



TRAFFIC IMPACT STUDY PROPOSED CHICK-FIL-A RESTAURANT

99 Stafford Street
Worcester, MA

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Introduction

Bowman has completed a traffic impact study for the proposed Chick-fil-A restaurant to be located at 99 Stafford Street in Worcester, Massachusetts, as shown in Figure 1. This traffic impact study is based on the Concept Plan prepared by Bohler Engineering, dated April 23, 2024 for a proposed 5,331 square foot (sf) Chick-fil-A restaurant. The purpose of this traffic impact study is to evaluate existing and projected traffic operations and safety conditions associated with the proposed development within the study area.

The traffic impact study is based on a review of existing traffic volumes, recent crash data, and the anticipated traffic generating characteristics of the proposed project. The study examines existing and projected traffic operations (both with and without the proposed development) at key intersections in the vicinity of the project site. The study area was selected based on a review of the surrounding roadway network and anticipated trip generating characteristics of the proposed project. This study provides a detailed analysis of traffic operations during the weekday midday, weekday afternoon and Saturday midday peak hours, when the combination of adjacent roadway volumes and project trips is expected to be the greatest.

Based on the analysis presented in this study, the proposed development is not expected to have a significant impact on the safety and operations of the area roadways. The following report documents these findings.

Project Description

The existing project site at 99 Stafford Street is bounded by railway tracks to the south, Heard Street to the west, Stafford Street to the north, and commercial properties to the east. The existing building, which previously housed a Walgreens, would be demolished and the proposed project would construct a new 5,331 sf Chick-fil-A restaurant with dual drive-through lanes. Access to the project site would be provided via two driveways located on Stafford Street (Northeast Site Driveway and Northwest Site Driveway) and one driveway on Heard Street (South Site Driveway). The Northeast Site Driveway on Stafford Street is proposed in the same location as the existing driveway and would be an exit-only driveway from the proposed drive-through. The Northwest Site Driveway would be constructed to provide right-turn, enter-only movements from Stafford Street. The South Site Driveway on Heard Street is proposed in the same location as the existing driveway and would allow for full access to and from the site.

With the proposed project in place, a total of 75 parking spaces would be provided, three of which would be accessible spaces adjacent to the proposed building. Dual drive-through lanes, each with their own order board and pickup area are proposed as part of this development. The drive-through lanes would circulate in a counterclockwise direction and an escape lane is provided after the order boards to the parking area. Two-way circulation would be provided throughout the parking areas on site.



FIGURE 1
STUDY AREA

PROPOSED CHICK-FIL-A
WORCESTER, MA



Study Methodology

This traffic impact study evaluates existing and projected traffic operations within the study area for the weekday midday, weekday afternoon, and Saturday midday peak hour traffic conditions, when the combination of the adjacent roadway volumes and estimated project trips would be expected to be the greatest.

The study was conducted in three steps. The first step consisted of an inventory of existing traffic conditions within the project study area. As part of this inventory, manual turning movement counts were collected in the vicinity of the project site during the weekday midday, weekday afternoon and Saturday midday peak periods. A field visit was also completed to document intersection and roadway geometries. Crash data at the study area intersections was obtained from the Massachusetts Department of Transportation (MassDOT) to determine if the study area intersections have any existing traffic safety deficiencies.

The second step of the study builds on the data collected in the first step to establish the basis for evaluating potential transportation impacts associated with the projected future conditions. During the second step, the projected traffic demands associated with any planned future developments that could influence traffic volumes at the study area intersections were assessed. Consistent with MassDOT traffic study guidelines, 2024 Existing traffic volumes were forecasted to the future year 2031 to establish 2031 No Build (without project) conditions and 2031 Build (with project) conditions.

The third step of this study determined if measures were necessary to improve existing or future traffic operations and safety, minimize potential traffic impacts, and provide safe and efficient access to the proposed project site.

Study Area Intersections

In coordination with the City of Worcester, the following study area intersections were selected for analysis:

- Stafford Street at Heard Street/Curtis Parkway
- Stafford Street at Northwest Site Driveway (Proposed)
- Stafford Street at Northeast Site Driveway
- Heard Street at South Site Driveway

The traffic impact study documents existing and future traffic conditions for the study area intersections noted above.

Existing Conditions

The existing conditions assessment included in this study consists of an inventory of intersection and roadway geometries, an inventory of traffic control devices, the collection of peak period traffic volumes, and a review of recent crash data. The existing conditions in the vicinity of the project site are summarized below.

Roadway Network

Stafford Street

Stafford Street generally extends in a southwest-northeast direction through the City of Worcester and is classified as an urban minor arterial under the City of Worcester jurisdiction. In the vicinity of the project site, Stafford Street generally provides one approximately 20-foot-wide travel lane in each direction with additional turning lanes at key intersections. Although no separate bicycle lanes are provided, the travel lanes are wide enough to accommodate bicycles. Sidewalks measuring approximately eight-feet-wide are provided on both sides of the roadway in the vicinity of the project site. Stafford Street has a posted speed limit of 35 miles per hour (mph).

Heard Street

Heard Street generally extends in north-south direction from the signalized intersection with Stafford Street in the north to Oxford Street in the south. Heard Street is classified as an urban collector under the City of Worcester jurisdiction. In the vicinity of the project site, Heard Street generally provides one 11-foot-wide travel lane in each direction with additional turning lanes at key intersections. Sidewalks measuring approximately five-feet-wide are provided on both sides of the roadway in the vicinity of the project site. Heard Street has a posted speed limit of 30 mph.

Signalized Intersection

Stafford Street at Heard Street/Curtis Parkway

The signalized intersection of Stafford Street at Heard Street/Curtis Parkway is a four-way intersection with Curtis Parkway forming the north leg, Heard Street forming the south leg and Stafford Street forming the east and west legs. The Curtis Parkway southbound approach consists of a single lane for shared left/through/right-turn movements. The Heard Street northbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. The Stafford Street eastbound approach consists of a shared lane left-turn/through lane and a shared through/right-turn lane. The Stafford Street westbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. Crosswalks are provided across all approaches to the intersection.

Unsignalized Intersections

Stafford Street at Northeast Site Driveway

The unsignalized intersection of Stafford Street at Northeast Site Driveway consists of Stafford Street forming the east and west legs and the Northeast Site Driveway forming the south leg. The Stafford Street eastbound approach consists of a shared through/right-turn lane. The Stafford Street westbound approach consists of a shared left-turn/through lane. The Northeast Site Driveway northbound approach consists of a single lane for left- and right-turn movements. A crosswalk is provided across the east leg of Stafford Street.

Heard Street at South Site Driveway

The unsignalized intersection of Heard Street at South Site Driveway consists of Heard Street forming the north and south legs and the South Site Driveway forming the east leg. All approaches to the intersection consist of a single lane.

Area Transit Services

Public transportation in Worcester is provided by the Worcester Regional Transit Authority (WRTA) bus and shuttle routes. Fixed bus Routes 27 and 825 operate along Stafford Street. Bus Route 27 provides service between the Union Hub Station and the Auburn Mall and Bus Route 825 provides service between the Union Hub Station and the YMCA on Shore Drive. The bus stop is located directly in front of the project site near the Northeast Site Driveway.

Pedestrian & Bicycle Facilities

Sidewalks are provided on both sides of Stafford Street and Heard Street within the study area. Crosswalks are provided on all legs at the signalized intersection of Stafford Street at Heard Street/Curtis Parkway. An unsignalized crosswalk is provided just east of the Northeast Site Driveway.

Existing Traffic Volumes

To assess peak hour traffic conditions, turning movement counts (TMCs) were conducted at the existing study area intersections during the weekday midday, weekday afternoon, and Saturday midday peak periods. In addition to the peak period TMCs, automatic traffic recorder (ATR) data was collected on Stafford Street and Heard Street.

Turning Movement Count Data

TMCs were conducted on Thursday, August 22, 2024, from 11:00 AM to 2:00 PM and 4:00 PM to 6:00 PM, as well as on Saturday, August 24, 2024 from 11:00 AM to 2:00 PM. The results of the turning movement counts are tabulated by 15-minute periods and are provided in Appendix A. The four highest consecutive 15-minute intervals during each of these count periods constitute the peak hours that are the basis of the traffic analysis provided in this report. Based on a review of the peak period traffic data, the weekday midday peak hour occurs between 12:45 PM and 1:45 PM, the weekday afternoon peak hour occurs between 4:30 PM and 5:30 PM, and the Saturday midday peak hour occurs between 1:00 PM and 2:00 PM.

In order to understand the potential difference in traffic operations between the previous on-site land use and the proposed land use, it was decided in coordination with the City to include Walgreens trips in the Existing year analysis. As the existing Walgreens is currently not operational, the Institute of Transportation Engineers' (ITE) publication, *Trip Generation Manual, 11th Edition*, was referenced to develop peak hour trips associated with the Walgreens. The estimated Walgreens trips are shown in Table 1 below.

