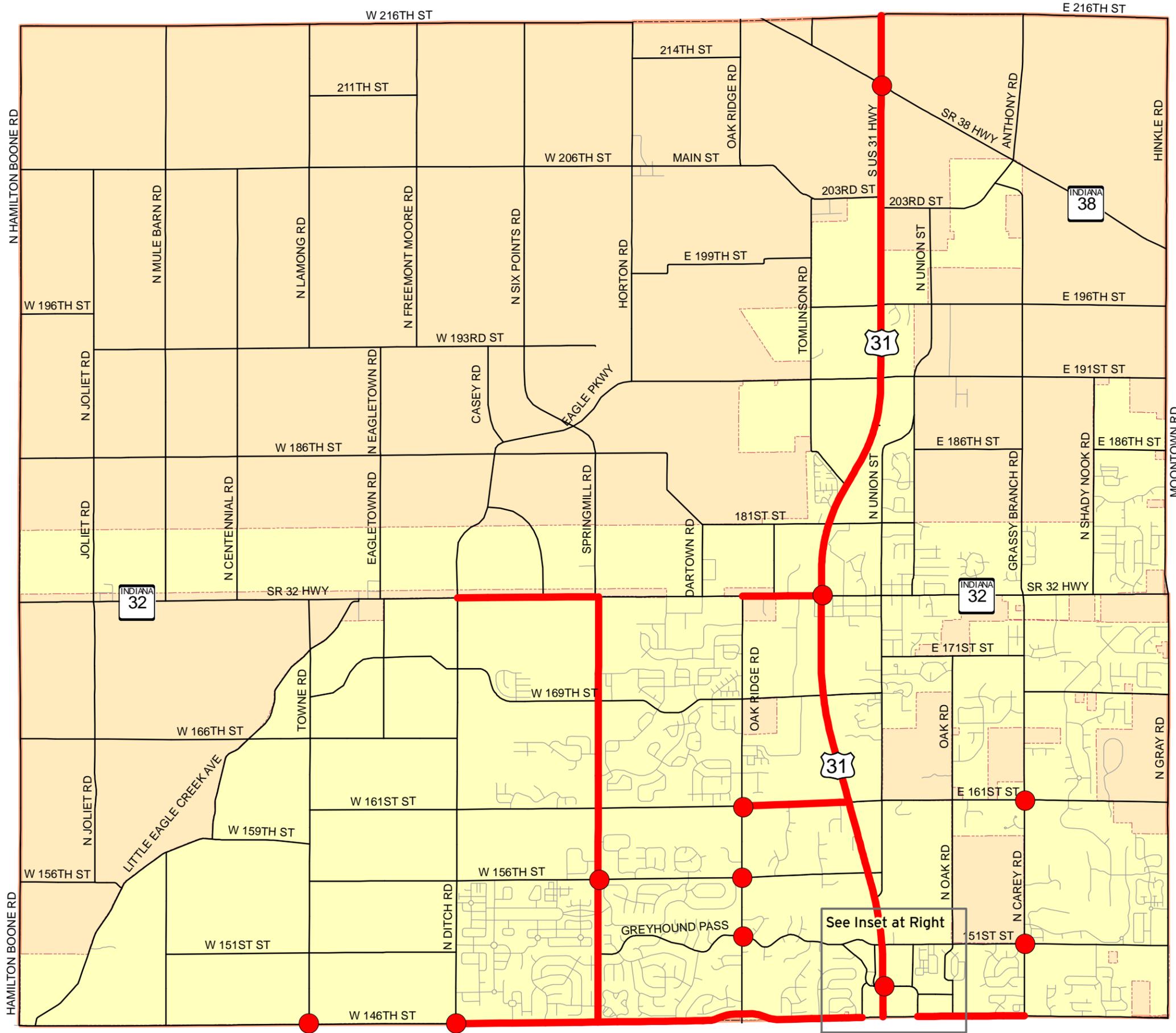
Town of Westfield
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See Inset at Right



