

# **TRAFFIC STUDY**

**COMMERCIAL GPA & ZONE CHANGE  
NORTHEAST CORNER OF HOSKING AVENUE & WIBLE ROAD  
BAKERSFIELD, CALIFORNIA**

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## **INTRODUCTION**

The purpose of this study is to evaluate the potential traffic impact of a proposed commercial General Plan Amendment (GPA) and Zone Change located on the northeast corner of Hosking Avenue and Wible Road in Bakersfield, California (see Figures 1 and 2 for Vicinity and Location maps).

### **A. Land Use, Site and Study Area Boundaries**

The 10-acre site is currently zoned for single family residential. The proposed change is for 10-acres of retail commercial (GC & C-2), with 73,196 square feet of retail commercial buildings as shown on the current site plan (see Figure 3, Site Plan). As shown on the site plan, the retail commercial buildings include a 5,500 square foot convenience market with gas pumps, a 59,346 square foot shopping center, 5,850 square feet of high-turnover sit-down restaurant use, and 5,000 square feet of fast-food with drive-through restaurant use.

The site is bounded by Hosking Avenue to the south, Wible Road to the west, and residential development to the north and east.

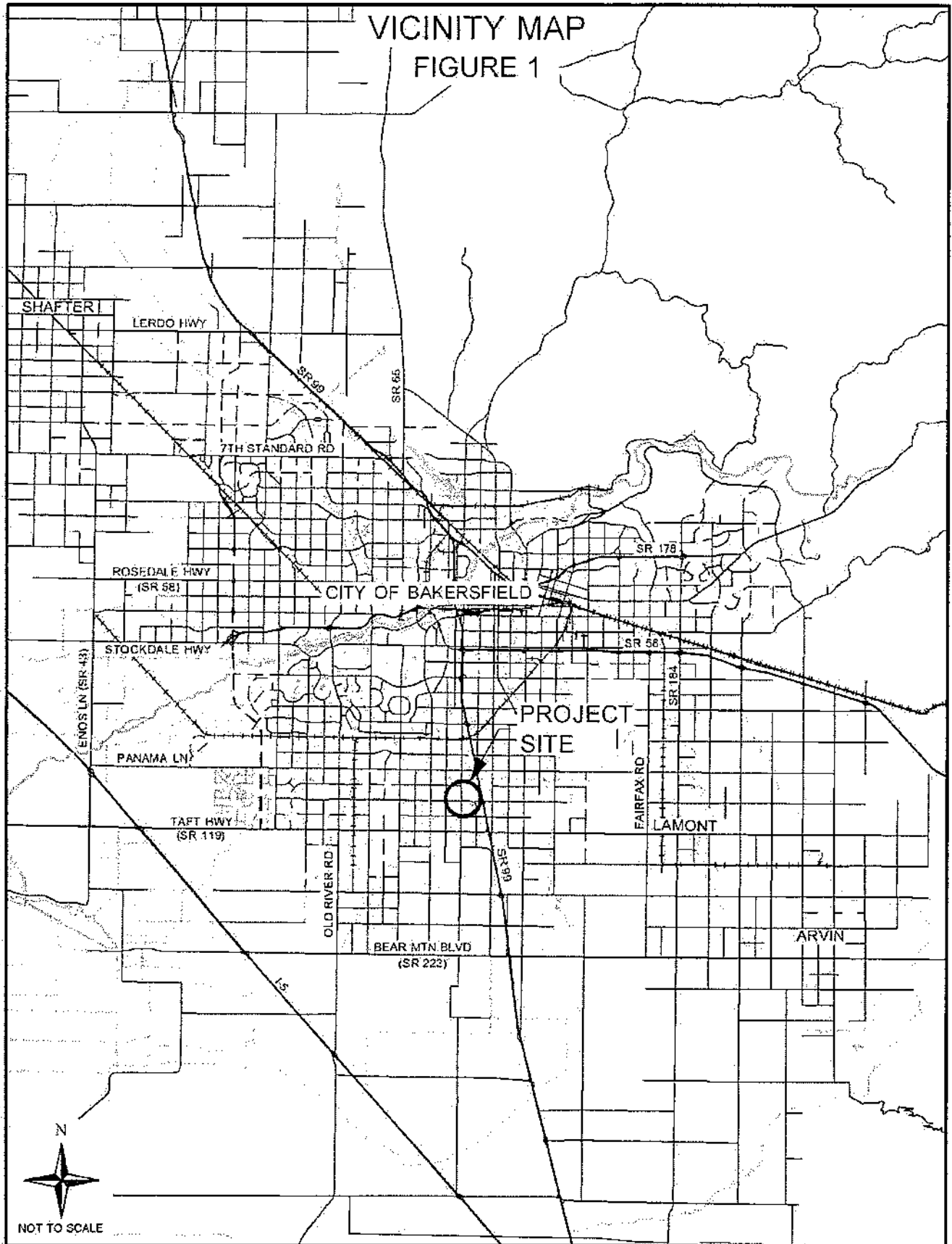
A total of 1 unsignalized intersection and 9 signalized intersections are included in the study. The scope of the study was developed in association with The City of Bakersfield Public Works Traffic Division, and Caltrans District 6.

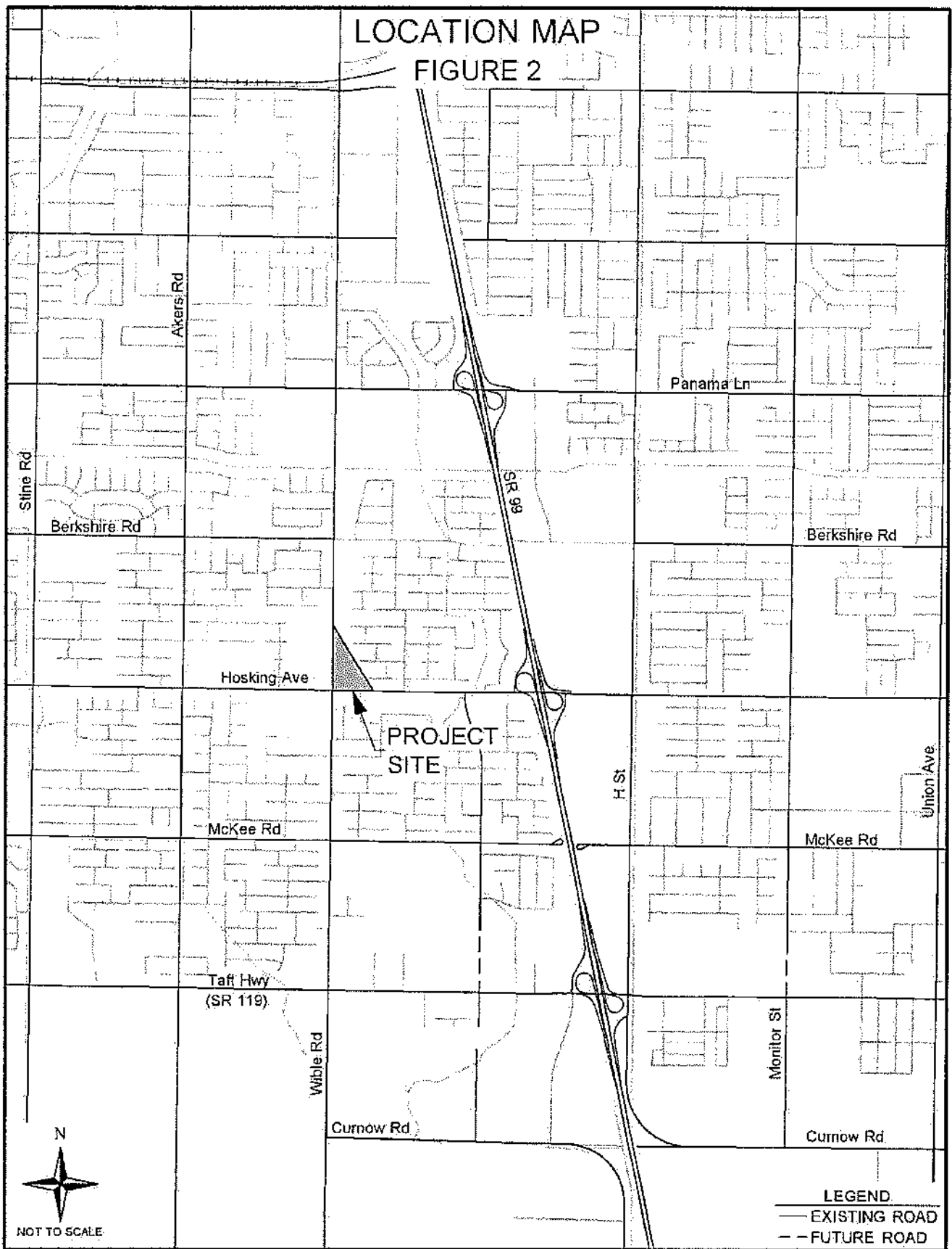
### **B. Existing Site Uses and Site Access**

