Transportation Master Plan Update

Revised Supplemental Document

City of Gardner, KS

August 5, 2022

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1. Introduction

The City of Gardner's Transportation Master Plan (TMP) was last updated in 2009. The purpose of this supplemental document is to update certain existing conditions data, document the updated forecasting methods and operational results, and revisit the transportation recommendations of the TMP.

This document is not a complete overhaul of the 2009 TMP. Rather, it supplements and updates the TMP where necessary, but should be considered a companion document rather than a replacement.

Note that portions of the existing conditions outlined in this document were completed in 2017 as part of a minor interim update. These elements, while slightly dated, remain relevant and were therefore maintained in the document.

2. Existing Conditions

This section presents data on current vehicular traffic volumes and congestion as well as safety and multimodal transportation.

Traffic Volumes on Key Roadways

Figure 2-1 illustrates recent traffic counts gathered from various sources including KDOT, Johnson County (AIMS), the City of Gardner, and prior consultant traffic studies – adjusted to a consistent 2017 base year.

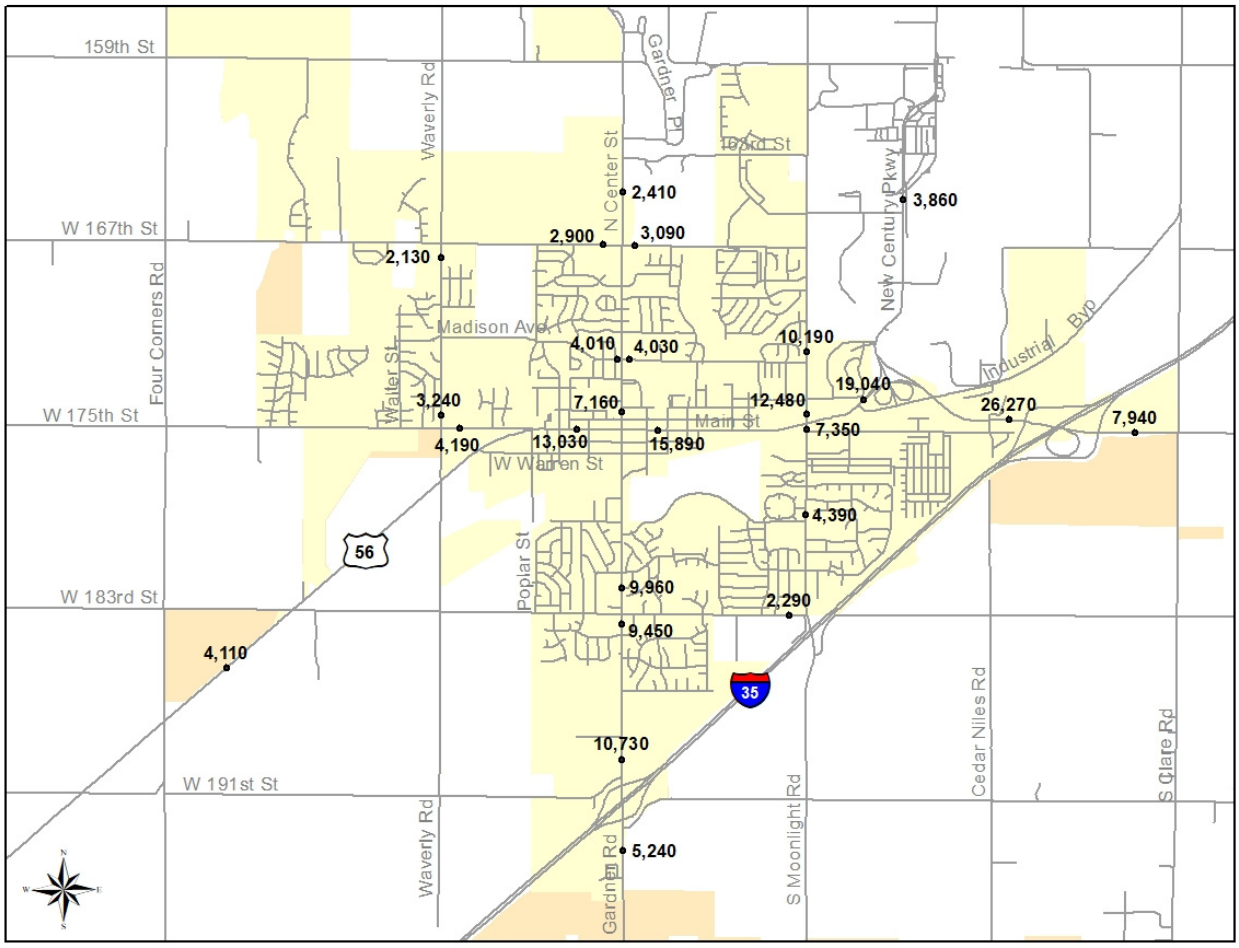
Some of the highest-volume roadways include:

- **US-56** carries over 25,000 vehicles per day (vpd) at its heaviest point, just west of I-35 – volumes in the upper capacity range of a typical four-lane urban arterial, but well below the capacity of an expressway-type facility, which this portion of US-56 is more similar to, given the small number of cross-streets and driveways. Within the heart of town, US-56 (Main Street) carries 13,000 to 16,000 vpd, below the capacity of a four-lane arterial, and, in fact, within the range typically considered acceptable for a three-lane road (two lanes plus a center turn lane). Outside the city limits on either end of the city, US-56 carries less than 10,000 vpd, within the typical capacity of a rural two-lane facility.

- **Gardner Road/Center Street** carries around 10,000 vehicles per day between US-56 / Main Street and I-35. This is well below the capacity of a four-lane arterial, and potentially appropriate for a three-lane road (two lanes plus a center turn lane). North of US-56, volumes taper from 7,000 vpd to 2,000 vpd near the northern city limit.

- **Moonlight Road** is the only other street in Gardner that carries over 10,000 vpd (north of US-56 / Main Street), and it is the only arterial to do so that doesn't directly connect with I-35. Moonlight Road serves one of the major commercial areas in Gardner.

FIGURE 2-1: 2017 AVERAGE DAILY TRAFFIC (ADT)

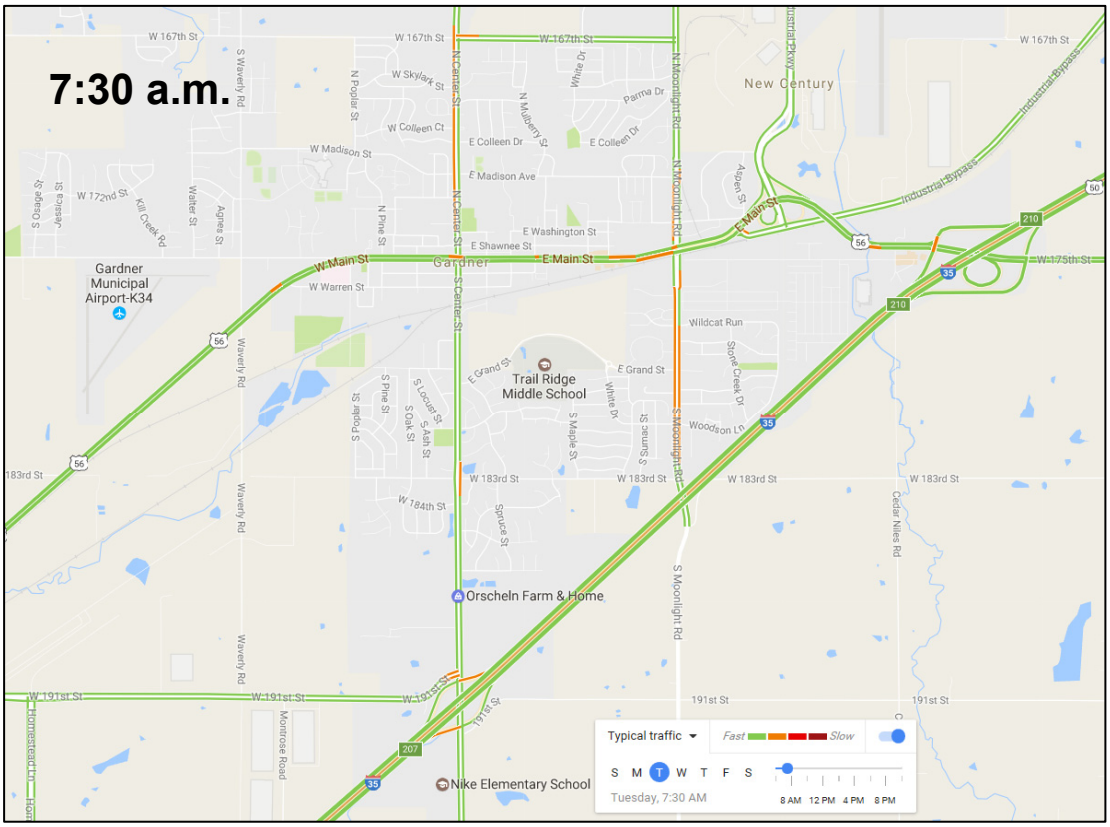


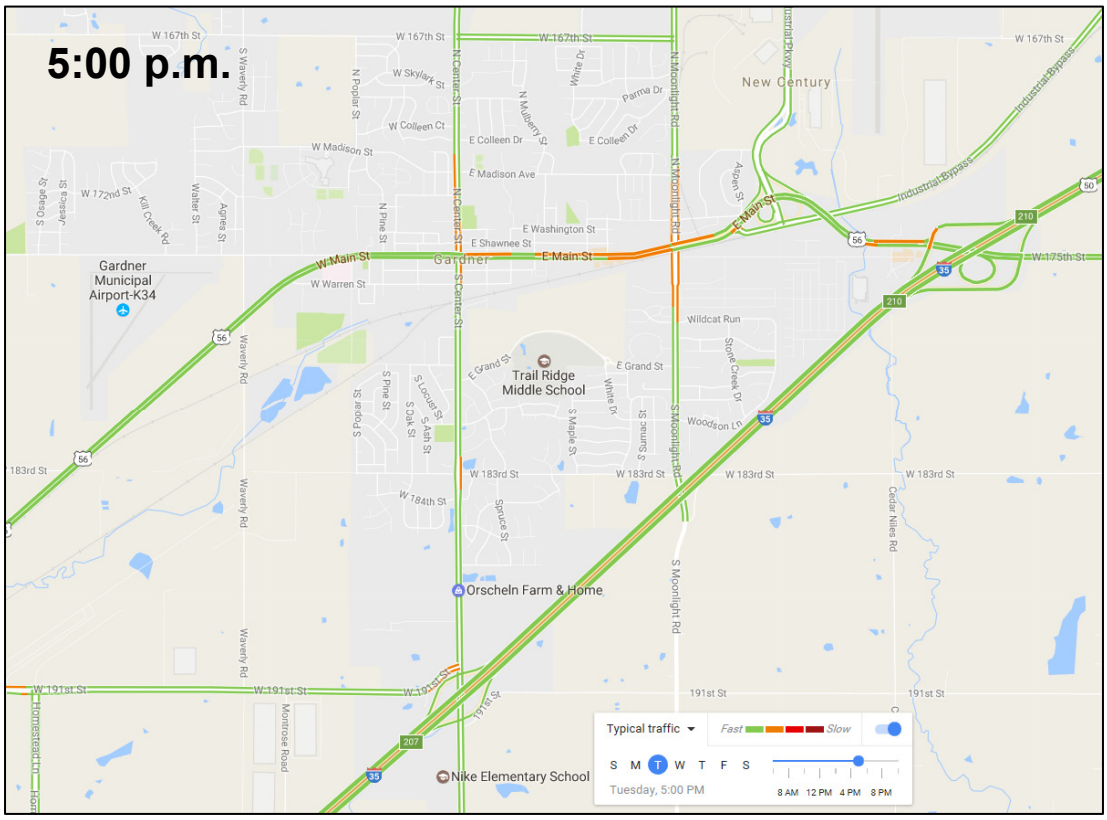
Note: areas shown in orange are newly annexed. These areas were not included in this study's analysis.

Traffic Congestion on Key Roadways

To identify areas of current congestion, information from Google Maps' "Typical Traffic" feature was observed. This data can be helpful for determining traffic "hot spots" on the major thoroughfares in the City. These planning-level observations indicate that the heaviest traffic occurs around 7:30 a.m. and 5:00 p.m. As shown in **Figure 2-2**, the areas that have the slowest speeds (and therefore are assumed to have the most congestion) are along the three highest-volume roads identified in the previous section: US-56, Gardner Street / Center Street, and Moonlight Road. Congestion is most evident near where these roadways intersect each other, and near where they intersect I-35. This congestion is characterized by Google Maps as moderate (orange not red), but these corridors and intersections are key areas to monitor for future improvements as the city grows.

FIGURE 2-2: CONGESTION HOT SPOTS DURING TYPICAL PEAK PERIODS *(SOURCE: GOOGLE MAPS, 2017)*





Roadway Safety

Historic crash data was obtained from the Mid-America Regional Council (MARC) for January 2010 through October 2016. During this period there were a total of 1,621 crashes within the city limits of Gardner. Among those crashes, there were 4 fatalities and 31 disabling injuries. **Figure 2-3** highlights the locations where crashes appear to be clustered. These locations may have safety issues that can be analyzed and addressed. Not surprisingly, many of the crashes were clustered on the highest-volume, most congested roadways identified in previous section. Notable highlights include:

- The US-56 corridor, from I-35 to Center Street, exhibits the highest crash densities. This is not surprising, as US-56 carries some of the highest traffic volumes in the city, largely consists of a four-lane undivided section, is densely populated with commercial driveways, and in some segments allows on-street parking. KDOT's US-56 Corridor Management Plan established a long-term vision for this corridor, including improved access management, a five-lane section west of Moonlight Road, a six-lane section east of Moonlight Road, and various intersection improvements throughout the corridor. **A key initiative for the City should be to continue to consolidate and improve access along this corridor whenever the opportunity arises.**

- The portion of the US-56 corridor near and including the I-35 interchange, which experiences high traffic volumes and high speeds, needs a holistic plan to develop the ultimate interchange type / configuration, and to improve circulation and access for the Cedar Niles Road – Santa Fe Street area.

- Moonlight Road between Lincoln Lane and US-56 was improved several years ago as part of a larger corridor improvement project, but the proximity of the two signalized intersections (~570 feet) causes some operational concerns. Signal timing and geometric improvements could help reduce crashes.

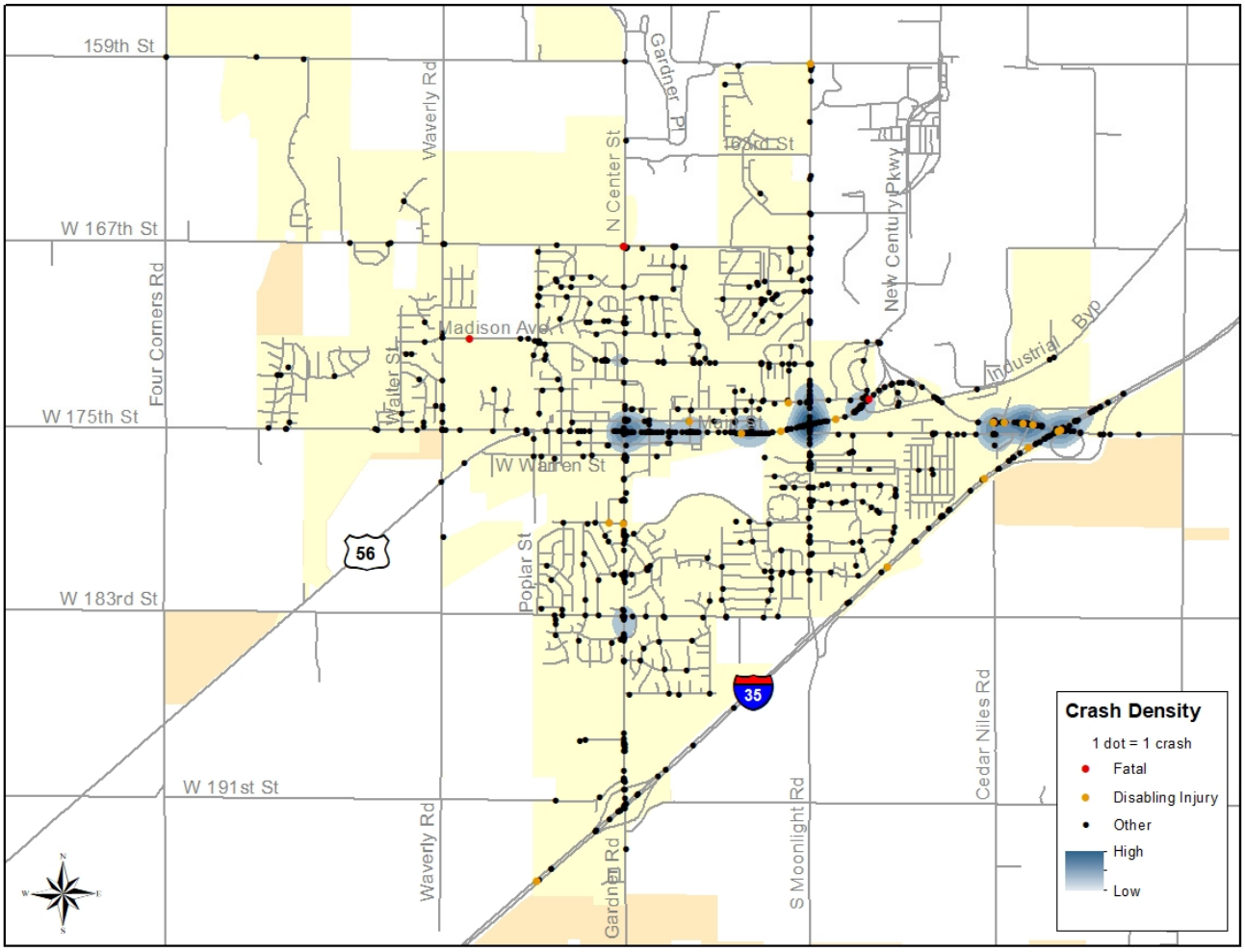
- The intersection of Main Street and Center Street shows a fairly high concentration of crashes, but the intersection was improved in 2015, and thus, the patterns have likely changed and the most recent five-year trend would likely show improved safety.

- The intersection of Gardner Road with 183rd Street, as well as its adjacent intersection with 184th Street, exhibit higher crash densities. This intersection was signalized in 2015, which may have improved safety at this intersection.

- The intersection of Center Street and Madison Avenue exhibits crash issues, but the City has recently improved the intersection to provide left-turn phasing (and pedestrian improvements), which should improve the five-year crash trend in coming years.

As evident from several of the highlights above, the City has been proactive in addressing several of its more prominent crash "hot spots".