Table 1: Existing Walgreens Trip Generation

Description	Weekday Midday Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Existing Walgreens Trips ¹	83	83	166	76	76	152	64	66	130

¹ ITE Land Use Code 881 (Pharmacy/Drugstore w/ Drive-Thru) based on 14,853 s.f.

The estimated trips associated with the Walgreens were distributed onto the study area network based on existing travel patterns.

Seasonal Variation

Based on MassDOT’s 2022 Weekday Seasonal Factors, August traffic volumes on urban principal arterials and all the others roadway types are shown to be higher than during an average month. This is consistent with MassDOT continuous count station data available nearby on Interstate 290 (Station ID 3894). Therefore, to provide a conservative analysis, the counted volumes were not seasonally adjusted downward to reflect an average month. The MassDOT seasonal adjustment data is provided in Appendix B.

Automatic Traffic Recorder Data

ATR data was obtained on Stafford Street, east of the Northeast Site Driveway and on Heard Street, south of the South Site Driveway. The ATR counts were collected over a 48-hour period from Wednesday, August 21 through Thursday, August 22, 2024. The ATR data is summarized in Table 2 and provided in Appendix A.

Table 2: ATR Summary

Location	Direction	Weekday ADT ¹	Midday Peak ² (vph)	Afternoon Peak ³ (vph)	Vehicle Speeds ⁴ (mph)
Heard Street, south of South Site Driveway	Northbound	3,800	226	397	30
	Southbound	2,800	184	237	33
	TOTAL	6,600	410	634	
Stafford Street, east of Northeast Site Driveway	Eastbound	6,500	405	451	37
	Westbound	6,200	384	557	34
	TOTAL	12,700	789	1,008	

(1) Average Daily Traffic based on ATR conducted from August 21-22, 2024.

(2) Weekday midday peak hour volumes occurred between 12:30 PM - 1:30 PM on Heard St and 12:00 PM - 1:00 PM on Stafford St.

(3) Weekday afternoon peak hour volumes occurred between 4:45 PM - 5:45 PM.

(4) Based on 85th percentile speeds.

As shown in Table 2, the average daily traffic (ADT) on Heard Street, south of the South Site Driveway is approximately 6,600 vehicles (3,800 northbound vehicles and 2,800 southbound vehicles) per day. The 85th

percentile speeds on Heard Street were measured to be 30 mph and 33 mph in the northbound and southbound directions, respectively.

The ADT on Stafford Street, east of the Northeast Site Driveway is approximately 12,700 vehicles (6,500 eastbound vehicles and 6,200 westbound vehicles) per day. The 85th percentile speeds on Stafford Street were measured to be 37 mph and 34 mph in the eastbound and westbound directions, respectively.

The resulting 2024 Existing weekday midday, weekday afternoon, and Saturday midday peak hour traffic volumes are presented in the traffic projection model provided in Appendix C and are presented in Figure 2, Figure 3, and Figure 4, respectively.