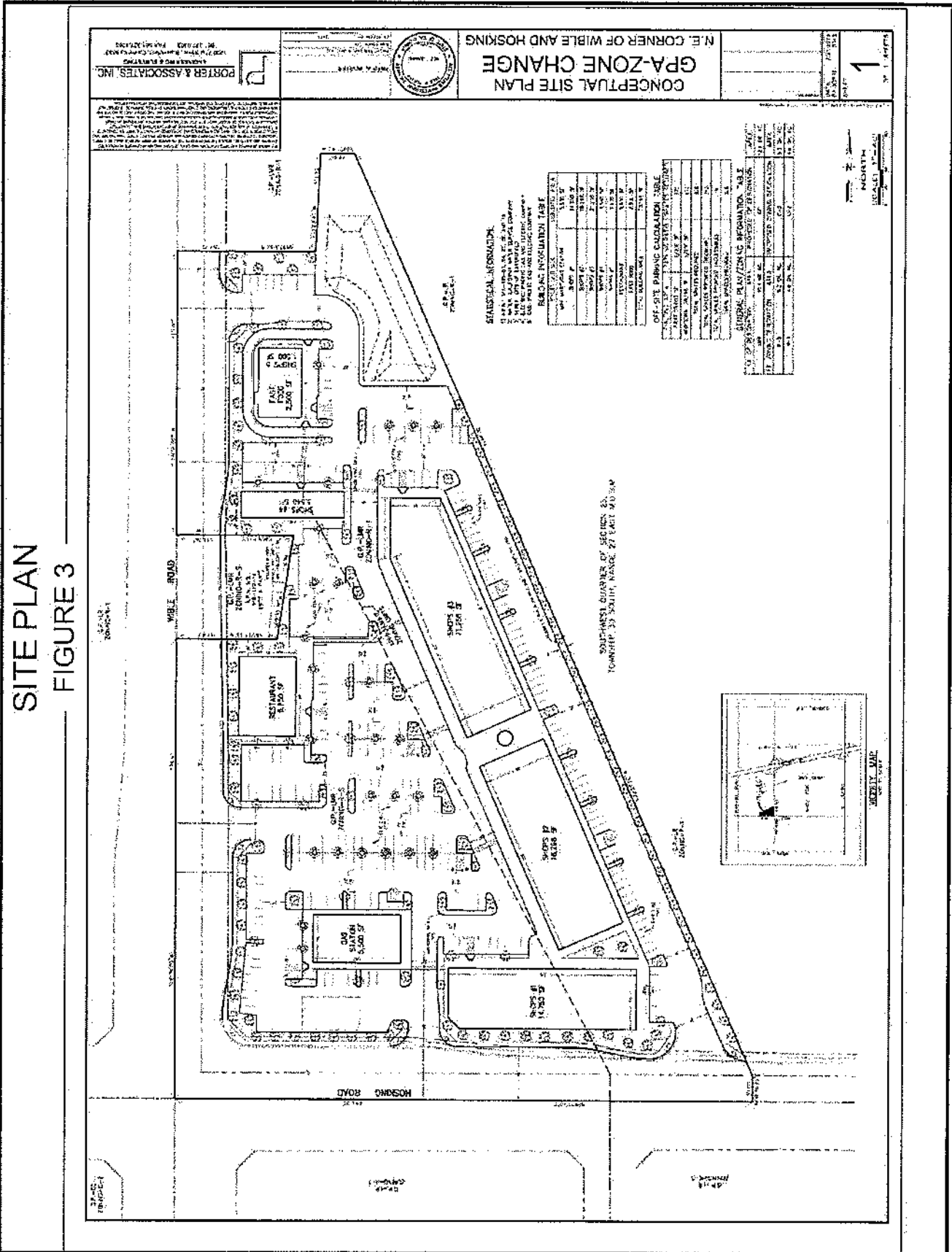
The project site currently includes two residences to the north as well as a residence to the east. There are also numerous vehicles and other small structures adjacent to the dividing wall between the project site and the residential community to the east. Access to the project is planned along Wible Road and Hosking Avenue.

### **C. Existing Uses in the Vicinity of the Site**

Existing land uses in the vicinity of the site include residential developments in all directions, Stonecreek Junior High School to the west, and a vacant lot directly south along the south side of Hosking Avenue.







SITE PLAN  
FIGURE 3

#### D. Roadway Descriptions

Akers Road is a north-south collector located midway between Stine Road and Wible Road. In the study area, Akers Road operates as a two-lane facility with a two-way left-turn lane. Akers Road provides access to residential land uses and some commercial land uses where it terminates at Ming Avenue.

Berkshire Road is an east-west collector located midway between Hosking Avenue and Panama Lane. It currently exists within the study area as a two-lane roadway at various stages of widening and improvement and provides access to residential land uses. Berkshire Road does not cross or connect with State Route 99.

Golden State Highway (State Route 99) is a north-south state highway that stretches almost the entire length of the Central Valley. Cities served include Bakersfield, Visalia, Fresno, Madera, Merced, Modesto, Stockton, and Sacramento. State Route 99 lies approximately two-thirds of a mile east of the project site where it operates as a 6-lane facility.

Hosking Avenue is an east-west arterial that operates as a two-to-four lane roadway at various stages of widening and improvement in the vicinity of the project. Hosking Avenue provides access primarily to residential and agricultural land uses, and has a recently constructed 5-lane interchange at State Route 99.

McKee Road is an east-west collector located midway between Taft Highway and Hosking Avenue. It currently exists within the study area as a two-lane roadway at various stages of widening and provides access primarily to residential land uses. McKee Road does not cross or connect with State Route 99.

Monitor Street is a north-south collector located midway between South H Street and South Union Avenue. It extends north from Hosking Avenue at Shannon Drive and provides access primarily to residential land uses. Monitor Street exists within the study area as a two-or-three lane roadway with improvements.

Panama Lane is designated as an arterial. It extends east from State Route 43 near Interstate 5 through the southern metropolitan Bakersfield area. It currently exists within the study area as a four-to-six lane roadway at various stages of widening and improvement and provides access to agricultural, residential and commercial land uses.