FIGURE 2-3: CRASH DENSITY, JAN 2010 – OCT 2016



Active Transportation Considerations (Bicycling/Walking)

The City of Gardner has a Complete Streets Policy as well as a Bicycle and Pedestrian Plan within the current Comprehensive Plan. The relevant sections of the Comprehensive Plan are incorporated by reference here, and helped shape the recommendations of this TMP update. The Comprehensive Plan recommendations can be distilled into the following key elements:

- An emphasis on multi-modal transportation corridors, and the habitual integration of multi-modal design elements (bike lanes, trails, sidewalks, crosswalks, pedestrian refuge islands, bicycle parking) into roadway design and subdivision/development planning.

- Ongoing identification of gaps in the multimodal network (such as missing sidewalks, inadequate sidewalks, and unsafe/inaccessible crosswalks) – and a program to address these gaps.

- Establishment of a dedicated funding stream for multi-modal improvements.

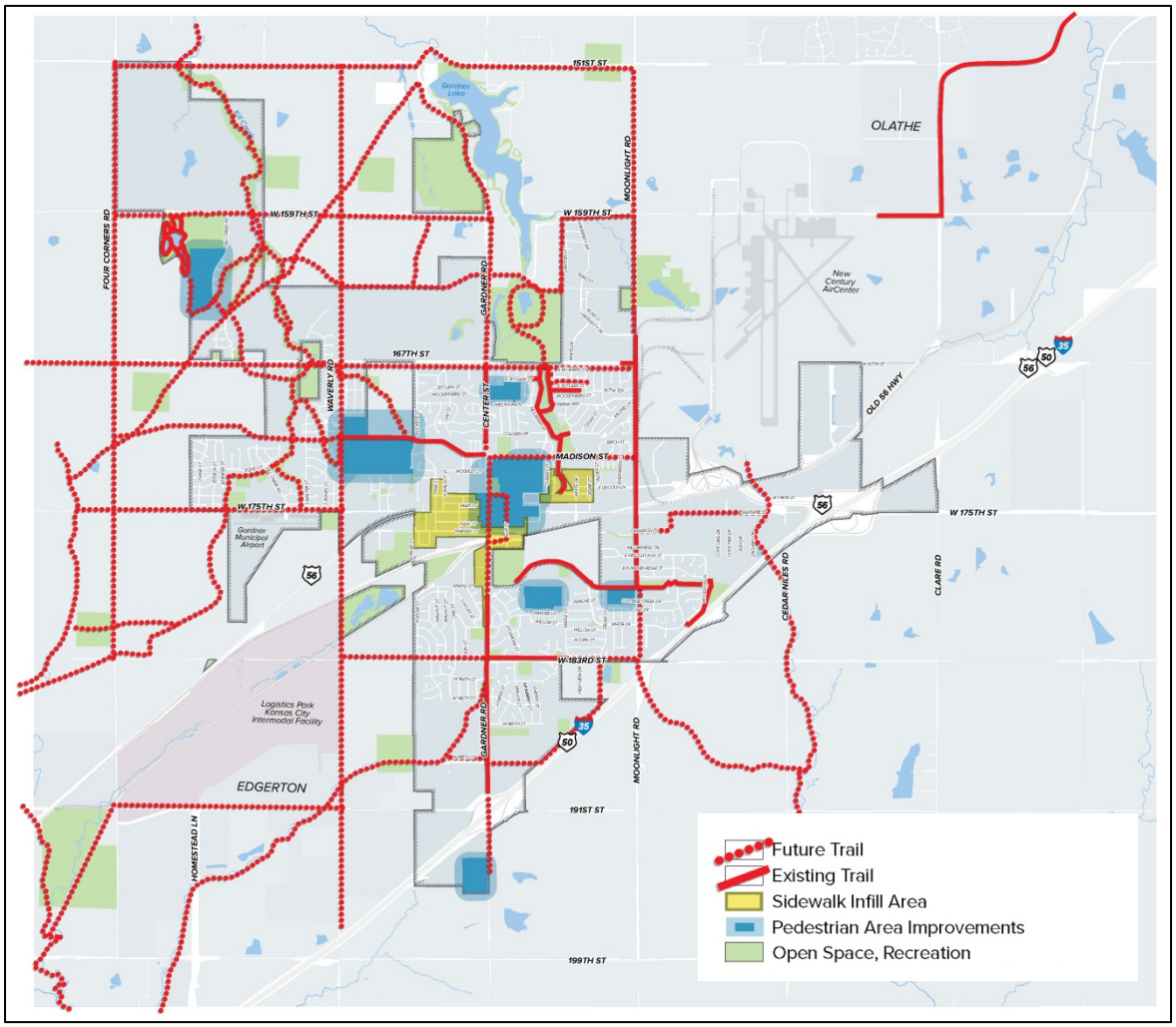
- An emphasis on Complete Streets, including a series of street types (see the "Major Street Map" section later in this TMP update) designed to be context-sensitive and to serve all users.

The concept of "serving all users" has been extended in the U.S. in recent years to the idea of not only serving all transportation modes, including bicyclists and pedestrians, but also of serving users of all ages and experience levels comfortably and safely. The concept of "low-stress" bicycle and pedestrian networks has emerged, encompassing design approaches that recognize the varying user types. This translates to carefully choosing non-motorized facility types when designing roadways. On higher-speed roadways, off-street shared paths or protected/buffered bike lanes are typically appropriate treatments. On collector-level streets, conventional bike lanes and sidewalks are usually an acceptable provision.

The essential recommendation of this TMP is that bicycle and pedestrian facilities should be considered whenever street improvements are considered, and should be incorporated into the planning of all new developments. The discussion above can inform the manner in which these provisions are incorporated, but **of paramount importance is that bicycle and pedestrian needs be considered with every project that involves transportation infrastructure in the City of Gardner, including new land development and redevelopment projects.**

Figure 2-4 illustrates the City's current Bike and Pedestrian Plan. It shows a network of on- and off-street trails and paths. As described above, this network must be complemented by sidewalk and bike facility development at the level of individual developments as well.

FIGURE 2-4: CITY OF GARDNER BIKE & PEDESTRIAN PLAN *(SOURCE: COMPREHENSIVE PLAN)*



Existing (2018) Intersection Analysis

Analysis of the existing conditions at twelve key intersections (plus the 4 ramp terminal intersections) is included in this TMP Supplement. Those intersections are as follows:

1. Moonlight Road & Madison Avenue
2. Moonlight Road & Lincoln Lane
3. US-56 & Waverly Road
4. Main Street & Center Street
5. Main Street & Moonlight Road
6. US-56 & Old 56 Hwy
7. 175th Street/US-56 & Cedar Niles Road
8. US-56 & I-35 Southbound Ramps
9. US-56 & I-35 Northbound Ramps
10. 175th Street & Clare Road
11. Santa Fe Street & Cedar Niles Road
12. Gardner Road & 183rd Street
13. Gardner Road & 188th Street (realigned 191st Street)
14. Gardner Road & I-35 Southbound Ramps
15. Gardner Road & I-35 Northbound Ramps
16. Gardner Road & 191st Street (south of interchange)

Turning movement counts at each intersection were generally derived from recent traffic studies or other sources and factored up to a common base year of 2018. The adjusted and balanced volumes used for analysis are presented in **Figure 2-5**.

Existing geometry and traffic control at each of the key intersections was obtained from aerial photography and is presented in **Figure 2-6**. Note that a re-design of the 175th Street/US-56 and Cedar Niles Road intersection was recently completed, adding additional capacity to the south leg of the intersection. Because the intersection is slated for near-term construction, the existing Synchro analysis includes the improved geometry.

FIGURE 2-5: EXISTING (2018) TURNING MOVEMENT VOLUMES

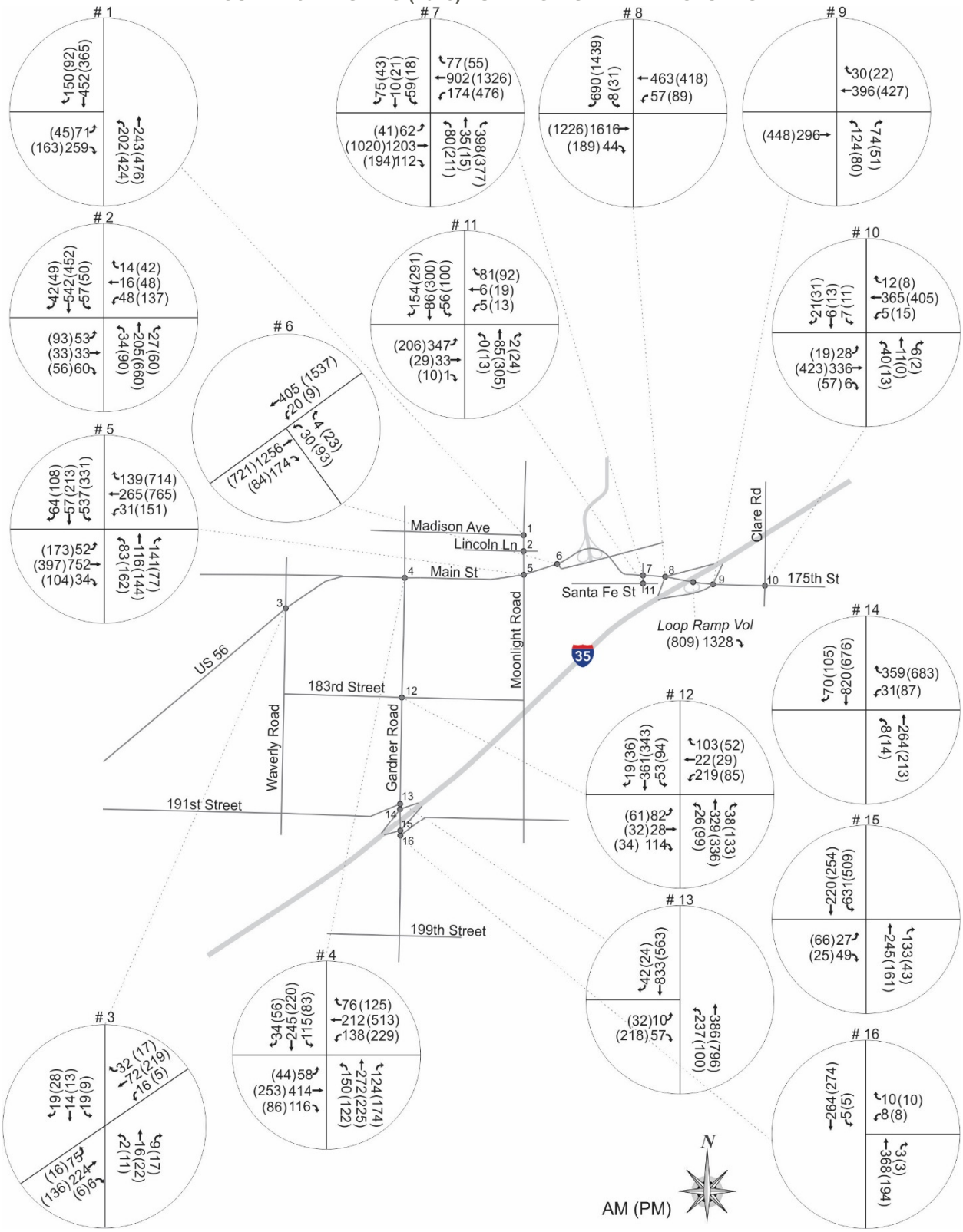
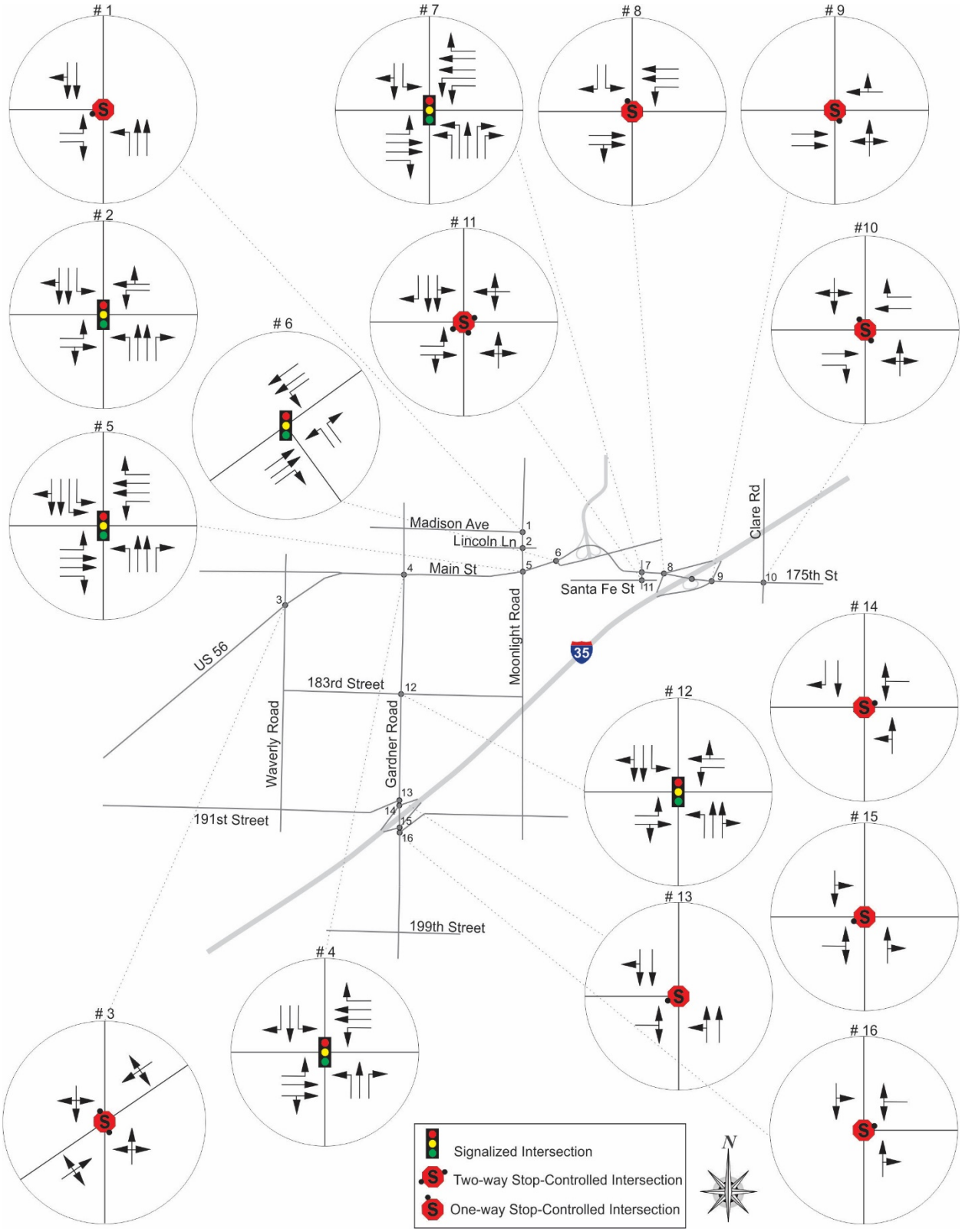


FIGURE 2-6: EXISTING (2018) GEOMETRY AND TRAFFIC CONTROL AT KEY INTERSECTIONS



Using the existing volumes and traffic control shown in **Figures 2-5 and 2-6**, as well as traffic signal timings provided by the City, the existing intersection operations were analyzed using the Synchro 10 software package. The HCM 6 evaluation method was used wherever possible, although due to some unusual configurations/controls certain intersections had to be analyzed using other methods.

As shown in **Table 2-1**, the results of the operational analysis indicate that 5 of the 16 study intersections operate at LOS E or F during one or both peak periods.

TABLE 2-1: EXISTING (2018) INTERSECTION OPERATIONS

			AM Peak Hour		PM Peak Hour	
ID	Intersection	Traffic Control Type	LOS	Delay* (sec/veh)	LOS	Delay* (sec/veh)
1	Moonlight Road at Madison Avenue	Two-way stop	F	56.4 (EBL)	F	250.2 (EBL)
	With mitigation (see below)	*Signal*	*B*	*12.0*	*A*	*8.5*
2	Moonlight Road at Lincoln Lane	Signal	C	28.5	D	47.1
3	US 56 at Waverly Road	Two-way stop	B	13.0 (NB)	B	11.9 (NB)
4	Gardner Road at US 56	Signal	B	11.3	B	10.8
5	Moonlight Road at US 56	Signal	D	51.4	E	55.4
	With potential mitigation (see below)	*Signal*	*D*	*36.4*	*D*	*36.4*
6	US 56 at Old US 56	Signal	A	6.9	A	4.8
7	Cedar Niles Road at US 56	Signal	C	26.4	C	31
8	I-35 SB Ramps at US 56	Two-way stop	F	54.0 (SB)	F	56.1 (SB)
9	I-35 NB Ramps at US 56	Two-way stop	C	21.1 (NB)	C	22.7 (NB)
10	Clare Road at 175th Street	Two-way stop	C	21.4 (NB)	C	23.6 (NB)
11	Cedar Niles Road at Santa Fe Street	Three-way stop	A	8.7	B	10.8
12	Gardner Road at 183rd Street	Signal	B	10.1	A	9.5
13	Gardner Road at 191st Street	Two-way stop	D	40.5 (EB)	D	31.8 (EB)
14	Gardner Road at I-35 SB Ramps	Two-way stop	D	28.7 (WB)	F	217.2 (WB)
15	Gardner Road at I-35 NB Ramps	Two-way stop	F	481.3 (EB)	F	284.6 (EB)
16	Gardner Road at 191st Street	Two-way stop	B	12.3 (WB)	B	10.7 (WB)

** For unsignalized intersections, delays for the worst movement are shown.*

Each of the intersections with poor existing LOS is discussed in more detail below. At some locations, small-scale mitigation projects could help improve operations to acceptable levels and should be considered for near-term implementation.

- *Moonlight Road at Madison Avenue (Intersection #1):* [Since the time the intersection operational analysis was completed, a traffic signal has been installed at this location.]
- *Moonlight Road at US-56 (Intersection #5)* – the addition of a second westbound right turn lane (westbound-to-northbound) would improve operations to LOS D during the PM peak hour. However, additional intersection improvements would be required to accommodate forecasted 2040 volumes, as discussed later. Therefore, it may be prudent to wait until a larger, longer-term project can be funded.
- *I-35 SB Ramps at US-56 (Intersection #8):* A major reconfiguration of this interchange will be required in the future; therefore, this intersection is not included as a near-term project mitigation. The City is pursuing funding for interim improvements at this interchange (ramp signalization), although said funding has not been secured.
- *Gardner Road at I-35 SB and NB Ramps (Intersections #14 & 15):* A major reconfiguration of this interchange is currently being designed. The new interchange will be a diverging diamond with enough capacity to handle existing volumes, as well as projected 2040 volumes.