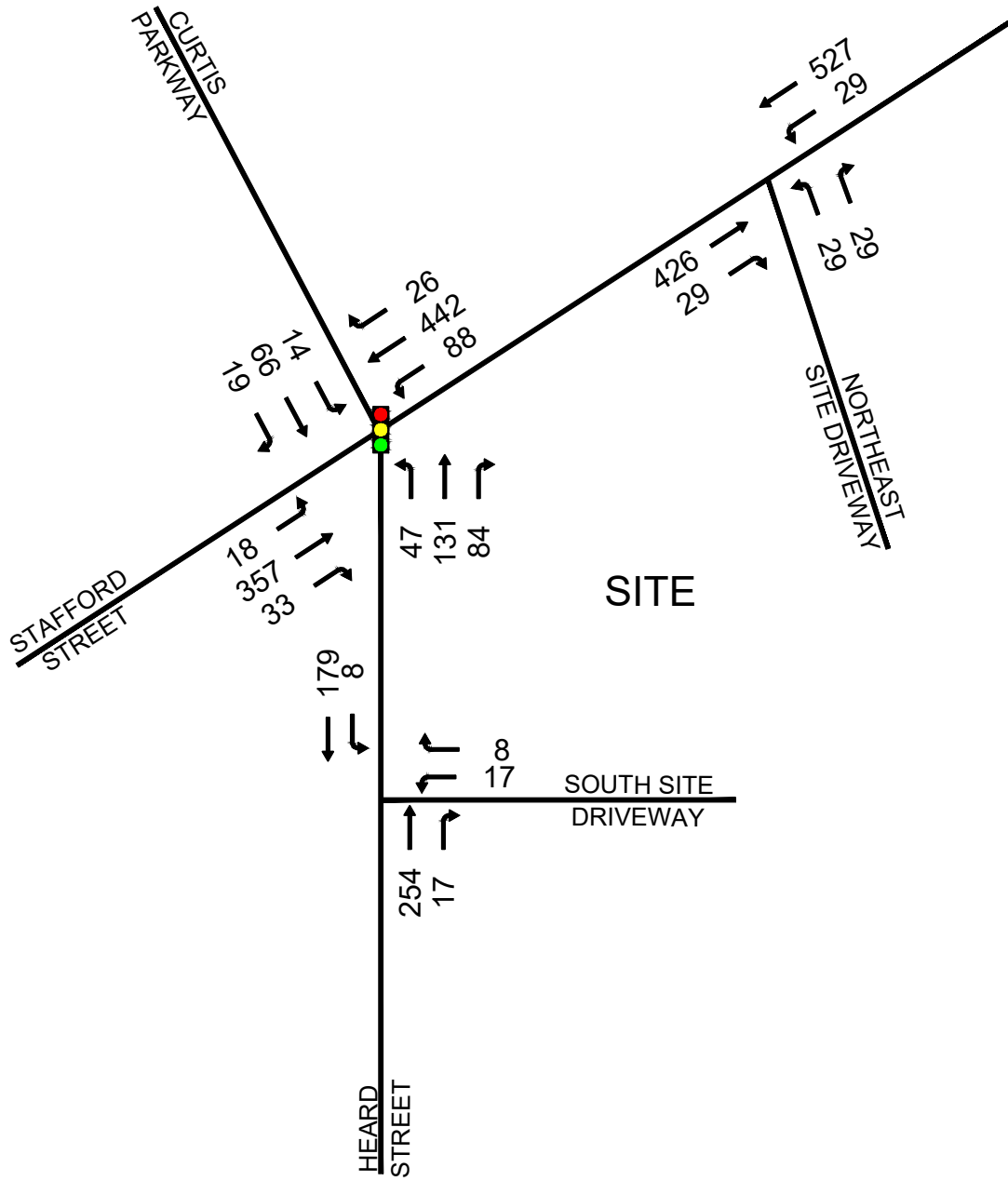


FIGURE 2
2024 EXISTING TRAFFIC VOLUMES
WEEKDAY MIDDAY PEAK HOUR

PROPOSED CHICK-FIL-A
WORCESTER, MA



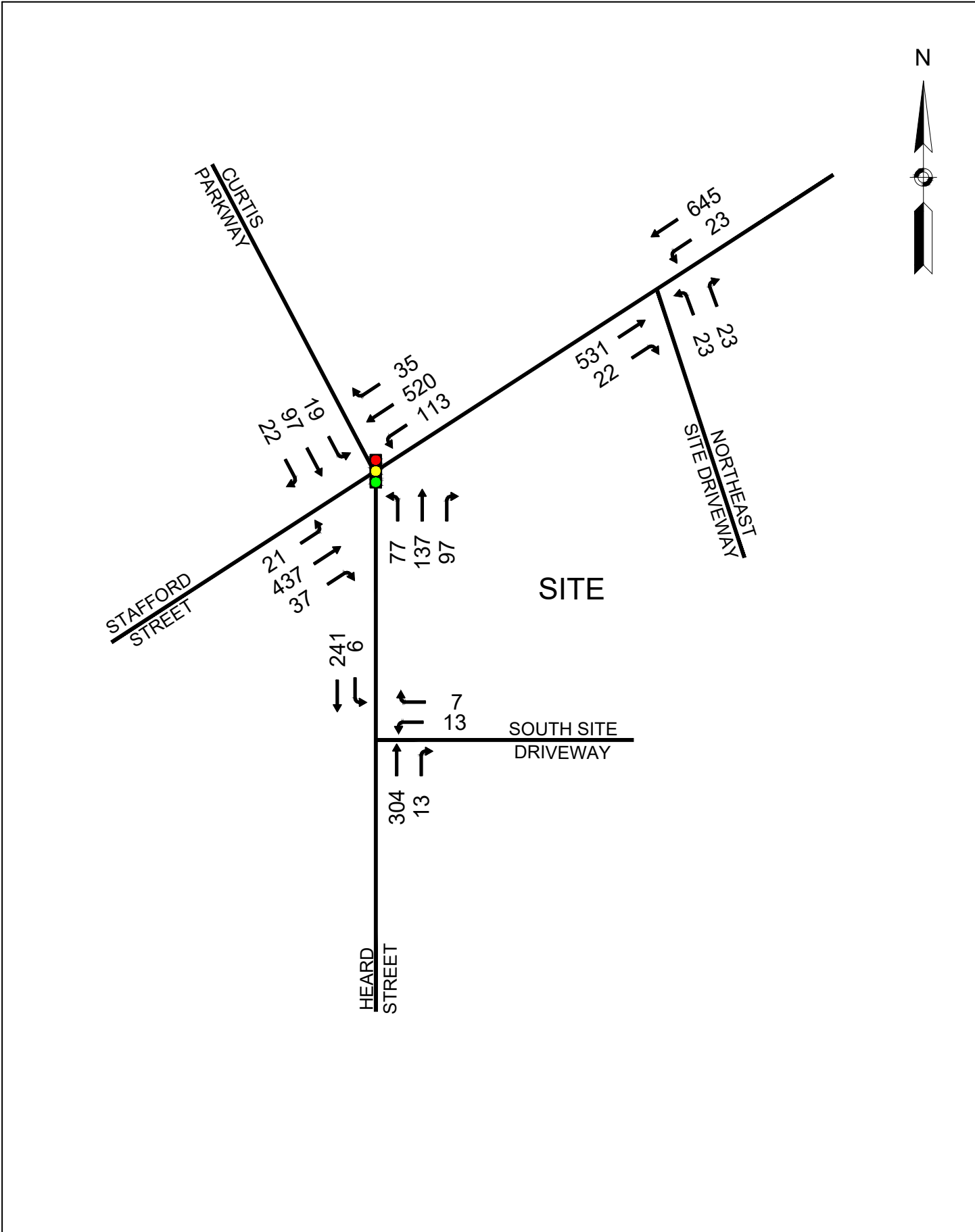


FIGURE 4
2024 EXISTING TRAFFIC VOLUMES
SATURDAY MIDDAY PEAK HOUR

PROPOSED CHICK-FIL-A
WORCESTER, MA



Crash Summary

Crash data at the study area intersections was obtained from MassDOT for the most recent five-year period available. This data includes complete yearly crash summaries for the years 2017 through 2021. A detailed summary of the crash data is provided in Appendix D.

The MassDOT Crash Rate Worksheet calculations were used to determine whether the crash frequencies at the study area intersections were unusually high given the travel demands at each location. The MassDOT Crash Rate Worksheet calculates a crash rate expressed in crashes per million entering vehicles (MEV). The calculated rate is then compared to the average rate for signalized and unsignalized intersections statewide and within MassDOT District 3. For signalized intersections, the statewide average crash rate is 0.78 crashes per MEV, and the MassDOT District 3 crash rate is 0.89 crashes per MEV. For unsignalized intersections, the statewide average crash rate is 0.57 crashes per MEV, and MassDOT District 3 average crash rate is 0.61 crashes per MEV.

The signalized intersection of Stafford Street at Heard Street/Curtis Parkway is reported to have experienced a total of 41 crashes during the five-year period analyzed, resulting in a crash rate of 1.28 crashes per MEV, which is higher than the statewide and District 3 crash rates for signalized intersections. Of the 41 reported crashes at the intersection, 21 crashes were angle collisions, nine crashes were rear-end collisions, five crashes were head-on collisions, four crashes were sideswipe collisions, one crash was single vehicle collision, and one crash was of unknown type. Eight crashes resulted in personal injury, 28 crashes resulted in property damage only, and five crashes were of unknown severity. This intersection was listed as a 2019-2021 Highway Safety Improvement Program (HSIP) cluster. A Road Safety Audit (RSA) has not been completed for this intersection. As discussed in later sections, there are proposed improvements at this intersection and along Stafford Street which are anticipated to help improve safety at the intersection.

The unsignalized intersection of Stafford Street at the Northeast Site Driveway is reported to have experienced a total of six crashes during the five-year period analyzed, resulting in a crash rate of 0.45 crashes per MEV, which is lower than the statewide and District 3 crash rates for unsignalized intersections. Of the six reported crashes at the intersection, three crashes were rear-end collisions, two crashes were angle collisions, and one crash was a sideswipe collision. Two crashes resulted in personal injury and the remaining four crashes resulted in property damage only.

The unsignalized intersection of Heard Street at the South Site Driveway is reported to have experienced one crash during the five-year period analyzed, resulting in a crash rate of 0.04 crashes per MEV, which is lower than the statewide and District 3 crash rates for unsignalized intersections. The reported crash was an angle collision that resulted in property damage only.

No crashes involving pedestrians or bicyclists were reported at the study area intersections within the time frame analyzed.

Future Conditions

To determine future traffic demands on the study area roadways and intersections, the 2024 Existing traffic volumes were projected to the future-year 2031, in accordance with MassDOT guidelines. Traffic volumes on the study area roadways in 2031 are considered to include existing traffic, as well as new traffic resulting from general growth in the study area and from other planned development projects, independent of the proposed project. The potential background traffic growth, unrelated to the proposed project, was considered in the development of the 2031 No Build (without project) peak hour traffic volumes. The estimated traffic increases associated with the proposed project were then added to the 2031 No Build volumes to reflect the 2031 Build (with project) traffic conditions. A more detailed description of the development of the 2031 No Build and 2031 Build traffic volume networks is presented below.

Planned Roadway Improvements

Planned roadway improvement projects can impact travel patterns and future traffic operations. To develop a clearer understanding of future area roadway operations, The City of Worcester Planning Department was consulted, and the MassDOT Project Portal was reviewed to identify other improvement projects in the vicinity of the site. Based on this review, improvements on Stafford Street are proposed which would include improvements to the intersection with Heard Street. The project would consist of modifying the westbound left-turn lane on Stafford Street and converting the eastbound shared left-turn/through lane into an exclusive left-turn lane. Additionally, bicycle lanes would be provided on both sides of Stafford Street. The existing unsignalized crosswalk located just east of the Northeast Site Driveway would also be removed as part of the corridor improvements. The geometry for this project was incorporated in the future no build and build analyses.

Background Traffic Growth

Traffic growth is generally a function of changes in motor vehicle use and expected land development within the area. To establish the rate at which traffic on the study area roadways can be expected to grow during the seven-year forecast period (2024 to 2031), both historical traffic growth and planned area developments were reviewed.

Historical Traffic Growth

Background traffic growth accounts for changes in traffic volumes associated with general changes in population and other developments that are not known at this time. Coordination with Central Massachusetts Regional Planning Commission (CMRPC) and the City of Worcester identified annual background growth rates from 0.5% to 1.0%. To present a more conservative analysis, the background traffic growth rate of 1.0% per year, compounded annually, was utilized for the study area to grow the 2024 traffic volumes to 2031 future year conditions.

Site-Specific Growth

The City of Worcester Planning Department was contacted to inquire about additional developments in the area. The City of Worcester identified a proposed Starbucks at 105-117 Stafford Street; however, no traffic impact study was identified for the proposed Starbucks to incorporate into future projections. Based on information within the *ITE Trip Generation Manual*, a significant portion of trips to and from a coffee shop with drive through are considered

to be pass-by trips. Since pass-by trips are vehicles already traveling on the adjacent roadways, they do not specifically represent new traffic on the roadways. Therefore, the trips associated with the proposed Starbucks are considered to be included within the 1.0% background growth rate.

2031 No Build Traffic Volumes

The 2024 Existing peak hour traffic volumes were grown by 1.0% per year, compounded annually, over the seven-year study horizon to establish the 2031 baseline volumes. The resulting 2031 No Build weekday midday, weekday afternoon, and Saturday midday peak hour traffic volumes are documented in the traffic projection model presented in Appendix C and illustrated in Figure 5, Figure 6, and Figure 7, respectively.