Greyhound Pass Area Inset

Westfield Road Impact Fee Study

Figure 5-3 2017 Roadway Improvement Needs

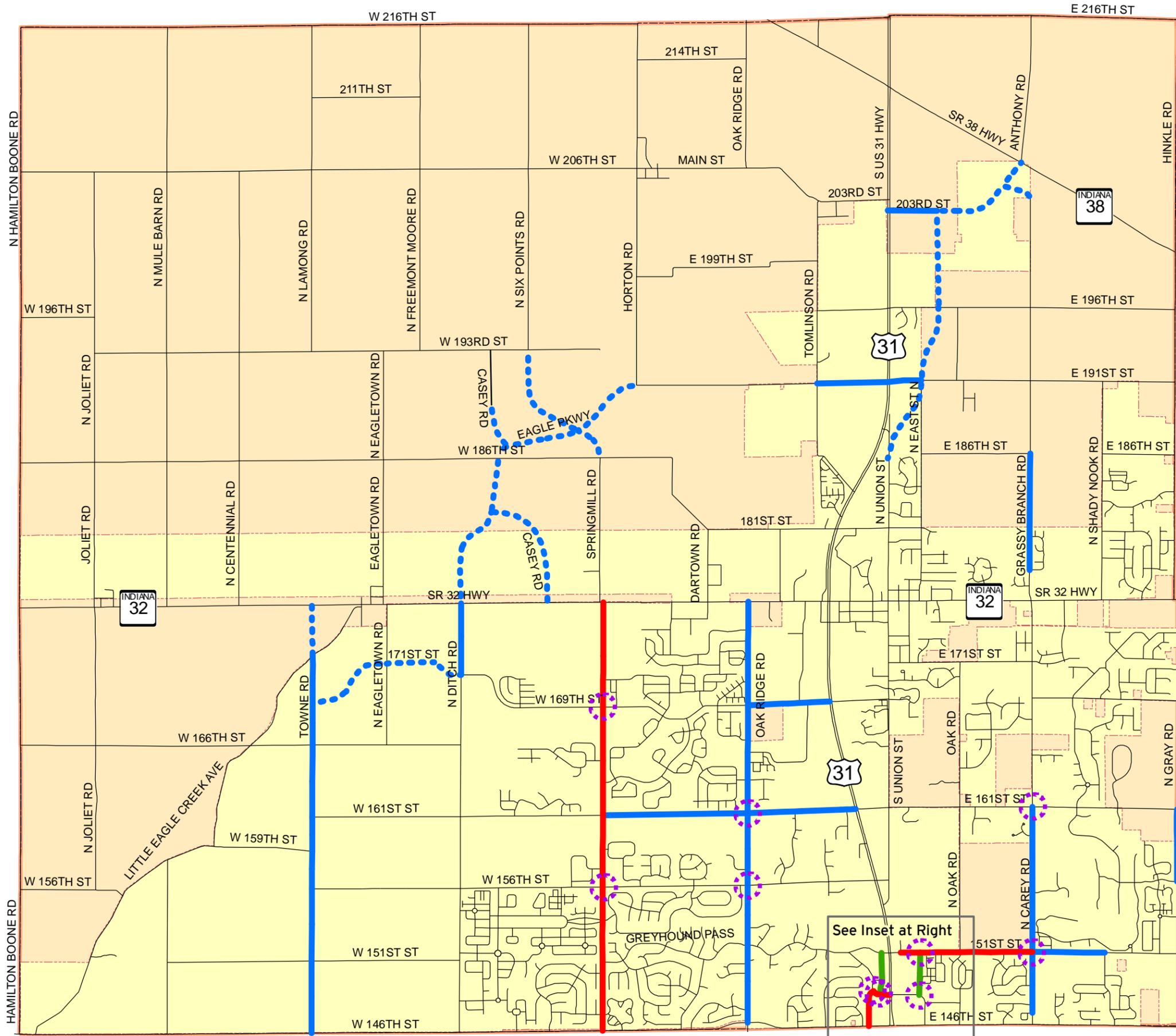
-  Widen & Overlay - 2 Lanes
-  New/Reconstruct - 2 Lanes
-  New/Reconstruct - 3 Lanes
-  New/Reconstruct - 4 Lanes
-  New Traffic Signal or Roundabout
-  Town of Westfield
-  Washington Township