3. Travel Demand Forecasting

Model Updates

This TMP Supplement includes an update and refinement of procedures used to project and analyze growth throughout the City, particularly on the east side of I-35 and in the northwest quadrant of the City. Prior analyses had done some sketch-planning for long-term traffic growth, using City-defined future growth areas, adopted sub-area land use plans, the ITE Trip Generation manual, and some basic trip distribution assumptions. The prior analysis yielded long-term daily volume projections at spot locations along the major thoroughfares in the City.

The refined analysis has been completed utilizing the most recent version of the Olathe Travel Demand Model (TDM), updated in 2014 (by others). The most recent version of the TDM is a PM peak-hour (only) model, with a base year of 2012 and future horizon years of 2025 and 2040.

LAND USE

To ensure that the model contained the most up-to-date information regarding Gardner's vision for future land use, the 2040 land use inputs were revisited and updated by City of Gardner planning staff. The updated land use data was provided at the traffic analysis zone (TAZ) level, for the 122 zones in the Gardner area (shown in dark green on **Figure 3-1**). TAZs outside the Gardner area (shown in light green) were not updated. The 2040 land use incorporated into the 2014 model update was assumed to still be reasonable for zones outside the Gardner area.

FIGURE 3-1: OLATHE TDM – GARDNER AREA

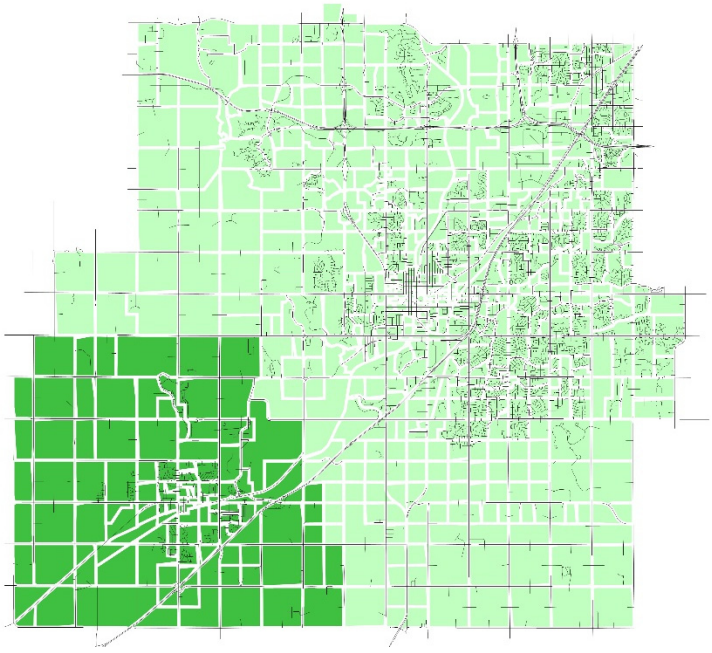


Table 3-1 summarizes the 2040 land use totals for the Gardner area. The land use categories and units were pre-defined by the model.

TABLE 3-1: 2040 LAND USE TOTALS – GARDNER AREA

Land Use Category	Units	Total
High Rate Commercial	Sq. Ft.	418,418
Middle Rate Commercial	Sq. Ft.	968,668
Low Rate Commercial	Sq. Ft.	653,342
Hotel	Rooms	498
Industrial	Sq. Ft.	28,205,411
Office	Sq. Ft.	1,055,738
Recreation / Park	Sq. Mi.	1.965
Church	Sq. Ft.	279,738
Elementary / Middle School	Sq. Ft.	1,358,305
High School	Sq. Ft.	409,524
Hospital	Sq. Ft.	242,413
Public	Sq. Ft.	997,130
Single Family Residential	Dwelling Unit	12,245
Duplex, Quadplex, Condo	Dwelling Unit	2,731
Apartment	Dwelling Unit	3,283

A traditional TDM script begins with socioeconomic data at the TAZ level, such as was developed by City staff. However, the first step of the Olathe TDM script runs a predefined Production-Attraction (P-A) table. Typically, the P-A table is generated by the model after land use is converted to trip generation. Therefore, in order to utilize the Olathe TDM, the updated Gardner land use totals were manually converted to a P-A table (by trip purpose) that could be fed into the model. The P-A table was created using the rates published in Table 5 of the *City of Olathe Travel Demand Model Update Documentation, February 2014.*

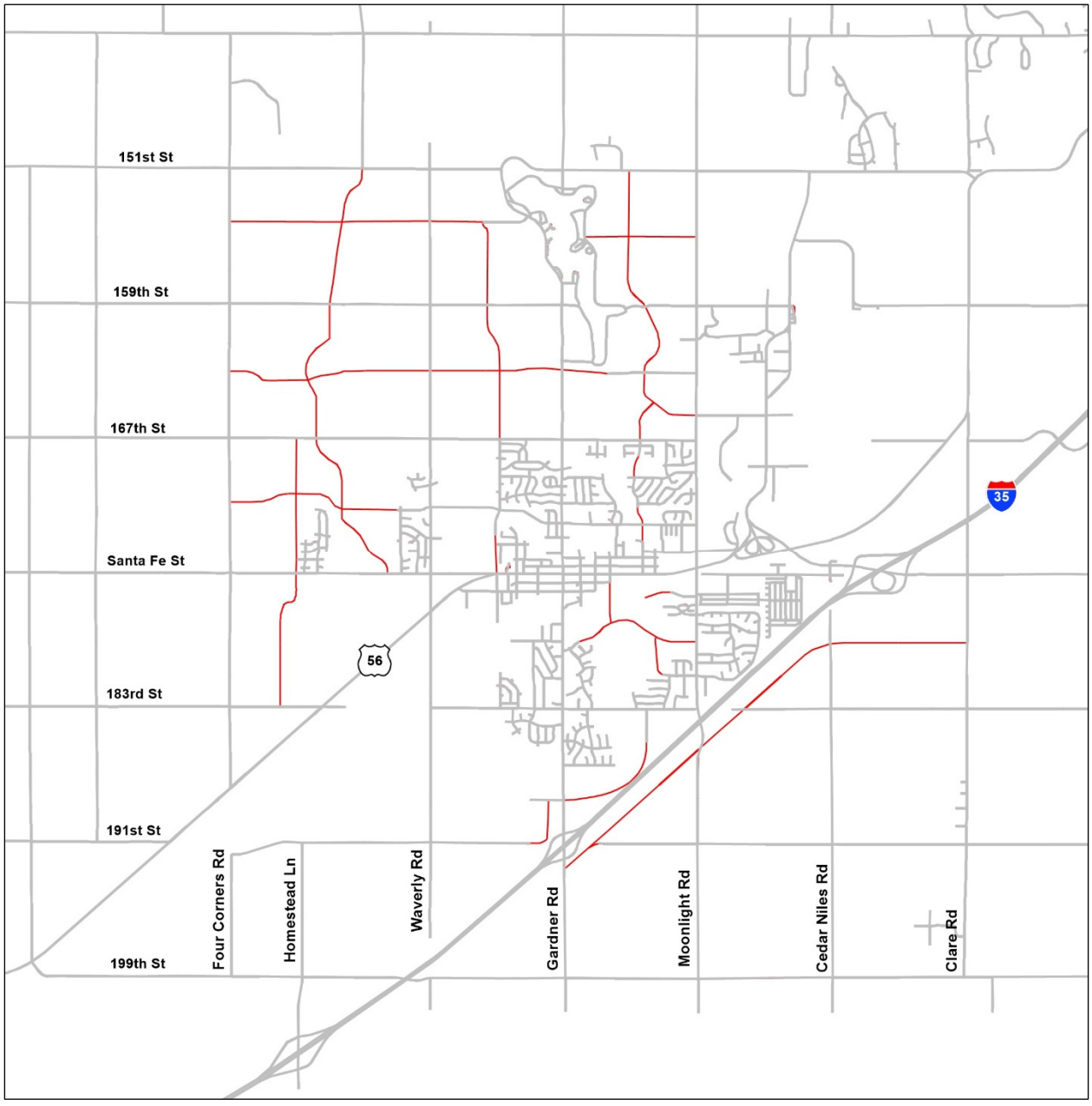
MODEL NETWORK

The 2040 TDM road network was also reviewed and updated for new roads completed since the last model update, as well as projects expected to be completed by 2040. These include:

- Grand Street, existing section between Center Street and Moonlight Road
- Kill Creek Road, existing sections and proposed connections between 151st Street and 175th Street
- University Drive, existing sections and proposed connections between Moonlight Road and 151st Street
- White Drive, existing sections and proposed connections between University Drive and Main Street
- Madison Street, proposed connection west to Four Corners Road
- Poplar Street, proposed connection north to 154th Street
- 163rd Street, proposed connection between Four Corners Road and Moonlight Road
- 191st Street (west of Gardner Road) re-alignment to 188th Street
- Proposed access road, running parallel along the east side of I-35

All of the 2040 base network additions are shown in red in **Figure 3-2**. An alternate future network (not shown) was developed that includes a new interchange at I-35 and 183rd Street/Moonlight Road.

FIGURE 3-2: 2040 MODEL NETWORK ADDITIONS



Model Results

Using the updated model input files, two 2040 scenarios were analyzed; the only difference being with the alternate future networks:

- 2040A – Does not include a new I-35 interchange at 183rd Street / Moonlight Road
- 2040B – Includes a new I-35 interchange at 183rd Street / Moonlight Road

The same land use inputs were used for both 2040 scenarios.

PROJECTED SEGMENT VOLUMES

Figures 3-3 and 3-4, on the following pages, illustrate the PM peak hour, directional segment volumes for the 2040A and 2040B scenarios, respectively. As shown, there are no substantial changes in volumes regionally between the two scenarios. There are some localized changes visible, primarily at (or near) the existing I-35 interchanges. The following list summarizes the majority of the volume shifts that are expected to occur with a new 183rd Street / Moonlight Road interchange in place (network 2040B).

Segments with Volume reductions:

1. Westbound US-56 (175th Street) between I-35 and New Century Parkway
2. The eastbound-to-northbound loop ramp at the US-56 / I-35 interchange
3. Gardner Road between 183rd Street and 191st Street, on the south side of the interchange (both directions)
4. The new access road on the east side of I-35, particularly between Gardner Road and Moonlight Road
5. I-35, south of the new interchange (both directions)

Segments with Volume increases:

1. Westbound 183rd Street, west of the new interchange
2. Southbound Moonlight Road, between 183rd Street and the new access road
3. I-35, north of the new interchange (both directions)

As noted previously, the latest version of the Olathe TDM is a PM peak-hour model only. However, with some manipulation of the origin-destination (O-D) matrix and the model script, AM peak hour results have been approximated. This process involved transposing the PM O-D matrix, and then reducing the number of trips by 84%. This reduction percentage was determined by calculating the ratio of AM entering volumes to PM entering volumes from existing counts at intersections throughout the City. The revised O-D matrix was then fed into the model script at the appropriate location and a new AM assignment was created. This was done for both the 2040A and 2040B scenarios.

Projected volume shifts in the AM peak hour are similar to those in the PM peak hour.

FIGURE 3-3: 2040A (NO 183RD INTERCHANGE) PM PEAK-HOUR FORECASTED DIRECTIONAL VOLUMES

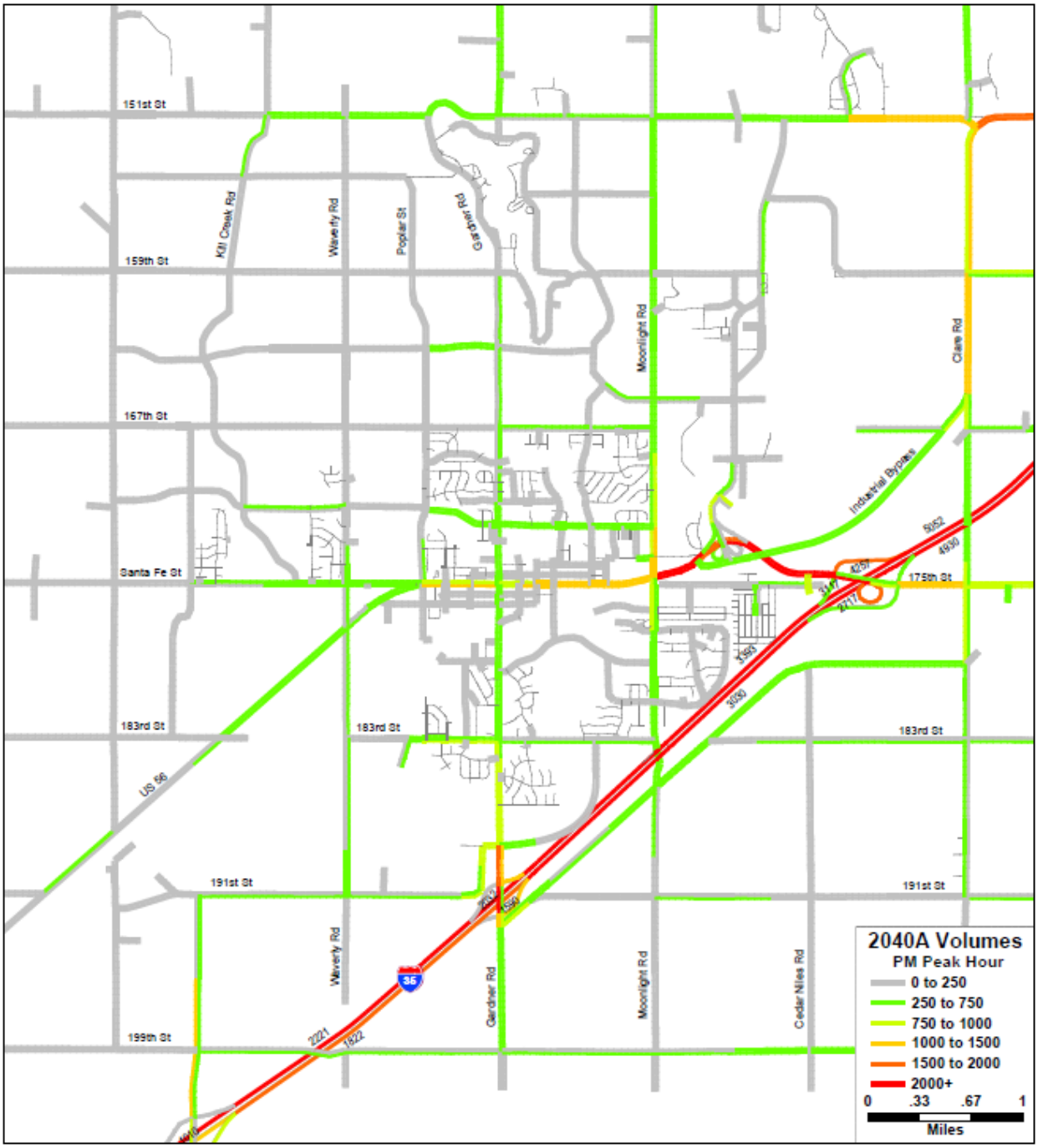
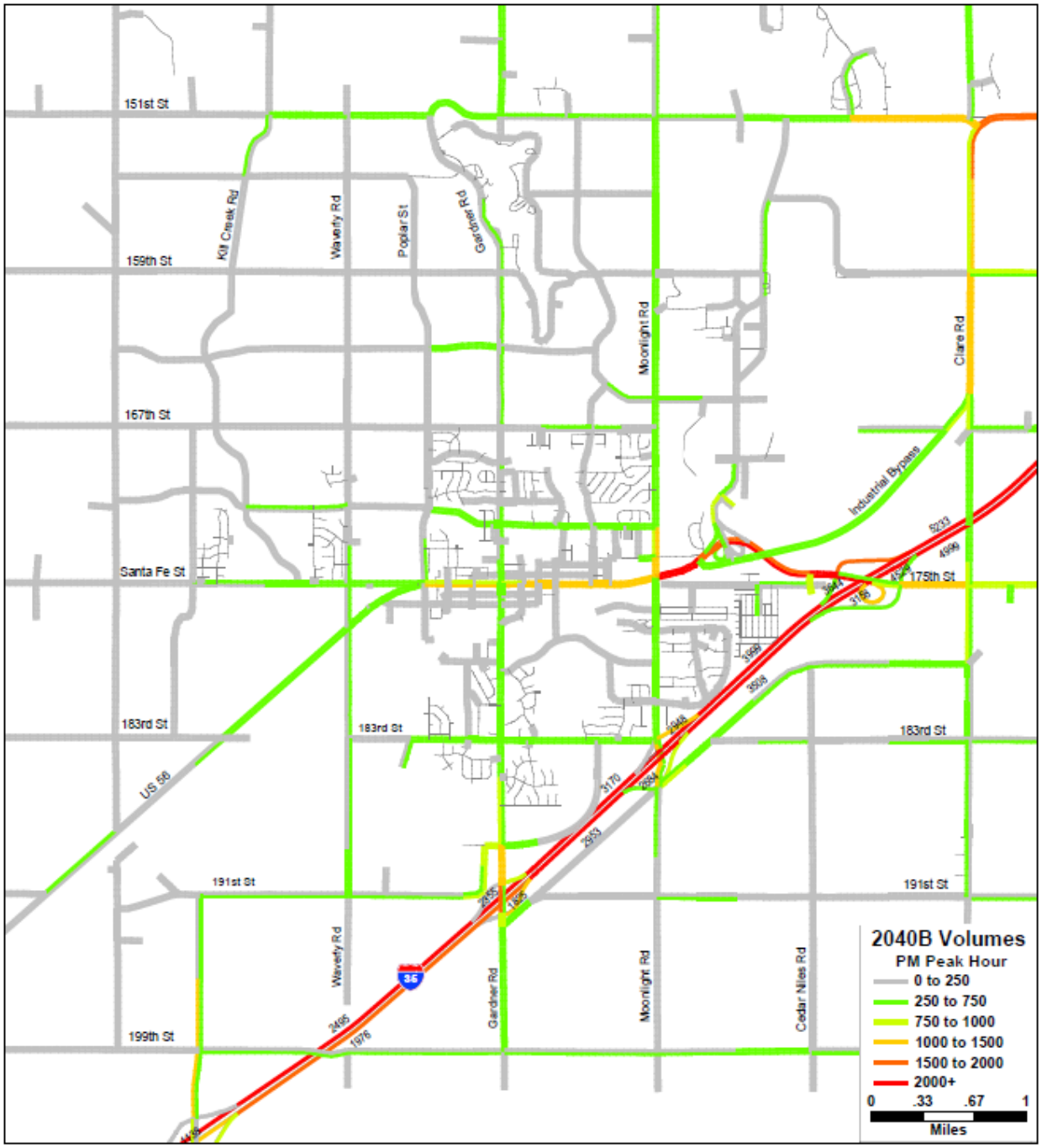


FIGURE 3-4: 2040B (WITH 183RD INTERCHANGE) PM PEAK HOUR FORECASTED DIRECTIONAL VOLUMES



SEGMENT LEVEL OF SERVICE

Volume-to-Capacity (V/C) ratios and Levels of Service (LOS) were also derived from the TDM. **Figures 3-5 and 3-6** illustrate these measures of effectiveness (MOEs) for the PM peak hour, for the 2040A and 2040B scenarios, respectively. Segments with the lowest V/C ratios (below 0.6) are considered to operate at LOS A, and are shown as dark purple; segments with the highest V/C ratios (above 1.0) are considered to operate at LOS F, and are shown as red. Segments shown to operate at LOS D or better are considered to be acceptable for long-term planning purposes. Segments shown to operate at LOS E or F are considered to be failing.