Taft Highway, an east-west roadway, is designated as an expressway west of State Route 99 (State Route 119) and as an arterial east of State Route 99. It currently exists as a two-lane roadway at various stages of widening adjacent to development between State Route 99 and South Union Avenue. Taft Highway continues as a two-lane roadway with graded shoulders east of South Union Avenue along the Panama Road alignment. Within the project vicinity, Taft Highway provides access from the communities of Greenfield, Weedpatch and Lamont to State Route 99.



## PROJECT TRIP GENERATION AND DESIGN HOUR VOLUMES

The trip generation and design hour volumes shown in Table 1 were calculated using the Institute of Transportation Engineers (ITE) Trip Generation, 10<sup>th</sup> Edition, as well as data provided in the project proposal. The AM/PM rates and directional splits for ITE Land Use Codes 853 (Convenience Market with Gasoline Pumps), 820 (Shopping Center), 932 (High-Turnover Site-Down Restaurant), and 934 (Fast-Food Restaurant w/Drive-Thru) were used to estimate trip generation for weekday peak hour of adjacent street traffic.

**Table 1**  
**Project Trip Generation**

General Information			Daily Trips		AM Peak Hour Trips			PM Peak Hour Trips		
ITE Code	Development Type	Variable	ADT RATE	ADT	Rate	In % Split/ Trips	Out % Split/ Trips	Rate	In % Split/ Trips	Out % Split/ Trips
853	Convenience Market with Gasoline Pumps	5.5 1000 sq ft GFA	624.2	3433	40.59	50% 112	50% 112	49.29	50% 136	50% 136
820	Shopping Center	59.346 1000 sq ft GLA	eq	4216	eq	62% 113	38% 69	eq	48% 177	52% 192
932	High-Turnover (Sit-Down) Restaurant	5.85 1000 sq ft GFA	112.18	656	9.94	55% 32	45% 26	9.77	62% 35	38% 22
934	Fast-Food Restaurant w/Drive-Thru	5 1000 sq ft GFA	470.95	2355	40.19	51% 102	49% 98	32.67	52% 85	48% 78
sub-total				10,660		359	305		433	428
Capture <sup>1</sup>		5%		533		18	15		22	21
Pass-by <sup>2</sup>		15%		731		22	14		32	32
Pass-by <sup>3</sup>		40%		2,315		86	84		88	86
Total				7,081		233	192		291	289

<sup>1</sup>Capture rate of 5%, per COB Subdivision & Design Manual, applied to all land uses.

<sup>2</sup>Pass-by rate of 15% applied to High-Turnover Restaurant and Shopping Center land uses only.

<sup>3</sup>Pass-by rate of 40% applied to Fast Food & Service Station land uses per COB Subdivision & Design Manual.

A pass-by rate of 15% was applied to the high-turnover restaurant and shopping center, and a pass-by rate of 40% was applied to the fast food restaurant and the service station, to account for trips which are made as intermediate stops between trip origin and ultimate destination. Pass-by trips are drawn from traffic passing the site, and therefore, do not add trips to the adjacent street system. The pass-by rates used for this study were based on City of Bakersfield guidelines.

A capture rate of 5% was applied to all land uses to account for trips between multiple land uses within the project. The capture rate used for this study was also developed based on City of Bakersfield guidelines.

### **TRIP DISTRIBUTION AND ASSIGNMENT**

The trip distribution shown in Table 2 represents the likely movement of traffic accessing the project site by direction. Project traffic distribution was estimated based on a review of the proposed project land use and potential draw from population centers, as well as input from the City of Bakersfield's Traffic Division. Assignments of project peak hour traffic to the study intersections are shown in Figure 4.

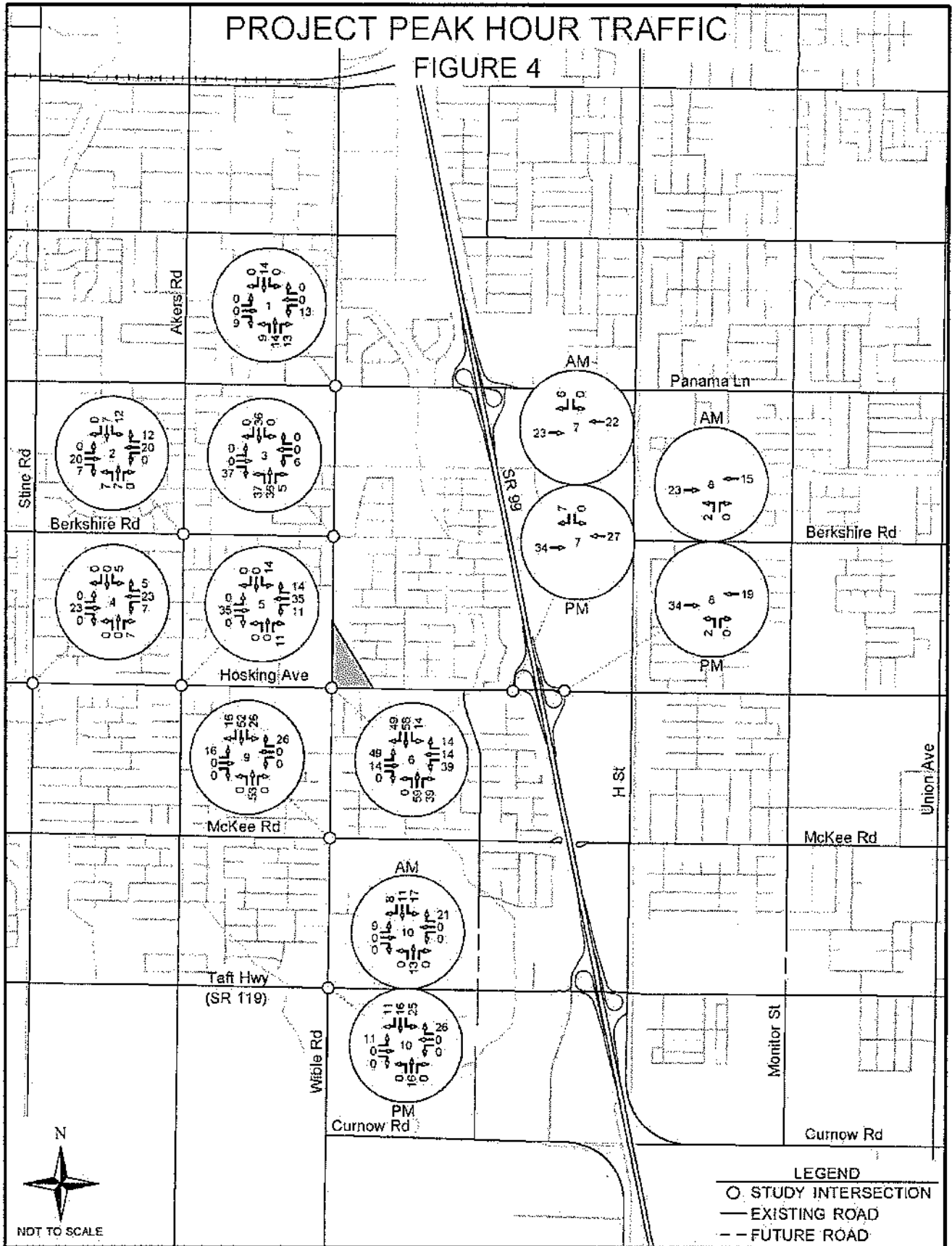
**Table 2**  
**Project Trip Distribution**

<b>Direction</b>	<b>Percent</b>	<b>Roadway</b>
North	25	Wible Road
South	20	Wible Road
East	25	Hosking Avenue
West	30	Hosking Avenue