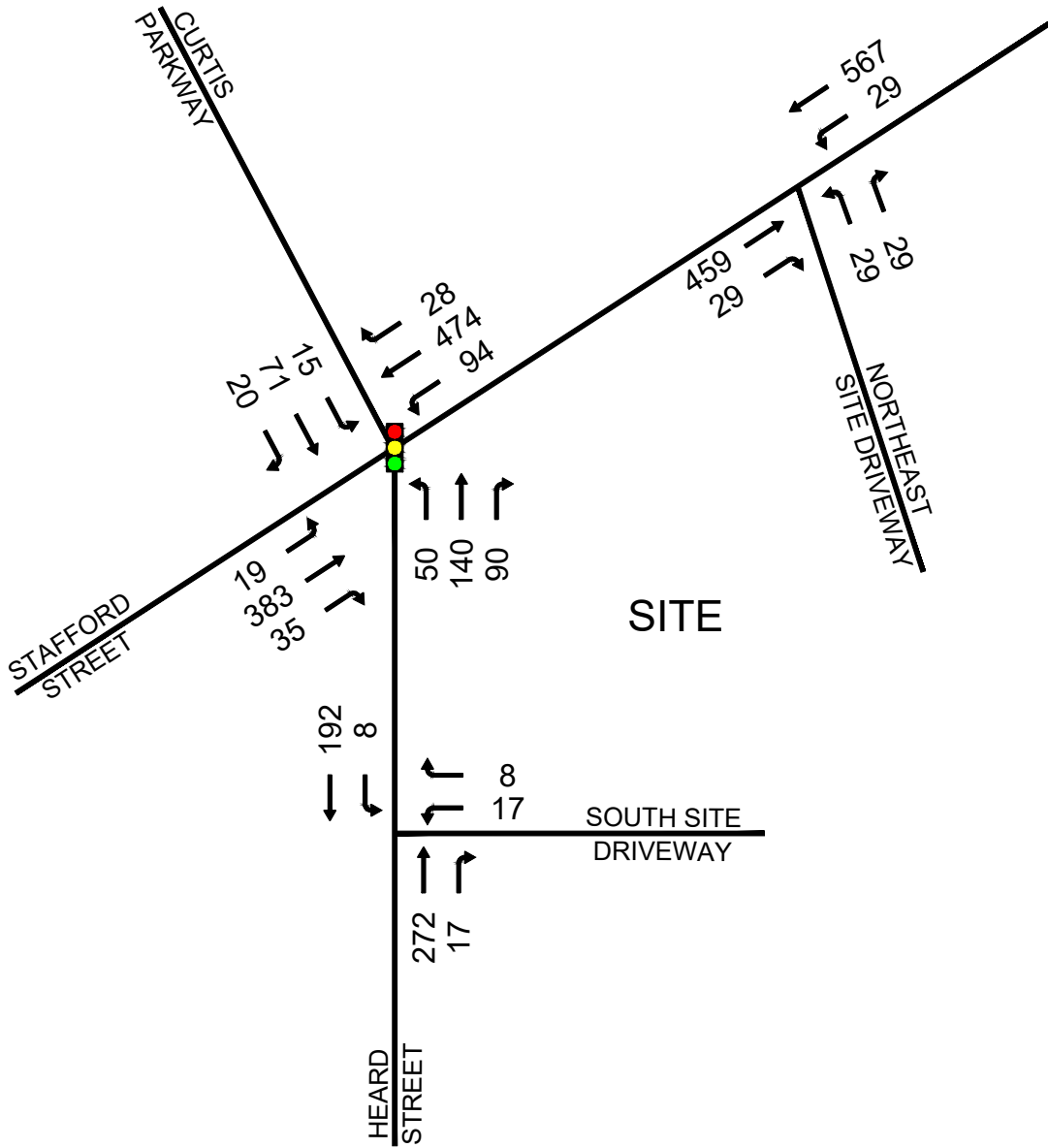


FIGURE 5
2031 NO BUILD TRAFFIC VOLUMES
WEEKDAY MIDDAY PEAK HOUR

PROPOSED CHICK-FIL-A
WORCESTER, MA



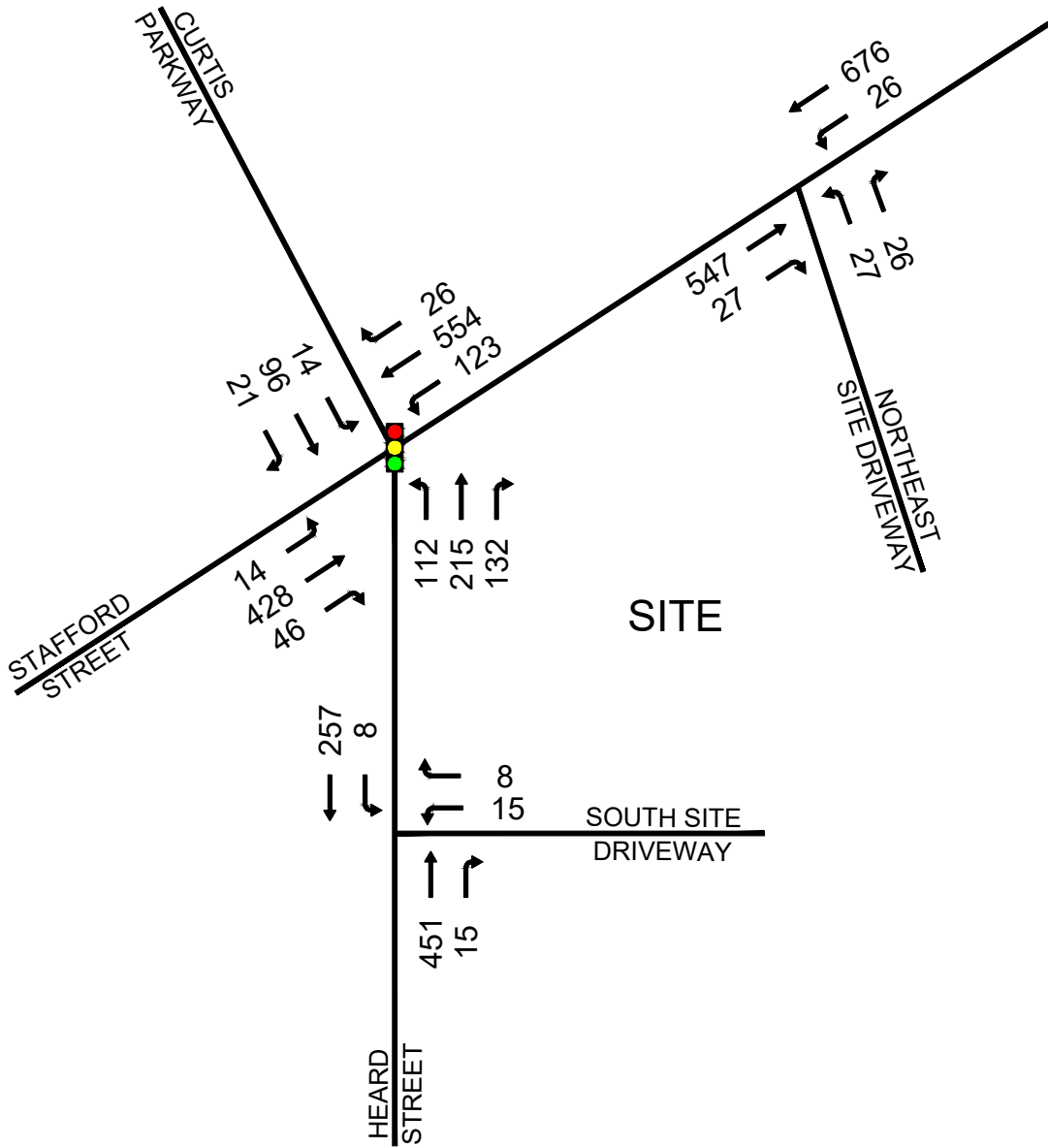
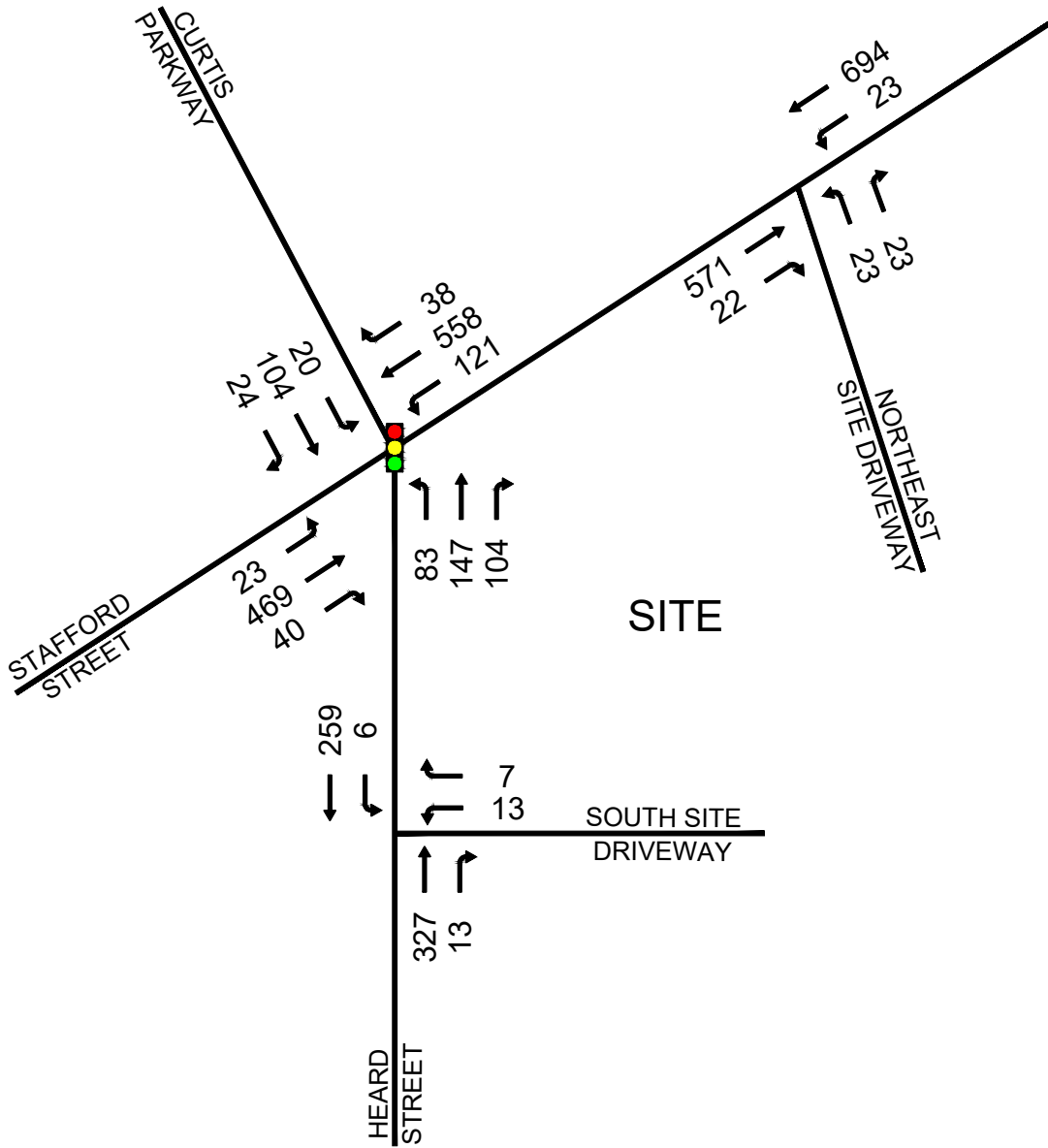