The following segments appear to consistently show poor LOS conditions under both of the future scenarios, during the PM peak. The Network Recommendations section, found later in this document, discusses some potential improvements to address these issues.

- 175th Street east of I-35 to Hedge Lane
- Clare Road between Industrial Bypass and the proposed frontage road on the east side of I-35.
- Locust Street between 188th Street and 191st Street
- Gardner Road between 188th Street and 191st Street
- 183rd Street/Cherokee Drive west of Gardner Road
- Ramps within the I-35/US-56 interchange
- 151st Street west of Clare Road

Given that there are no capacity changes between scenarios 2040A and 2040B, aside from the addition of the new interchange, there is a direct correlation between locations where volumes increase and where LOS declines, when comparing the two scenarios. There are a handful of locations where operations are forecasted to significantly improve (or decline) with the addition of the new interchange, but for the most part levels of service remain fairly similar.

Operational Improvements:

- The Gardner Road interchange southbound off-ramp would improve from LOS F to LOS B in the PM peak hour. The northbound on-ramp would also improve but only to LOS E, which is below acceptable levels.
- Moonlight Road, between Grand Boulevard and US-56, improves from LOS F to LOS D.
- Although not noticeable from the graphic, the US-56 interchange southbound off-ramp and northbound loop ramp would improve somewhat, despite remaining below acceptable levels.

Operational Declines:*

- Moonlight Road, between 183rd Street and the new access road on the east side of I-35, would decline from LOS C/D to LOS F during the PM peak hour.
- 183rd Street west of Moonlight would decline from LOS A to LOS E.
- I-35 southbound between the US-56 interchange and the new 183rd Street / Moonlight Road interchange would decline from LOS C to LOS E.

*All of these operational declines could be mitigated with capacity improvements included as a part of the construction of the new interchange (a southbound auxiliary lane might be needed on I-35).

MOEs were also derived for the AM peak hour. Given the way in which the AM model run was developed, less importance should be placed on these results; however, they are provided for reference in **Figures 3-7 and 3-8**.

Due to lower overall volumes in the AM, certain areas (like Gardner Road from 188th Street through the I-35 interchange) show greater improvements than are visible on the PM map. This is mainly because the operational levels were closer to those LOS thresholds to begin with (in the 2040A scenario).

FIGURE 3-5: 2040A (NO 183RD INTERCHANGE) PM PEAK HOUR MODEL OUTPUT LEVEL OF SERVICE

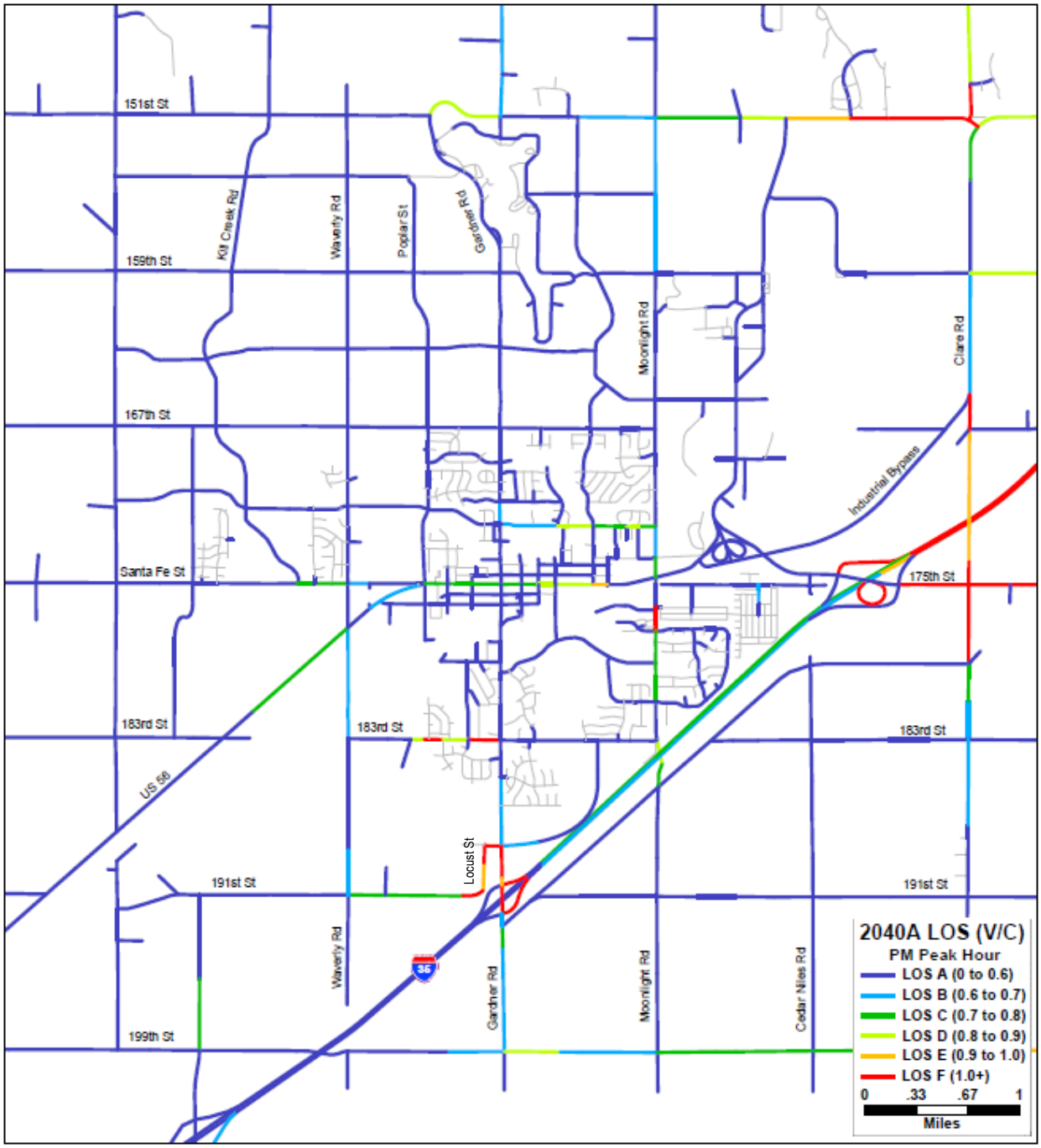


FIGURE 3-6: 2040B (WITH 183RD INTERCHANGE) PM PEAK HOUR MODEL OUTPUT LEVEL OF SERVICE

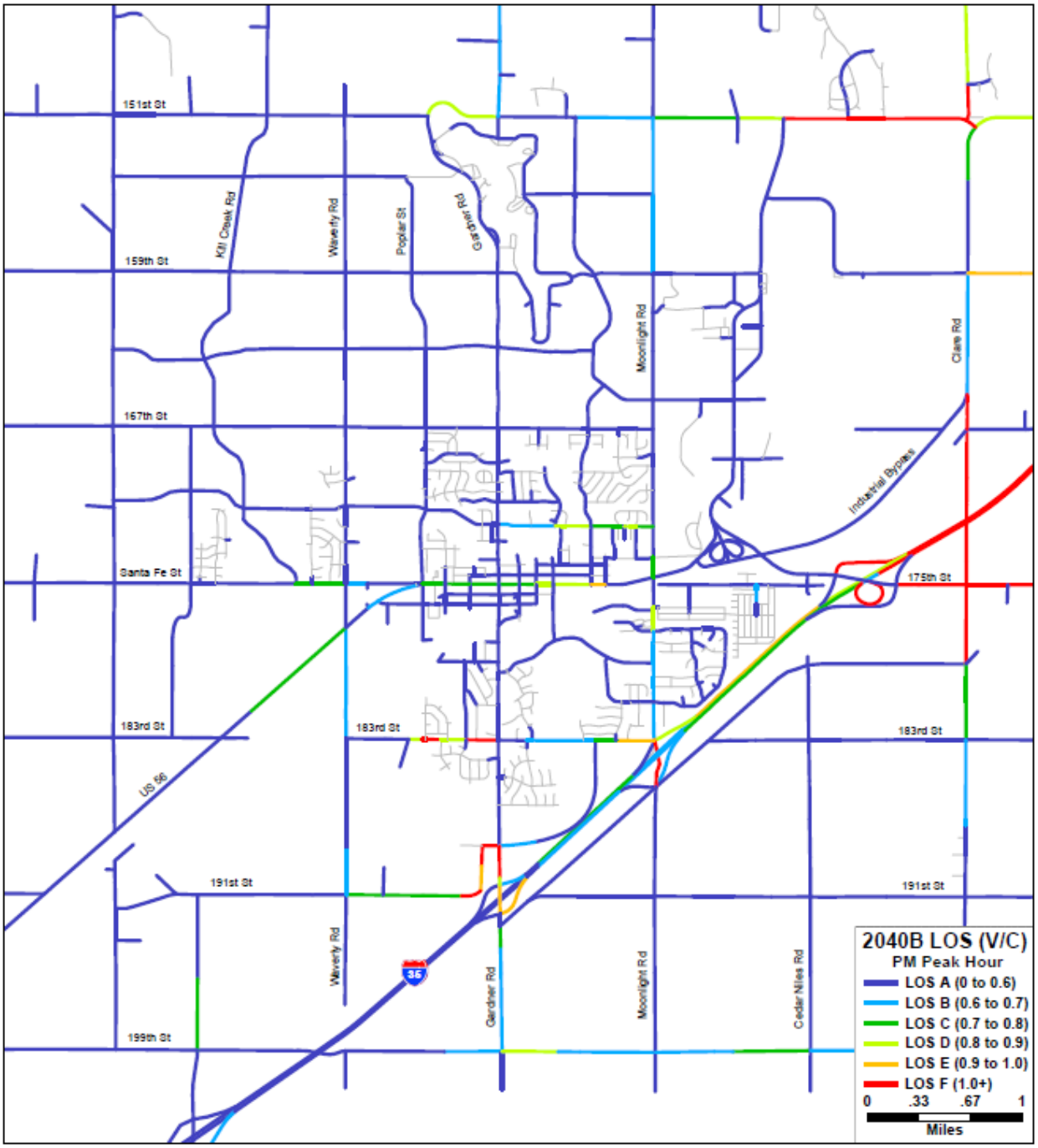
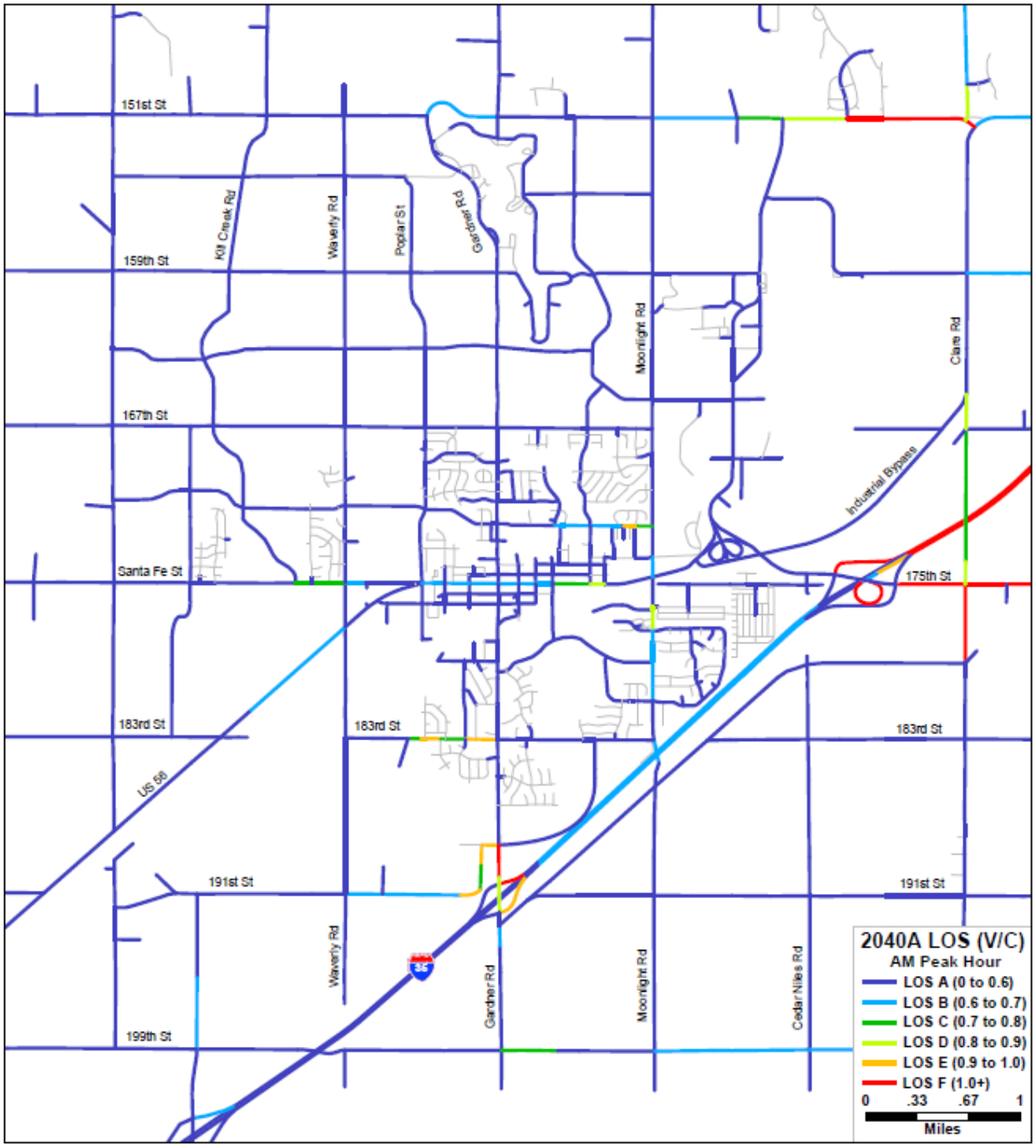
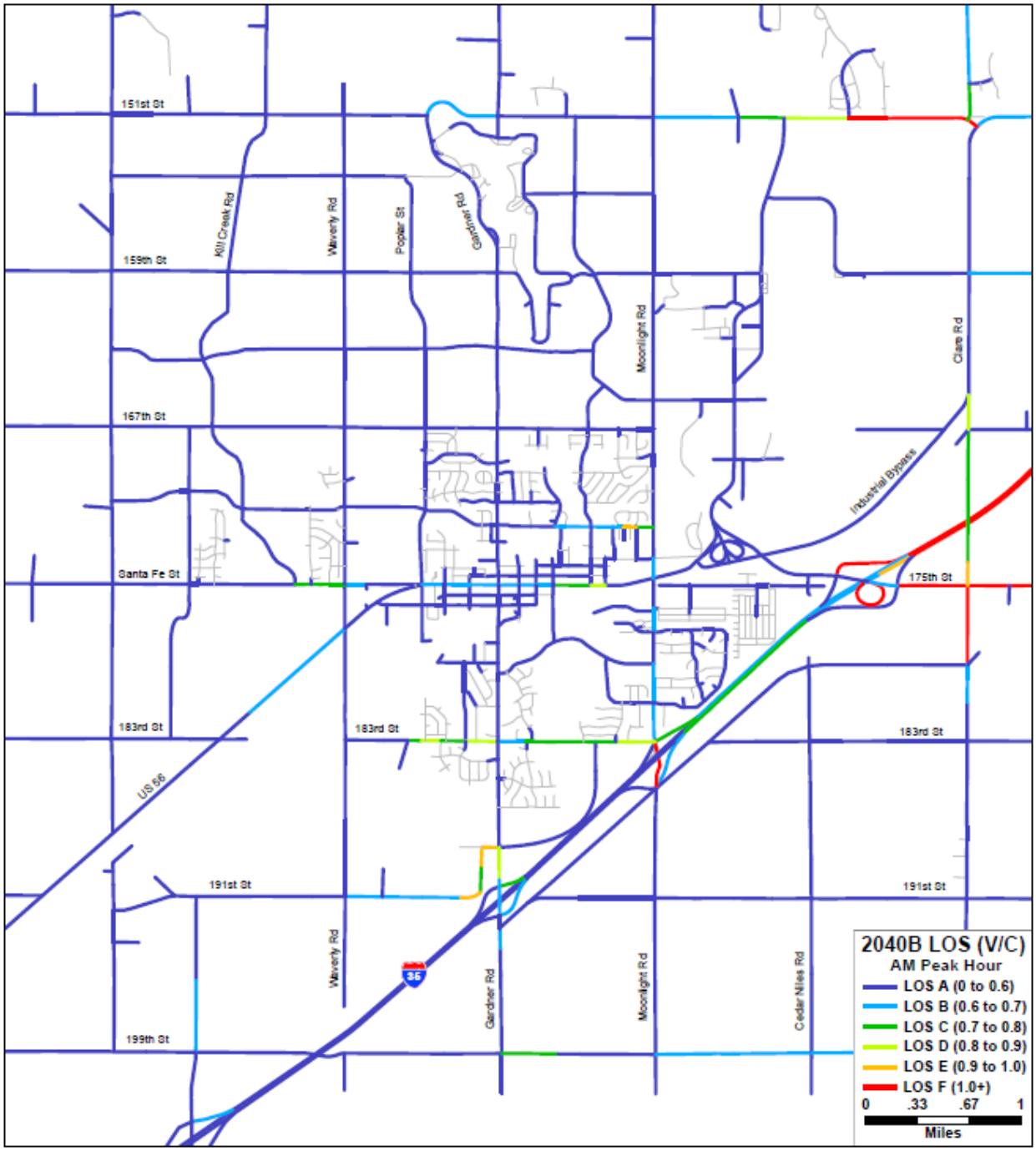


FIGURE 3-7: 2040A (NO 183RD INTERCHANGE) AM* PEAK HOUR MODEL OUTPUT LEVEL OF SERVICE



AM Model derived from manipulated PM model and results should be less emphasized; see text

FIGURE 3-8: 2040B (WITH 183RD INTERCHANGE) AM* PEAK HOUR MODEL OUTPUT LEVEL OF SERVICE



**AM Model derived from manipulated PM model and results should be less emphasized; see text*

INTERSECTION VOLUME FORECASTS

The TDM was also used to derive turning movement counts at each of the study intersections. The raw model turning-movement outputs were examined for reasonableness, and were compared to existing turning-movement counts. In some cases, particularly where future model volumes were projected to be lower than existing, adjustments were made. In those situations, a 20% growth factor was applied to the existing count, to show at least minimal growth for the future scenarios. Some balancing adjustments were also made.