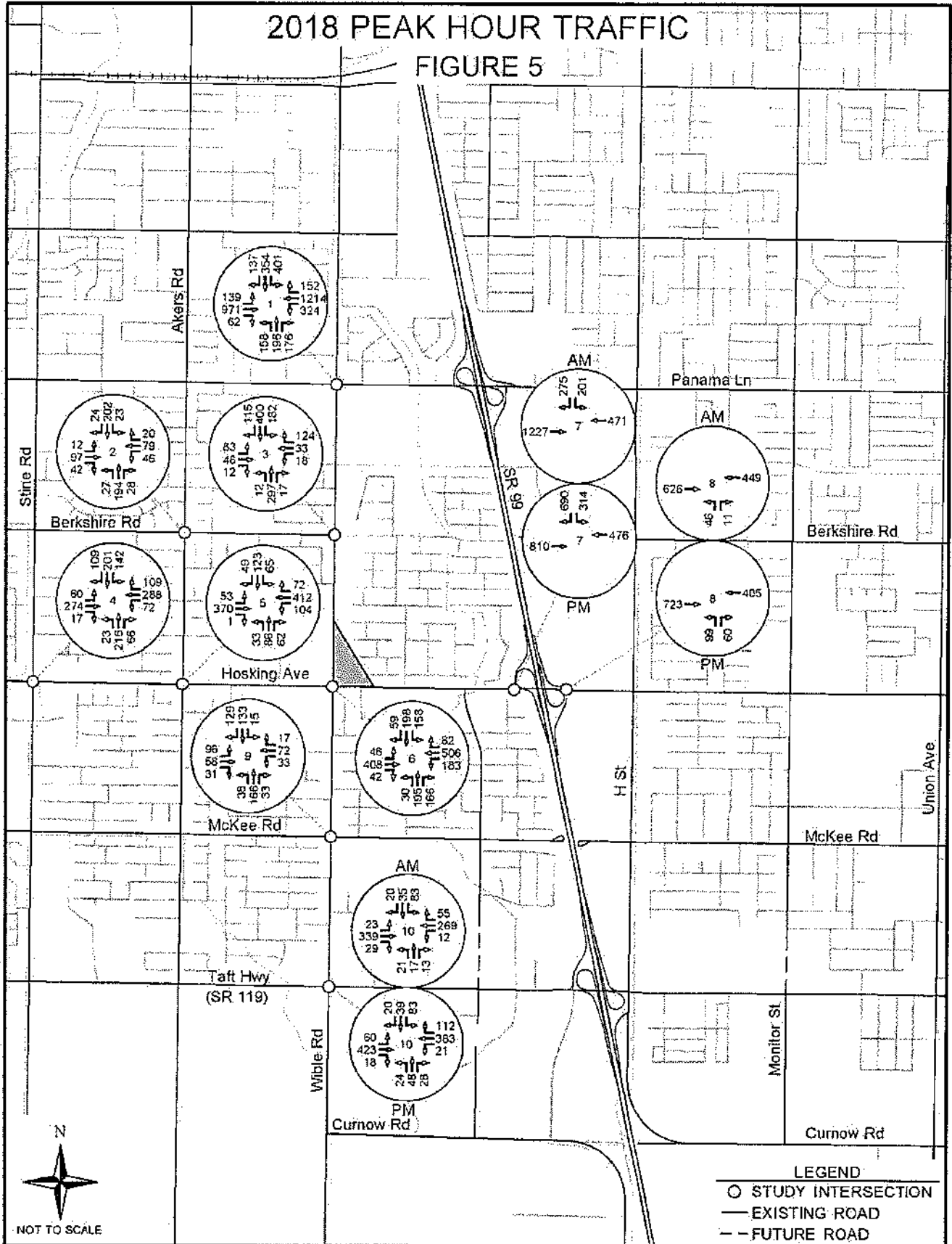
### **EXISTING AND FUTURE TRAFFIC**

Existing weekday AM and PM peak hour volumes and turning movements were field measured at the study intersections in September 2018 (AM counts for state facilities only). Existing volumes are shown in Figure 5, and existing plus project volumes are presented in Figure 6. Figures 7 and 8 represent the build year (2021) and build year (2021) plus project traffic volumes.

Average annual growth rates ranging between 0.2 and 4 percent were applied to existing peak hour volumes to estimate future volumes for the year 2035. These growth rates were estimated based on a review of existing development and KernCOG traffic model data. Cumulative traffic was also estimated for projects that would not yet be accounted for in the KernCOG traffic model. A list of active tentative projects, within a 2-mile radius of the project site is included in the appendix. A cumulative trip generation and distribution was then created and added to the future traffic volume estimates at the study intersections. Future peak hour volumes for the year 2035 are shown in Figure 9. Future plus project peak hour volumes are shown in Figure 10.