FIGURE 6
2031 NO BUILD TRAFFIC VOLUMES
WEEKDAY AFTERNOON PEAK HOUR

PROPOSED CHICK-FIL-A
WORCESTER, MA





SITE

SOUTH SITE DRIVEWAY

FIGURE 7

2031 NO BUILD TRAFFIC VOLUMES
SATURDAY MIDDAY PEAK HOUR

PROPOSED CHICK-FIL-A
WORCESTER, MA



Trip Generation

To estimate the number of vehicle trips associated with the proposed Chick-fil-A restaurant, the ITE publication, *Trip Generation Manual, 11th Edition*, was referenced. ITE is a national research organization of transportation professionals, and the *Trip Generation Manual, 11th Edition* provides traffic generation information for various land uses compiled from studies conducted by members nationwide. This reference establishes vehicle trip rates (in this case expressed in trips per square foot) based on actual traffic counts conducted at similar types of existing land uses. Vehicle trip estimates for the proposed Chick-fil-A restaurant were developed based on data presented for Land Use Code (LUC) 934 (Fast-food Restaurant with Drive-Through).

Not all trips to fast food restaurants are considered “new” trips. In fact, a significant portion of the total trips attracted to such land uses are “pass-by” trips. Since pass-by traffic is already on the adjacent roadway network, this portion of the total development traffic is reflected in the existing, base traffic volumes, and does not represent new traffic on the roadway network. Therefore, the total traffic volume associated with the project is reduced by the pass-by volume to estimate the “new” traffic generated by the project.

According to ITE data for LUC 934, approximately 50% of weekday morning trips and 55% of weekday afternoon trips can be attributed as pass-by trips. As no data is provided for the weekday midday or Saturday midday trips, the 50% pass-by rate was applied to the weekday midday and Saturday midday peak hours. A summary of the peak hour trip generation estimates for the project are shown in Table 3 below.

Table 3: Vehicular Trip Generation

Description	Weekday Midday Peak Hour			Weekday Afternoon Peak Hour			Saturday Midday Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Proposed Chick-fil-A Trips ¹	138	133	271	92	85	177	150	144	294
- Pass-By Trips ²	-68	-68	-136	-49	-49	-98	-73	-73	-146
New Trips	70	65	135	43	36	79	77	71	148

¹ ITE Land Use Code 934 (Fast-Food Restaurant w/ Drive-Thru) based on 5,331 s.f.

² According to ITE, approximately 50% of weekday morning and 55% of weekday afternoon peak hour trips for Land Use Code 934 (Fast-Food Restaurant w/ Drive-Thru) are attributed to pass-by trips. No pass-by data is available for weekday midday or Saturday midday. To be conservative, the 50% pass-by rate was applied to the weekday midday and Saturday midday peak hour trip generation estimates.

As shown in Table 3 above, the proposed project is estimated to result in approximately 135 new trips (70 entering vehicles and 65 exiting vehicles) during weekday midday peak hour, approximately 79 new trips (43 entering vehicles and 36 exiting vehicles) during the weekday afternoon peak hour, and approximately 148 new trips (77 entering vehicles and 71 exiting vehicles) during Saturday midday peak hour. The trips summarized in Table 3 do not include the removal of trips associated with the prior Walgreens.

Trip Distribution and Assignment

The traffic estimated to be generated by the proposed development was distributed onto the study area roadways and intersections based on the existing travel patterns of the adjacent roadways. The trips were distributed to the

project site driveways based on the ease of access and anticipated utilization of drive-through and dine-in facilities on site. The resulting arrival and departure patterns are presented in Figure 8 and are documented in the traffic projection model located in Appendix C.

The project-related traffic was assigned to the surrounding roadway network based on the project trip distribution patterns presented in Figure 8. The resulting distributed new project trips are shown in Figure 9, Figure 10, and Figure 11 for the weekday midday, weekday afternoon and Saturday midday peak hours, respectively.

2031 Build Traffic Volumes

To establish the 2031 Build peak hour traffic volumes, the distributed project trips shown were added to the 2031 No Build peak hour traffic volumes and the existing Walgreens trips were removed to establish the 2031 Build peak hour traffic volumes. The resulting 2031 Build weekday midday, weekday afternoon, and Saturday midday peak hour traffic volumes are documented in the traffic projection model presented in Appendix C and presented in Figure 12, Figure 13, and Figure 14, respectively.

