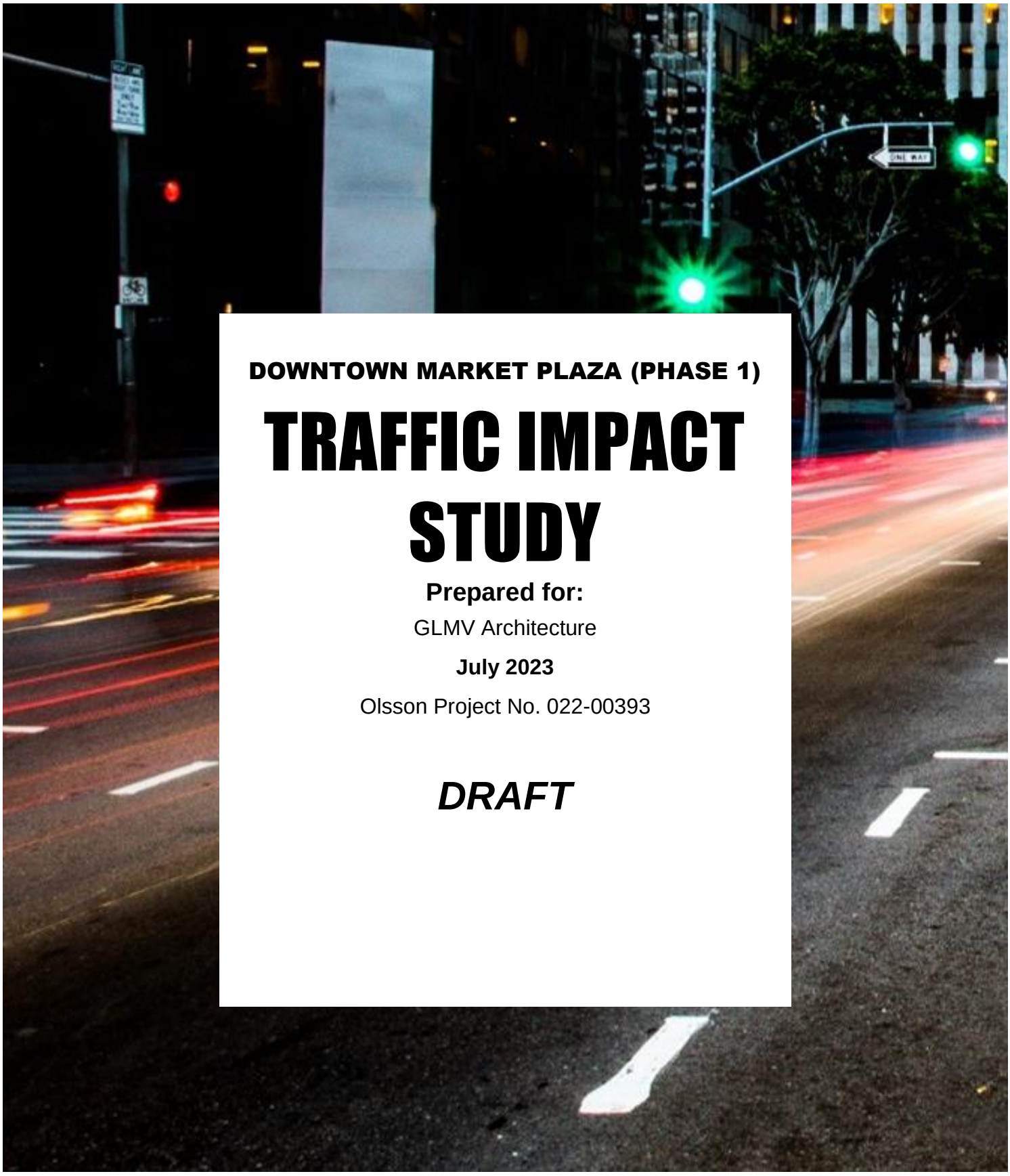

DOWNTOWN MARKET PLAZA (PHASE 1)

TRAFFIC IMPACT STUDY

Prepared for:

GLMV Architecture

July 2023

Olsson Project No. 022-00393

DRAFT

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1. INTRODUCTION

This report studies the traffic impacts of the proposed Lee's Summit Downtown Market Plaza. The proposed development is located in downtown Lee's Summit, Missouri. The boundaries of the project area are between Green Street and Johnson Street and from 2nd Street to 3rd Street and represents redevelopment of the area. The approximate location of the proposed development is shown on the Vicinity Map in **Figure 1.**

The development project is proposed to be built in two phases. The first phase will include closure of a portion of Green Street, construction of a pedestrian plaza east of City Hall, and construction of an event space/farmers market. The second phase of the project will include a multi-use development encompassing residential, retail and office uses. This study will focus on the impact of the closure of a portion of Green Street and network operations with the development of Phase 1 only.

This report presents the potential impacts of the proposed development on the existing roadway network and, as appropriate, recommends additional turn lanes, storage bay modifications, and intersection control methods per the City of Lee's Summit *Access Management Code*, dated March 2018. The study intersections include the following:

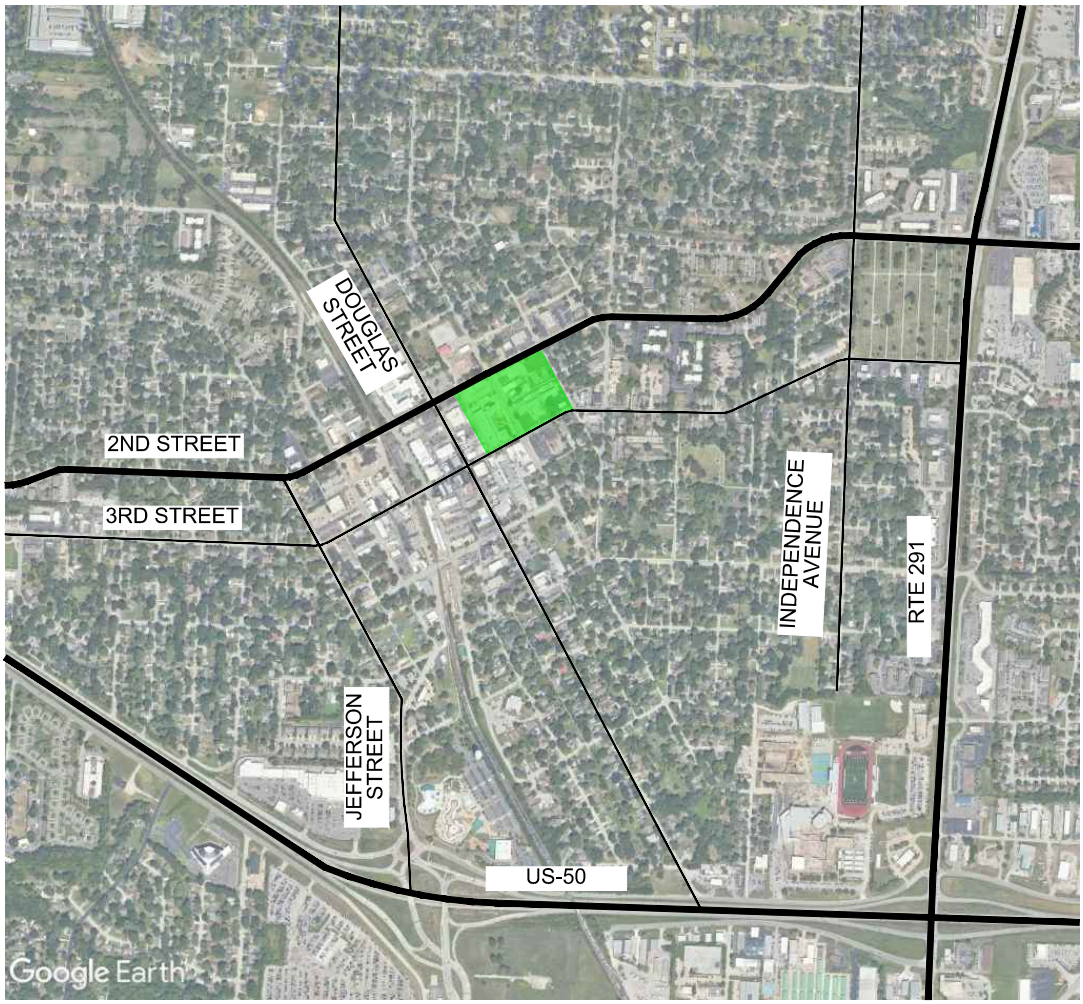
- 2nd Street and Southeast Alley (City Hall Alley)
- 2nd Street and Green Street
- 2nd Street and Johnson Street
- 3rd Street and Southeast Alley (City Hall Alley)
- 3rd Street and Green Street
- 3rd Street and Johnson Street
- Green Street and City Hall Parking Garage Access
- Any proposed site driveways as appropriate

The following scenarios were analyzed considering weekday AM, PM, and weekend PM peak hour periods:

- Existing Conditions
- Existing Redistribution Conditions
- Existing Plus Phase 1 Development Conditions