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See Inset at Right



Greyhound Pass Area Inset



6 Infrastructure Improvement Costs

The estimated costs of the improvement projects required to meet existing 2007 and projected 2017 needs are shown in **Table 6-1**, **Table 6-2**, and **Table 6-3**. Detailed project cost estimates are provided in **Appendix G**. Separate intersection improvement cost estimates are identified in **Table 6-3** only for those intersections where the Town of Westfield may want to initiate separate intersection improvement projects. The construction costs for these intersections have been subtracted from those of any corresponding road segment. Where intersection improvements are unlikely to be constructed separate from a larger road project, their costs have been included in the costs of the corresponding road project. This is the case for intersections on new road segments, which would be constructed at the same time as the road segment.

The 2017 cost tables identify several projects that are committed for construction using Tax Increment Financing (TIF) funds collected from the TIF district designated in the vicinity of the Village Park Plaza shopping center. The tables also identify a portion of the cost of several projects that is necessary to meet the LOS criteria for existing 2007 conditions. These capital costs are the responsibility of the Town of Westfield and are not included in the impact fee calculation. The Town of Westfield anticipates using several sources of funds to meet these capital improvement obligations. These include the use of impact fees that have already been collected under the existing ordinance, State MVH and LRS distributions, general obligation bonds, possible federal-aid highway funding, and the possible implementation of new TIF districts.

It is recognized that the new roads identified for construction are not required only to meet the additional travel demand of future development and should therefore not be funded entirely by impact fees imposed on new development. These roads would provide benefits to existing users of the road network even without new development in Westfield. Because of this, the proportion of traffic using each proposed new road that is attributable to new development was identified through travel demand modeling. The construction costs for these new roads were then assigned to existing users and impact fees accordingly.

Cost estimates for new and reconstructed roads are based on providing 12-foot travel lanes plus curb and gutter. An 8-foot asphalt multi-use trail is assumed on each side of the new road in accordance with current Town of Westfield standards. Cost estimates for widening and overlay of existing 2-lane roads that do not currently meet the cross section requirements are based on providing 12-foot lanes, 4-foot asphalt shoulders, and auxiliary lanes per the Indiana Design Manual⁷ and Town of Westfield standards.

⁷ Indiana Design Manual, Indiana Department of Transportation, available online at <http://www.in.gov/dot/div/contracts/standards/dm/english/index.html>



Where intersections meet traffic signal warrants, construction costs include the cost of a new traffic signal, although it is recognized that the Town of Westfield may elect to construct a roundabout instead. The exception is at the intersection of 151st Street and Carey road, where a roundabout is currently under design and is included in the cost of the adjoining 151st Street improvement project.

The typical roadway features described in this section comply with the design requirements of the Town of Westfield, but they were used only to develop improvement cost estimates. These features do not comprise design recommendations for the various projects.

Table 6-1: 2007 Improvement Costs

Road	Begin	End	Cost to Meet 2007 LOS
Springmill Road	Merrimac Drive	SR 32	\$2,491,800
Carey Road	Springmeadow Lane	161st Street	\$1,183,800
Springmill Road	At Greyhound Pass		\$408,000
Springmill Road	At 156th Street		\$480,000
Springmill Road	At 169th Street		\$402,000
Carey Road	At 161st Street		\$697,200
TOTAL			\$5,662,800