The adjusted peak-hour turning-movement volumes for the 2040A and 2040B scenarios are shown in **Figures 3-9 and 3-10**, respectively. Note that for the 2040B scenario, the new interchange ramp terminals at I-35 and 183rd Street were added as study intersections.

OPERATIONAL RESULTS

The 2040 turning movement volumes derived from the model outputs were then analyzed for operational performance. A few intersection-level geometric improvements were assumed to have been made by 2040 (see below); however, the majority of intersections were analyzed with their existing geometry and traffic control in order to assess where problems may occur in the future.

By 2040, the following intersection-level improvements were assumed to be in place:

- The Moonlight Road / Madison Avenue intersection would be signalized, per the near-term mitigation recommendations.
- The I-35 / Gardner Road interchange would be converted to a Diverging Diamond (DDI) with signalized ramp terminals.
- As stated previously, the 2040 TDM scenarios assume the realignment of existing 191st Street (west of Gardner Road) so that it intersects with Gardner Road further north, at the current 188th Street alignment. The realigned portion will be renamed Locust Street. The existing intersection of W 191st Street and Gardner Road will be closed. As a result, the intersection level analysis is different for the existing and 2040 scenarios. The 2040 scenarios also assume the 188th Street and Gardner Road intersection will be signalized and will include a fourth (westbound approach) leg. The geometry is assumed to be improved to include left turn lanes on all approaches, including double northbound lefts, and right turn lanes on the southbound and eastbound approaches. This configuration is consistent with current preliminary design plans.
- All signal timings were assumed to be optimized in 2040. In some cases, where there are existing signals, this resulted in improved future conditions without providing additional capacity (see Moonlight Road at Lincoln Lane).
- As stated above, the interchange ramp terminals at I-35 and 183rd Street were added to the 2040B analysis. Due to the unique geometry in these locations, multi-leg roundabouts were assumed for the future traffic control.

FIGURE 3-9: 2040A (NO 183RD INTERCHANGE) PEAK-HOUR TURNING-MOVEMENT VOLUMES

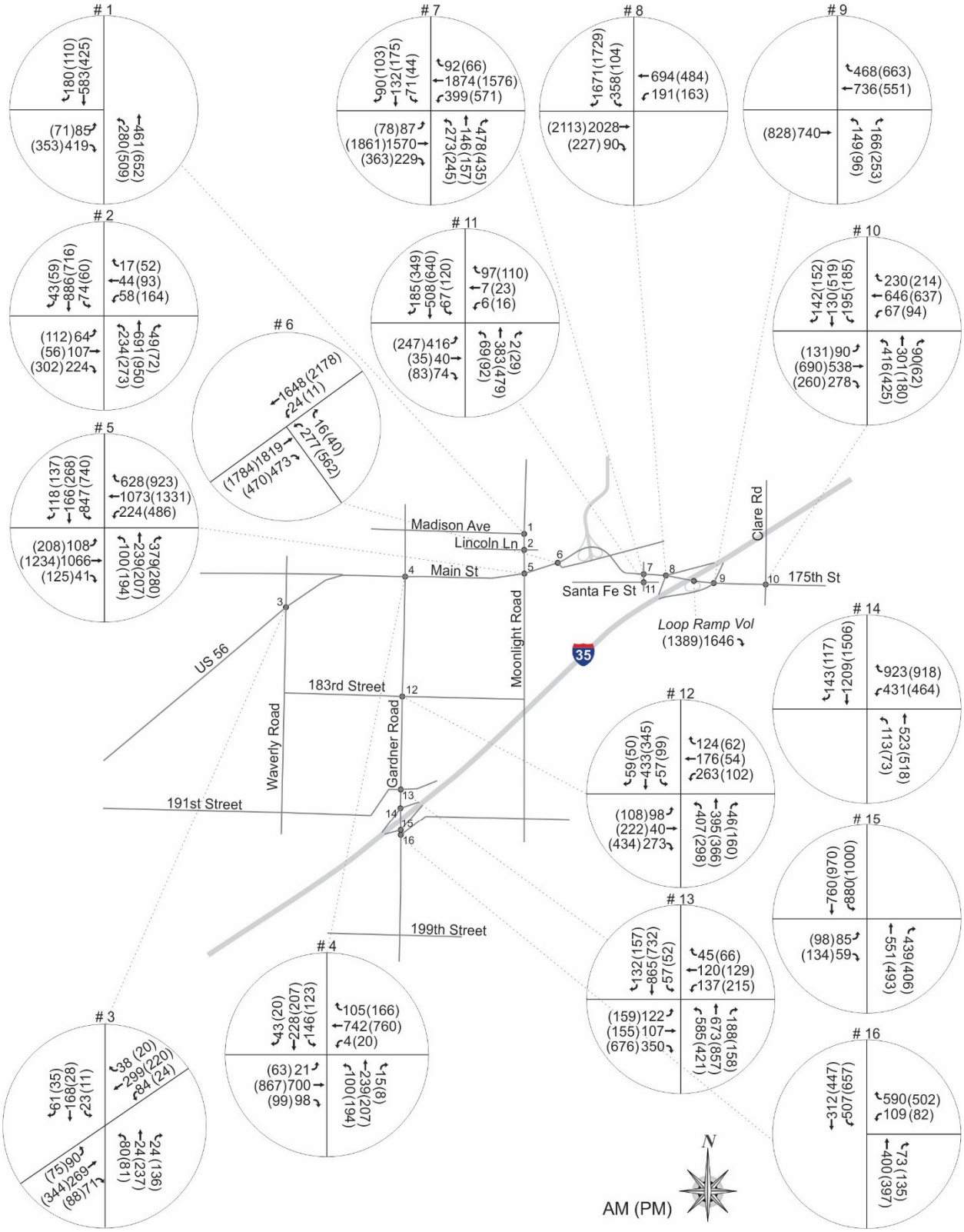
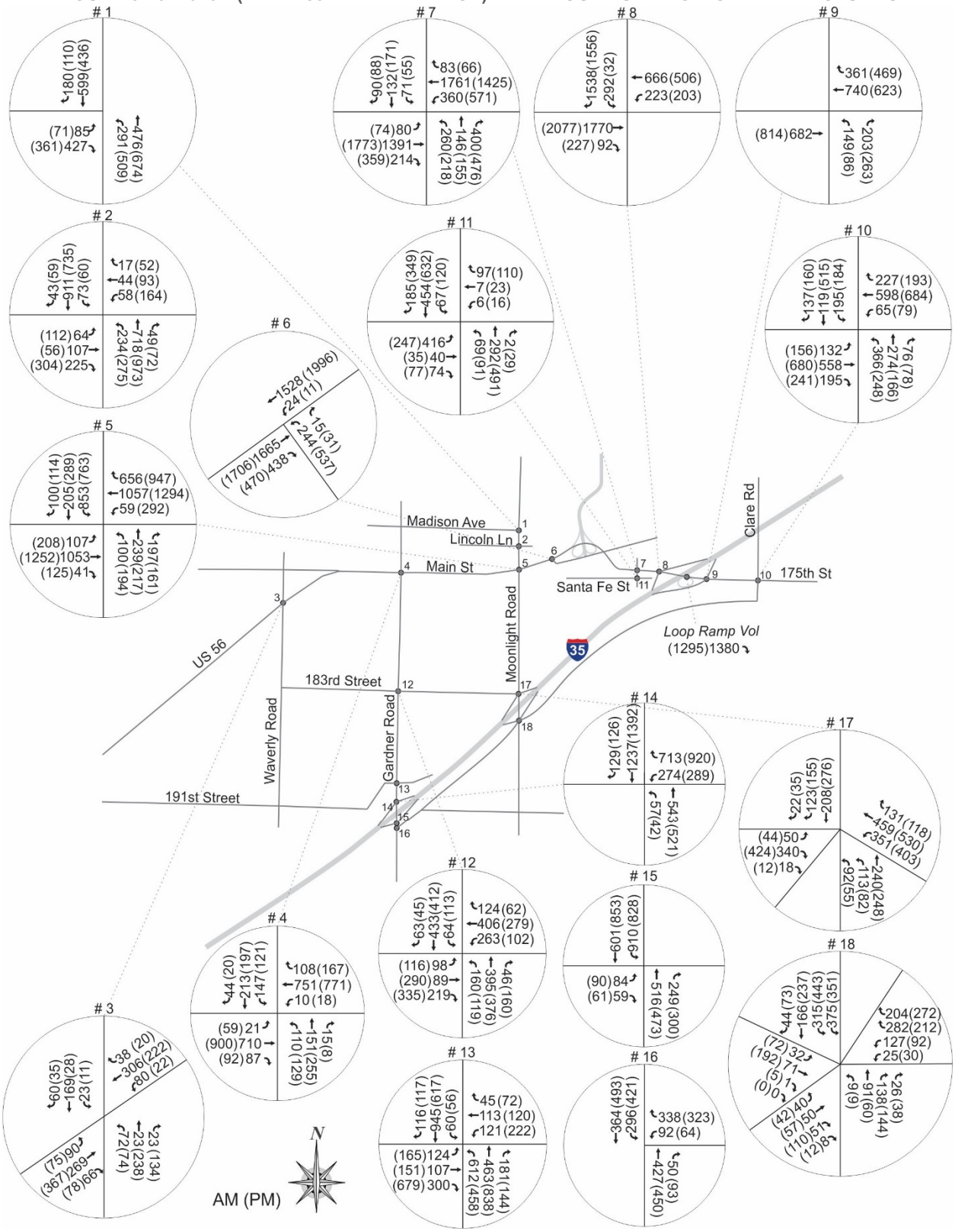


FIGURE 3-10: 2040B (WITH 183RD INTERCHANGE) PEAK-HOUR TURNING-MOVEMENT VOLUMES



The 2040 projected volumes and geometric assumptions were entered into the appropriate software packages for analysis; Synchro 10 for signalized and stop-controlled intersections, and SIDRA Intersection 8 for roundabouts. The HCM 6 reporting methodology was used for the majority of intersections. As described for the existing conditions analysis, in certain locations where there is non-standard geometry, the HCM 6 methodology was not applicable, and an alternative method was used. The complete intersection analysis results for the 2040A and 2040B scenarios are shown in **Tables 3-2 and 3-3**, as well as existing conditions results for reference.

As described previously, the AM model results, and therefore the derived 2040 AM peak hour turning movements, were developed using a transposed and factored-down PM O-D matrix rather than from a true AM model. So, again, less emphasis should be placed on the AM intersection analysis results (Table 3-3) than the PM results (Table 3-2).

TABLE 3-2: PM PEAK HOUR INTERSECTION ANALYSIS RESULTS – EXISTING AND FUTURE

			Existing**		2040A (No 183rd intchg)		2040B (With 183rd)	
ID	Intersection	Traffic Control*	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1	Moonlight / Madison	Signal	A	8.5	B	13.6	B	13.5
2	Moonlight / Lincoln	Signal	D	47.1	D	40.1	D	41.3
3	US 56 / Waverly	Two-way stop	B	11.9 (NB)	F	371.6 (NB)	F	377.8 (NB)
4	Gardner / US 56	Signal	B	10.8	C	24.3	C	24.1
5	Moonlight / US 56	Signal	E	55.4	F	161.4	F	121.7
6	US 56 / Old US 56	Signal	A	4.8	B	18.1	B	17.7
7	Cedar Niles / US 56	Signal	C	31	E	71.2	E	59.7
8	I-35 SB / US 56	Two-way stop	F	56.1 (SB)	F	225.4 (WBL)	F	317.9 (WBL)
9	I-35 NB / US 56	Two-way stop	C	22.7 (NB)	F	537.7 (NB)	F	432.1 (NB)
10	Clare / 175th	Two-way stop	C	23.6 (NB)	~	~	~	~
11	Cedar Niles / Santa Fe	Three-way stop	B	10.8	F	90.0	F	90.5
12	Gardner / 183rd	Signal	A	9.5	C	34.9	B	19.8
13	Gardner / 191st	Two-way stop	D	31.8 (EB)	--	--	--	--
	Gardner / 188th	Signal	--	--	E	68.8	E	65.9
14	Gardner / I-35 SB Ramps	Two-way stop	F	217.2 (WB)	B	15.6	B	15.0
15	Gardner / I-35 NB Ramps	Two-way stop	F	284.6 (EB)	B	14.8	B	14.0
16	Gardner / 191st	Two-way stop	B	10.7 (WB)	F	5468.6 (WBL)	F	770.4 (WBL)
17	I-35 SB Ramps / Moonlight / 183rd	Roundabout	--	--	--	--	B	10.7
18	I-35 NB Ramps / Moonlight /183rd	Roundabout	--	--	--	--	B	11.7

*At unsignalized intersections, delays are shown for the worst movement.
**Includes near-term mitigated results at intersection 1.
~Volume exceeds capacity for northbound and southbound legs; Synchro does not report values.

TABLE 3-3: AM*** PEAK HOUR INTERSECTION ANALYSIS RESULTS – EXISTING AND FUTURE

			Existing**		2040A (No 183rd intchg)		2040B (With 183rd)	
ID	Intersection	Traffic Control *	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1	Moonlight / Madison	Signal	B	12.0	B	16.3	B	16.7
2	Moonlight / Lincoln	Signal	C	28.5	D	43.7	D	36.8
3	US 56 / Waverly	Two-way stop	B	13.0 (NB)	F	225.8 (SB)	F	220.2 (SB)
4	Gardner / US 56	Signal	B	11.3	B	14.0	B	16.4
5	Moonlight / US 56	Signal	D	51.4	F	116.1	F	85.7
6	US 56 / Old US 56	Signal	A	6.9	B	10.1	A	7.9
7	Cedar Niles / US 56	Signal	C	26.4	D	47.7	D	43.6
8	I-35 SB / US 56	Two-way stop	F	54.0 (SB)	F	172.3 (WBL)	F	115.0 (WBL)
9	I-35 NB / US 56	Two-way stop	C	21.1 (NB)	F	849.2 (NB)	F	683.2 (NB)
10	Clare / 175th	Two-way stop	C	21.4 (NB)	~	~	~	~
11	Cedar Niles / Santa Fe	Three-way stop	A	8.7	F	102.5	F	90.7
12	Gardner / 183rd	Signal	B	10.1	C	32.8	B	17.9
13	Gardner / 191st	Two-way stop	D	40.5 (EB)	--	--	--	--
	Gardner / 188th	Signal	--	--	D	37.0	D	41.7
14	Gardner / I-35 SB Ramps	Two-way stop	D	28.7 (WB)	B	15.5	B	14.3
15	Gardner / I-35 NB Ramps	Two-way stop	F	481.3 (EB)	B	14.5	B	11.8
16	Gardner / 191st	Two-way stop	B	12.3 (WB)	F	1472 (WBL)	F	236 (WBL)
17	I-35 SB Ramps / Moonlight / 183rd	Roundabout	--	--	--	--	A	9.8
18	I-35 NB Ramps / Moonlight /183rd	Roundabout	--	--	--	--	A	9.7

*At unsignalized intersections, delays are shown for the worst movement.
**Includes near-term mitigated results at intersection 1.
*** AM Model derived from manipulated PM model and results should be less emphasized; see text
~Volume exceeds capacity for northbound and southbound legs; Synchro does not report values.

Key findings from the intersection analysis include:

- US-56 /Waverly Road will need improvements.
- The intersection of Moonlight Road and US-56 will experience capacity issues.
- The I-35 / US-56 interchange will experience capacity issues in the future, even with a 183rd Street interchange in place. (Cedar Niles Road / US-56 will experience issues as well.)
- The planned new interchange at Gardner Road and I-35 should accommodate future demands, although Gardner Road intersections near the interchange (188th Street and 191st Street) will need capacity improvements.
-

4. Network Recommendations

The results of the analyses described in previous sections begin to paint a picture of the types of transportation improvements needed to support the traffic demand expected in the future.

Interchanges

The City of Gardner is currently served by two interchanges on I-35: US-56 and Gardner Road. Both the TDM and the intersection-level Synchro analysis indicate heavy congestion at both of these interchanges by 2040 (or before – for many movements these interchanges are already exceeding capacity). At a minimum, both of these interchanges should be geometrically reconfigured with improved traffic controls. The construction of a new interchange at 183rd Street/Moonlight Road would also help to relieve traffic at the two existing interchanges, as demonstrated by the results of scenario 2040B.

I-35 & GARDNER ROAD

With its narrow two-lane bridge, lack of turn lanes at intersections, and minimal separation from 191st Street on both sides, the interchange is undersized for both current and forecasted needs. Fortunately, preliminary design for improvements is underway. Two separate projects will address this area: The first one, focused on relocating 191st Street and improving the existing intersection of 188th Street and Gardner Road, is currently undergoing final design and is expected to be let in 2020. The second one will reconstruct the interchange and bridge over I-35 and is in the preliminary design phase as of 2020. With this improved capacity, the interchange can be expected to operate acceptably well beyond 2040.

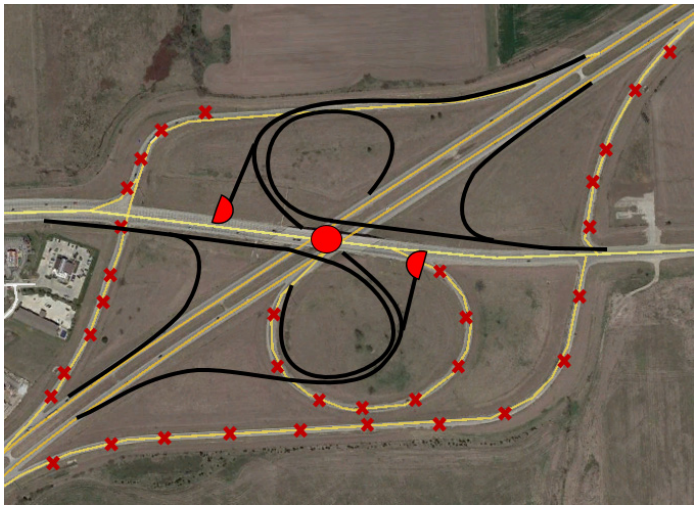
I-35 & US-56

The I-35 / US-56 interchange is a partial cloverleaf configuration, with a very large (~340-foot-radius) loop-ramp occupying the southeast quadrant. The interchange, constructed decades ago, is a high-speed rural configuration with the ramps separated by approximately 2,100 feet. The heaviest movements are between the west and north legs, as traffic largely moves between Gardner and the rest of the metro area to the northeast.