FIGURE 1

Lee's Summit, MO
Vicinity Map



LEGEND

Lee's Summit Downtown Market Plaza

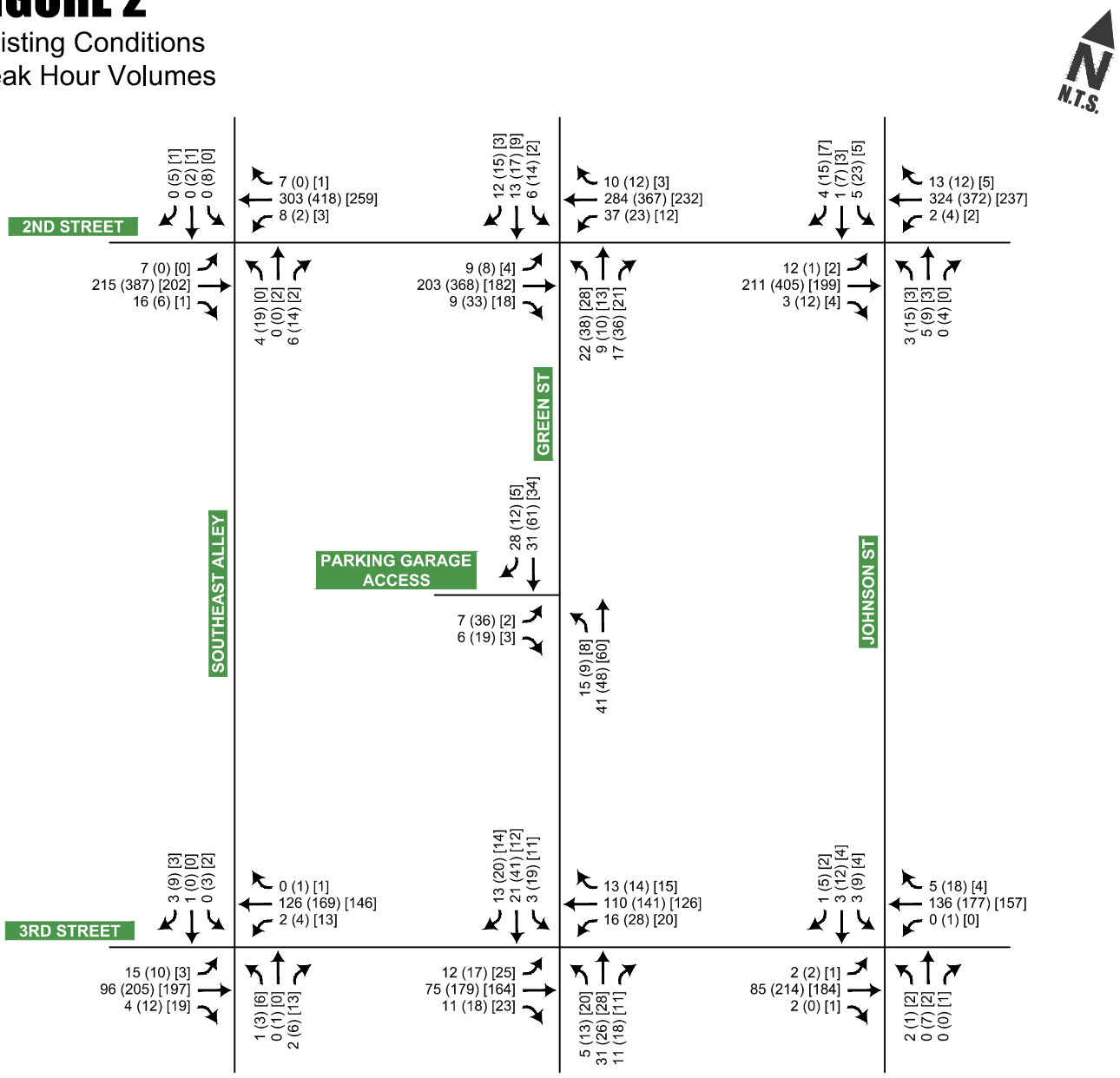
2. DATA COLLECTION

The data collection effort included acquiring peak period turning movement counts and historical average daily traffic counts.

Turning movement traffic counts were collected at the study intersections on Wednesday, May 10th and Saturday, May 13th, 2023. Counts were collected for the typical weekday thirteen-hour period (6:00 AM to 7:00 PM) and for the Saturday event period (6:30-9:30 PM). Peak hour periods varied slightly throughout the area; however, the following time frames were determined based on total volumes: weekday AM peak hour of 7:30-8:30 AM, weekday PM peak hour of 4:15-5:15 PM, and Saturday PM peak hour of 6:30-7:30 PM. Through volumes were balanced along the 2nd and 3rd Street corridors. Existing peak hour traffic count data is illustrated in **Figure 2**. Traffic count data is provided in **Appendix A.**

FIGURE 2

Existing Conditions
Peak Hour Volumes



LEGEND

AM(PM) [WKND] Peak Hour Volumes

3. EXISTING CONDITIONS

Existing traffic conditions were evaluated to identify any existing deficiencies and to provide a baseline for comparison purposes.

3.1 Network Characteristics

Within the study area there are five roadways that were considered during analysis: 2nd Street, 3rd Street, Southeast Alley (north/south alley located west of city hall), Green Street, and Johnson Street. The maintaining jurisdiction for all roadways is the City of Lee's Summit.

Functional classification for roadways maintained by Lee's Summit was acquired referencing the *Thoroughfare Master Plan*. Current network characteristics were determined and are summarized in **Table 1**.

Table 1. Existing Network Summary.

Roadway	Functional Classification	Typical Section	Median Type	Posted Speed
2nd Street	Minor Arterial	Three-Lane	TWLTL	30 mph
3rd Street	Minor Arterial	Two-Lane	N/A	25 mph
Southeast Alley	Local	One-Lane	N/A	N/A
Green Street	Local	Two-Lane	N/A	25 mph
Johnson Street	Local	Two-Lane	N/A	25 mph

3.1.1 Parking Review

A review of existing parking on street, in designated surface lots, and within the city parking garage was conducted. A map illustrating on street, surface lot, and parking garage location and number of spaces is provided in **Appendix B**. On street parking is provided along 3rd Street, Market Street, Main Street, Douglas Street, and Green Street. Parking accommodations include striping and signing to support parking activity. Parking style along public streets is primarily parallel or angle. The locations and types of parking are detailed in **Table 2**.

Table 2. On-Street Parking Summary.

Roadway	Start	End	Type	Notes
3rd Street	Jefferson Street	Green Street	Parallel	Break at rail line
Market Street	Mid-block between 2nd and 3rd Street	4th Street	Parallel	-
Main Street	2nd Street	4th Street	Angle north of 3rd Street, Parallel to south	SW Main Street also provides parking
Douglas Street	2nd Street	4th Street	Parallel	No parking near fire station
Green Street	2nd Street	4th Street	Parallel	-

City staff provided parking count data for the downtown area. Parking data was collected in 2021. Based on the city parking survey, approximately 350 on street parking spaces are provided within the study area.

Several surface lots are located within the downtown area that support parking. Based on the city parking survey, approximately 316 surface lot parking spaces are provided within the study area.

A public parking garage is located in the southwest quadrant of 2nd Street and Green Street. Access to the parking garage is provided via Green Street and the Southwest Alley. Based on the city parking survey, 314 spaces are provided in the garage. In addition to total parking available, the city has conducted parking usage surveys for the garage. Parking usage data is provided in **Appendix B**.

3.2 Existing Warrant Analysis

Existing lane configuration and traffic control for the study network are illustrated in **Figure 3**.

3.2.1 Signal Warrants

A traffic signal may be justified if traffic conditions meet any of the applicable nine signal warrants described in the 2009 Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD provides criteria for conducting an engineering study to determine whether a traffic signal is appropriate at any intersection. Based on the data available, the Eight Hour Vehicular Volume Warrant (Warrant 1), Four Hour Vehicular Volume Warrant (Warrant 2), the Peak Hour Warrant (Warrant 3), and the Pedestrian Volume Warrant (Warrant 4) were evaluated for following existing unsignalized study intersections:

- 2nd Street and Green Street
- 2nd Street and Johnson Street
- 3rd Street and Green Street
- 3rd Street and Johnson Street

Based on existing traffic volumes, the unsignalized study intersections do not warrant signalization under existing conditions. Signal warrant analysis sheets are provided in **Appendix B**.

3.2.2 Turn Lane Warrants

Turn lane warrant analysis was conducted for the study area roadways following agency guidelines. Operations, presented in **Section 3.3,** were reviewed to assist in evaluation of turn lane recommendations. Turn lane warrant analysis sheets are provided in **Appendix B**.

Left-Turn Lanes

The following left-turn lanes are warranted under existing conditions:

- Northbound Green Street at 2nd Street (meets all three peak hours)
- Southbound Johnson Street at 2nd Street (meets PM peak hour only)
- Westbound 3rd Street at Green Street (meets PM and weekend peak hours)
- Northbound Green Street at 3rd Street (meets weekend peak hour only)
- Eastbound 3rd Street at Green Street (meets weekend peak hour only)

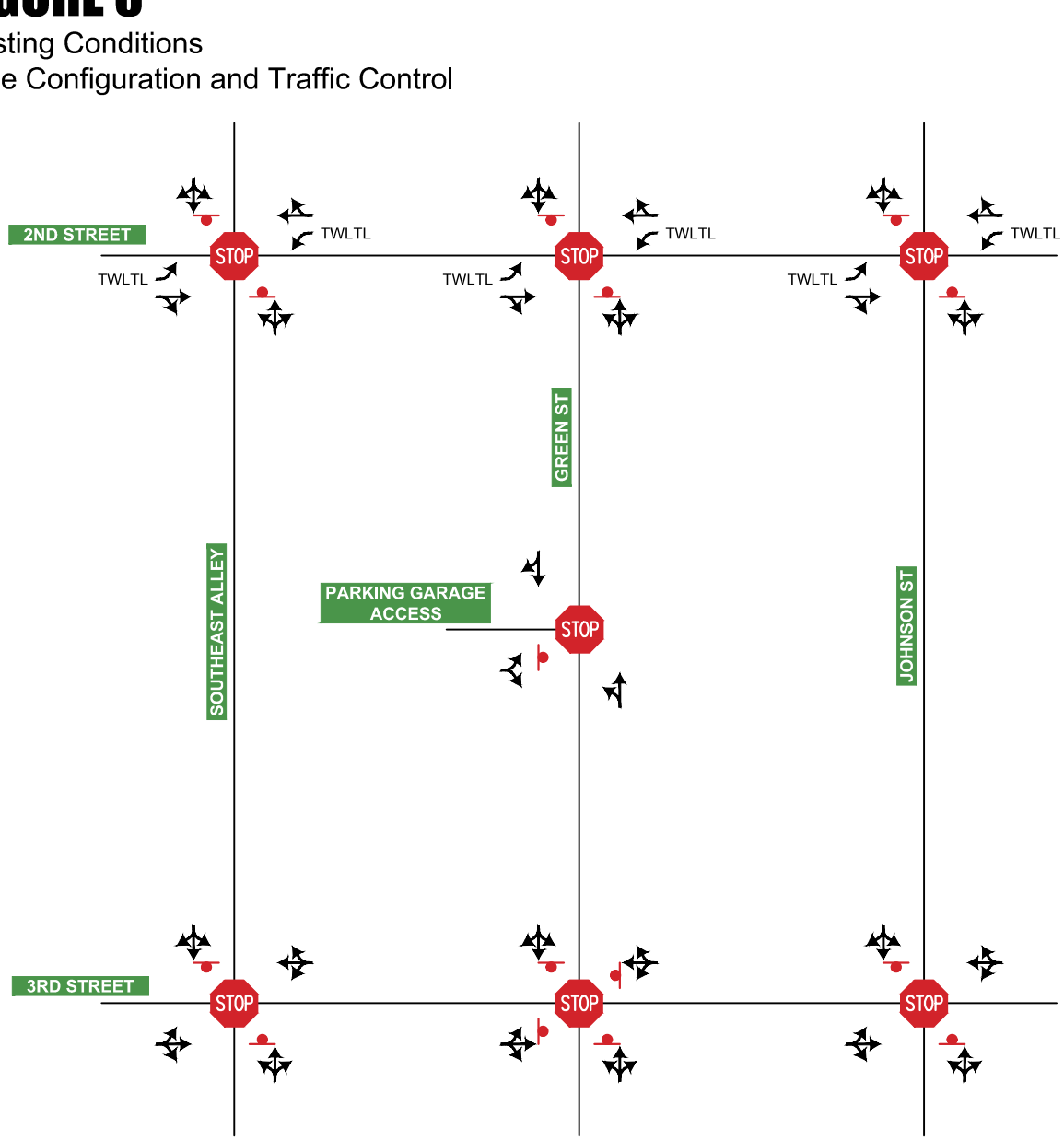
Right-Turn Lanes

No right-turn lanes are warranted under existing conditions.