Table 6-2: 2017 Roadway Improvement Costs

Road	Begin	End	Project	Typical Section	Cost to Meet 2017 LOS			Current TIF Projects	Cost to Provide for Existing Traffic	Impact Fee Cost
					Construction	Design, Survey & Inspection (20%)	Total			
Towne Road	146th Street	Eagle Avenue	Widen and Resurface	2-lane with shoulders	\$1,047,500	\$209,500	\$1,257,000			\$1,257,000
Towne Road	Eagle Avenue	SR 32	New Road	2-lane with curb & gutter	\$1,154,000	\$230,800	\$1,384,800		\$789,300	\$595,500
169th/171st Street	Towne Road	Ditch Road	New Road	2-lane with curb & gutter	\$3,632,000	\$726,400	\$4,358,400		\$261,500	\$4,096,900
Ditch Road	171st Street	SR 32	Widen and Resurface	2-lane with shoulders	\$341,000	\$68,200	\$409,200			\$409,200
Eagle Parkway	SR 32	186th Street	New Road	2-lane with curb & gutter	\$3,358,500	\$671,700	\$4,030,200		\$415,500	\$3,614,700
Eagle Parkway	186th Street	191st Street	New Road	2-lane with curb & gutter	\$3,121,000	\$624,200	\$3,745,200		\$580,500	\$3,164,700
Casey Road	Eagle Parkway	500' N. of Eagle Parkway	Reconstruct	2-lane with curb & gutter	\$338,500	\$67,700	\$406,200		\$36,600	\$369,600
Casey Road	SR 32	Eagle Parkway	New Road	2-lane with curb & gutter	\$3,293,500	\$658,700	\$3,952,200		\$395,200	\$3,557,000
Springmill Road	186th Street	193rd Street	New Road	2-lane with curb & gutter	\$3,060,500	\$612,100	\$3,672,600		\$1,459,500	\$2,213,100
Springmill Road	Merrimac Drive	SR 32	Reconstruct	4-lane with curb & gutter	\$10,625,000	\$2,125,000	\$12,750,000		\$2,491,800	\$10,258,200
161st	Springmill Road	US 31	Widen and Resurface	2-lane with shoulders	\$1,167,000	\$233,400	\$1,400,400			\$1,400,400
Oakridge Road	146th Street	SR 32	Widen and Resurface	2-lane with shoulders	\$1,605,500	\$321,100	\$1,926,600			\$1,926,600
169th St	Oakridge Road	US 31	Widen and Resurface	2-lane with shoulders	\$421,500	\$84,300	\$505,800			\$505,800
N. Union Street Extension	Union Street	191 St Street	New Road	2-lane with curb & gutter	\$1,208,000	\$241,600	\$1,449,600		\$130,500	\$1,319,100
N. Union Street Extension	191st	196th Street	New Road	2-lane with curb & gutter	\$1,559,500	\$311,900	\$1,871,400		\$168,400	\$1,703,000
N. Union Street Extension	196th Street	202nd Street	New Road	2-lane with curb & gutter	\$2,308,500	\$461,700	\$2,770,200		\$249,300	\$2,520,900
202nd Street	US 31	N. Union Street Extension	Widen and Resurface	2-lane with shoulders	\$214,000	\$42,800	\$256,800		\$33,400	\$223,400
202nd Street	N. Union Street Extension	SR 38	New Road	2-lane with curb & gutter	\$2,087,500	\$417,500	\$2,505,000		\$400,800	\$2,104,200
Carey Road	Springmeadow Lane	161st Street	Widen and Resurface	2-lane with shoulders	\$986,500	\$197,300	\$1,183,800		\$1,183,800	\$0
Grassy Branch Road	Grassy Knoll Drive	186th Street	Widen and Resurface	2-lane with shoulders	\$417,000	\$83,400	\$500,400			\$500,400
Grassy Branch Road	800' S. of 202nd Street	202nd Street	Reconstruct	2-lane with curb & gutter	\$489,500	\$97,900	\$587,400		\$94,000	\$493,400
Gray Road	156th Street	161st Street	Widen and Resurface	2-lane with shoulders	\$367,000	\$73,400	\$440,400			\$440,400
191st Street	Tomlinson Road	US 31	Widen and Resurface	2-lane with shoulders	\$334,000	\$66,800	\$400,800			\$400,800
151st Street	Thatcher Lane	Carey Road	Reconstruct	4-lane with curb & gutter			\$6,580,000	\$6,580,000		\$0
151st Street	Carey Road	Setters Run	Reconstruct	2-lane with curb & gutter			\$1,747,200	\$1,747,200		\$0
Greyhound Pass/Western W	146th Street	US 31	Widen/Intersection Imp.	3-4 lanes with curb & gutter			\$1,508,000	\$1,508,000		\$0
East Access Road	Greyhound Pass	151st Street	New Road	2-lane with curb & gutter			\$2,850,000	\$2,850,000		\$0
Greyhound Court	Greyhound Pass	151st Street	Reconstruct	3-lane with curb & gutter			\$806,800	\$806,800		\$0
TOTAL					\$43,137,000	\$8,627,400	\$65,256,400	\$13,492,000	\$8,690,100	\$43,074,300