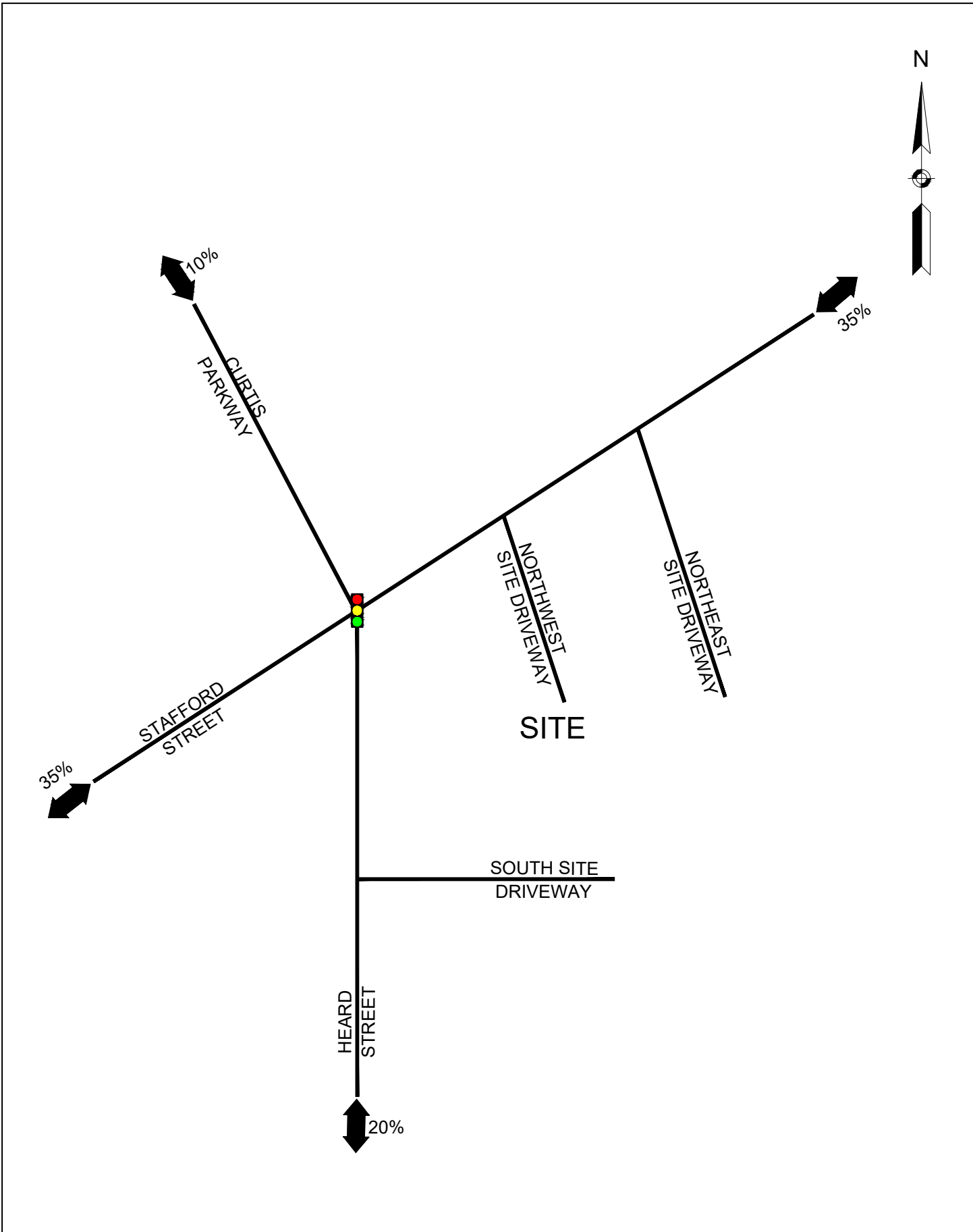
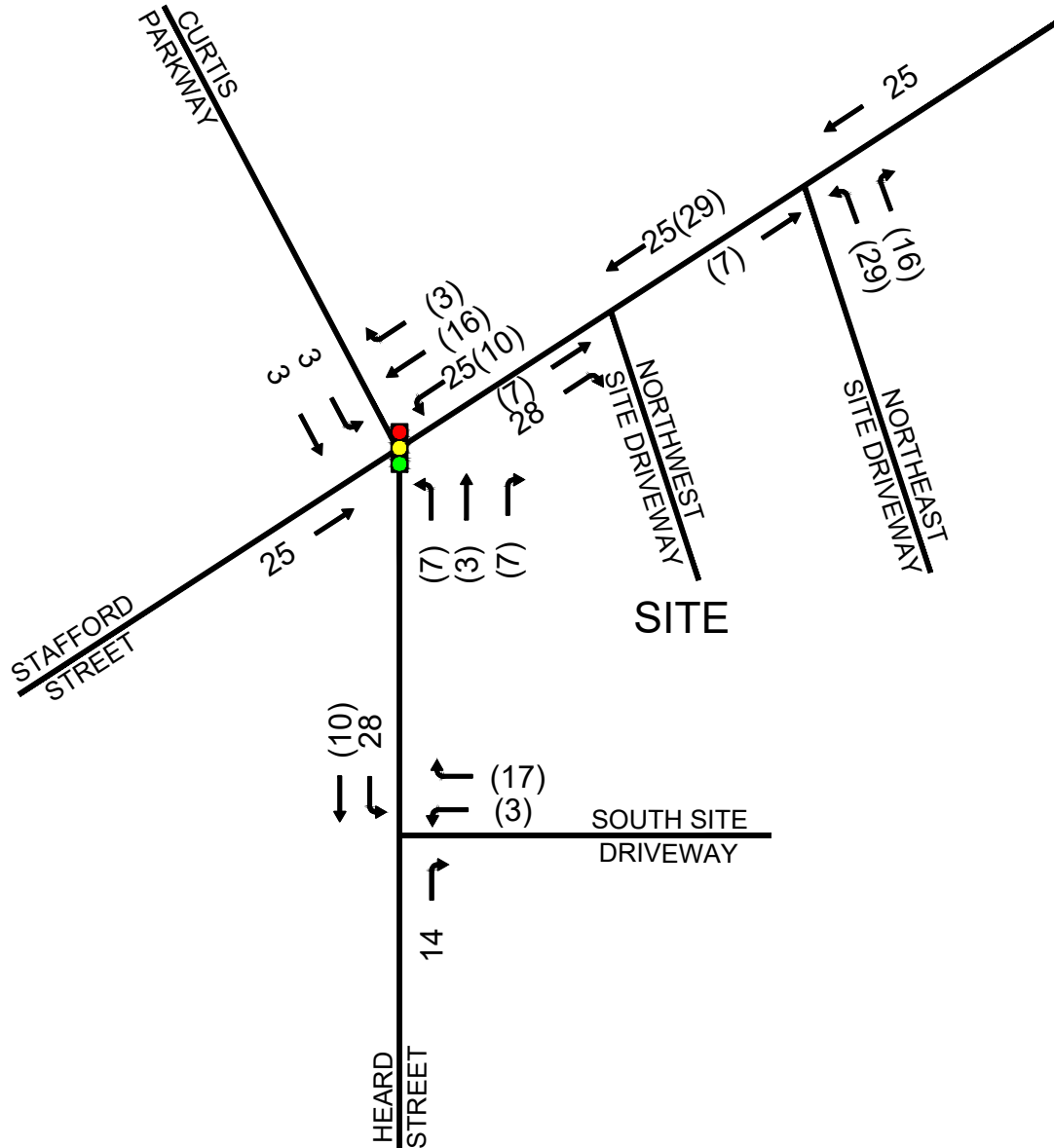