The ability to add dedicated turn lanes is limited at several intersections in the downtown area, restricted by right-of-way and existing building setback. Capacity analysis will be reviewed in **Section 3.3** to identify areas with operational deficiencies. Recommendations for turn lanes will be based on feasibility, constructability and benefit of improvement. Other considerations when determining if turn lanes should be installed should include pedestrian activity and the impact of additional lanes to pedestrian crossing distances. Within the downtown core, maintaining a shorter pedestrian crossing distance may be preferred to providing vehicular turn lane capacity.

FIGURE 3

Existing Conditions
Lane Configuration and Traffic Control



LEGEND

- XX' → Lane Configuration & Storage Length
- STOP — Stop Controlled Intersection
- Stop Sign
- TWLTL — Two Way Left Turn Lane

3.3 Existing Capacity Analysis

Capacity analysis was performed for the study intersections using the existing lane configurations and traffic control. Analysis was conducted using Synchro, Version 11, based on the *Highway Capacity Manual* (HCM) delay methodologies. For simplicity, the amount of control delay is equated to a grade or Level of Service (LOS) based on thresholds of driver acceptance. The amount of delay is assigned a letter grade A through F, LOS A representing little or no delay and LOS F representing very high delay. **Table 3** shows the delays associated with each LOS grade for signalized and unsignalized intersections, respectively. Queuing analysis was conducted referencing the 95th percentile queue length. This represents the queue length that has a 5 percent probability of being exceeded during the peak hour period.

Table 3. Intersection Level of Service Criteria.

Level of Service	Average Control Delay (seconds)	
	Signalized	Unsignalized
A	< 10	< 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50
Highway Capacity Manual (6th Edition)		

Analysis was conducted referencing the existing peak hour factors as obtained from data collection. Heavy vehicle percentages were based on existing conditions. The City of Lee's Summit *Level of Service Policy* was referenced to determine acceptable operations for the purposes of this study. The policy outlines that a LOS C is desired, but LOS D may be deemed acceptable for signalized intersections. Likewise, a LOS C is desired for stop-controlled intersections, however a LOS D or E may be deemed acceptable due to extenuating circumstances.

Unsignalized movements are operating at LOS C or better during all three peak hour periods.

Several intersection movements meet turn lane warrants under existing conditions, thus a further analysis of the necessity and practicality of improvements was conducted. A combination of warranting condition, existing LOS and queue length, and constructability was considered. A summary of factors for turn lane warrants and recommendations are summarized in **Table 4**. One of the factors included is the warranting criteria from the City of Lee's Summit. Turn lanes may be warranted based on traffic control elements such as signalization, peak hour turning

volumes of the three study hours, and roadway classification (arterial vs. arterial streets), which are summarized below.

Reviewing not only warranting characteristics but also operations and feasibility, several movements do not need additional capacity based on operations or present construction challenges. With this consideration, no improvements are recommended under existing conditions. The Existing capacity analysis summary is illustrated in **Figure 4**. Detailed results are provided in **Appendix B.**

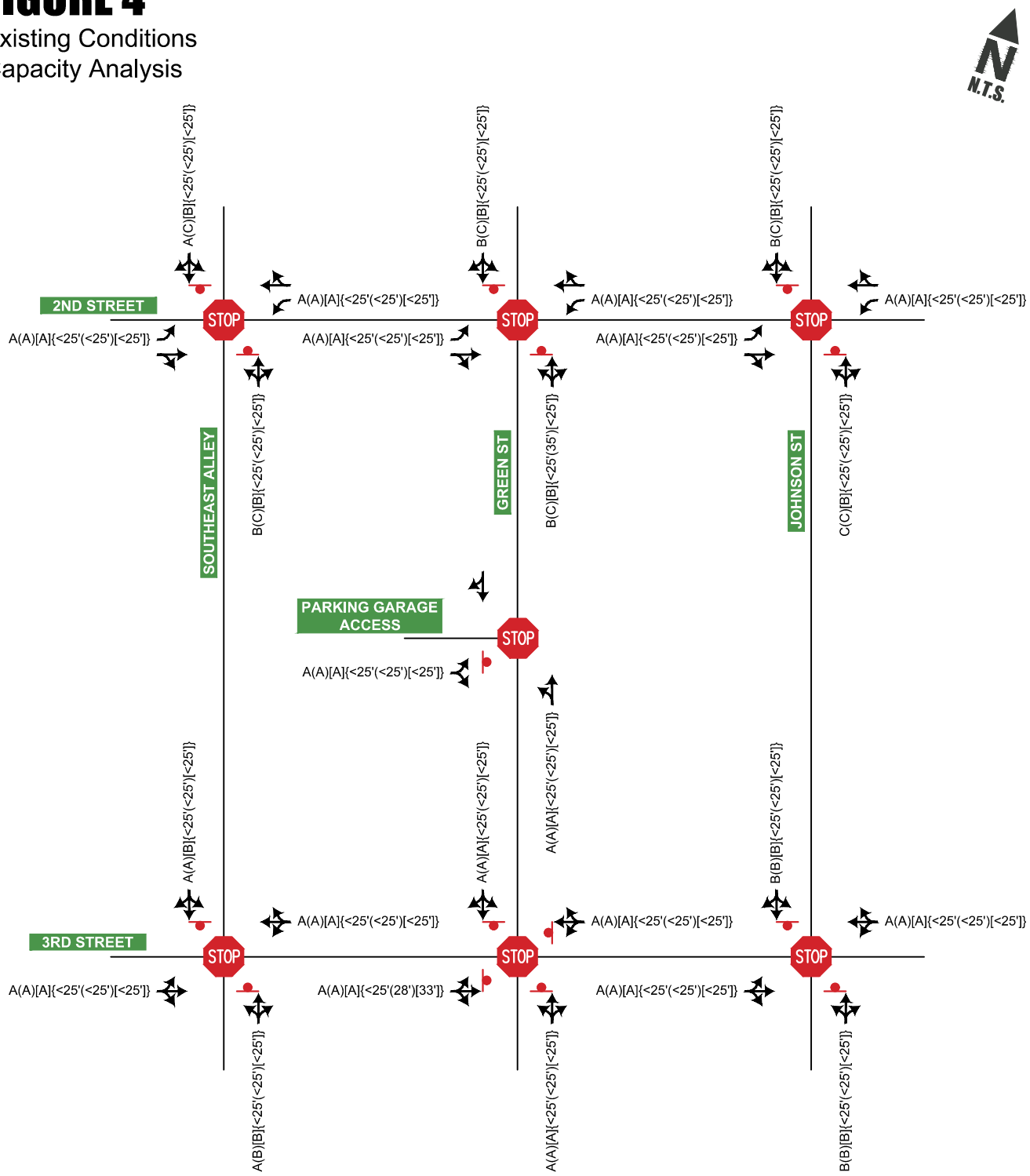
Table 4. Existing Conditions Turn Lane Warrant Review.

Intersection		Movement	Criteria*	Operations	Recommended?
Left-Turn Lanes	2nd and Green	Northbound	Volumes (3/3)	LOS B-C	NO
	2nd and Johnson	Southbound	Volumes (1/3)	LOS B-C	NO
	3rd and Green	Westbound	Volumes (2/3)	LOS A	NO
		Northbound	Volumes (1/3)	LOS A	NO
		Eastbound	Volumes (1/3)	LOS A	NO

*This column represents the warrant criteria met. When meeting based on volumes, the column indicates the number of hours (three peak hour periods were considered) of which the warrant was met.

FIGURE 4

Existing Conditions
Capacity Analysis



LEGEND

→	Lane Configuration
AM(PM)[WKND]{AM'(PM')[WKND']}	Movement LOS & {95th-Percentile Queue}
STOP	Stop Controlled Intersection
	Stop Sign

4. EXISTING REDISTRIBUTION CONDITIONS

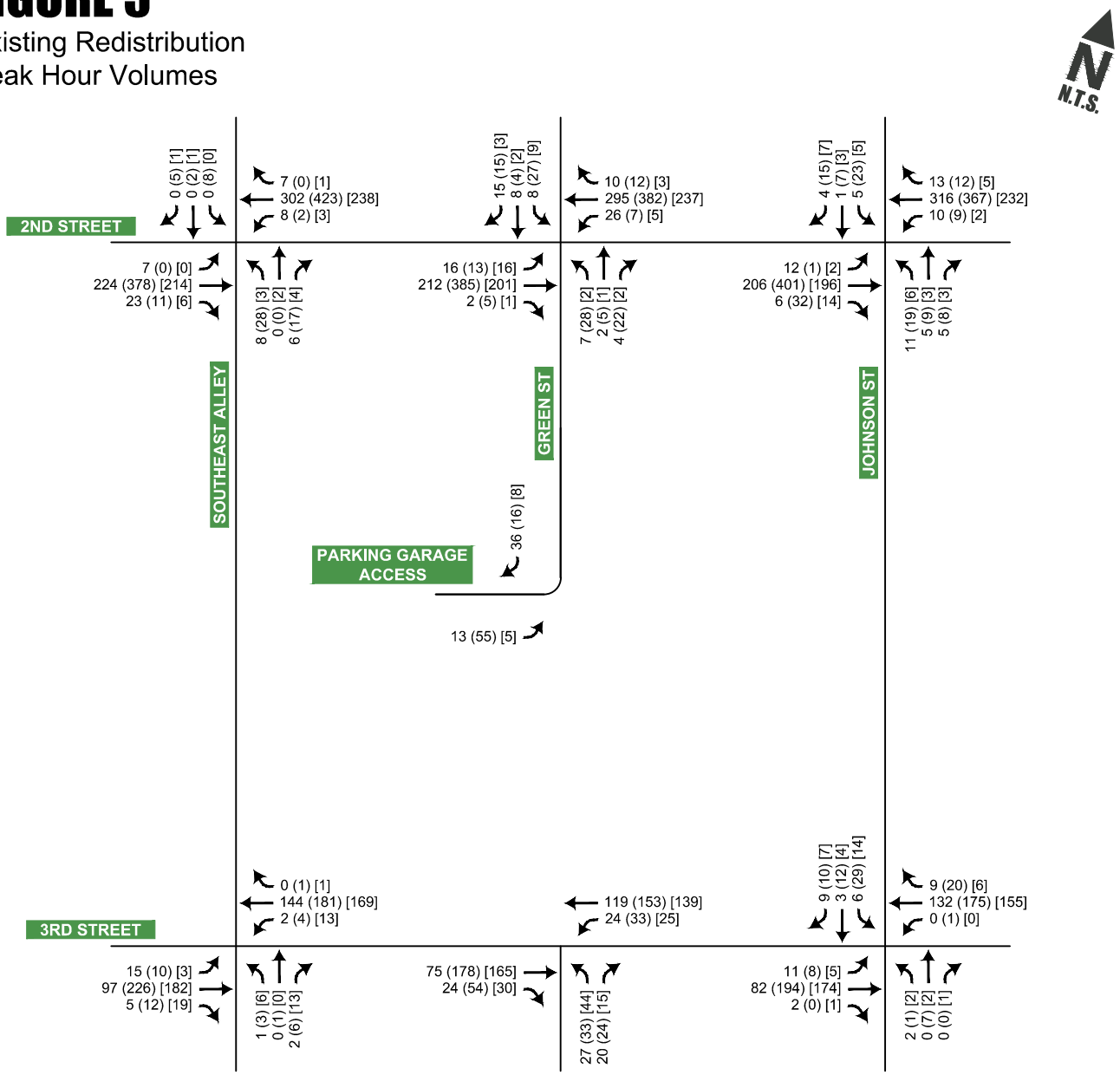
The city is considering the closure of Green Street to support construction of planned development including a pedestrian plaza area directly east of the City Hall building. Green Street is proposed to be closed between 3rd Street and 2nd Street. The current four-leg, all-way stop controlled intersection of 3rd Street and Green Street will transition to a T-intersection. With closure of the north leg, the intersection was assumed to remain under all-way stop control. The intersection of 2nd Street and Green Street will remain under its current configuration as a four-leg intersection with stop control for the minor leg (Green Street). The south leg of the intersection will provide access to the city parking garage only and will terminate north of city hall.