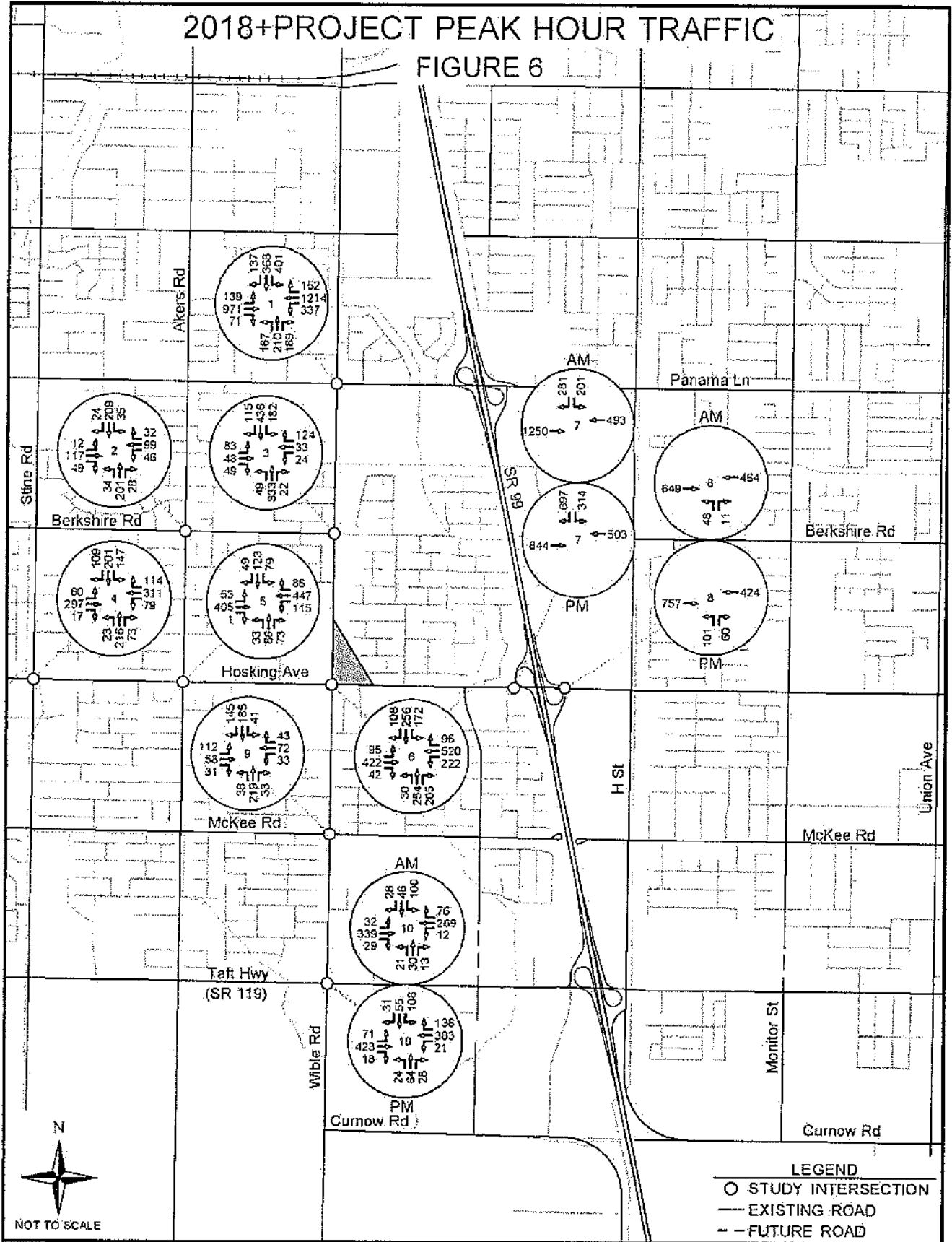


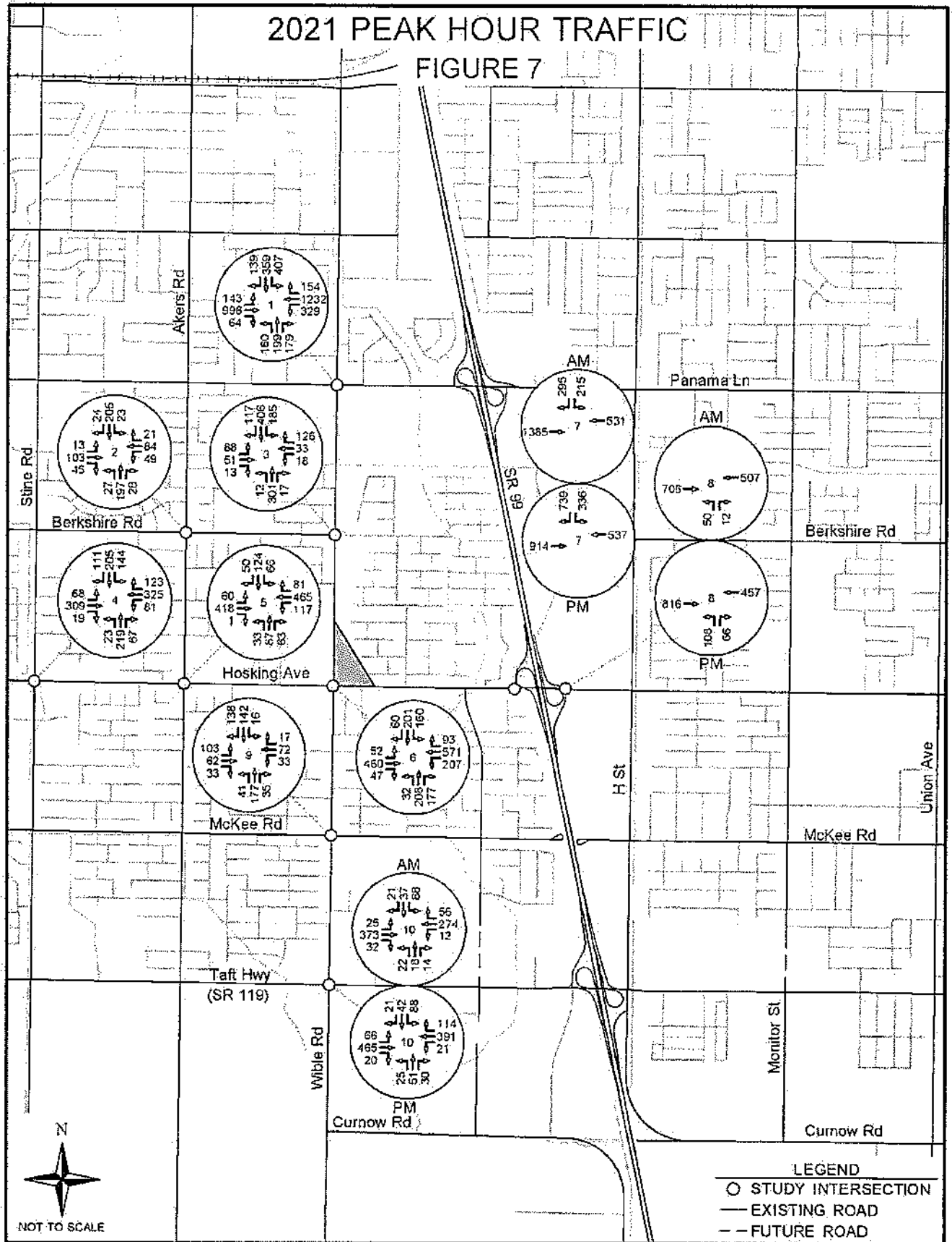
# 2018 PEAK HOUR TRAFFIC FIGURE 5



# 2018+PROJECT PEAK HOUR TRAFFIC

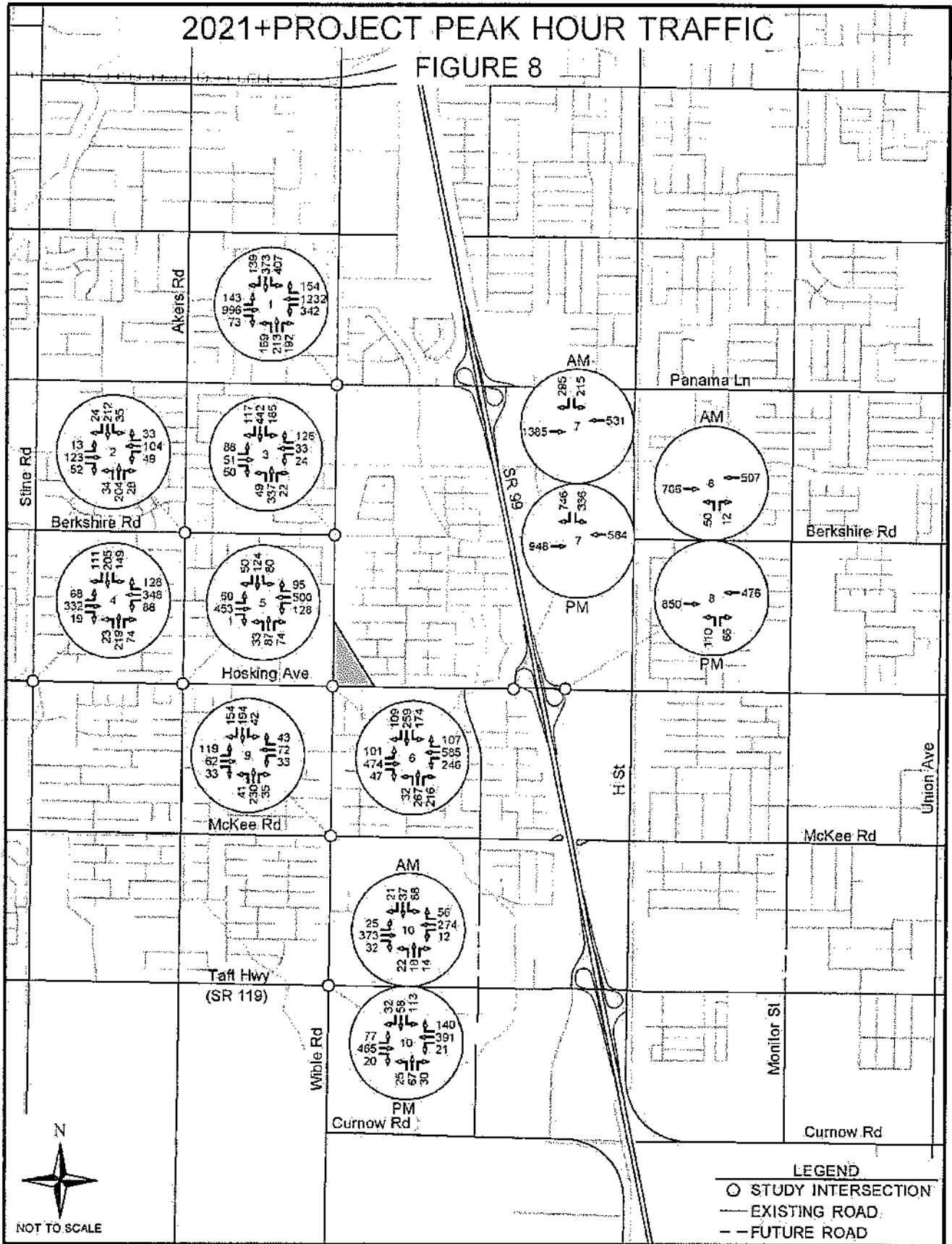
## FIGURE 6

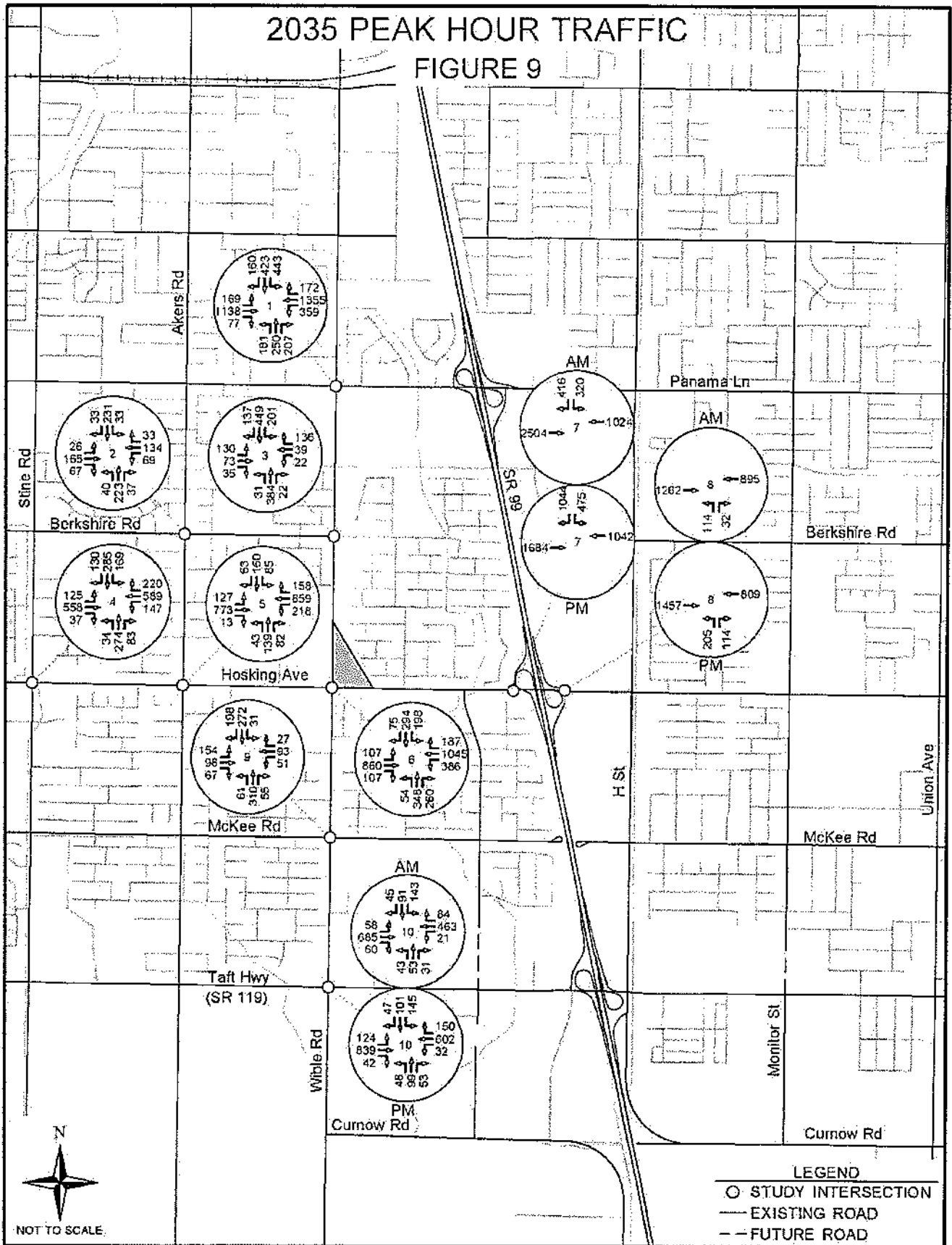




# 2021+PROJECT PEAK HOUR TRAFFIC

## FIGURE 8

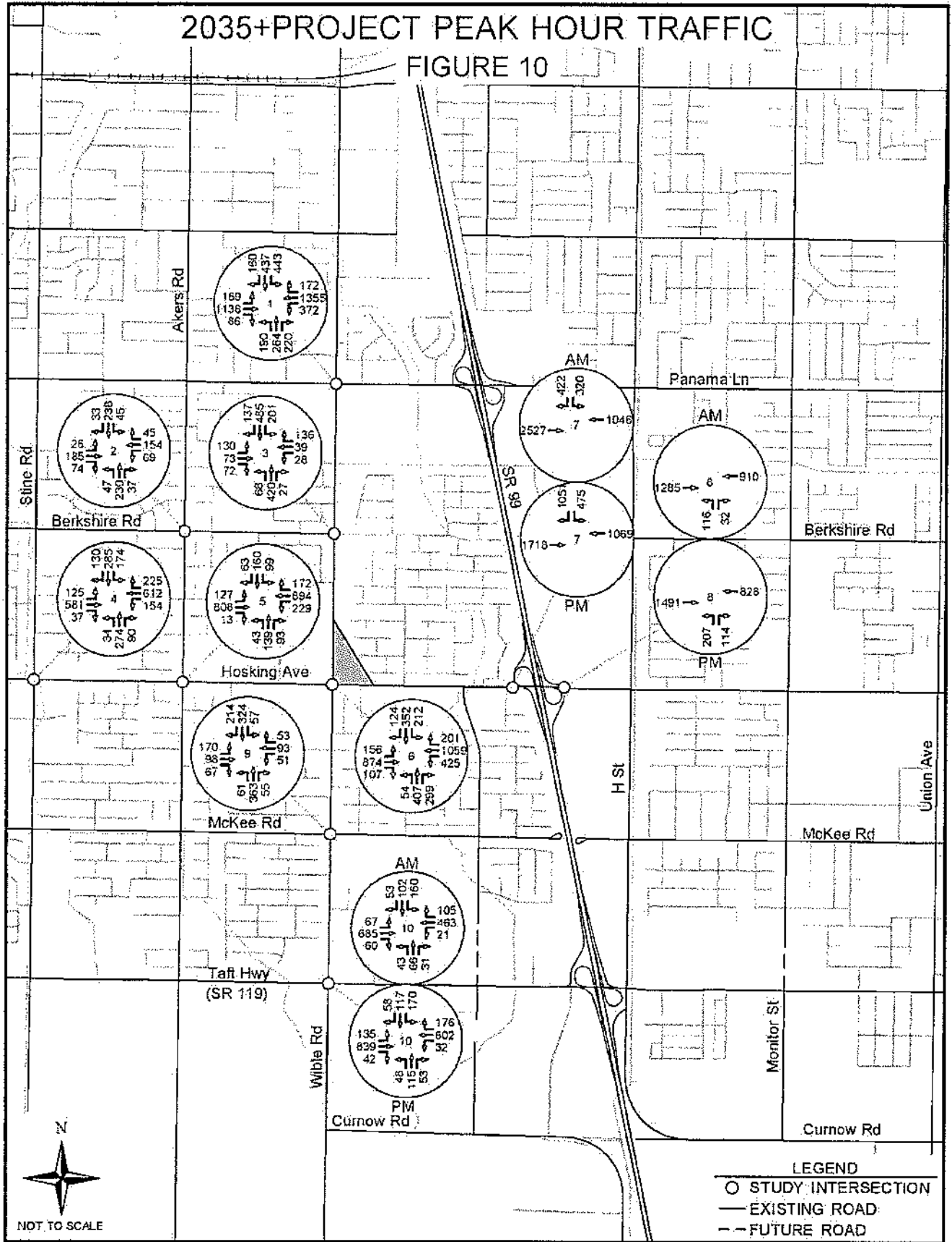






# 2035+PROJECT PEAK HOUR TRAFFIC

## FIGURE 10



## **SIGNIFICANT IMPACT CRITERIA**

The City of Bakersfield utilizes three criteria to evaluate whether project traffic would cause a significant impact and therefore require mitigation. First, a significant impact would be found when the addition of project traffic causes the level of service of an intersection or roadway segment to drop below LOS C. Second, a significant impact would be found when an intersection or roadway segment operates below LOS C without project traffic and the addition of project traffic causes further degradation in the level of service. Third, for intersections that currently operate at LOS D, E or F, mitigation would be required when the addition of project traffic in the future year creates an additional control or an average delay per vehicle of more than 5 seconds.

These criteria have been adopted by the City of Bakersfield and are contained in various planning documents, such as the Circulation Element of the Metropolitan Bakersfield 2010 General Plan and Kern County's Congestion Management Program.

## **INTERSECTION ANALYSIS**

A capacity analysis of the study intersections was conducted using Synchro 9 software from Trafficware. This software utilizes the capacity analysis methodology in the Transportation Research Board's 2010 Highway Capacity Manual. The analysis was performed for the weekday AM and PM peak hours for each of the following traffic scenarios (AM analyzed for state facilities only):

- Existing (2018) Traffic
- Existing (2018) + Project Traffic