FIGURE 8
DIRECTION OF ARRIVALS AND
DEPARTURES

PROPOSED CHICK-FIL-A
WORCESTER, MA



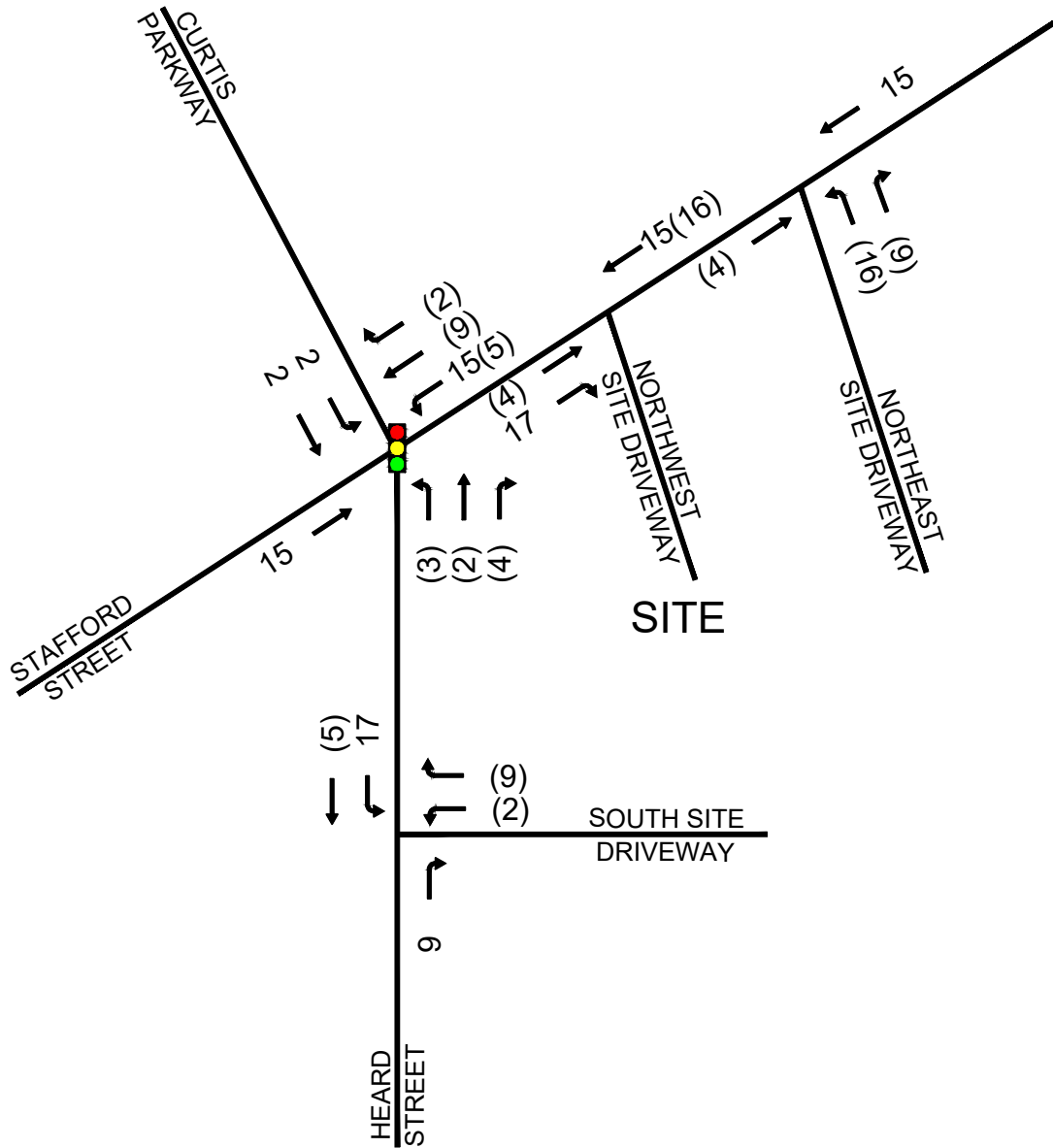


XX = ENTER
 (XX) = EXIT

FIGURE 9
 NET NEW TRAFFIC VOLUMES
 WEEKDAY MIDDAY PEAK HOUR

PROPOSED CHICK-FIL-A
 WORCESTER, MA





XX = ENTER
 (XX) = EXIT

FIGURE 10
 NET NEW TRAFFIC VOLUMES
 WEEKDAY AFTERNOON PEAK HOUR

PROPOSED CHICK-FIL-A
 WORCESTER, MA



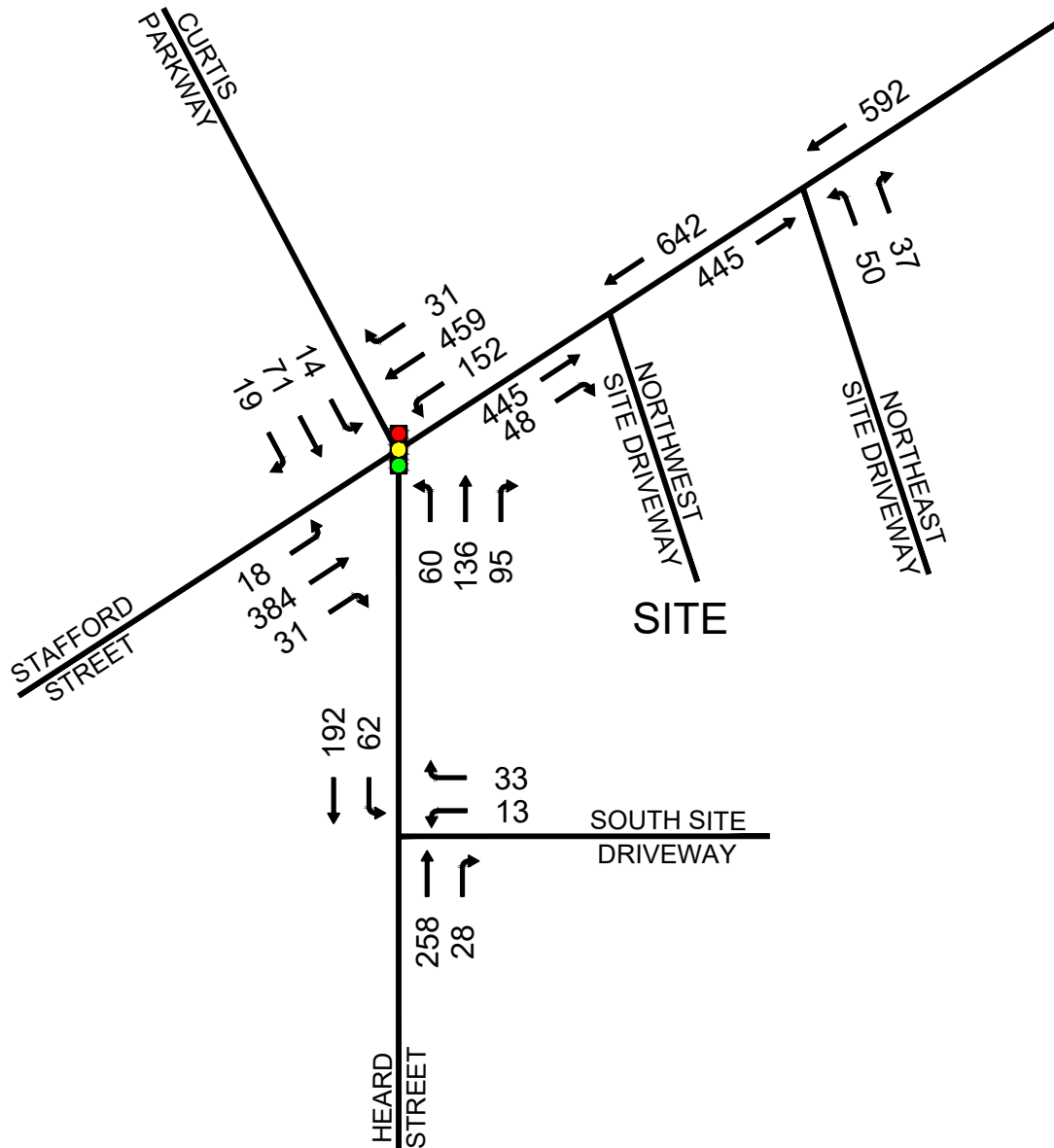


FIGURE 12
2031 BUILD TRAFFIC VOLUMES
WEEKDAY MIDDAY PEAK HOUR

PROPOSED CHICK-FIL-A
WORCESTER, MA



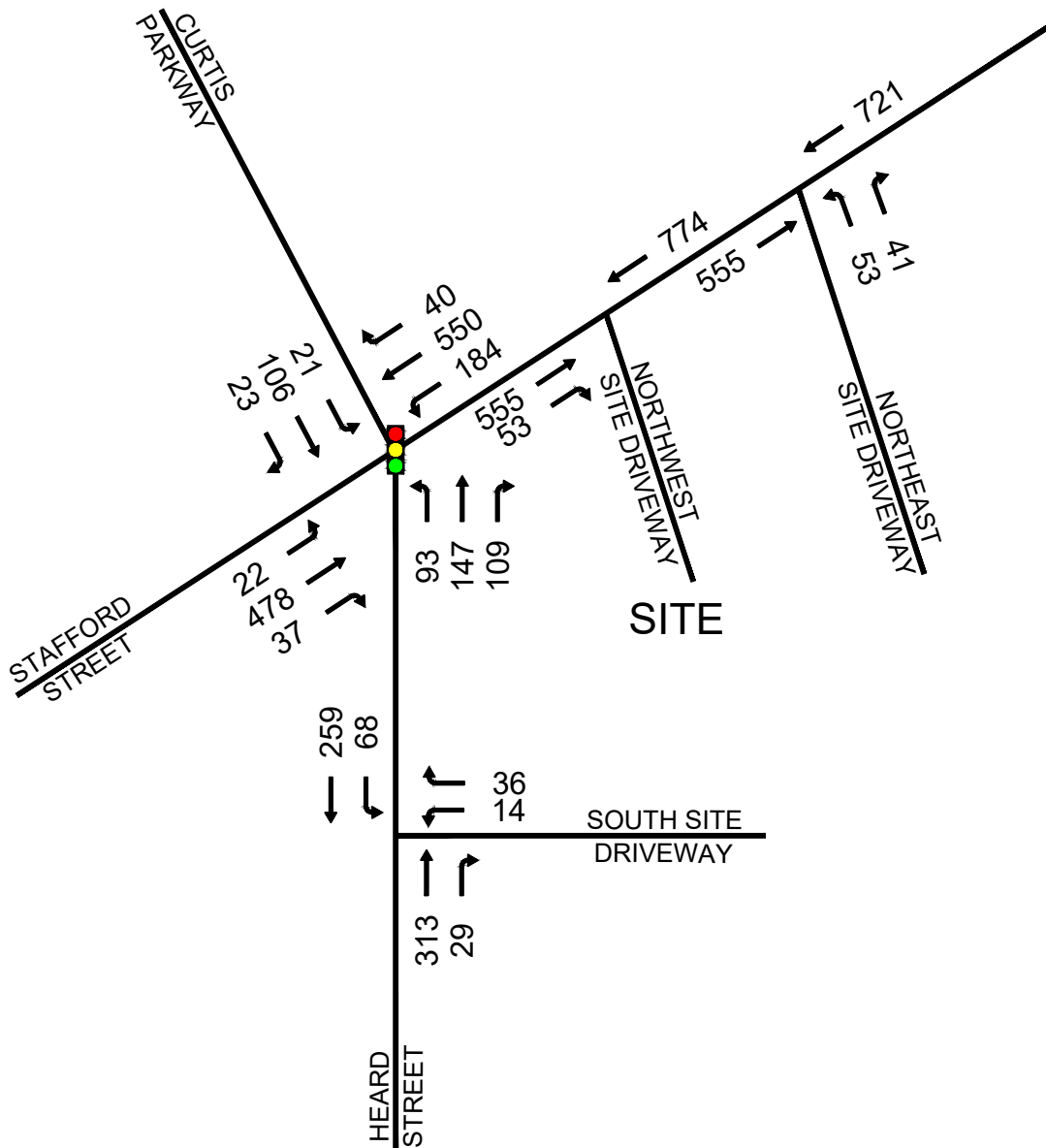


FIGURE 14
2031 BUILD TRAFFIC VOLUMES
SATURDAY MIDDAY PEAK HOUR

PROPOSED CHICK-FIL-A
WORCESTER, MA



Traffic Operations Analysis

In previous sections of this report, the quantity of traffic at the study area intersections has been discussed. This section describes the overall quality of the traffic flow at the study area intersections during the weekday midday, weekday afternoon, and Saturday midday peak hours. To complete this assessment, intersection capacity analysis was conducted using the Synchro capacity analysis software at the study area intersections under the 2024 Existing, 2031 No Build, and 2031 Build scenarios for the three peak hour traffic conditions. The analysis is based on Synchro capacity analysis methodologies and procedures contained in the *Highway Capacity Manual, 6th Edition* (HCM), which are summarized in Appendix E. A discussion of the evaluation criteria and a summary of the results of the capacity analysis are presented below.