Table 6-3: 2017 Intersection Improvement Costs

Road	Intersection	Project	Cost to Meet 2017 LOS			Current TIF Projects	Cost to Provide for Existing Traffic	Impact Fee Cost
			Construction	Design, Survey & Inspection (20%)	Total			
Towne Road	At 151st Street	Widen, resurface & turn lanes	\$335,100	\$67,000	\$402,100			\$402,100
Towne Road	At 156th Street	Widen, resurface & turn lanes	\$229,800	\$46,000	\$275,800			\$275,800
Towne Road	At 159th Street	Widen, resurface & turn lanes	\$229,800	\$46,000	\$275,800			\$275,800
Towne Road	At 161st Street	Widen, resurface & turn lanes	\$229,800	\$46,000	\$275,800			\$275,800
Towne Road	At 166th Street	Widen, resurface & turn lanes	\$335,100	\$67,000	\$402,100			\$402,100
Towne Road	At 169th Street	Widen, resurface & turn lanes	\$229,800	\$46,000	\$275,800			\$275,800
Springmill Road	At Greyhound Pass	Reconstruct N/S plus turn lanes	\$811,500	\$162,300	\$973,800		\$408,000	\$565,800
Springmill Road	At 156th Street	Reconstruct N/S plus turn lanes, signal	\$1,083,000	\$216,600	\$1,299,600		\$480,000	\$819,600
Springmill Road	At 161st Street	Reconstruct N/S plus turn lanes, signal	\$1,123,500	\$224,700	\$1,348,200			\$1,348,200
Springmill Road	At 169th Street	Reconstruct N/S plus turn lanes, signal	\$959,100	\$191,800	\$1,150,900		\$402,000	\$748,900
Oakridge Road	At Greyhound Pass	Widen, resurface & turn lanes	\$216,700	\$43,300	\$260,000			\$260,000
Oakridge Road	At 156th Street	Widen, resurface, turn lanes, signal	\$454,700	\$90,900	\$545,600			\$545,600
Oakridge Road	At 161st Street	Widen, resurface, turn lanes, signal	\$550,400	\$110,100	\$660,500			\$660,500
Oakridge Road	At 169th Street	Widen, resurface & turn lanes	\$210,600	\$42,100	\$252,700			\$252,700
Carey Road	At 161st Street	Traffic signal and turn lanes	\$588,200	\$117,600	\$705,800		\$697,200	\$8,600
Union Street	At 161st Street	turn lanes	\$386,100	\$77,200	\$463,300			\$463,300
TOTAL				\$1,594,600	\$9,567,800	\$0	\$1,987,200	\$7,580,600



7 Impact Fee Calculation

7.1 Supportable Impact Fee

The TransCAD model was used to analyze trip patterns for the Washington Township study area. Based on this analysis it was determined that two impact zones, each with reasonably uniform benefits, could be established by dividing the study area at US 31. Therefore, all development and road improvements east of US 31 are included in the East Impact Zone, while all development and road improvements west of US 31 are included in the West Impact Zone. These impact zones are shown in **Figure 7-1**.

Table 7-1 shows the road impact fee rates that can be supported for new development in the East Impact Zone and the West Impact Zone. These rates are based on the total impact cost of improvements in each zone divided by the number of new daily trip ends anticipated in that impact zone by 2017. The number of new daily trip ends in each impact zone was determined from the travel demand model.

The cost of currently identified Westfield TIF projects and the cost to bring existing LOS up to Community LOS are the responsibility of Westfield. These costs are subtracted from the 2017 needs in determining the total impact cost. No impact deductions or non-local funding sources have been identified to further reduce the total impact cost of either zone.