In addition to the closure of Green Street, Southeast Alley (the north/south road segment west of city hall) is proposed to be restricted to one way access in the northbound direction. A section of two-way access will be maintained along Southeast Alley from 2nd Street to the parking garage access.

To represent the closure of Green Street, existing vehicular traffic volumes were redistributed to the surrounding intersections. All trips to/from the garage to the south were redistributed north to 2nd Street. The primary bypass route that was utilized for existing trips along Green Street was Douglas Street. It is noted that with the closure of Green Street, some existing users may find alternative routes outside of the downtown area. It is anticipated that the volume redistribution presented is conservative representation. The existing redistribution conditions peak hour volumes are shown in **Figure 5**. Detailed volume redistribution spreadsheets are provided in **Appendix C**.

FIGURE 5

Existing Redistribution
Peak Hour Volumes



LEGEND

AM(PM) [WKND] Peak Hour Volumes

4.1 Existing Redistribution Warrant Analysis

Turn lane and signal warrants were reviewed for Existing Redistribution conditions following the methodologies stated in **Section 3.2**. Existing Redistribution lane configuration and traffic control for the study network are illustrated in **Figure 6**. Detailed warrant analysis is provided in **Appendix C.**

4.1.1 Signal Warrants

Due to the redistribution of volumes from Green Street and Southeast Alley, trip distribution patterns are expected to change. The percent increase or decrease of approach peak hour volumes were calculated and a factor was extrapolated to use over the entire count period. Warrants 1, 2 and 3 were reviewed for the following intersections, consistent with the existing conditions.

- 2nd Street and Green Street
- 2nd Street and Johnson Street
- 3rd Street and Green Street
- 3rd Street and Johnson Street

No intersections are expected to warrant signalization under Existing Redistribution Conditions.

Existing pedestrian travel patterns are not expected to significantly change with the closure of Green Street. While pedestrian traffic may increase within the plaza area, pedestrians are expected to utilize the city parking garage for access. Outside of the city hall block, pedestrians would be expected to follow similar travel patterns to existing. Pedestrian volumes were not revised for redistribution conditions, thus Warrant 4 was not reviewed.

4.1.2 Turn Lane Warrants

Due to the reconfiguration of Green Street and Southeast Alley, several vehicular turning movements will no longer exist. The following is a summary of turn lane warrants that are met with the redistribution of traffic. Movements that were previously warranted under existing conditions are not included. Detailed turn lane warrant analysis sheets are provided in **Appendix C.**

4.1.2.1 Left-Turn Lanes

Based on Existing Redistribution volumes, the following left-turn lanes are warranted:

- Northbound on Southeast Alley at 2nd Street (meets PM peak hour only)
- Southbound on Green Street at 2nd Street (meets PM peak hour only)
- Southbound on Johnson Street at 3rd Street (meets PM peak hour only)
- Westbound on 3rd Street at Green Street (increased warrant, meets all hours)
- Northbound on Green Street at 3rd Street (increased warrant, meets all hours)

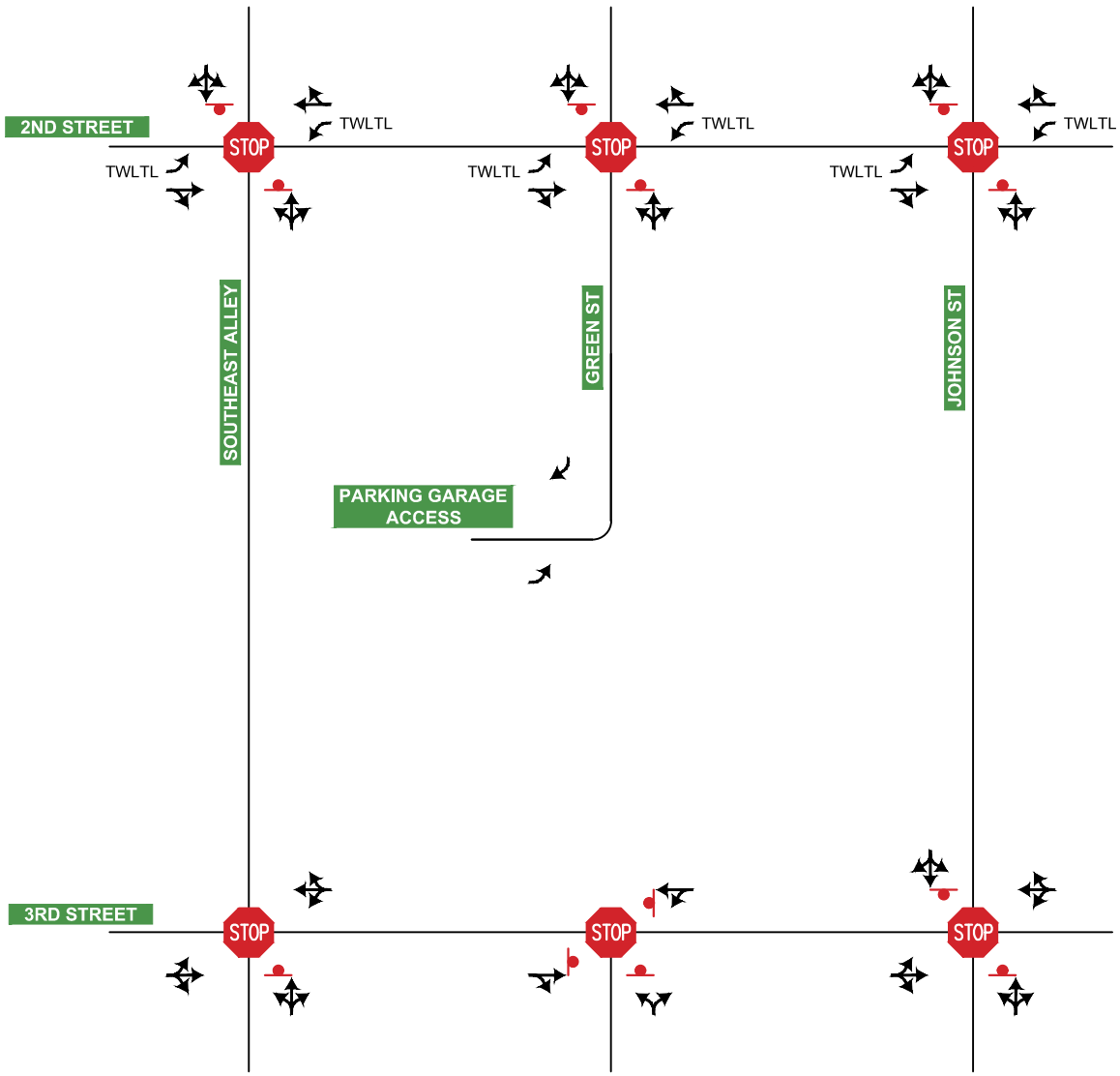
4.1.2.2 Right-Turn Lanes

Based on Existing Redistribution volumes, no right-turn lanes are warranted.

Capacity analysis will be reviewed in **Section 4.3** to identify areas with operational deficiencies. Recommendations for turn lanes will be based on feasibility, constructability and benefit of improvement.

FIGURE 6

Existing Redistribution
Lane Configuration and Traffic Control



LEGEND

- XX' → Lane Configuration & Storage Length
- STOP Stop Controlled Intersection
- Stop Sign
- TWLTL Two Way Left Turn Lane

4.2 Existing Redistribution Capacity Analysis

Capacity analysis was performed for Existing Redistribution conditions using the methodologies described in **Section 3.3**. The peak hour factors observed under existing conditions were used for existing redistribution conditions at all existing study intersections. Truck percentages were not updated from existing conditions.

Unsignalized movements are expected to operate similar to existing conditions at LOS C or better with acceptable 95th percentile queue lengths during all three peak hour periods.