The 2009 TMP recommended signalizing both ramp terminals in the 2010-2016 time-frame. Growth in Gardner (and the rest of the metro area) slowed down due to the recession, and thus the need for these signals did not materialize as quickly as anticipated. However, forecasted traffic volumes clearly show a need for some sort of improvement.

As mentioned earlier, the City is seeking a near-term solution of signalizing the existing configuration. Ultimately, the long-term solution is likely to design a tighter interchange footprint, at a more urban scale, which will allow better separation between the interchange ramp terminals and existing/proposed development access points on either side of the interchange. Any future interchange type must account for the very large eastbound-to-northbound and southbound-to-westbound movements, both of which are “free” today, in order to avoid severe congestion.

One such solution is a SPUPCLO; a combination of a single-point urban interchange (SPUI) and a partial cloverleaf (PARCLO). See sketch at right. The eastbound-to-northbound and westbound-to-southbound movements would be removed from the center, signalized intersection, and would access I-35 via small loop ramps (although capacity for the eastbound-to-northbound loop will need to be verified). The northbound and southbound off-ramp right turns would also be removed from the main central signal, although each of those would be served by a half signal to allow for easier turns. The signals could be phased such that eastbound and westbound traffic would not have to stop more than once. Preliminary analysis of this configuration indicates acceptable levels of service in 2040.



Interim solutions for this interchange may be possible, such as a “Continuous T” configuration at the northbound ramps, with the northbound left-turn feeding an “add” westbound through lane – but it must be noted that adding signals to the intersection in the near-term could bring large-volume traffic movements that haven’t previously been subject to stopping under signal control, adding new delays. Short-term signal improvements may require the addition of turn lanes that could ultimately get “thrown away” if the short-term solution is not able to be coordinated with the ultimate design.

I-35 & 183RD STREET/MOONLIGHT ROAD

The US-56 and Gardner Road interchanges on I-35 are separated by approximately 3.1 miles. Given Gardner’s historical development patterns, these two interchanges have generally been sufficient to serve the City’s interstate access needs. However, as future growth occurs in the large undeveloped areas near these interchanges (especially commercial growth), additional pressure will, at a minimum, force the need for capacity enhancements. Additionally, if the land east of I-35 between 175th Street and 191st Street develops as City plans have previously shown, these two interchanges will become insufficient to serve the City by themselves. From an emergency services perspective alone, the lack of an interchange serving the 183rd Street corridor could be a serious impediment.

This TMP recommends that the City continue to plan, reserve right-of-way, and consider funding options, for a future interchange at this location. If the east side of I-35 is to develop, the City has the option to require development to contribute funds over time in order to allow the interchange to be built when it is needed. (See funding discussion in Chapter 5.)

Important considerations for the planning of this interchange include:

- The fact that **183rd Street intersects Moonlight Road** not far from I-35 means that both arterials must be incorporated into the design of the interchange, not unlike the situation at Gardner Road / 191st Street, Lone Elm Road / 159th Street, or US-169 / 151st Street elsewhere along the I-35 corridor – each of which deal with I-35's diagonal nature in a different manner. At this intersection, which would likely not be considered a major service interchange, a treatment such as multi-leg roundabout terminals is a strong consideration.

- Within the last decade, KDOT has several times mentioned plans to **relocate the truck weigh station** currently located north of 167th Street to the area of 183rd Street. The new weigh station would need a great deal more length parallel to I-35 than is currently provided, to meet modern standards for acceleration, deceleration, and truck queueing. While the presence of a new weigh station would not necessarily preclude the development of a new interchange at 183rd Street, it would certainly complicate it. It is not clear whether the weigh station is still a priority for KDOT. The City should continue to monitor the situation, and in either case the design would need to be closely coordinated with KDOT to ensure objectives for all parties are considered and addressed.

There are at least three paths to getting this future interchange funded, constructed and built with respect to KDOT processes:

- KDOT Modernization and Expansion Funds: The 2020 Eisenhower Legacy Transportation (IKE) Program is KDOT's 10-year rolling statewide transportation program that includes, among other elements, $2.3 billion in funds for highway modernization and expansion projects. Every two years, the state will select new projects to enter the construction pipeline based on a scoring system with considerations that include engineering, economic opportunities, and other factors. The primary mechanism for these selections is the Local Consult process, a series of meetings across the state that, among other things, includes opportunities to submit transportation projects for consideration. At the most recent District 1 Local Consult meeting, in 2019, the I-35 / Moonlight Road / 183rd Street interchange was submitted as an Urban Expansion project and scored fairly low – 14th out of 16 projects. The top ten projects were considered the "top tier" by KDOT. The next round of Local Consult meetings is expected to occur in Fall 2021. Even under this process, KDOT would highly prefer significant financial participation from the City in the project at every phase (even through construction), and the strength of the commitment to participate would likely have a major bearing on the project's selection for the pipeline.
- Other KDOT Funding Programs – The IKE program also includes $20-$25M per year for KDOT's Cost Share program, and $20M per year for its Economic Development program. These programs are much smaller than the main funding "pots" in the IKE program, and are also very competitive.
    - The Cost Share program has both fall and spring cycles, and requires a 15 percent minimum local match. Applicants need to be able to demonstrate the benefits of the project.

- The Economic Development program includes a preferred local match of 25 percent. Applicants must be able to demonstrate that the project will support job growth and capital investment in the state of Kansas.

- "Local" Funding Only – The City could seek to fund the interchange through means other than the available KDOT programs. This could include existing City funding "pots", federal grant funds (such as the BUILD and INFRA programs), regionally sub-allocated federal funding such as STP and CMAQ, new City funding mechanisms (Improvement Districts, etc.), and perhaps other non-state sources. See Chapter 5 for more information.

Regardless of which funding method ends up being used, the first step is for City staff to initiate a meeting with KDOT Area, District and Statewide Planning staff. At this meeting, the various paths toward funding and implementation would be discussed and a tailored approach would be formulated. The City would also get a sense of KDOT's ultimate stance toward the interchange. KDOT would also want to involve MARC early in the process – not at this meeting, but not long after. The project would need to ultimately be included in the regional Transportation Improvement Plan (TIP), as well as the Metropolitan Transportation Plan (MTP), which are processes that MARC oversees.

Ultimately, a Break-In-Access (BIA) study would be needed to demonstrate that the project addresses the policy points specified by the FHWA's Policy on Access to the Interstate System, which primarily revolve around traffic operations and safety. Other environmental and planning studies would likely be needed in order to properly account for, and mitigate, project impacts. KDOT is currently updating its internal Standard Operating Procedure (SOP) for new and modified access to the interstate system, and the City should continue to watch for the implementation of this new SOP.

The City will need to make a strong case to KDOT for the development of this interchange. Although KDOT's preferred spacing for interchanges in urban areas is one mile, and the new interchange would result in spacing exceeding that (1.4 miles), this area is a transition between urban and rural – and KDOT's rural spacing guidelines are 2 miles. The ongoing urbanization of the Gardner area would need to be a key emphasis point.

Roadway Network / Segments

Based on the needs identified through the modeling process and other conversations with City staff, the following arterial-level improvements are recommended to accommodate projected 2040 traffic.

- Construct East Side frontage road – A frontage road running parallel on the east side of I-35, connecting 191st Street and 175th Street will be crucial to the development of the area to the east of I-35. It should be constructed as a high-capacity arterial.
- Widen 175th Street east of I-35 – from the interchange east to Hedge Lane, 175th Street should be widened to four lanes to accommodate increased the traffic caused by expected development on the east side of I-35, and in particular commercial developments along 175th Street.
- Widen Clare Road in the vicinity of 175th Street – from the new East Side frontage road north to Industrial Bypass. The full segment north of 175th Street may not need to be widened within the 2040 horizon, but any actions taken in this area should not preclude such a future widening.
- Locust Street between 188th Street and 191st Street – This segment is currently planned to be improved to a three-lane section. Although the model shows potential future congestion along this segment, there are several tempering factors to consider. Model accuracy is not always adequate to capture certain subtleties of traffic flow, and that could account for some of the forecasted overloading on Locust Street. Also, traffic in this area is a function of future development along 191st Street and potential future usage of the Gardner Road interchange vs. the Homestead Lane interchange by the resulting traffic. Finally, improvements recommended at the Gardner Road / Locust Street intersection itself (see next section) may address some of the major issues. The City should continue to monitor the situation.
- Widen Gardner Road between 188th Street and 191st Street – The forecasts indicate that this section will ultimately need to provide three through lanes per direction. The project currently under design by KDOT will provide three northbound lanes (with one terminating as a left-turn lane at 188th Street) but only two continuous southbound through lanes. In the future, a third continuous southbound lane will likely be needed.
- Widen 183rd Street / Cherokee Drive west of Gardner Road – this two-lane section should be widened to include a center two-way left-turn lane from Gardner Road west to Oak Street.
- 151st Street west of Clare Road – The City of Olathe's TMP shows 151st Street east of (and even within) Gardner as an expressway. The forecasting model shows this east-west connection as important and requiring additional capacity. This segment should be planned for four lanes, ultimately providing an important long-term connection between I-35 and the Kill Creek Road corridor (which could ultimately serve as an important connection to K-10). It will be important to coordinate with the City of Olathe on these future improvements.

Figure 4-1 is the City's Major Street Map, reflecting many of the network changes discussed in previous sections. (Street Types on this figure are described in subsequent sections of this report.) The arterial and collector system is intended to provide the spine for the buildout of Gardner. Some key features are described below:

- In the northwest portion of the City, The TMP continues to emphasize a strong arterial grid system, supplemented by key collectors (Kill Creek Road, Poplar Street, Madison Avenue).
- Gardner Lake and New Century Air Center will continue to be barriers to east-west travel, making 151st Street an especially key future connector. With the City of Olathe's eventual plans to connect 151st Street from Lone Elm Road to Old 56, this will become a key route for future traffic heading to and from the east toward I-35.
- The east side of I-35 shows a robust future street network, laid out on a grid pattern modified by the diagonal nature of I-35. The plan shows a frontage road, the disposition of which would be affected by the potential interchange at 183rd Street. As shown below, three alternative configurations for a future connection over I-35 have been considered in the vicinity of Moonlight Road, 183rd Street, and the new frontage road. Each configuration could also accommodate conversion to an interchange if desired in the future, as shown by the dashed ramp locations.

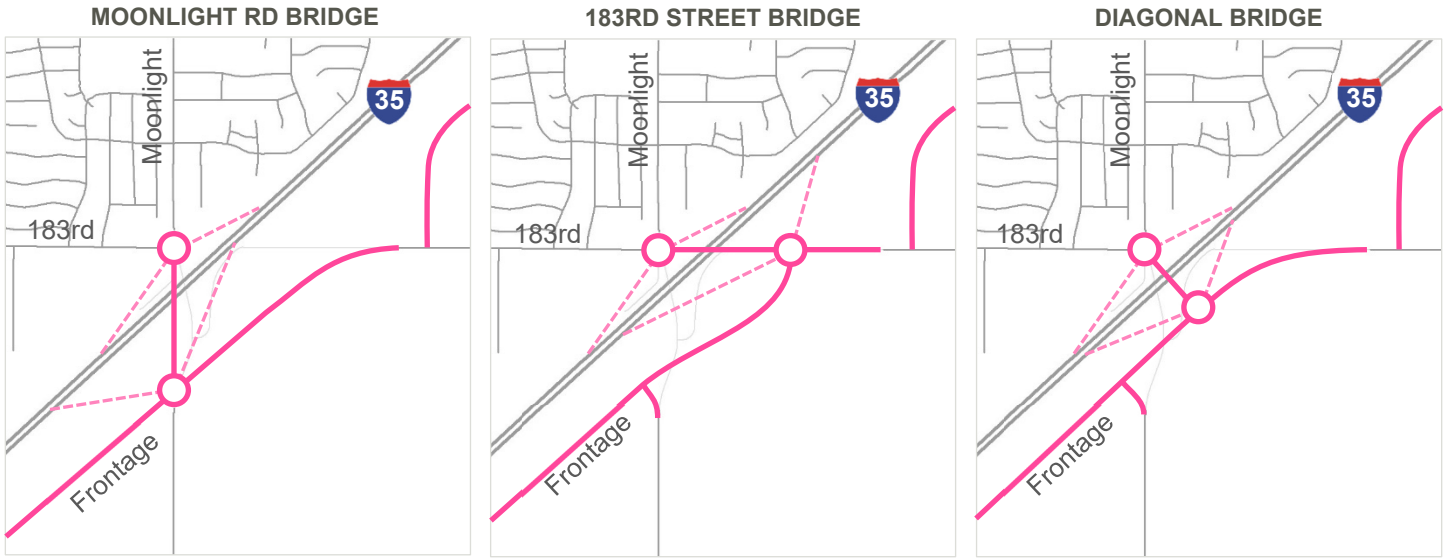
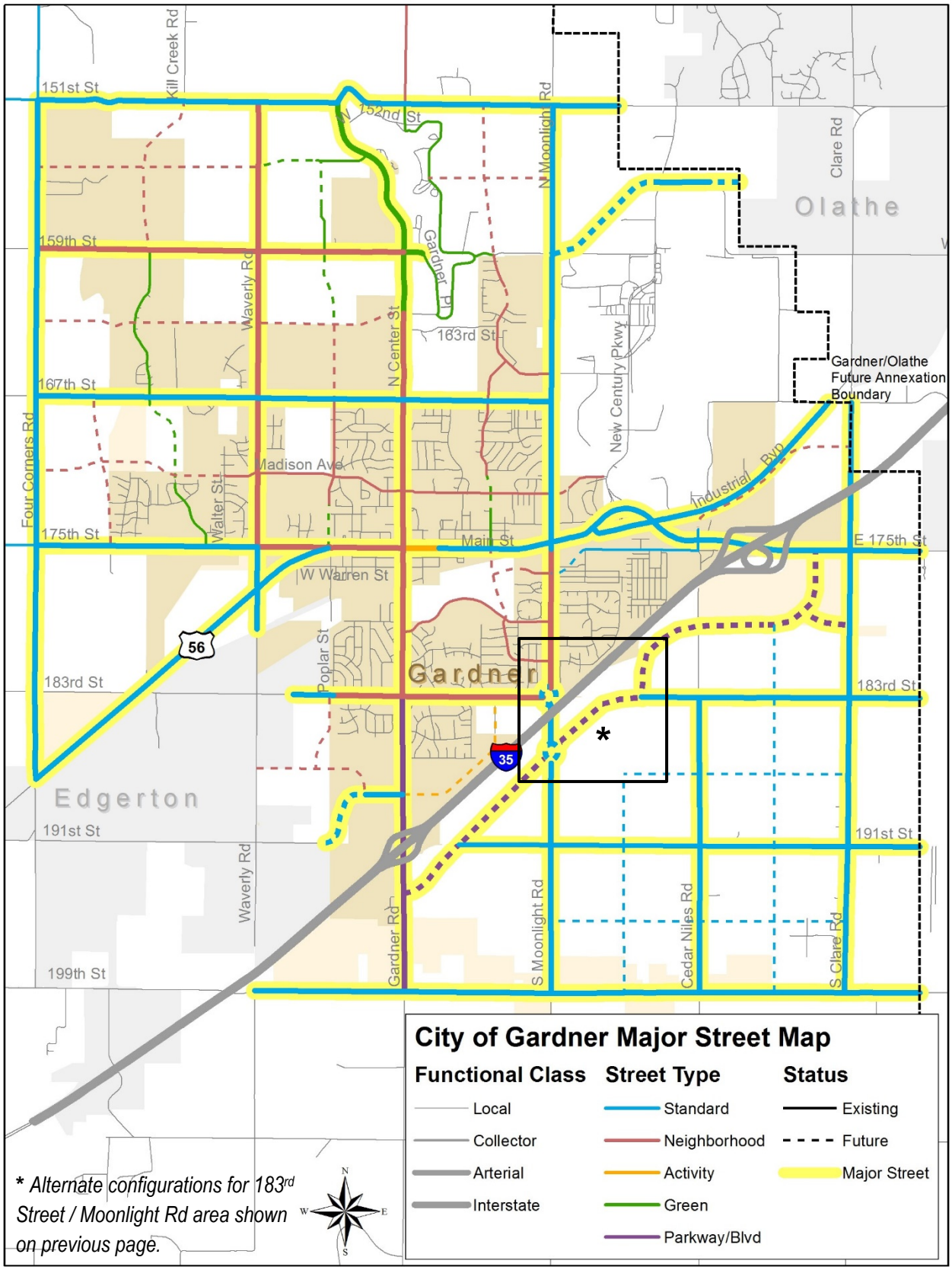


FIGURE 4-1: MAJOR STREET MAP



Intersections

To address the intersection-level issues uncovered by the 2040 operational analysis, the following improvements are recommended. Where specific improvements are listed, mitigated Synchro files were developed to verify that these improvements would adequately address the expected issues.

- *US-56 at Waverly Road (Int #3):* Signalize the intersection; add left turn lanes on all approaches and a right turn lane eastbound, per HDR's *US-56 & Waverly Road TIS Memo* dated October 4, 2019.
- *Gardner Road at 191st Street (south) (Int #16):* Signalize the intersection.
- *Gardner Road at 188th Street (Int #13)*: Even with the improvements already planned by the City, one movement would remain an issue driving future congestion at this intersection: eastbound right turns. Given that the previous section of this report recommended an additional southbound lane on Gardner Road south of this point, and the eastbound-to-southbound right turn is a major driver for this need, a free right-turn lane feeding exclusively into this new southbound lane would be a logical improvement. The third lane on Gardner Road could then function more as an auxiliary lane, handling right turns to and from driveways south of 188th Street (in addition to the right turns from 188th Street). If the third southbound lane on Gardner Road doesn't get built, a dual signalized eastbound right-turn lane at the intersection would also work.

The following intersections may need to be considered in a joint study (see text following the last intersection description):

- *I-35 and US-56 Ramp Terminals (Ints #8/9):* Reconstruct the interchange to tighten to a smaller footprint while adding capacity. Conduct a study to determine the correct ultimate configuration. Consider alternative interchange designs such as a SPUPCLO or DDI.
- *Cedar Niles Road at Santa Fe Street (Intersection #11):* The primary issue with this intersection is its proximity to the intersection of US-56 and Cedar Niles Road to the north. This proximity hampers the ability to institute a satisfactory measure of traffic control, such as a roundabout. The current intersection is stop-controlled on three of its four legs. The southbound leg is uncontrolled and has heavy existing and forecasted peak volumes. Solutions for this intersection would most likely involve restricting movements or closing legs, both of which cause difficulties due to the need for local access.
- *Cedar Niles Road at US-56 (Intersection #7):* The projected 2040 LOS deficiencies at this intersection are resolvable by adding a third through lane at the intersection; this lane would need to carry all the way east to the northbound I-35 ramp terminal. However, decisions regarding the I-35 / US-56 interchange as well as the Cedar Niles Road / Santa Fe Street intersection could affect needs at this intersection.
- *Moonlight Road at US-56 (Intersection #5):* In the near term, adding a second westbound right-turn lane to the intersection would mitigate it to acceptable levels. However, this intersection is the "gateway to Gardner" for much of the future growth that could occur in the northwest portion of the City. Based on the forecasted 2040 peak-hour volumes, a

great deal of additional capacity would be needed at the intersection – primarily a third through lane in each direction. Adding a third eastbound lane may be achievable, but a third westbound lane is likely not, because it would have to be dropped west of the intersection, limiting its effectiveness.