Table 7-1: Calculation of Supportable Impact Fees

	West Zone	East Zone	Total
2017 Road Segment Needs	\$42,514,200	\$22,742,200	\$65,256,400
2017 Intersection Needs	\$8,398,700	\$1,169,100	\$9,567,800
Identified TIF Projects	(\$2,314,800)	(\$11,177,200)	(\$13,492,000)
Cost to Serve Existing Traffic	(\$7,719,900)	(\$2,957,400)	(\$10,677,300)
Cost of Impact Fee Study*	\$218,000	\$111,000	\$329,000
Total Impact Cost	\$41,096,200	\$9,887,700	\$50,983,900
New Daily Trip Ends	68,222	34,756	102,978
Impact Fee Per New Daily Trip End	\$602	\$284	

* Cost of the impact fee study was allocated to each zone based on the number of trip ends.

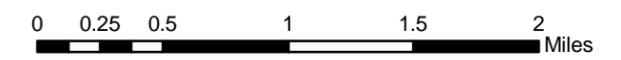
Westfield Road Impact Fee Study

Figure 7-1 Westfield Road Impact Zones

 Road Impact Zones

 Town of Westfield

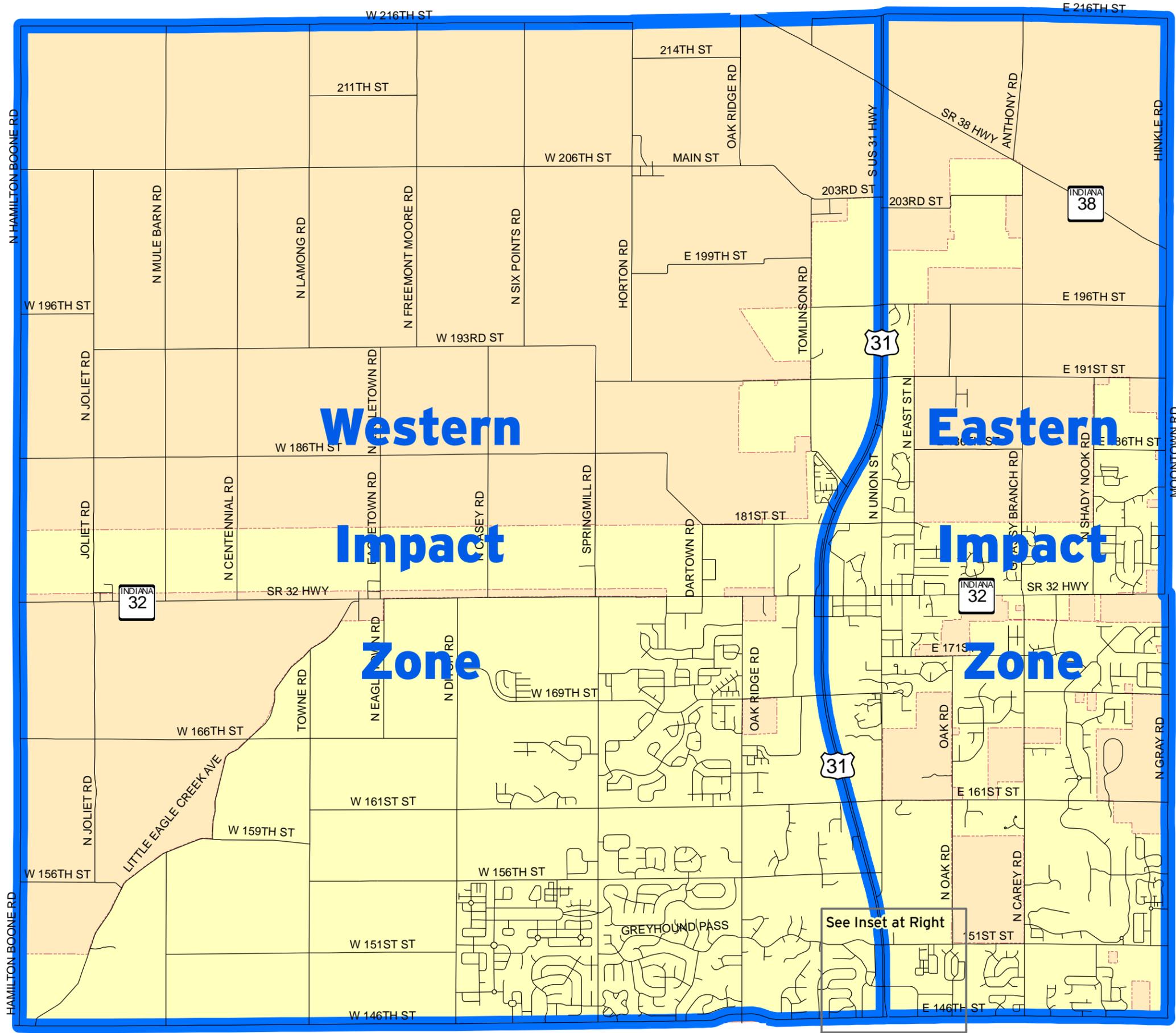
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Greyhound Pass Area Inset