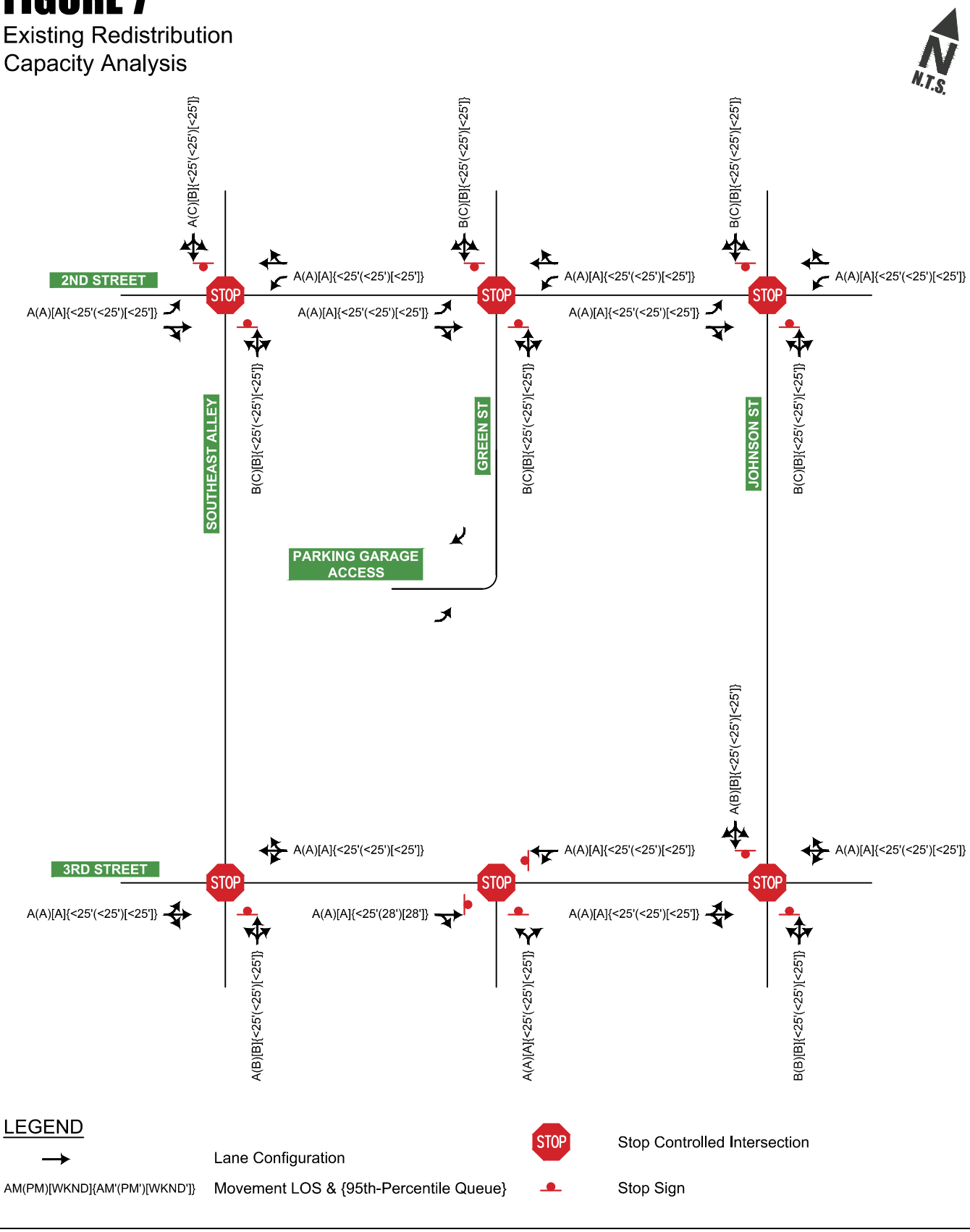
A further analysis of the necessity and practicality of improvements was conducted as outlined in **Section 3.3**. Movements with unchanged volumes from the previous scenario were removed. A summary of factors for turn lane warrants and recommendations are summarized in **Table 5**. Reviewing not only warranting characteristics but also operations and feasibility, several movements do not need additional capacity based on operations or present construction challenges. With this consideration, no improvements are recommended under existing redistribution conditions. The Existing Redistribution capacity analysis summary is illustrated in **Figure 7**. Detailed results are provided in **Appendix C.**

Table 5. Existing Redistribution Turn Lane Warrant Review.

	Intersection	Movement	Criteria	Operations	Recommended?
Left-Turn Lanes	2nd and SE Alley	Northbound	Volumes (1/3)	LOS B-C	NO
	2nd and Green	Southbound	Volumes (1/3)	LOS B-C	NO
	3rd and Green	Westbound	Volumes (3/3)	LOS A	NO
		Northbound	Volumes (3/3)	LOS A	NO

FIGURE 7

Existing Redistribution
Capacity Analysis



5. EXISTING PLUS PHASE 1 DEVELOPMENT CONDITIONS

This project represents redevelopment of existing land uses within the area. As presented in **Section 1.0**, the development site is proposed to be constructed in two phases. This study is focusing only on phase 1 development; phase 2 development will be presented under separate document. The first phase of development will be the construction of an event space, located east of the existing city hall parking garage. An internal private road network will provide access to phase 1 as well as limited on street parking. The event space is expected to be utilized for the farmer's market, as well as special events throughout the year. Phase 2 will represent development of the remainder of the site. The site plan is presented in **Figure 8,** with planned phasing shown. Phase 1 is considered under existing year conditions and represents the farmers market and event space land uses.

The existing Lee's Summit farmer's market is located in the northeast quadrant of 2nd Street and Douglas Street. Vendors utilize an existing parking lot for the market space, with attendees parking along the public street network. The farmer's market is held on Wednesday and Saturday mornings between April and November. With phase 1 development the farmer's market is proposed to be relocated to the new event space. Up to fifty vendors are expected to be supported within the space. Further details on logistics and spacing will be presented later in this section. Based on conversations with agency staff, Wednesday morning farmer's market conditions were reviewed for the purposes of this study.

The event space is also expected to support special events throughout the year. Based on conversations with city staff, weekly evening events with smaller attendance are planned as well as weekend events that may have larger attendance. Both scenarios (smaller weeknight event and larger weekend event) are presented in this study.

5.1 Phase 1 Development Trip Generation and Distribution

To determine the impact of potential site traffic on the roadway network, expected trips associated with the proposed site were generated and applied to the study network. Two methodologies were utilized to generate trips. Trip generation was discussed with city staff due to the unique uses of the site. The Institute of Transportation Engineers (ITE) provides methods for estimating traffic volumes of common land uses in the *Trip Generation Manual (11th Edition)*. The ITE manual was referenced to develop trips for the farmers market. The land use that most resembles the proposed site is Land Use Code 858 (Farmers Market).

An applicable land use in the ITE manual is not available to represent the event space uses. Based on conversations with city staff, projected attendance was used to generate trips. An attendance of 225 people was considered for a typical weeknight event and attendance of 1,000 people was considered for a weekend event. Assumptions to generate vehicular trips

associated with an event included assuming 2.0 riders per vehicle, 20% of traffic arrives prior to the peak hour of the event, and entering/exiting distribution rates that match other typical events (Land Use Code 462 Baseball Stadium was referenced).

There is not expected to be overlap between the farmers market and an event during a typical weekday, therefore farmers market is the only trip generator during the AM peak hour period and an event is the only trip generator during the PM peak hour period. City staff requested review of an event during the weekend PM peak hour period.

Based on the *ITE Trip Generation Manual* and assumptions, trip generation characteristics were developed for Phase 1 of the proposed site. Trip generation characteristics expected for the site are shown in **Table 6**. Detailed trip generation information is provided in **Appendix C**.

Table 6. Phase 1 Development Trip Generation.

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour			Weekend PM Peak Hour		
	Total	Enter	Total	Total	Total	Exit	Total	Total	Exit
Farmers Market	887	461	426	-	-	-	-	-	-
Event	-	-	-	113	104	9	400	368	32
TOTAL	**887**	**461**	**426**	**113**	**104**	**9**	**400**	**368**	**32**

Trips associated with existing development located on the property and on network trips associated with the existing farmers market were not removed from existing count data. Thus, the operations presented in this report are expected to present a conservative representation of potential conditions.

Trips were distributed through the study network based on the existing gravity, anticipated land use, and review of the surrounding area. Directional trip distribution percentages expected for the site are illustrated in **Table 7**.

Table 7. Trip Distribution.

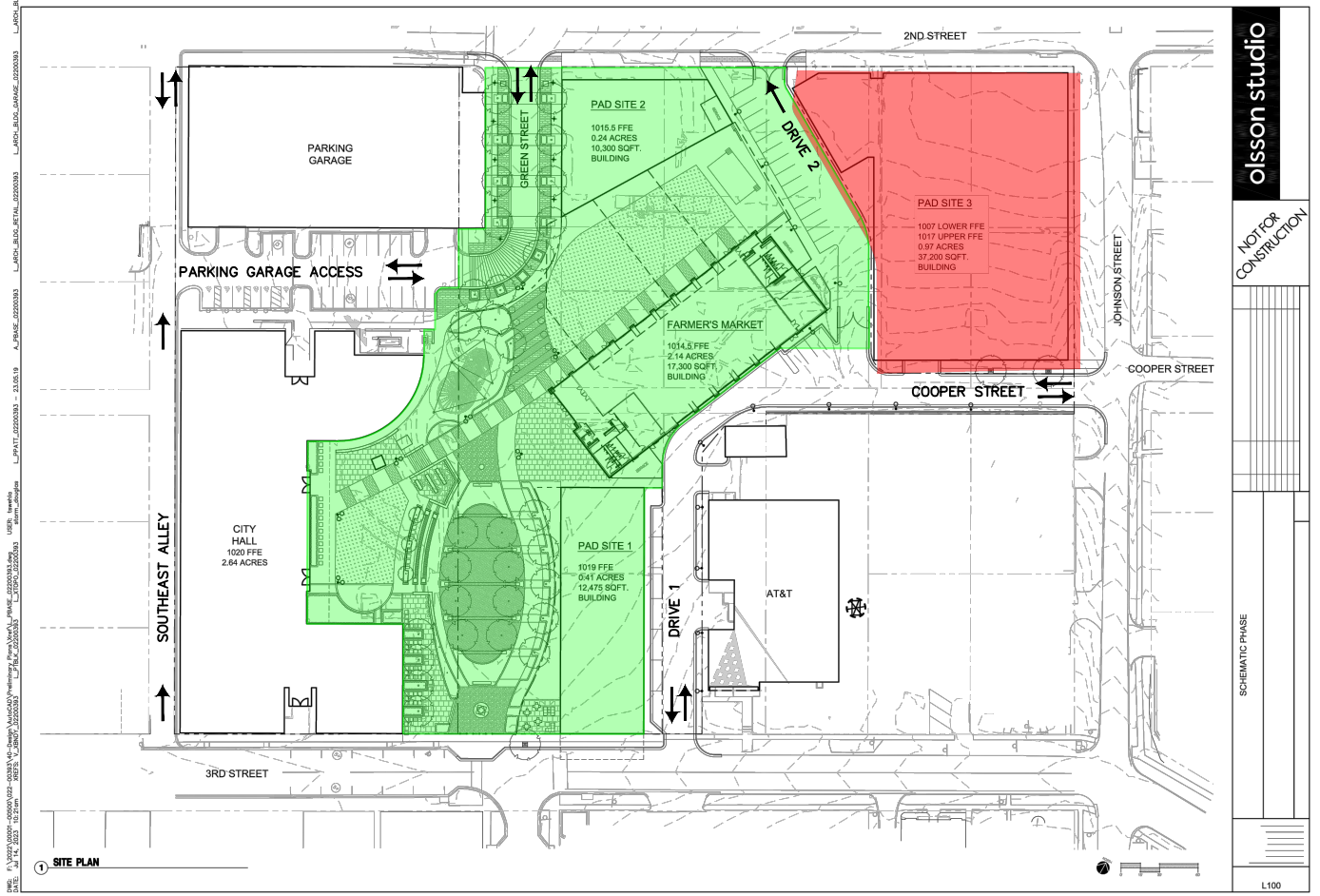
Direction	Trip Distribution
2nd Street (West)	11%
2nd Street (East)	15%
3rd Street (West)	15%
3rd Street (East)	10%
Jefferson Street (South)	10%
Market Street (North)	1%
Market Street (South)	2%
Main Street (North)	1%
Main Street (South)	2%
Douglas Street (North)	16%
Douglas Street (South)	5%
Green Street (North)	1%
Green Street (South)	4%
Johnson Street (North)	1%
Johnson Street (South)	1%
Independence Avenue (North)	4%
Independence Avenue (South)	1%
TOTAL	**100%**

Trip generation and distribution was provided to agency staff for review. The expected trip distribution volumes for the proposed development are shown in **Figure 6**. The resulting existing plus development volumes are illustrated in **Figure 7**.