- Build Year (2021)
- Build Year (2021) + Project
- Future (2035) Cumulative Traffic
- Future (2035) Cumulative + Project Traffic

Level of service (LOS) criteria for unsignalized and signalized intersections, as described in HCM 2010, are presented in the tables below. Level of service analysis results for the study intersections are presented in Tables 3 and 4. The intersection peak hour level of service goal for the City of Bakersfield is LOS C or better.

**LEVEL OF SERVICE CRITERIA  
UNSIGNALIZED INTERSECTION**

Level of Service	Average Control Delay (sec/veh)	Expected Delay to Minor Street Traffic
A	$\leq 10$	Little or no delay
B	$> 10$ and $\leq 15$	Short traffic delays
C	$> 15$ and $\leq 25$	Average traffic delays
D	$> 25$ and $\leq 35$	Long traffic delays
E	$> 35$ and $\leq 50$	Very long traffic delays
F	$> 50$	Extreme delays

**LEVEL OF SERVICE CRITERIA  
SIGNALIZED INTERSECTIONS**

Level of Service	Average Control Delay (sec/veh)	Volume-to-Capacity Ratio
A	$\leq 10$	$< 0.60$
B	$> 10$ and $\leq 20$	0.61 - 0.70
C	$> 20$ and $\leq 35$	0.71 - 0.80
D	$> 35$ and $\leq 55$	0.81 - 0.90
E	$> 55$ and $\leq 80$	0.91 - 1.00
F	$> 80$	$> 1.00$

**Table 3  
Intersection Level of Service  
Weekday AM Peak Hour**

#	Intersection	Control Type	2018	2018+ Project	2023 (Build Yr)	2023+ Project (Build Yr)	2035 Cum	2035 Cum+ Project	2035+Proj w/Mit <sup>1</sup>
7	SR 99 SB Off Ramp & Hosking Ave	Signal	B	B	B	B	D (50.4)	D (52.8)	C
8	SR 99 NB Off Ramp & Hosking Ave	Signal	A	A	A	A	A	A	-
10	Wible Rd & Taft Hwy (SR 119)	Signal	B	B	B	B	C	C	B

NOTE: Cum=Background Cumulative Traffic; Mit=Mitigation

<sup>1</sup>See Table 7 for Mitigation Measures.

<sup>2</sup>Mitigation due to PM level of service.

**Table 4  
Intersection Level of Service  
Weekday PM Peak Hour**

#	Intersection	Control Type	2018	2018+ Project	2023 (Build Yr)	2023+ Project (Build Yr)	2035 Cum	2035 Cum+ Project	2035+Proj w/Mit <sup>1</sup>
1	Wible Rd & Panama Ln	Signal	D (38.7)	D (39.3)	D (44.1)	D (44.5)	D (44.7)	D (45.4)	<sup>2</sup>