7.2 Impact Fee Assessment

Procedures

The impact fees calculated in this study are based on average daily trip ends generated by new development. With the following exceptions and restrictions, the Town of Westfield will assess impact fees for individual developments based on a calculation of average weekday trip ends according to the methods and rates provided in the latest editions of *Trip Generation* and the *Trip Generation Handbook*, published by the Institute of Transportation Engineers.

1. Independent Variable

- a. The independent variable used to calculate average weekday trip ends shall be as follows:
 - Residential Uses: Dwelling Units
 - Retail Uses: Gross Floor Area or Gross Leasable Area
 - Industrial Uses: Gross Floor Area
 - Office Uses: Gross Floor Area
 - Lodging Uses: Total Number of Rooms
 - Churches: Gross Floor Area
 - Gasoline/Service Stations: Number of Fueling Positions
 - Other Services Uses: Gross Floor Area
- b. For land uses not listed above or for which the above independent variables cannot be used, the independent variable to be used will be approved by the Town of Westfield

2. Trip End Calculation

- a. Trip ends for residential uses shall be calculated using the average weekday trip rate provided in *Trip Generation*.
- b. Trip ends for land uses other than residential shall be calculated using either the average weekday trip rate or the weekday fitted curve regression equation provided in *Trip Generation*. The determination of whether to use the average rate or the regression equation shall be based on the recommended procedure in the *Trip Generation Handbook*.

3. Passby Trip Reduction

- a. The following daily passby trip reduction percentages will be allowed:
 - Free-Standing Discount Superstore (ITE 813): 28%



- Shopping Center (ITE 820): 34%
 - Home Improvement Superstore (ITE 862): 48%
 - Drive-in Bank (ITE 912): 47%
 - Quality Restaurant (ITE 931): 44%
 - High-Turnover (Sit-Down) Restaurant (ITE 932): 43%
 - Fast Food Restaurant with Drive Through (ITE 934): 50%
 - Gasoline/Service Station with Convenience Market (ITE 945): 62%
- b. Passby reduction for other uses will be allowed only if justification is provided.
4. Internal capture rates for multi-use development, when used, shall be calculated using the procedures of the *Trip Generation Handbook*, using the daily capture rates. Internal capture rates may not be applied to:
- Shopping centers
 - Office parks or office buildings with retail
 - Hotels with limited retail and/or restaurant space
 - Any development where traffic between the uses crosses a thoroughfare

Examples

1. An example calculation of the impact fee assessment for a 100 home residential development in the West Impact Zone is as follows:

ITE Trip Generation rate for single-family detached housing (ITE Code 210):

$$T = 9.57 (X)$$

Where, T = the daily trip ends
 X = the number of dwelling units

For 100 dwelling units, the number of daily trip ends = 957 trips/day

$$\begin{aligned} 957 \text{ trips/day} * \$602/\text{trip} &= \$576,114 \text{ impact fee for the entire development} \\ &= \$5,761 \text{ per home} \end{aligned}$$

2. An example calculation of the impact fee assessment for a 400,000 square foot shopping center in the East Impact Zone is as follows:

ITE Trip Generation rate for a shopping center (ITE Code 820):



$$\ln(T) = 0.65 \ln(X) + 5.83$$

Where, T = the daily trip ends
 X = 1,000 square feet of gross leasable area

For a 400,000 SF shopping center, the number of daily trip ends = 16,721 trips/day

Passby reduction = 34% x 16,721 trips/day = 5,685 trips/day

Total new trips generated = 16,721 - 5,685 = 11,036 trips/day

11,036 trips/day * \$284/trip = \$3,134,224 impact fee for the entire development

7.3 Impact Fee Adjustment

The impact fees calculated in this study were developed based on 2007 construction cost estimates and current forecasts of development. It will be necessary to periodically update the calculations and assumptions used to develop the impact fees to account for cost inflation and changes in development forecasts.



8 Anticipated Timing of Improvements

Table 8-1 and Table 8-2 show example construction schedules for identified improvements in the East and West impact zones, respectively. The schedules are based on estimates of future development patterns over the next ten years. Actual construction should occur as needed to meet evolving system requirements. These schedules are primarily intended to indicate the priority groupings of individual projects within the impact zones. Construction according to these schedules would require the following to occur:

- The full value of supportable impact fees is assessed for all development
- Development occurs as expected and evenly throughout the 10-year impact fee horizon
- TIF funds and other funding sources are available when needed
- Town, contract and consultant staffing resources are sufficient to design and construct all projects within the required time frame

Table 8-1: East Impact Zone Example Construction Schedule

Project	Road	Begin	End	Construction Years*
1	Carey Road	At 161st Street		1-3
2	Carey Road	Springmeadow Lane	161st Street	
3	151st Street	Carey Road	Setters Run	
4	Gray Road	156th Street	161st Street	
5	East Access Road	Greyhound Pass	151st Street	
6	151st Street	Thatcher Lane	Carey Road	
7	Union Street	At 161st Street		
8	N. Union Street Extension	Union Street	191 St Street	4-7
9	N. Union Street Extension	191st	196th Street	
10	N. Union Street Extension	196th Street	202nd Street	
11	202nd Street	N. Union Street Extension	SR 38	8-10
12	202nd Street	US 31	N. Union Street Extension	
13	Grassy Branch Road	800' S. of 202nd Street	202nd Street	
14	Grassy Branch Road	Grassy Knoll Drive	186th Street	

*Illustrative schedule only. See text for assumptions.



Table 8-2: West Impact Zone Example Construction Schedule

Project	Road	Begin	End	Construction Years*
1	Greyhound Pass/Western Way	146th Street	US 31	1-2
2	Greyhound Court	Greyhound Pass	151st Street	
3	Oakridge Road	At Greyhound Pass		
4	Oakridge Road	At 156th Street		
5	Oakridge Road	At 161st Street		
6	Oakridge Road	At 169th Street		
7	Oakridge Road	146th Street	SR 32	
8	Springmill Road	At Greyhound Pass		3-6
9	Springmill Road	At 156th Street		
10	Springmill Road	At 161st Street		
11	Springmill Road	At 169th Street		
12	Springmill Road	Merrimac Drive	SR 32	
13	161st	Springmill Road	US 31	7-8
14	169th/171st Street	Towne Road	Ditch Road	
15	Ditch Road	171st Street	SR 32	
16	Towne Road	Eagle Avenue	SR 32	
17	Eagle Parkway	SR 32	186th Street	
18	Casey Road	SR 32	Eagle Parkway	
19	Casey Road	Eagle Parkway	500' N Eagle Parkway	
20	Springmill Road	186th Street	193rd Street	
21	Eagle Parkway	186th Street	191st Street	9-10
22	Towne Road	At 151st Street		
23	Towne Road	At 156th Street		
24	Towne Road	At 159th Street		
25	Towne Road	At 161st Street		
26	Towne Road	At 166th Street		
27	Towne Road	At 169th Street		
28	Towne Road	146th Street	Eagle Avenue	
29	169th St	Oakridge Road	US 31	
30	191st Street	Tomlinson Road	US 31	

*Illustrative schedule only. See text for assumptions.