One potential solution would be to convert the intersection to a Displaced Left Turn (DLT) configuration on the east and west legs. The potential drawback of this design is that it would pull the intersection footprint closer to the BNSF tracks, which might not be feasible.

If constraints prevent further improvements, the City could also make a policy decision to accept the poor LOS during a portion of the peak period.

- *Clare Road at 175th Street (Int #10):* Signalize the intersection; increase to 2 lanes on all approaches; add left-turn lanes on all approaches. This could happen in conjunction with widening on 175th Street east of I-35.

Based on the complications presented by the above intersections, it is recommended that the City conduct a corridor study of US-56 / 175th Street from Hedge Lane to Mulberry Street, inclusive of the US-56 interchange, to set a plan that addresses future traffic capacity needs and resolves existing alignment/access irregularities. Some of the key items the study would need to address include:

- Is there a way to eliminate the proximity issue of Santa Fe Street / Cedar Niles Road and US-56 / Cedar Niles Road while retaining needed access?
- Can tightening the footprint of the US-56/I-35 interchange present new opportunities to address Cedar Niles Road issues? What type of interchange is best?
- It appears that an interchange at I-35 / Moonlight Road / 183rd Street would address some of the issues on the US-56 corridor, but not all. Would refined forecasting shed more light?
- Is there a way to change the relationship of the intersection of US-56 / Moonlight Road with the BNSF tracks, through either grade separation or realignment?
- Is there another opportunity for grade separation over the BNSF tracks to relieve US-56 / Moonlight Road, such as at White Drive or just west of that location?
- How does proposed development on the east side of I-35 affect intersection spacing and operations along 175th Street?
- Does the intersection of New Century Parkway and US-56 truly warrant the existing grade separation?
- Would an alternative alignment of US-56 make sense?

Prioritized Projects

Based on the recommendations described earlier in this Chapter (and some carried forward from previous versions of the TMP), **Table 4-1** is a prioritized list of projects. The table is organized into four groups: Intersection Projects, Segment Projects, Interchange Projects, and US-56 / 175th Street Eastern Corridor Projects. This last grouping was created because a great deal of the needed projects revolve around the eastern portion of US-56.

High-priority projects from the table are summarized below:

- *Moonlight Road Signal Optimization, Lincoln Street and Main Street:* This low-cost project could have important benefits along Moonlight Road.
- *Center / Gardner Road Improvements:* This project will provide needed safety benefits.
- *Construct East Frontage Road:* Although a longer-term priority, the City should keep focused on building this important connecting spine fronting the east side of I-35.
- *Gardner Road Widening, I-35 to 199th Street:* Planned improvements at the I-35 / Gardner Road interchange are expected to spur development to the south, which will drive the need for this improvement.
- *US-56 Access, Waverly Road to Four Corners Road:* This issue involves conceptual thinking and close collaboration with KDOT to ensure this portion of the City can develop.
- *I-35 / Gardner Road Interchange Improvements:* The first phase of the project, including the relocation of 191st Street is under construction, as of April 2021. Later phases are under design, but need a funding source for full buildout of this important southern gateway to the City.
- *US-56 / I-35 Interchange Area Study (Mulberry Street to Hedge Lane):* This study could generate nearly a dozen projects, and is crucial to the long-term viability of the northern gateway into Gardner.

TABLE 4-1: PRIORITIZED PROJECTS LIST

No.	Project	Status	Description	Issues Addressed	Support	Cost Category	Time-frame	Priority
Intersection Projects								
I-1	**Moonlight Signal Optimization (Lincoln & Main)**	Planning	Optimize signal timing to reduce delays.	Traffic Operations	Congestion apparent in speed data.	Low ($20k)	Near-Term	**High Priority**
I-2	**US-56 / Waverly Intersection Improvements**	Planning	Reconstruct intersection to include left-turn lanes on all approaches and a right-turn lane on the eastbound approach. The intersection should be signalized.	Safety, Capacity	US-56 & Waverly TIS Memo, dated October 4, 2019	Moderate ($3M)	Near-Term	**Moderate Priority**
I-3	**US-56 / 175th / Poplar Intersection Improvements**	Planning	Redesign this intersection as a roundabout or in some other manner.	Safety, Capacity, Access	While this project has been considered for many years, it does not appear to be immediately needed from either a safety or capacity perspective. The intersection had three crashes from 2010-2016 and it is not a major congestion location. It should continue to be monitored and improvements made if conditions change.	Moderate (when required by development) ($3M)	Long-Term	**Low Priority**
I-4	**Gardner / 191st Signal (south of I-35)**	Planning	Signalize the intersection.	Capacity	2040 Synchro analysis shows poor levels of service without mitigation. Monitor conditions as growth occurs in the south.	Low ($150k)	Long-Term	**Low Priority**
I-5	**Gardner / 188th Intersection Improvements**	Planning	Construct an eastbound-to-southbound "free" right-turn lane that feeds into the proposed third southbound lane on Gardner Road (Project S-13).	Capacity	2040 analysis shows that additional capacity may be needed due to growth contributing to corridor demand. Reserve ROW wherever possible and monitor conditions. This project relies on **Project S-11** being built. If that project is not built, a dual eastbound right-turn lane should be built instead.	Low (<$500k)	Long-Term	**Low Priority**
Segment Projects								
S-1	**Center / Gardner Improvements** (Grand Street to 186th St)	Planning	Consider restriping Center / Gardner to 3 lanes from Grand to 186th Street. Extra pavement width could be striped out or bike lanes could be considered. This improvement should be studied in more detail before implementing; it may not be the ultimate improvement because the street will likely ultimately carry 2 lanes per direction. However, the 3-lane configuration could provide safety benefits for the near term.	Safety, Bike / Pedestrian circulation	There were 156 crashes from 2010-2016 on Center St / Gardner Rd between Main St and 191st St. Many of these occurred at intersections and driveways. 3-Lane sections have been shown to reduce crashes compared to undivided 4-lane sections. Traffic volumes appear to be in the 8,500 to 9,500 range, which is consistent with a 3-lane section. Based on historic growth and expected future trends, volumes are predicted to remain below 15,000 for at least the next 10 years. This is within the capacity of a 3-lane section. There is no sidewalk on west side of road between Grand Street and Kane St.	Low ($200k to $1M)	Mid-Term	**High Priority**
S-2	**Center St 3-lane Section (Madison to 167th)**	Planning	Restripe Center St as a 3-lane street to provide a center left-turn lane from Madison Road to 167th Street. Some new construction will be needed to provide a southbound left-turn lane at 167th St. Bike lanes could be considered given the existing street width.	Safety	The main benefit of this improvement is intersection safety. The number of crashes from 2010-2016 was 33, which is moderate compared to other locations in the City. Traffic volumes are below 10,000 vpd (4,000 to 7,000 in 2010) and are expected to be less than 15,000 vpd over the next 10 years.	Low ($500k to $1M)	Mid-Term	**Low priority**
S-3	**West 188th connection to 183rd**	Implement with Development	Construct a new collector roadway(s) west of Center Street up to 183rd Street on the Gardner/Edgerton border to improve circulation in south Gardner.	Circulation and Development	This project should be built as part of development in the area. Care should be taken not to encourage cut-through traffic, but to still provide an alternative for local residents so that they do not have to use Gardner/Center for all travel in the area.	NA	Mid-Term	**Moderate Priority**
S-4	**East 188th connection to 183rd**	Implement with Development	Construct a new collector roadway east of Center Street up to 183rd Street near Moonlight Road to improve circulation and facilitate development in south Gardner.	Circulation and Development	This project should be built as part of development in the area. It is important to provide an alternative for local residents so that they do not have to use Gardner/Center for all north-south travel in the area. This street should also be located and constructed in such a way that it could work with a new I-35 interchange near 183rd Street and Moonlight Road.	NA	Mid-Term	**Moderate Priority**

No.	Project	Status	Description	Issues Addressed	Support	Cost Category	Time-frame	Priority
S-5	**Moonlight Widening (Warren to Grand)**	Planning	Widen Moonlight Rd to four lanes from Grand Street to Warren Street.	Safety, Capacity	With the addition of an interchange or new bridge over I-35 volumes are projected to increase along Moonlight Road. The projected volumes are expected to exceed the capacity of a two-lane road.	Moderate ($2.3 M)	Mid-Term	**Moderate Priority**
S-6	**Construct East Frontage Road**	Implement with Development	Construct a new diagonal arterial roadway east of I-35 connecting 175th to 191st.	Circulation and Development	This project should be built as part of development in the area. It will likely be built in phases, with the northern portion built first.	Moderate to High	Mid- to Long-Term	**High Priority**
S-7	**Clare Widen to 4 lanes (Industrial Bypass to East Frontage Rd)**	Implement with Development	Widen to 4 lanes, and include turn lanes at the intersection of 175th Street and Clare Road.	Capacity	The 2040 model runs indicate poor LOS within this segment of Clare, and the forecasted turning movement volumes at the 175th / Clare intersection indicate a need for additional capacity as a result of nearby proposed developments.	Low to Moderate	Long-Term	**Low Priority**
S-8	**Cedar Niles Extension**	Implement with Development	Extend Cedar Niles Road from US-56 to Clare Road as a two-lane road with turn lanes if warranted.	Circulation, Development	This project would open a new area for development. It could be part of a development proposal for the area. The restrictions of the airport need to be taken into account and could impact this project and development in the area of this proposed connection.	High ($4 to 7M) can be phased	Long-Term	**Low Priority**
S-9	**167th 3-lane Section (Kill Creek Rd to Moonlight)**	Implement with Development	Widen 167th to 3 lanes to provide left-turn lanes at intersections from Kill Creek Rd to Moonlight. Include intersection improvements at Waverly / 167th, Center / 167th, and Moonlight / 167th.	Safety	The main benefit of this improvement is intersection safety. The number of crashes from 2010-2016 was 24, which is moderate compared to other locations in the City. Volumes are currently well below 5,000 vpd. Improvements should be tied to new development. Near term, preserve right-of-way for the future 3-lane section.	High ($4M to $12M) depends on reconstruction	Mid-Term	**Moderate Priority**
S-10	**Locust Widening (188th to 191st)**	Planning	Widen to 4 lanes.	Capacity	2040 forecasts indicate the need for four lanes on this segment, dependent on growth further west. Monitor needs and reserve right-of-way if possible.	Moderate	Long-Term	**Low Priority**
S-11	**Gardner Rd Widening (188th to I-35)**	Planning	Widen Gardner Road to provide a 3rd southbound lane between 188th Street and the I-35 interchange	Capacity	2040 forecasts show the need for an additional southbound lane. This project could be combined with Intersection **Project I-5**. The City is taking steps with current development projects to allow for the possibility of this third lane, although a few driveway right-turn lanes might have to be eliminated.	Moderate	Long-Term	**Low Priority**
S-12	**Gardner Rd Widening (I-35 to 199th)**	Planning	Widen Gardner Road to provide at least four lanes between the I-35 interchange and 199th Street.	Capacity	With the planned improvements to the I-35/Gardner Road interchange, increased traffic is expected on this section of Gardner Road. The travel-demand model likely does not fully account for the potential growth.	Moderate	Mid-Term	**High Priority**
S-13	**183rd /Cherokee Widening (Oak to Gardner)**	Planning	Convert to 3-lane section.	Capacity	With future industrial growth on the west end, the 2040 model runs indicate poor LOS through this segment. Reserve ROW to the extent possible. This improvement could possibly be accomplished via restriping.	Low to Moderate	Long-Term	**Low Priority**
S-14	**151st Widening (New Century Pkwy to Clare)**	Planning	Widen to 4 lanes.	Capacity / Regional Connectivity	2040 projections indicate 4-lane capacity is needed. Part of this extent is in Olathe. Would require a partnership agreement.	Moderate to High	Long-Term	**Moderate Priority**
S-15	**US-56 Access, Waverly to Four Corners**	Study	Develop a concept for future development access.	Access	At least one site along this corridor has been difficult to develop due to access management requirements and skewed intersections. Gardner must continue working with KDOT to develop a solution that can favor both development access and corridor safety.	Low (Study)	Near-Term	**High Priority**

No.	Project	Status	Description	Issues Addressed	Support	Cost Category	Time-frame	Priority
Interchange Projects								
IC-1	**I-35 / Gardner Road Interchange Improvements**	Preliminary Design	Reconstruct the interchange to a DDI configuration.	Capacity	This interchange becomes increasingly important as development continues in the traffic shed for this interchange. KDOT currently has a preliminary design project underway; construction funding for the full interchange design is not secured. $7M in funds have been secured for near-term improvements.	Very High, Unfunded ($20M+)	Mid-Term	**High Priority**
IC-2	**New I-35 / 183rd Interchange**	Long Range	Construct a new diamond interchange at Moonlight Road and I-35.	Capacity and Access	This interchange would provide some relief to both the US-56 and Gardner Rd interchanges, but likely not enough to eliminate the need for improvements to those interchanges. Therefore, the benefits of a new interchange do not appear to outweigh the costs for the 2040 scenario. However, if significant development, especially non-residential, occurs east of I-35, additional interstate access may become more important. Therefore, ROW should be preserved to allow the interchange to be constructed in the 2040 (or longer) timeframe.	Very High, Unfunded ($25M)	Long-Term	**Long-Term Planning**
US-56 / 175th Street Eastern Corridor Projects								
Project 56-1 is the "gateway" to the rest of the improvements under this category. The study should be done in the immediate term to set a long-range vision. All other 56-x projects hinge on this study.								
56-1	**US-56 / I-35 Interchange Area Study (Mulberry to Hedge)**	Planning	This study would evaluate options for improving the US-56 corridor from Moonlight to Hedge, inclusive of the I-35 interchange. It would examine safety and operations on Cedar Niles Road as well.	Safety, Capacity	The US-56 gateway into Gardner is growing and exhibits a number of complications: The future configuration of the I-35 interchange, access difficulties due to the adjacent BNSF tracks, unfortunate close spacing of Santa Fe Street, the bottleneck at Moonlight Road, and more. The City needs a comprehensive long-term plan that addresses as many of the existing and future issues as possible, and provides a phasing strategy.	Low ($200-$300k for Study)	Near-Term	**High Priority**
56-2	**I-35 / US-56 Interchange Improvements**	Planning	Increase interchange capacity and improve safety. Several configurations could be considered. Possible design options are described in the text. Near-term signalization is also currently being sought.	Capacity, Safety	This is the main interchange connecting residents of Gardner to the rest of the Kansas City area; forecasts indicate near- and long-term capacity concerns. In addition, it would be sensible to shrink the interchange's large current footprint.	Very High, Unfunded ($15M - $20M)	Long-Term	**TBD**
56-3	**Moonlight / Main Intersection Improvements**	Planning	Study possible signage, traffic control, and median improvements at and near this intersection. Could install a continuous flow intersection east-west.	Capacity, Safety	Long-range forecasts show future capacity needs. The City added some additional northbound signalization south of the railroad tracks to help address safety concerns. Alternative intersection designs should be considered. Other network improvements that reduce traffic at this intersection would also be helpful. This project could be combined with **Project 56-4**.	TBD	Mid- to Long-Term	**TBD**
56-4	**US-56 Widen to 6 Lanes (Moonlight to I-35)**	Planning	Widen to 6 lanes from Moonlight Rd to I-35.	Capacity	Traffic on US-56 in this area has remained in the 20,000 vpd to 25,000 vpd range for the last 10 years. While it is possible that traffic could exceed the capacity of the current 5-lane section in the future, the cost and impacts of 6-lanes do not appear to be warranted at this time. 2040 forecasts are showing through-lane capacity issues at several of the intersections, which begins to suggest tying them together in a 6-lane section. This project could be combined with **Project 56-3**.	Very High, Unfunded ($10M - $15M)	Long-Term	**TBD**
56-5	**175th Street Widen to 4 lanes (I-35 to Hedge)**	Implement with Development	Widen to 4-lanes plus a median and turn lanes.	Capacity and Access Management	As development occurs in the 175th Street corridor and on parcels to the south, the roadway should be widened to accommodate 4 lanes with turn lanes and a median. More lanes could be needed closer to I-35. Coordination with Olathe is important. This project could be combined with **Project 56-6**.	High, Unfunded ($12M)	Mid-to Long-Term	**TBD**

No.	Project	Status	Description	Issues Addressed	Support	Cost Category	Time-frame	Priority
56-6	**175th / Clare Intersection Improvements**	Implement with Development	Install a traffic signal and left-turn lanes.	Traffic Operations, Safety, Access Management	Traffic on 175th Street is expected to grow due to increased through traffic and new development in the corridor. Traffic on Clare Road is also expected to grow due to new development. A traffic signal is ultimately expected to be needed at this intersection. The intersection should also be reconstructed/restriped at that time to provide for left and right turn lanes. Ultimately, the intersection is expected to need to accommodate at least 4 through lanes; however, this could be well into the future unless development occurs more rapidly than it has in the last 10 years. This project could be combined with **Project 56-5**.	Low to Moderate	Mid-to Long-Term	**TBD**
56-7	**BNSF Overpass west of Moonlight**	Long Range	Consider ways to cross the tracks west of Moonlight, to provide relief to both Moonlight and US-56. This could be via White Drive or semi-vacant properties further west.	Traffic circulation, safety, railroad crossing issues	In the long-term, traffic volumes on the limited number of railroad crossings currently available could reach capacity. This is one of the few locations where an additional grade-separated crossing could be constructed. The crossing could help alleviate traffic at the existing crossings and improve traffic circulation throughout the City. However, the cost will be very high and the benefits would have to be carefully scrutinized. Construction of another I-35 interchange or another connection between Moonlight Road and US-56 near Cedar Niles Rd may offer a higher cost-benefit.	Very High ($10M-$20M)	Long-Term	**TBD**
56-8	**US-56 / Cedar Niles Intersection Improvements**	Planning	Enhance the capacity of the intersection; consider alternative intersection forms such as a Displaced Left-Turn (DLT) configuration.	Capacity	2040 Synchro analysis shows poor levels of service. This project could be combined with **Project 56-9**.	Moderate	Long-Term	**TBD**
56-9	**Cedar Niles / Santa Fe Intersection Improvements**	Planning	Address the proximity of this intersection to the US-56 / Cedar Niles intersection, and the capacity and safety issues that entails.	Safety, Capacity	2040 Synchro analysis shows poor levels of service. Solutions will likely not be inexpensive. Restricting movements or closing legs would help address the problem, but may not be feasible. Realignments of one or more roadways in the vicinity might be needed. This project could be combined with **Project 56-8**.	Potentially High	Mid-Term	**High Priority**
56-10	**US-56 & New Century Pkwy Interchange Reconstruction**	Planning (CCLIP Funds)	Improve the US-56 / New Century Parkway interchange to provide full access (or nearly full access) to/from New Century Parkway. This will allow traffic on Old US-56 to use the interchange for travel to/from US-56 in both directions. --OR-- Consider removing the grade separation and converting to an at-grade intersection.	Traffic Operations & Safety	The smaller project would eliminate the need for the signal at US-56/Old 56. Right-in and/or right-out movements might still be needed depending on the interchange design. This project was considered when the signal was constructed, but there was insufficient funding at the time to reconstruct the interchange. The larger project (removal of grade separation) should be considered as part of the overall US-56 study (Project 56-1).	Moderate to High	Mid-Term	**TBD**

Street Types

As a part of the Land Development Code (LDC), Gardner adopted a set of designated street design types. The purpose of creating these street types was to guide future transportation planning and help identify appropriate automotive, bicycle, and pedestrian infrastructure and policies for City streets. The five street design types are each described below (and are color-coded to match the Major Street Map in **Figure 4-1**).