2	Akers St & Berkshire Rd	Signal	C	C	C	C	C	C	-
3	Wible Rd & Berkshire Rd	Signal	C	C	C	C	C	C	-
4	Stine Rd & Hosking Ave	Signal	C	C	C	C	E (69.1)	E (69.4)	C
5	Akers Rd & Hosking Ave	Signal	C	C	C	C	C	C	-
6	Wible Rd & Hosking Ave	Signal	C	D (38.6)	D (35.4)	D (39.6)	F (84.1)	F (84.9)	C
7	SR 99 SB Off Ramp & Hosking Ave	Signal	B	B	B	B	E (56.4)	E (61.0)	C
8	SR 99 NB Off Ramp & Hosking Ave	Signal	A	A	A	A	A	A	-
9	Wible Rd & McKee Rd	All Way Stop	B	B	B	B	D (50.4)	E (37.9)	C
10	Wible Rd & Taft Hwy (SR 119)	Signal	C	C	B	B	E (69.9)	E (70.9)	C

NOTE: Cum=Background Cumulative Traffic; Mit=Mitigation

<sup>1</sup>See Table 7 for Mitigation Measures.

<sup>2</sup>No mitigation since addition of project traffic does not add more than 5 seconds of delay.

### TRAFFIC SIGNAL WARRANT ANALYSIS

Weekday PM peak hour signal warrants were evaluated for the unsignalized intersection within the scope of the study based on the 2014 edition of the California Manual on Uniform Traffic Control Devices (2014 CA MUTCD). Signal warrants assess delay to traffic on minor street approaches at major street intersections. Signal warrant analysis results are presented in Table 5.

**Table 5**  
**Traffic Signal Warrants**  
**Weekday PM Peak Hour**

Intersection #9 - Wible Road & McKee Road						
Year	Without Project			With Project		
	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
2018	514	185	NO	661	201	NO
2021	549	198	NO	696	214	NO
2035	927	319	YES	1074	335	YES

It is important to note that a signal warrant defines the minimum condition under which signalization of an intersection might be warranted. Meeting this threshold does not suggest traffic signals are required, but rather, that other traffic factors and conditions be considered in order to determine whether signals are truly justified.