The site is not expected to consist of a high volume of truck traffic. A delivery or single-unit truck is expected to be a typical heavy vehicle to service the site. A significant impact to adjacent roadway truck percentages is not expected with the proposed development.

FIGURE 8

Lee's Summit, MO
Site Plan

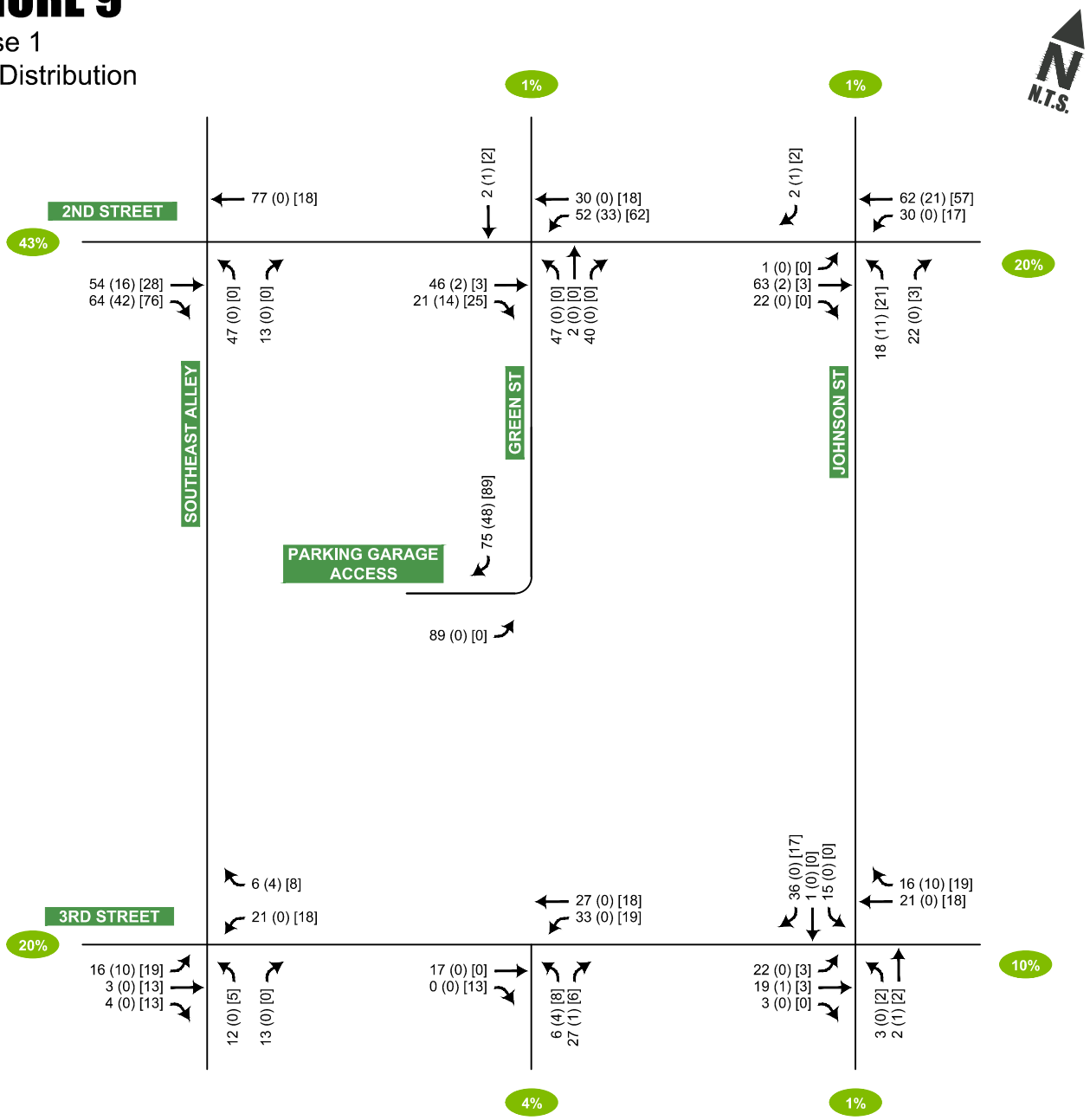


LEGEND

- Phase 1
- Phase 2
- Traffic Circulation

FIGURE 9

Phase 1
Trip Distribution

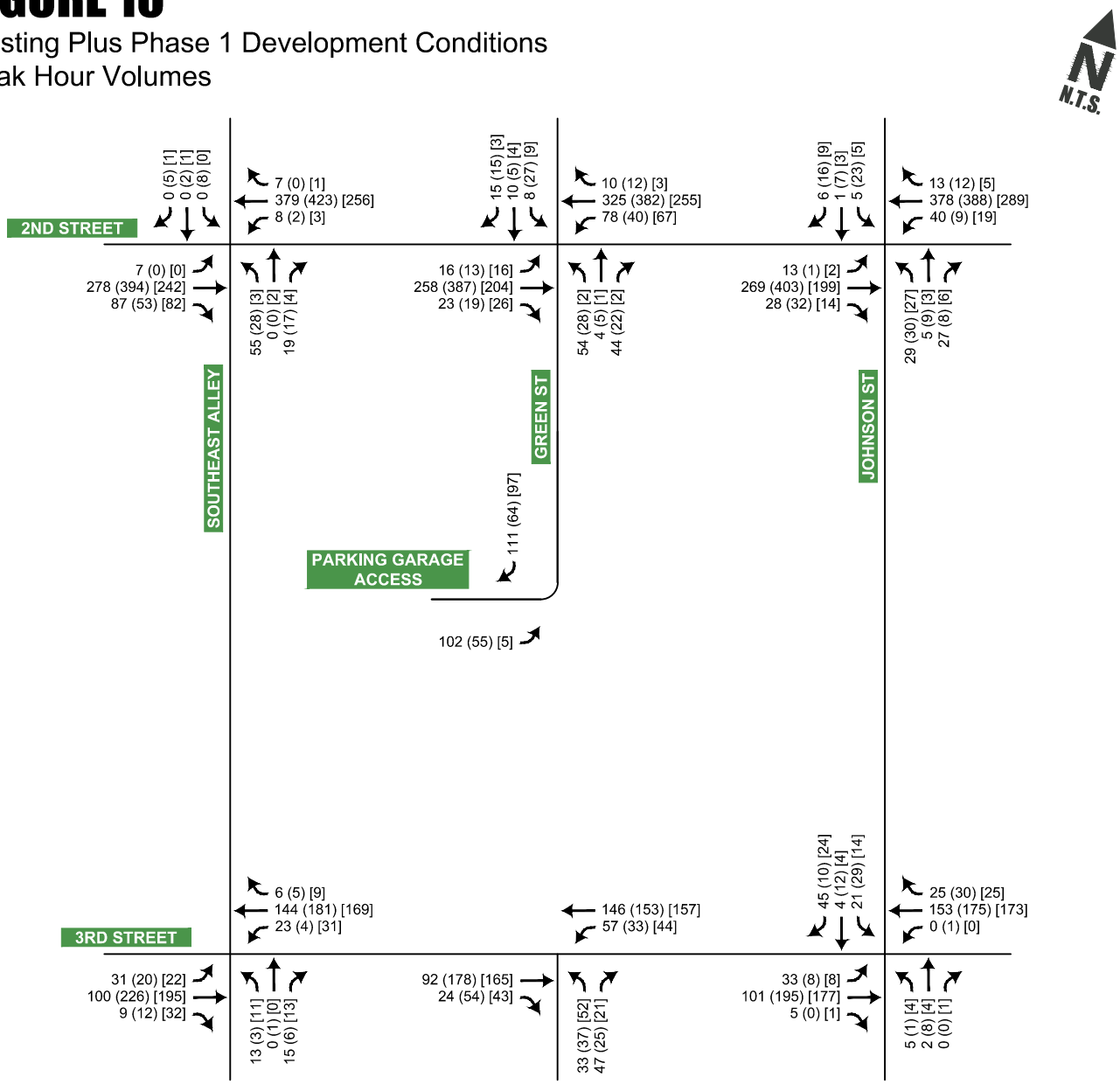


LEGEND

AM (PM)[WKND]	Peak Hour Trips (Car)
XX%	To/From Car Trip Distribution Percentages

FIGURE 10

Existing Plus Phase 1 Development Conditions
Peak Hour Volumes



LEGEND

AM (PM)[WKND] Peak Hour Volumes

5.2 Parking Conditions

Section 3.1.1 presented existing parking characteristics in the downtown area. The city hall parking garage is expected to service the farmers market and event space. Dependent upon event attendance, when the parking garage is full drivers are expected to start utilizing on street and surface parking lots.

The city provided data from a survey of parking garage usage which was referenced to determine a projected number of available stalls during each analysis period. Based on discussion with city staff, the available parking garage stalls were further reduced by 84 stalls to represent potential stall usage by approved developments.

Reviewing phase 1 trip generation, both the weekday AM farmers market and weekend PM event could generate more vehicular trips than parking that is available in the garage. To represent trip generation to the area, it was assumed that for both land uses the parking garage would be filled first, with any remaining trips utilizing on street and surface parking lots. Ample on street and public surface lots are expected to be available within ¼ mile of the site that should adequately serve typical operations for all analysis periods.

Adequate parking in the city hall garage is expected to service a weekday PM event, thus all expected trips were distributed to the garage.

Parking garage assumptions and a map of public parking areas is provided in **Appendix C**.

5.3 Access Characteristics

As shown on the site plan presented in **Figure 8**, the proposed development is located in the downtown block east of City Hall bordered by 2nd Street, Johnson Street, 3rd Street, and Green Street. Two new access points are proposed to service phase 1 development: one full access drive along 3rd Street and one gated one-way access along 2nd Street. Several existing driveways are proposed to be improved, removed, or used in place.