Level-of-Service Criteria

Average total vehicle delay is reported as level-of-service (LOS) on a scale of A to F. LOS A represents delays of 10 seconds or less, while LOS F represents delays in excess of 50 seconds for unsignalized intersections and greater than 80 seconds for signalized intersections. A more detailed description of the LOS criteria is provided in Appendix E.

Capacity Analysis Results

Intersection capacity analysis was conducted using the Synchro capacity analysis software for the study area intersections to evaluate the 2024 Existing, 2031 No Build, and 2031 Build traffic conditions during the weekday midday, weekday afternoon and Saturday midday peak hours. The peak hour traffic volumes utilized as part of this analysis are provided in the traffic projection model, attached in Appendix C.

The Synchro capacity analysis results for the 2024 Existing, 2031 No Build, and 2031 Build traffic conditions are presented in Appendix F, Appendix G, and Appendix H, respectively. The capacity analysis results for the signalized and unsignalized study area intersections are presented in Table 4 and Table 5 below, respectively. The results of the specific capacity analysis at the study area intersections are discussed below, with a more detailed summary of the capacity analysis for the study area intersections provided in Appendix I.

Table 4: Signalized Intersection Overall Levels-of-Service

Intersection	Period	2024 Existing			2031 No Build			2031 Build		
		LOS ¹	Delay ²	ICU ³	LOS	Delay	ICU	LOS	Delay	ICU
Stafford Street at	MIDDAY	C	20.5	0.70	C	23.5	0.70	C	24.0	0.68
Heard Street/Curtis Parkway	PM	C	24.5	0.76	C	29.8	0.75	C	29.6	0.74
	SAT	C	23.1	0.83	C	29.1	0.81	C	30.7	0.82

1 Level-of-Service

2 Average vehicle delay, in seconds

3 Intersection capacity utilization

As displayed above, the signalized intersection of Stafford Street at Heard Street/Curtis Parkway is shown to currently operate at overall LOS C during the weekday midday, weekday afternoon, and Saturday midday peak hours. Under 2031 No Build and 2031 Build conditions, with the proposed improvements along Stafford Street and the addition of the proposed Chick-fil-A trips, the intersection is projected to continue to operate at overall LOS C during the weekday midday, weekday afternoon, and Saturday midday peak hours.

Table 5: Unsignalized Intersection Levels-of-Service

Intersection	Period	Movement	2024 Existing			2031 No Build			2031 Build		
			LOS ¹	Delay ²	V/C ³	LOS	Delay	V/C	LOS	Delay	V/C
Stafford Street at	MIDDAY		C	18.9	0.20	C	20.6	0.22	C	21.9	0.31
Northeast Site Driveway	PM	NB - LR	C	21.4	0.21	C	24.0	0.23	C	23.5	0.24
	SAT		C	23.9	0.21	D	27.1	0.24	D	34.8	0.46
Heard Street at South Site Driveway	MIDDAY		B	11.7	0.05	B	12.1	0.05	B	11.8	0.09
	PM	WB - LR	B	13.7	0.06	B	14.3	0.06	B	13.3	0.07
	SAT		B	12.9	0.05	B	13.3	0.05	B	13.2	0.11

1 Level-of-Service

2 Average vehicle delay, in seconds

3 Volume to capacity ratio

As displayed above, the critical Northeast Site Driveway northbound approach at its unsignalized intersection with Stafford Street is shown to currently operate at LOS C during the weekday midday, weekday afternoon, and Saturday midday peak hours. Under 2031 No Build and 2031 Build conditions, the critical northbound approach is projected to continue to operate at LOS C during the weekday midday and weekday afternoon peak hours and is projected to operate at LOS D during the Saturday midday peak hour.

The critical South Site Driveway westbound approach at the unsignalized intersection of Heard Street at the South Site Driveway is shown to currently operate at LOS B during the weekday midday, weekday afternoon, and Saturday midday peak hours. Under 2031 No Build and 2031 Build conditions, the critical westbound approach is projected to continue to operate at LOS B during the weekday midday, weekday afternoon, and Saturday midday peak hours.

Due to the proposed enter-only configuration of the Northwest Site Driveway, no capacity analysis results for movements exiting the site are provided.

Site Access and Circulation

Access to the project site would be provided via the two driveways located on Stafford Street (Northeast Site Driveway and Northwest Site Driveway) and one driveway located on Heard Street (South Site Driveway). The Northeast Site Driveway, proposed in the same location as the existing site driveway, would become an exit-only driveway serving the vehicles leaving the drive-through. The Northwest Site Driveway would be constructed to provide right-turn enter-only movements from Stafford Street accessing the parking area of the site. The South Site Driveway located at the existing site driveway on Heard Street is proposed to remain in its existing location and provide full access between Heard Street and the project site.

With the proposed project in place, a total of 75 parking spaces would be provided, three of which would be accessible spaces adjacent to the proposed building. Two-way circulation would be provided through the parking areas which are located on the south and west sides of the proposed building. Dual drive-through lanes, each with their own order board and pickup area are proposed as part of this development. The drive-through lanes would circulate in a counterclockwise direction around the south and east sides of the site and provide approximately 400 feet of queue storage in each lane. An exit lane to the proposed parking area is proposed just north of the order boards for vehicles needing to leave the drive-through lanes.

Sight Distance

A field review of the available sight distance was conducted at the project site driveway locations on Stafford Street and Heard Street. The American Association of State Highway and Transportation Officials (AASHTO) publication, *A Policy on Geometric Design, 2018 Edition*, defines minimum and recommended sight distances at intersections and was used to conduct this review.

The minimum sight distance is based on the required stopping sight distance (SSD) for vehicles traveling along the main road. According to AASHTO, "If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient time to anticipate and avoid collisions."

The required SSD based on the respective 85th percentile speeds and the corresponding field-measured sight distances are reported in below in Table 6 below.

Table 6: Stopping Sight Distance

Site Driveway Location	Approaching	Speed Limit (mph)	85th % Speed (mph)	SSD¹ Required	SSD Measured	Meets Required SSD?
Northwest Site Driveway	Eastbound	35	37	270	>450'	Yes
Stafford Street	Westbound	35	34	240	>450'	Yes
Northeast Site Driveway	Eastbound	35	37	270	>450'	Yes
Stafford Street	Westbound	35	34	240	>450'	Yes
South Site Driveway at	Northbound	30	30	210	185	Yes ²
Heard Street	Southbound	30	33	215	270	Yes

1 Stopping sight distance (see AASHTO equations 3-2 and 3-3) for the 85th percentile speeds.

2 SSD met with requisite landscaping management.

As shown in Table 6, the available SSD for vehicles approaching the Northwest Site Driveway and Northeast Site Driveway on Stafford Street exceed the minimum SSD requirements for the 85th percentile speeds. The available SSD for vehicles approaching the South Site Driveway in the southbound direction exceeds the minimum SSD requirement and would meet the northbound SSD requirement with requisite landscaping management. The project team is committed to coordinating landscape clearing, as appropriate, with the City of Worcester.

Overall, with the proposed project and requisite landscaping management in place, sight distances from the project site driveways would allow for safe access and egress to and from the project site.

Conclusion

The proposed project includes the demolition of the existing building, which previously housed a Walgreens, and the construction of a new 5,331 sf Chick-fil-A restaurant with dual drive-through lanes. Access to the project site would be provided via two driveways located on Stafford Street (Northeast Site Driveway and Northwest Site Driveway) and one driveway on Heard Street (South Site Driveway). The Northeast Site Driveway on Stafford Street is proposed in the same location as the existing driveway and would be an exit-only driveway from the proposed drive-through. The Northwest Site Driveway would be constructed to provide right-turn, enter-only movements from Stafford Street. The South Site Driveway on Heard Street is proposed in the same location as the existing driveway and would allow for full access to and from the site.

With the proposed project in place, a total of 75 parking spaces would be provided, three of which would be accessible spaces adjacent to the proposed building. Dual drive-through lanes, each with their own order board and pickup area are proposed as part of this development. The drive-through lanes would circulate in a counterclockwise direction and an escape lane is provided after the order boards to the parking area. Two-way circulation would be provided throughout the parking areas on site.

Not accounting for the prior Walgreens land use on-site, the proposed project is estimated to generate approximately 135 new trips (70 entering vehicles and 65 exiting vehicles) during weekday midday peak hour, approximately 79 new trips (43 entering vehicles and 36 exiting vehicles) during the weekday afternoon peak hour, and approximately 148 new trips (77 entering vehicles and 71 exiting vehicles) during Saturday midday peak hour.

With the proposed project in place under 2031 Build conditions, the intersection of Stafford Street at Heard Street/Curtis Parkway is shown to experience minor increases in overall average vehicle delay and is projected to continue operating at overall LOS C during all peak hours analyzed. The project site driveway approaches are shown to operate at LOS D or better and under capacity during each analyzed peak hour.

Sight lines at the project site driveways are projected to meet the minimum stopping sight distance requirements with landscaping management to allow for safe access to and from the project site.

Based on a review of the analysis contained within this traffic impact study, the proposed development is not shown to have a significant impact on the traffic operations at the study area intersections.