- **Standard** - A basic street type appropriate generally where no particular development characteristics or urban design context warrant application of other street types.
- **Activity** - A pedestrian-oriented street type appropriate for all areas where walkability is a goal. It is characterized by narrow lanes, slow speeds, on-street parking, and large, well-designed pedestrian amenity zones that support businesses and economic activity along these streets.
- **Neighborhood** - A community-oriented street type appropriate where a higher level of neighborhood design amenity and neighborhood walkability is desired. It is characterized by large street trees, sidewalks, slow speeds, and occasional on-street parking.
- **Green** - A natural-oriented street type appropriate where streets cross or align with natural features, particularly to emphasize the parks and environmental themes in the plan. It is characterized by slow to moderate speeds, informal and natural landscape edges, and the incorporation of the City trails system.
- **Parkway/ Boulevard** – A wider street with a significant proportion of the right-of-way dedicated to planting areas and amenities.

Each arterial and collector (existing and future proposed) throughout the Gardner area was assigned a street type designation by City staff, as shown in the Major Street Map in **Figure 4-1. (**Street types also apply to local streets, but these are not mapped as part of this TMP.)

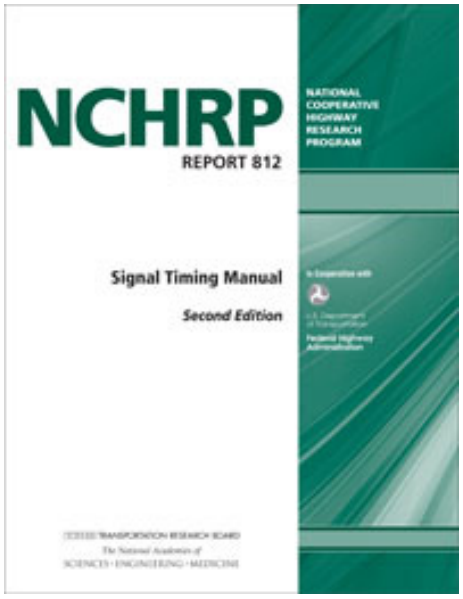
The City Planning Department is currently working on the development of a new land use code. Therefore, these street types and what they represent in terms of street width and right-of-way preservation may change in the future. The current policy shall be to reserve right-of-way, in the amounts specified below for each roadway classification type, until such time as a revised LDC states otherwise.

- Arterials – 120 feet
- Collectors – 60 feet
- Local Roads – 50 feet

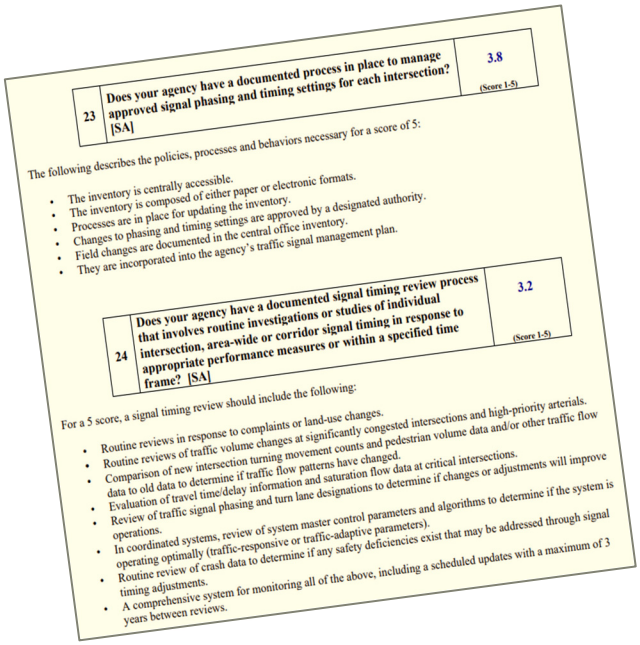
5. Other Recommendations

Signal Timing Policy

The Transportation Research Board (TRB) National Cooperative Highway Research Program (NCHRP) Report 812: Signal Timing Manual - Second Edition, covers fundamentals and advanced concepts related to signal timing. The report addresses ways to develop a signal timing program based on the operating environment, users, user priorities by movement, and local operational objectives. Advanced concepts covered in the report include the systems engineering process, adaptive signal control, preferential vehicle treatments, and timing strategies for over-saturated conditions, special events, and inclement weather. This manual should be used to guide all traffic signal operations in the City of Gardner. Contracted signal design, signal timing, or other signal related work should require the use of this manual.



The Institute of Transportation Engineers (ITE), in conjunction with the National Operations Center of Excellence (NOCoE) and FHWA, periodically issues a self-assessed National Traffic Signal Report Card. The most recent self-assessment was issued for agency completion in 2018. Completing this self-assessment permits agencies to develop a traffic signal benchmark for their signal system. Benchmarking traffic signal infrastructure, current practice, and technology implementation is an essential tool to informing the investment decisions of policymakers, department managers, and transportation professionals, both now and into the future.



23	**Does your agency have a documented process in place to manage approved signal phasing and timing settings for each intersection? [SA]**	3.8 (Score 1-5)

The following describes the policies, processes and behaviors necessary for a score of 5:

- The inventory is centrally accessible.
- The inventory is composed of either paper or electronic formats.
- Processes are in place for updating the inventory.
- Changes to phasing and timing settings are approved by a designated authority.
- Field changes are documented in the central office inventory.
- They are incorporated into the agency's traffic signal management plan.

24	**Does your agency have a documented signal timing review process that involves routine investigations or studies of individual intersection, area-wide or corridor signal timing in response to appropriate performance measures or within a specified time frame? [SA]**	3.2 (Score 1-5)

For a 5 score, a signal timing review should include the following:

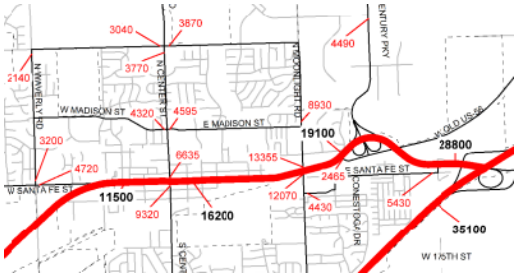
- Routine reviews in response to complaints or land-use changes.
- Routine reviews of traffic volume changes at significantly congested intersections and high-priority arterials.
- Comparison of new intersection turning movement counts and pedestrian volume data and/or other traffic flow data to old data to determine if traffic flow patterns have changed.
- Evaluation of travel time/delay information and saturation flow data at critical intersections.
- Review of traffic signal phasing and turn lane designations to determine if changes or adjustments will improve operations.
- In coordinated systems, review of system master control parameters and algorithms to determine if the system is operating optimally (traffic-responsive or traffic-adaptive parameters).
- Routine review of crash data to determine if any safety deficiencies exist that may be addressed through signal timing adjustments.
- A comprehensive system for monitoring all of the above, including a scheduled updates with a maximum of 3 years between reviews.

Completion of the 2018 self-assessment by City staff at Gardner would create a signal system benchmark to assist with guiding the signal system growth, operations, and investment priorities.

Transportation System Monitoring Program

Implementation of a monitoring system of the City's transportation system, tracking trends in traffic operations and safety, would be a beneficial step in helping the City to understand where issues exist and future projects may be needed. Finding ways to do that economically is crucial for a City of Gardner's size. Following are recommended elements:

- Conduct an annual or biannual count program at key intersections within the City. Candidates include: I-35 / US-56 interchange, I-35 / Gardner Road interchange, Main Street / Moonlight Road, Gardner Road / 188th Street, US-56 / Cedar Niles Road. The purpose of the counts would be to monitor the growth of congestion at these intersections and be proactive in developing improvements.
- Leverage KDOT's periodic counts that are conducted in Gardner for use in ongoing traffic analyses and monitoring. Obtain detailed hourly count and classification data, as available, for each count location on KDOT's map. Work with KDOT to request specific segments be added to the count program, if needed.



- Conduct an annual or biannual safety monitoring report on crashes within the City. Data can be obtained from MARC. Crash trends could be monitored for the top ten or twenty key locations in the city to note significant patterns and identify countermeasures.
- Consider ongoing ways to use "Big Data" from available resources. The historical traffic feature in Google Maps (shown earlier in this report) is one way to conduct Citywide monitoring of speed, and is freely available. Other vendors – such as StreetLight Data Services, INRIX, Waze, and HERE – sell such data, and this data may be worth the occasional expenditure at times when the City is updating its TMP or taking other big-picture looks at citywide traffic. It is possible some of this data can be obtained from MARC. MARC might be able to help the City by providing quick snapshots of the data.
- Create a centralized repository of traffic studies. The City may already do this informally. One suggestion is to put these studies on-line, so developers and consultants can use them both for data-gathering and also as examples.
- Create a centralized database of traffic counts. Again, the City may already be doing this informally. Moving the counts on-line would make them more readily available to consultants and others who might need to make use of them. Converting the counts from PDFs or other formats to an Excel or database format would make them more useful and accessible. The City may want to consider development of a citywide Synchro model as a repository for counts, geometric data, and signal timing information – creating a common platform for those doing traffic analysis within the City.

Infrastructure Funding and Financing

This section deals with potential new ways to fund transportation infrastructure within the City of Gardner, for consideration as the City continues to build out the transportation network described in this TMP.

Value Capture

Value-capture strategies acknowledge a nexus between private development and public infrastructure, and are a method of having development "pay its own way". Gardner already has a process in place to have developers pay for their near-term transportation impacts, by requiring developers to conduct transportation impact studies and to fund the transportation improvements recommended by those studies. However, Gardner currently does not have a method to account for and fund *cumulative* transportation impacts that especially impact the city's major arterials and are unreasonable to be borne by any single development. Certain existing City revenues cover a portion of that gap. Value capture strategies can further reduce the gap. Key examples that may have application in Gardner include:

- *Impact Fees:* Impact fees typically are charged based on the type and size of a proposed development. Gardner has a Park Impact Fee in place that is assessed on new commercial and industrial buildings, currently set at $0.11 per square foot in both categories. Transportation impact fees are similar, and are typically set in the following manner:
    1. A set of long-term land-use assumptions is developed for the entire City based on its future land-use plan (for either a horizon year or buildout).
    2. The land-use assumptions from Step 1 are fed into a traffic forecasting model, and areas of long-term transportation improvement need are developed. Concept-level improvement projects are developed to address the needs, such as additional lanes, intersection upgrades, or an interchange reconstruction project.
    3. Costs are developed for the set of transportation improvements developed in Step 2 (including inflation assumptions, etc.)
    4. The mix of future land-use (above and beyond already-developed land) used in the traffic model of Step 2 is assumed to be the mix that will need to contribute to the improvements.
    5. The total number of trips (typically daily) generated by the future land-use in the Step 4 mix is determined by category (e.g, residential, commercial, etc.), and each category's fraction of the overall trips is calculated.
    6. The total revenue to be obtained from each category is computed by multiplying the cost from Step 3 by that category's fraction from Step 5.
    7. The revenue per category from Step 6 is divided by the total size (in relevant units) of the category to determine the fee per unit for each category (e.g., $1 million for

office ÷ 2 million square feet of future office = fee of $0.50 per square foot of new office building).

Other nearby cities in Johnson County use similar mechanisms. For example, Lenexa has a Transportation Improvement Program (TIP) fee, and Olathe has a Transportation Improvement Excise Tax (applied at the time of platting).

- *Assessment Districts:* Assessment Districts are typically sub-regions of the City and are typically focused around a single transportation improvement or package of related improvements. A tax is imposed on the district to recover the costs of the improvement(s). The tax may be calculated using the process for impact fees described above, or through some other calculation. For example, the City could develop an East Gardner Transportation Improvement District to help fund future improvements east of I-35.

  Tax-Increment Financing (TIF): TIF uses increases in real-estate tax revenues to fund infrastructure improvements (either through an up-front sale of bonds, or reimbursement of the developer on a pay-as-you-go basis). Unlike the previous two funding strategies, TIF is usually focused on a single development project. In Kansas, there are restrictions on the types of sites that are eligible for TIF. TIF does not create new public revenue, but instead reallocates future property tax revenues to infrastructure.

Outside Revenue Sources

In addition to value-capture strategies, there are a number of other funding programs available at the federal, state, and county levels. A brief summary of some of these is provided below.

- **BUILD (Better Utilizing Investments to Leverage Development)** – the BUILD program (recently replaced by RAISE) is appropriated by Congress annually. Historically, BUILD has released approximately $1B per year for projects with a "significant local or regional impact." The most recent round of BUILD funding recompensed 100% of costs for rural projects and 80% for urban projects, with program funding split evenly between the two. While requirements change with each Congressional authorization, BUILD grants generally rate projects based on safety, state of good repair, economic competitiveness, and quality of life impacts. Applicant agencies may submit up to 3 applications per year, and awards are capped to $25m per project and $90m per state. The obligation deadline is typically 2.5 to 3 years.
- **INFRA (Infrastructure For Rebuilding America)** typically supports large ($100m+) freight, grade separation, and national highway system improvement projects. Project selection is based on four key objectives: supporting economic vitality, leveraging federal funding, innovation, and performance/accountability. INFRA obligation deadlines are generally within 3 years of the award, and construction is typically expected within 18 months of obligation. The minimum grant amount is $25m for large projects and $5m for small projects, with less stringent selection criteria for the latter. INFRA has been allocated $1B for FY 2020 and is reauthorized by Congress via long-term transportation funding legislation.

- **Congestion Mitigation Air Quality (CMAQ)** – Federal via Mid-America Regional Council (MARC) – CMAQ awards are intended to support projects that improve air quality in "non-attainment" and "maintenance" areas as defined by the EPA. Funds are distributed to Metropolitan Planning Organizations (MPOs) based on population and severity of air pollution; MPOs are responsible for distributing these funds to projects within their jurisdiction.
- **Surface Transportation Program (STP)** – Federal via Mid-America Regional Council (MARC) – STP funds are distributed to MPOs to support multimodal and roadway projects on federal aid highways. MARC's Kansas STP / Bridge Priorities Committee administers grants. Four primary criteria are used for determining awards: transportation infrastructure maintenance, modal choice expansion, community integration, and roadway capacity management. The application cycle begins when MARC issues a call for projects; applications are then scored by MARC staff, who then forward applications to the STP / Bridge Priorities committee for evaluation.
- **Transportation Alternatives Set-Aside** – Federal via Mid-America Regional Council (MARC) – a portion of the Surface Transportation Block Grant is set aside for "transportation alternatives," encompassing pedestrian and bicycle facilities, trails, public recreational amenities, safe routes to school, historic preservation, vegetation management, and environmental mitigation. Applications are evaluated by the MARC Active Transportation Programming Committee (ATPC), which prioritizes projects which advance the Council's long-range plan.
- **Cost Share and Economic Development Programs** – Kansas Department of Transportation (KDOT) – See the previous discussions under the "Interchanges" section of Chapter 4.
- **County Assistance Road Program (CARS)** – Johnson County – CARS is designed to support the maintenance of major arterials and minor collectors by county municipalities. Eligible projects include capacity improvements, overlays and patching, traffic efficiency improvements, bridges, and non-roadway improvements (sidewalks, bike infrastructure, and lighting). The county uses a scoring system to select projects from municipal 5-year road improvement plans. CARS grants fund 50% of project construction costs (not including design, ROW, or utility relocation).

Related Studies

The following recently published reports contain supplementary information on transportation improvements along the US-56 corridor. As the recommendations of the TMP are implemented, these other studies should be consulted.

Gardner Main Street Corridor Plan (2018) – This plan focuses on the US-56 corridor from I-35 to Waverly Road, and makes the following recommendations with regards to transportation infrastructure.

1. *Slow and manage traffic on Main Street* – within the Downtown Core subarea (Center Street to Sycamore Street), recommendations include installing a planted median, reducing travel lane widths to 11 feet, maintaining parallel parking, and installing bulb-outs at major intersections. Additional intersection improvements, to help accommodate and promote bicycle and pedestrian usage, are recommended along Main Street at Poplar Street, Pine Street, Oak Street, Center Street, Elm Street, and Sycamore Street.

2. *Introduce bicycle and pedestrian facilities to connect neighborhoods to the Main Street Corridor* – one specific improvement includes restriping the Center Street bridge, narrowing travel lanes from 16 feet to 14 feet, to allow space for a 7-foot multi-use path. Recommendations regarding the designation of bike boulevards and construction of additional off-street paths are also described.

3. *Improve access across railroads to better connect north and south sides of the community* – these long-term recommendations include further investigation of (1) a new grade-separated crossing at Mulberry Street or White Drive, and (2) a new pedestrian bridge along Elm Street.

Gardner Destination Downtown: A Placemaking and Mobility Enhancement Project (2020) – This plan builds upon the 2018 Main Street Corridor Plan, fine-tuning the recommended improvements for the Downtown Core subarea (bounded by Center Street, Sycamore Street, Washington Street, and Warren Street). The plan finalizes a streetscape concept and provides a path for implementation. Each of the streets within the area are designated as primary, secondary, or tertiary. Then, specific elements are assigned based on that designation, including typical sections (number of lanes, lane widths, median type, parking accommodations, etc.).