As presented previously, modifications to the existing road geometrics will occur with phase 1 development. Green Street will be closed between 3rd Street and 2nd Street. The south leg of the intersection of 2nd Street and Green Street will remain, providing access to the city hall parking garage. Southeast Alley will also be modified to accommodate the Green Street closure. The alley will be assigned one way northbound from 3rd Street to the parking garage access. Both streets will continue to provide two-way access between 2nd Street and the garage. Redistribution of trips was presented in **Section 4.0**.

Currently, an east/west alley is located south of 2nd Street providing access between Green Street and Johnson Street. At Johnson Street, the alley is offset from Cooper Street by

approximately 20 feet (south of Cooper Street, measured center to center). With redevelopment of the site, the alley is proposed to be removed; however, the existing curb cut with Johnson Drive is proposed to remain (referred to as Cooper Street for the purposes of this report). The Cooper Street access point is expected to service both phase 1 and 2 development and will service two-way traffic. Considering expected traffic conditions, it is recommended to realign the west leg of Cooper Street 20 feet to the north to eliminate the offset condition.

The City of Lee's Summit *Access Management Code* provides guidance for acceptable access spacing of new streets and driveways. Connections where there is no median provided (no restrictions to access) should provide a minimum separation of 400 feet along minor arterials. Connections at local roadways should be spaced at appropriate distances to accommodate throat length queuing.

The City of Lee's Summit *Unified Development Ordinance* further outlines expectations for design within the downtown core area. In general, the number of curb cuts and the size of access is to be minimized, and access spacing is to be provided as is reasonable.

Drive 1 is proposed along 3rd Street to provide access to phase 1 and 2 development. Drive 1 is proposed to be located approximately 125 feet east of Green Street and 330 feet west of Johnson Street, aligning with an existing access to the south. Although minimum recommended spacing of 400 feet is not met, the removal of the north leg of Green Street and the access alignment with an existing drive is a preferred location. Drive 1 is proposed to service two-way traffic as a full access intersection.

Drive 2 is located along 2nd Street approximately 185 feet east of Green Street. Drive 2 is proposed to be gated at all times except for events (farmers market vendor drop off/pick up and event support services) and will service exiting (northbound) traffic only. The drive is not proposed to service daily, public traffic. Reviewing potential locations for access, several closely spaced driveways are located along the north side of 2nd Street. The presence of these existing drives hinders location of the drive to prevent offset intersections. If the drive can be adjusted to align with one of the existing drives along the north side of 2nd Street, that would be a preferred condition. However, considering that the drive will have limited usage (gated) and service northbound traffic only, the offset location is acceptable. Drive 2 will consolidate two existing full access drives currently located along 2nd Street within this block.

Site access should be designed to meet City of Lee's Summit standards.

5.4 Site Circulation and Connectivity

Site circulation and connectivity was reviewed for the site considering phase 1 conditions. The site will be serviced by a new two-way internal drive that intersects Johnson Drive (Cooper Street) and 3rd Street (Drive 1). A one-way drive (northbound) will intersect the internal drive and

provide limited access to 2nd Street. Drive 2 will be gated, with access restricted during non-event periods. Existing access points associated with phase 2 development are expected to remain in place and will be considered during the phase 2 study.

The Drive 1/Cooper Street loop will serve 2-way traffic and will be the primary access to the east of the site, with on street parking proposed along the north and west sides of the road.

Two-way access will be provided to/from the city hall garage at Green Street and at Southeast Alley, consistent with existing conditions. Southeast Alley will be restricted to one-way only northbound traffic between the 3rd Street and the parking garage access.

Drive 2 access will be restricted to egress only for vendors or service providers associated with the events (including farmers market). During an event, access to the drive will be provided internally to the site from the Cooper Street/Drive 1 loop road. It is anticipated that this gate location will be monitored by staff to restrict access to vehicles only associated with an event. Vendors will be able to access the drive, park to unload/load, and will then exit northbound. At 2nd Street, northbound left and right turn movements will be allowed. Based on discussions with city staff, it is anticipated that the existing farmers market lot (northeast quadrant of 2nd Street and Douglas Street) will serve as parking for vendors during an event. Allowing northbound egress to both the west and east supports this planned circulation. Signage is recommended to be provided along 2nd Street at the drive location to note that it is gated and one way (exit) only.

During non-farmers market periods, the parking will be accessed via the Drive 1/Cooper Street loop, with the gate to 2nd Street closed. This parking area is proposed to be available for limited public parking during non-event periods. If parking is allowed, adequate turn around space should be provided and access to 2nd Street restricted. Parking management should be in place to ensure public parking is cleared from the space before event periods.

Traffic flow interior to the site is illustrated in **Figure 8.**

5.5 Existing Plus Phase 1 Development Warrant Analysis

Turn lane and signal warrants were reviewed for Existing Plus Phase 1 Development conditions following the methodologies stated in **Section 3.2**. Existing Plus Phase 1 Development lane configuration and traffic control for the study network are illustrated in **Figure 11**. Detailed warrant analysis is provided in **Appendix D.**

5.5.1 Signal Warrants

Due to the peak nature of the farmers market and event space land uses, Warrant 3 was the only signal warrant reviewed for the study intersections outlined in **Section 3.2**. No intersections are expected to warrant signalization under Existing Plus Phase 1 Development Conditions.

Warrant 4 considers pedestrian activity at an intersection. Based on existing pedestrian volumes, signalization is not warranted. With the relocation of the farmers market to the event space, it is anticipated that attendees will park in the parking garage, then transition to on street or surface lot parking. The majority of surface lot parking, and ample on street parking, is located in the downtown core south of 2nd Street. It is anticipated that pedestrian crossing patterns may change with a reduction in pedestrian traffic north/south across 2nd Street as attendees utilize parking available closer to the site.

5.5.2 Turn Lane Warrants

The following is a summary of new or increased warrants the previous existing conditions scenario. Detailed turn lane warrant analysis sheets are provided in **Appendix D.**

5.5.2.1 Left-Turn Lanes

Based on Existing Plus Phase 1 Development volumes, the following left-turn lanes are warranted:

- Northbound on Southeast Alley at 2nd Street (increased warrant, AM and PM)
- Northbound on Johnson Street at 2nd Street (meets all hours)
- Southbound on Johnson Street at 3rd Street (increased warrant, AM and PM)
- Eastbound on 3rd Street at Johnson Street (meets AM peak hour only)
- Westbound on 3rd Street at Southeast Alley (meets AM and weekend)
- Eastbound on 3rd Street at Southeast Alley (meets all hours)

5.5.2.2 Right-Turn Lanes

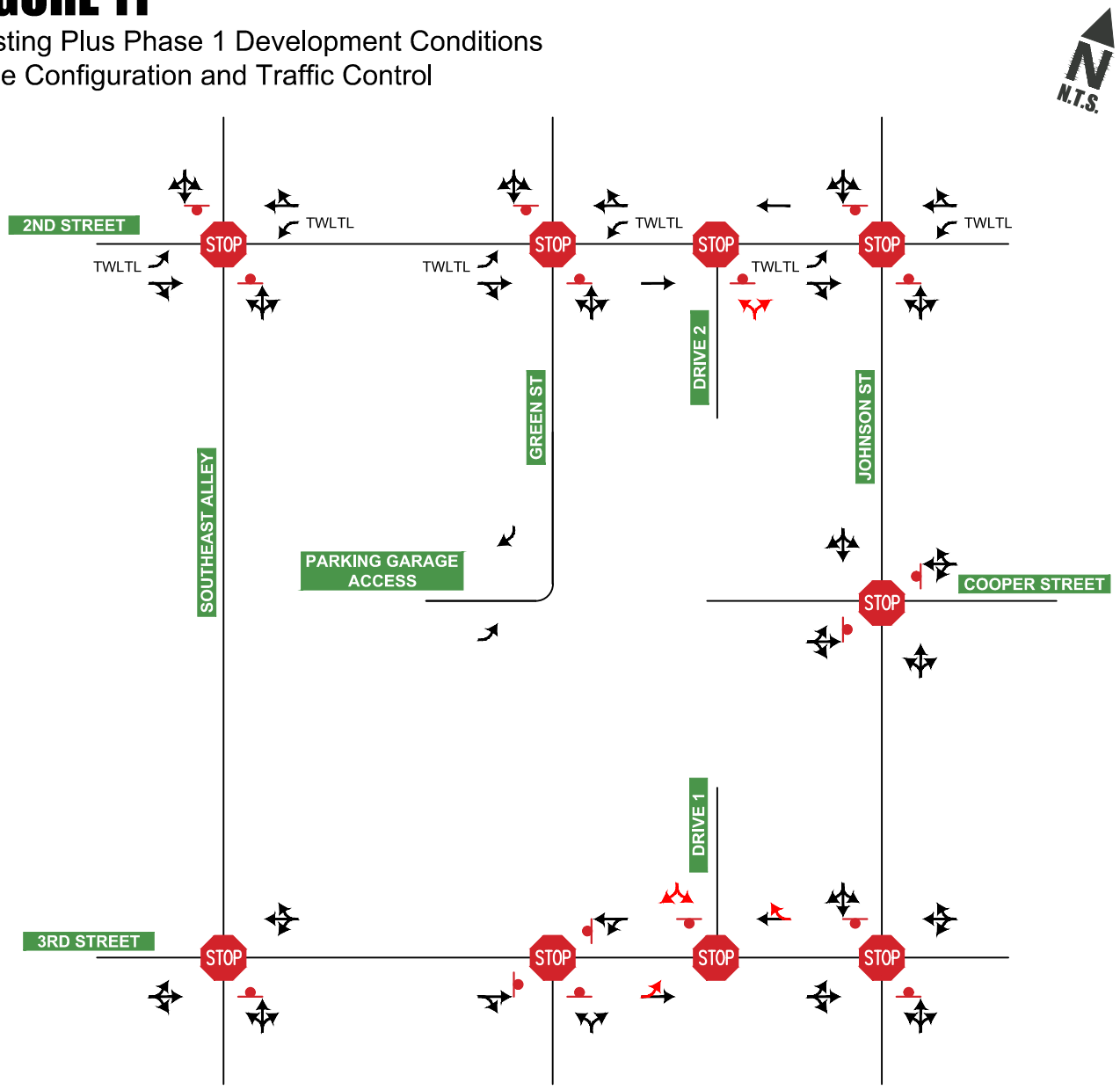
Based on Existing Plus Phase 1 Development volumes, the following right-turn lane is warranted:

- Eastbound on 2nd Street at Southeast Alley (meets AM and weekend)

Capacity analysis will be reviewed in **Section 5.6** to identify areas with operational deficiencies. Recommendations for turn lanes will be based on feasibility, constructability and benefit of improvement.

