TRAFFIC IMPACT STUDY

175th Street & Lone Elm Road

OLATHE, KANSAS

Prepared For:
Phelps Engineering

Prepared By:
Michael Hare, PE, PTOE

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MERGE MIDWEST ENGINEERING

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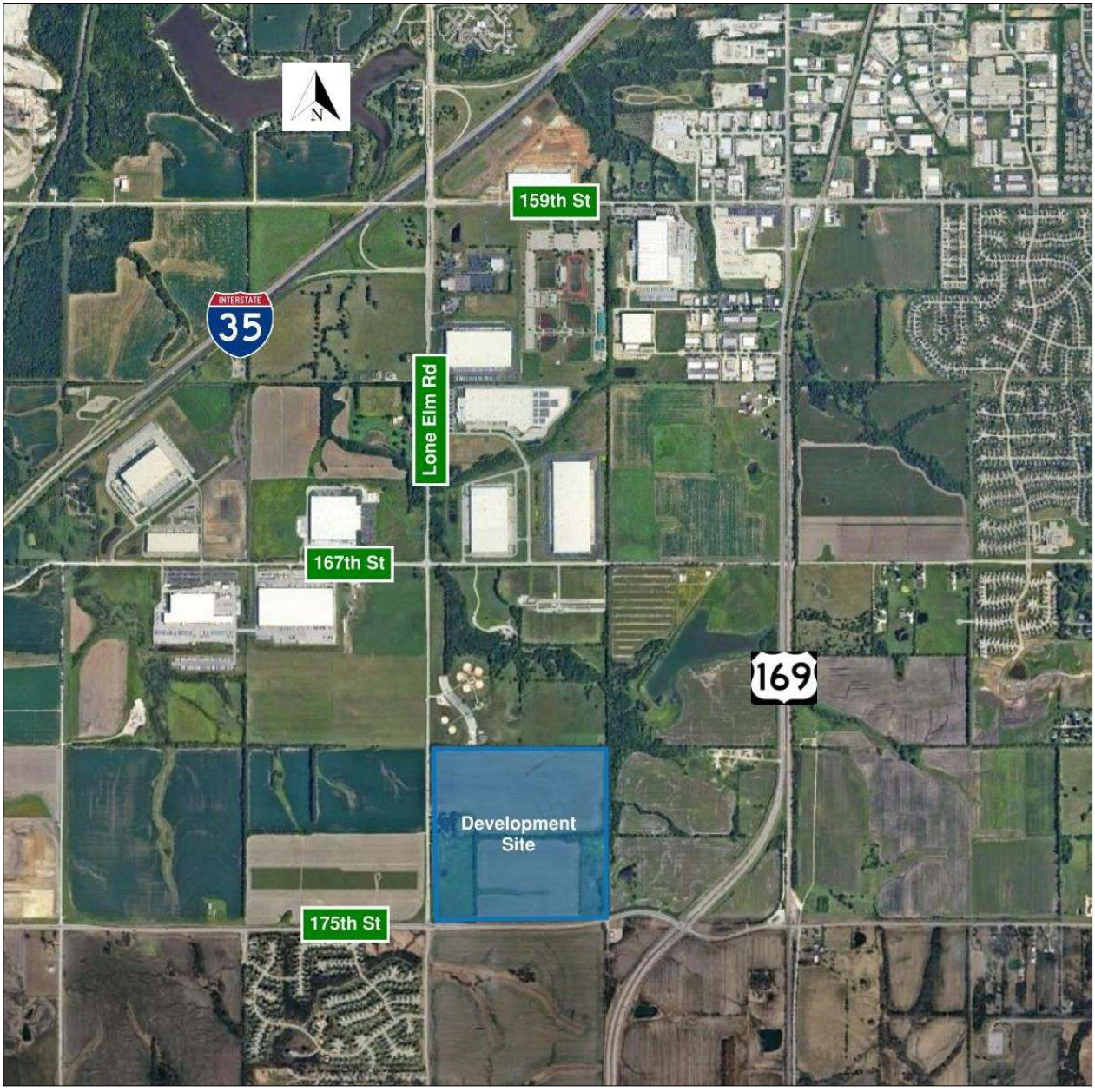
INTRODUCTION

This traffic impact study has been completed for the proposed industrial development to be located in the northeast quadrant of the 175th Street & Lone Elm Road intersection in Olathe, Kansas. The location of the proposed development relative to major streets in the area is shown below on ***Figure 1.*** This study includes a description of the proposed development, existing and future conditions, intersection capacity analyses, and a summary of findings.

Figure 1: Location Map



Source: Google Earth

EXISTING CONDITIONS

Existing Traffic Volumes: Existing weekday turning-movement traffic counts were collected at the following study intersections via video camera during the hours of 7:00 A.M. to 9:00 A.M. and 4:00 P.M. to 6:00 P.M.:

- US-169 & 175th Street
- 167th Street & Lone Elm Road
- NB I-35 Ramps & Lone Elm Road
- SB I-35 Ramps & Lone Elm Road

A 24-hour turning-movement traffic-volume count was collected at the 175th Street & Lone Elm Road study intersection.

All the counts were collected on Tuesday, June 17, 2025. Based on the data, the AM peak hour generally occurs between 7:15 and 8:15 A.M., and the PM peak hour generally occurs between 4:15 and 5:15 P.M. The existing AM and PM peak-hour volumes are shown in ***Appendix A*** on ***Figure A-1.*** The raw traffic counts were processed by Miovision Technologies, Inc. and can be found in ***Appendix B***.