It is also noted that signal warrants do not necessarily correlate with level of service. An intersection may satisfy a signal warrant condition and operate at or above LOS C, or operate below LOS C and not meet signal warrant criteria.

**ROADWAY ANALYSIS**

Volume-to-capacity (v/c) ratios for roadway segments in the study area are shown in Table 6. A volume-to-capacity ratio of greater than 0.80 corresponds to a LOS of less than C, as defined in HCM 2010. The City of Bakersfield’s operational goal for roadway capacity is LOS C or better.

**Table 6  
Roadway Capacity**

Street	2018 <sup>1</sup>	Project ADT	2021 ADT	2021+ Project	2035 ADT	2035+ Project	Existing Capacity	Mitigated Capacity	v/c(Ex) 2018	v/c(Ex) 2018+ Proj	v/c(Fu) 2021	v/c(Fu) 2021+ Proj	v/c(Fu) 2035	v/c(Fu) 2035+ Proj	v/c(Mit) 2035+ Proj
Berkshire Rd: Stine Rd - Wible Rd	3149 <sup>2</sup>	903	3347	4250	4448	5351	15000	-	0.21	0.27	0.22	0.36	0.30	0.36	-
Hosking Ave: Stine Rd - Wible Rd	13507	1538	15242	16780	26792	28330	40000	-	0.34	0.38	0.38	0.71	0.67	0.71	-
Hosking Ave: Wible Rd - SR 99	17810	1636	20097	21733	35321	36957	60000	-	0.30	0.32	0.33	0.62	0.59	0.62	-
Akers Rd: Hosking Av - Panama Ln	8878	342	8973	9315	9429	9771	15000	-	0.59	0.61	0.60	0.65	0.63	0.65	-
Wible Rd: Hosking Av - Panama Ln	10283	2967	10912	13879	14399	17566	30000	-	0.34	0.44	0.36	0.58	0.48	0.58	-
Wible Rd: Taft Hwy (SR 119) - Hosking Ave	9861 <sup>2</sup>	2381	10515	12896	14189	16570	15000	30000	0.66	0.82	0.70	1.10	0.95	1.10	0.55

<sup>1</sup>Published ADT data

<sup>2</sup>2018 Data not available; data grown out from previous available year.

**MITIGATION**

The Regional Transportation Impact Fee (RTIF) Program imposes fees on new development and includes a Regional Transportation Facilities List and Transportation Impact Fee Schedule. The Facilities List includes transportation improvements which are needed by the year 2035 to maintain a LOS C or better for new growth or to prevent the degradation of facilities which currently operate below LOS C. The Fee Schedule sets forth fees to be collected from new development to mitigate the need for transportation improvements.

Intersection and roadway improvements needed by the year 2035 to maintain or improve the operational level of service of the street system in the vicinity of the project are presented in Tables 7 and 8. Additionally, Tables 7 and 8 identify local mitigation improvements not covered by the RTIF Program or adjacent development, and the project's percent share for the cost of these improvements if needed.

**Table 7  
Future Intersection Improvements and Local Mitigation**

#	Intersection	Total Improvements Required by 2035	Local Mitigation (Improvements not covered by RTIF or adjacent development)	Project Share for Local Mitigation
4	Stine Rd & Hosking Ave	Change EBT/R to 1 EBT, 1 EBR Change WBT/R to 1 WBT, 1 WBR Add: 1 EBT, 1 EBL, 1 WBT, 1 WBL, 2 NBT, 1 NBL, 2 SBT, 1 SBL	-1	N/A
6	Wible Rd & Hosking Ave	Change EBT/R to 1 EBT, 1 EBR Add: 1 EBT, 1 EBL, 1 WBT, 1 WBL, 2 NBT, 1 NBL, 2 SBT, 1 SBL	-1	N/A
7	SR 99 SB Off Ramp & Hosking Ave	Add 1 EBT <sup>2</sup>	-1	N/A
9	Wible Rd & McKee Rd	Install Signal Change NBT/R to 1 NBT, 1 NBR	-1	N/A
10	Wible Rd & Taft Hwy (SR 119)	Change SBT/R/L to 2 SBL, 3 SBT, 1 SBR Add: 2 EBT, 1 EBL, 2 WBT, WBL	-1	N/A

NOTES: NB=Northbound; L=Left-Turn Lane; SB=Southbound; T=Through Lane; EB=Eastbound;  
R=Right-Turn Lane; WB=Westbound

<sup>1</sup>All improvements are included in the Fee Program facilities list.

<sup>2</sup>Striping only.

**Table 8  
Future Roadway Improvements and Local Mitigation**

<b>Roadway Segment</b>	<b>Total Improvements Required by 2040</b>	<b>Local Mitigation (Improvements not covered by RTIF or adjacent development)</b>
Wible Road: Taft Hwy (SR 119) to Hosking Ave	Add 2 Lanes	-

This study evaluated the potential traffic impact of a proposed commercial General Plan Amendment (GPA) and Zone Change located on the northeast corner of Hosking Avenue and Wible Road. Study findings are summarized below.

**Intersection Level of Service**

With the exception of the intersection at Wible Road & Panama Lane, all intersections within the scope of the study currently operate at or above LOS C during the weekday peak hours. With the addition of project traffic in the existing year, it is anticipated that Wible Road & Hosking Avenue will operate below level of service C.

It is anticipated that all intersections operating at or above LOS C in the existing plus project condition will continue to do so in the 2023 build year and 2023 build year plus project conditions.

By 2035, four additional intersections are anticipated to operate below a level of service C prior to the addition of project traffic (Stine Road & Hosking Avenue, SR 99 SB Off Ramp & Hosking Avenue, Wible Road & McKee Road, and Wible Road & Taft Highway/State Route 119). All other intersections operating at or above LOS C are anticipated to continue to do so with the addition of project traffic.

All study intersections meeting City of Bakersfield significant impact criteria can be mitigated to operate at LOS C during the weekday peak hours in the year 2035 through measures included in the Regional Transportation Impact Fee program.



### **Roadway Capacity**

All roadway segments within the scope of the study currently operate at or above LOS C. It is anticipated that the roadway segment of Wible Road between Taft Highway (SR 119) and Hosking Avenue will operate below LOS C with the addition of project traffic in the existing year.

It is anticipated that all roadway segments operating at or above LOS C in the existing plus project condition will continue to do so through the future year 2035 and 2035 plus project conditions.

The segment of Wible Road between Taft Highway (SR 119) and Hosking Avenue, which meets the City of Bakersfield's significant impact criteria, can be mitigated to operate at an acceptable level of service through measures included in the Regional Transportation Impact Fee program.

### **CONCLUSION**

Five study intersections and one roadway segment were identified to need improvements by the year 2035 in order to maintain acceptable levels of service (shown in Tables 7 and 8). These improvements are included on the RTIF facilities list. Provided the RTIF improvements are constructed, it is anticipated that the proposed commercial General Plan Amendment (GPA) and Zone Change will have minimal impact on traffic operations in the vicinity of the project.

**REFERENCES**

1. California Manual on Uniform Traffic Control Devices for Streets and Highways, 2014 Edition, State of California, California State Transportation Agency, Department of Transportation (Caltrans), 2014
2. Highway Capacity Manual, Transportation Research Board, 2010
3. Traffic Count Database System (TCDS), Kern Council of Governments (Kern COG)
4. Trip Generation Manual, 9th Edition, Institute of Transportation Engineers (ITE), 2012

## APPENDIX