FIGURE 11

Existing Plus Phase 1 Development Conditions
Lane Configuration and Traffic Control



LEGEND

XX' →	Lane Configuration & Storage Length
XX' →	Proposed Lane Configuration & Storage Length
STOP	Stop Controlled Intersection
	Stop Sign
TWLTL	Two Way Left Turn Lane

5.6 Existing Plus Phase 1 Development Capacity Analysis

Capacity analysis was performed for Existing Plus Phase 1 Development conditions using the methodologies described in **Section 3.3**. The peak hour factors observed under previous scenarios were used for Existing Plus Phase 1 Development conditions at all existing study intersections. Truck percentages were not updated from previous scenarios.

Unsignalized movements are expected to operate similar to Existing Redistribution conditions at LOS C or better with acceptable 95th percentile queue lengths during all three peak hour periods with the following exception:

- The southbound shared left/through/right turn movement at the intersection of 2nd Street and Green Street is expected to operate at a LOS D during the PM peak hour period. Queue lengths are expected to be one vehicle. It is anticipated that the lower level of service is associated with higher east/west traffic volumes that can be expected during an event scenario.

A further analysis of the necessity and practicality of improvements was conducted as outlined in **Section 3.3**. Movements with unchanged volumes from the previous scenario were removed. A summary of factors for turn lane warrants and recommendations are summarized in **Table 8**. Reviewing not only warranting characteristics but also operations and feasibility, several movements do not need additional capacity based on operations or present construction challenges. With this consideration, no improvements are recommended under Existing Plus Phase 1 Development conditions. The Existing Plus Phase 1 Development capacity analysis summary is illustrated in **Figure 12**. Detailed results are provided in **Appendix D.**

Table 8. Existing Plus Phase 1 Turn Lane Warrant Review.

	Intersection	Movement	Criteria	Operations	Recommended?
Left-Turn Lanes	2nd and SE Alley	Northbound	Volumes (2/3)	LOS B-C	NO
	2nd and Johnson	Northbound	Volumes (3/3)	LOS B-C	NO
	3rd and Johnson	Southbound	Volumes (2/3)	LOS B	NO
		Eastbound	Volumes (1/3)	LOS A	NO
	2nd and Green	Southbound	Volumes (1/3)	LOS C-D	NO
	3rd and SE Alley	Westbound	Volumes (2/3)	LOS A	NO
		Eastbound	Volumes (3/3)	LOS A	NO
Right-Turn Lanes	2nd and SE Alley	Eastbound	Volumes (2/3)	LOS A	NO

5.7 Event Conditions

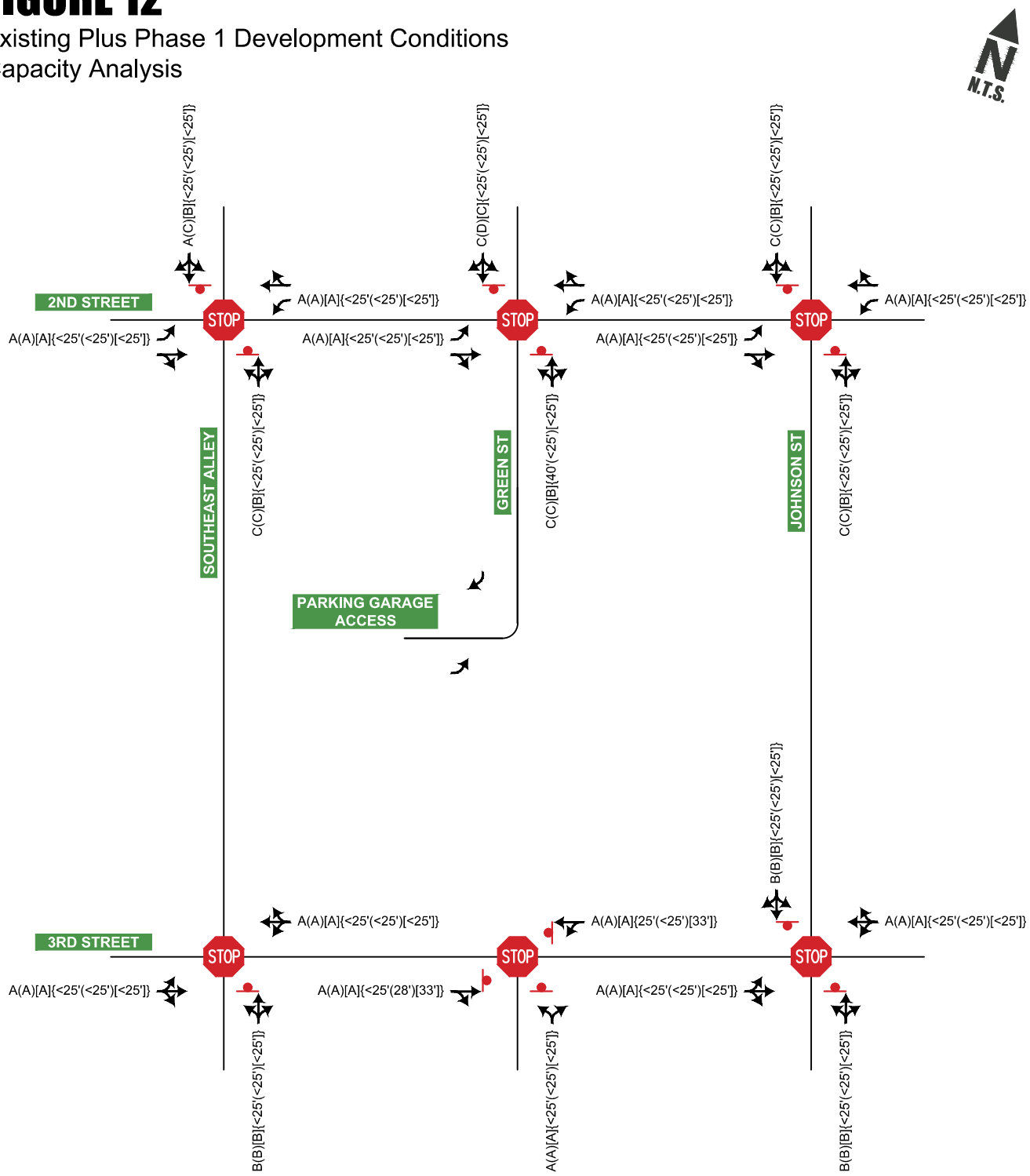
As presented in **Section 5.6**, the study area network is expected to operate acceptably during event conditions. Adequate parking is anticipated to be available for a typical farmers market, weekday event, or weekend event considering the expected attendance. Dependent upon event conditions, some event types (i.e., concert or event with a designated start time) may result in heavier loading the hour prior to an event. While higher delay and queuing may be expected before and after events, it is expected to be limited to higher occupancy events. With the relocation of the farmers market and development of different event types, it is recommended to observe conditions and provide additional wayfinding or traffic control support as needed to support traffic operations. The following options can be considered when developing an approach to accommodate event traffic:

- Event signage designating preferred traffic routes.
- Wayfinding signage to parking areas.
- Presence of staff to direct traffic into (before event) or out of (after event) high volume drives (parking garage).

- Consider installation of a system to monitor available parking in the garage. Use of dynamic signage or apps to notify attendees when the parking garage is full.
    - Monitoring of the parking garage will be important during high occupancy events to prevent drivers entering and ‘circling’ the garage.
- A one-way circulation plan can be considered for the garage if congestion occurs. Traffic can be designated to enter at one location (Southeast Alley) and exit at an alternate location (Green Street). This may assist in improved circulation and traffic control during higher occupancy events. Appropriate staff and/or signage to support the circulation plan should be provided.

FIGURE 12

Existing Plus Phase 1 Development Conditions
Capacity Analysis



LEGEND

→	Lane Configuration
AM(PM)[WKND]{AM'(PM')[WKND']}	Movement LOS & {95th-Percentile Queue}
STOP	Stop Controlled Intersection
	Stop Sign

6. SUMMARY

This report summarizes analysis conducted for the Lee's Summit Downtown Market Plaza development located in Lee's Summit, Missouri. The project represents redevelopment of the area bordered by Green Street, 2nd Street, Johnson Street, and 3rd Street. The development project will be completed in two phases; this study presents expected operations with phase 1 development only which is the development of a farmers market/event space.

6.1 Conclusions

The general findings for this traffic impact study include the following:

1. To support the proposed project, Green Street will be removed between 3rd Street and 2nd Street. Full access is proposed to remain to and from the parking garage at Green Street and at Southeast Alley. Southeast Alley will be modified to one way northbound between 3rd Street and the garage.
2. Limited data is available for the proposed phase 1 site uses (farmers market and event). Expected attendance and vendors were considered, as well as ITE land uses, to conduct trip generation for the site. City staff were involved in the development of trip generation assumptions.
3. Two new access drives are proposed with this site; one existing access will be used. Drive 1 is a new full access intersection on the north side of 3rd Street, east of Green Street. Cooper Street is an existing full access curb cut (alley) along the west side of Johnson Drive. An internal, two-way drive will connect Drive 1 and Cooper Street. Drive 2 is a restricted access out only drive that is to be used during events only. This access is located on the south of 2nd Street east of Green Street.
4. No intersections currently meet or are expected to meet signal warrants based on existing and anticipated phase 1 traffic volumes.
5. Considering Lee's Summit criteria, several turn lane warrants are met under existing conditions within the study area. Reviewing operations, the majority of the movements warranting additional turn lanes are expected to operate at acceptable levels of service with minimal queuing. In addition to operations, other factors that influenced consideration of the recommendation of turn lanes included feasibility of construction associated with limited right-of-way and/or existing building setback. Due to the current development of the downtown area, there are limited opportunities for turn lane improvements. Other considerations when determining if turn lanes should be installed should include pedestrian activity and the impact of additional lanes to pedestrian crossing distances.
6. Based on the analysis conducted for this study, Phase 1 of the proposed development is expected to have minimal impact on the existing operations of the system. Capacity

analysis results are similar for the study area from existing to redistribution to phase 1 development conditions.

6.2 Recommendations

Proposed drives and recommended improvements should be constructed following agency guidelines. Sight distance should be provided at new intersections.

Based on review and analysis of the proposed development, the following improvements are recommended:

6.2.1 Existing Conditions

No recommended improvements.

6.2.2 Existing Redistribution Conditions

No recommended improvements.

6.2.3 Existing Plus Phase 1 Development Conditions

1) Provide signage at Drive 2 to indicate one-way directional flow (exit only) and gate closure.
2) Realign the existing alleyway (Cooper Street) on the west leg of the intersection of Johnson Street and Cooper Street 20 feet to the north to align the intersection.
3) Dependent up on event occupancy, consider event traffic control measures such as enhanced signing, garage monitoring, or circulation plans to improve traffic operations.

DOWNTOWN MARKET PLAZA – PHASE 1

Lee's Summit, MO

July 2023

Olsson Project No. 022-00393