Based on the 24-hour traffic count, the recorded average daily traffic (ADT) on 175th Street adjacent to the development site is 10,105 vehicles per day (vpd): 4,857 vpd westbound and 5,248 vpd eastbound. The recorded ADT along Lone Elm Road adjacent to the development site is 7,748 vpd: 4,659 vpd southbound and 3,089 vpd northbound.

Existing Land Use: The existing property consists of mostly vacant land. There are two residential homes on the property that will be removed as part of the proposed development. The site is primarily surrounded on all sides by vacant land with the exception of the Lone Elm Park softball complex located to the north of the site.

Existing Roadway Network: Current roadway characteristics near the study area are summarized below in ***Table 1*****.**

The 175th Street & Lone Elm Road intersection currently operates under signal control with dedicated left-turn lanes and dedicated right-turn lanes on each intersection approach. The US-169 & 175th Street intersection currently operates under signal control with dedicated left-turn lanes on each intersection approach and dedicated right-turn lanes on the northbound, southbound, and eastbound intersection approaches. 167th Street & Lone Elm Road currently operates under signal control with dedicated left-turn lanes on each intersection approach and dedicated right-turn lanes on the southbound and eastbound intersection approaches. The NB I-35 Ramps & Lone Elm Road intersection currently operates under signal control. It includes dual northbound left-turn lanes, dedicated eastbound, westbound, and southbound left-turn lanes, and a dedicated southbound right-turn lane. The SB I-35 Ramps & Lone Elm Road intersection currently operates under signal control with dual southbound left-turn lanes, dedicated northbound and westbound left-turn lanes, and a dedicated northbound right-turn lane.

Table 1: Existing Roadway Characteristics

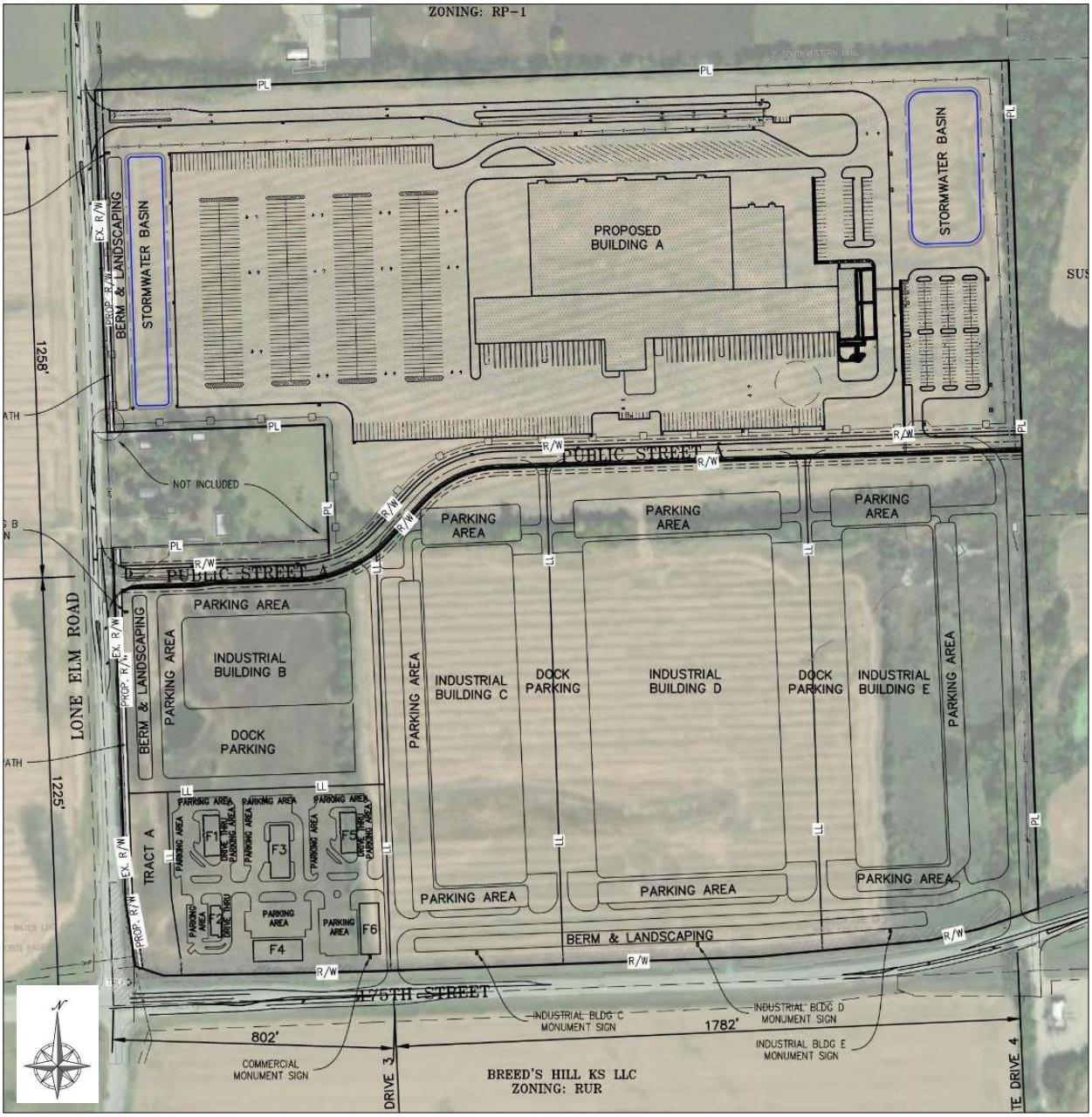
Roadway	Classification[1]	Section	Median Type	Posted Speed Limit
175th Street	Expressway	2-lane w/ paved outside shoulders	Undivided	50 mph
Lone Elm Road	Arterial	2-lane rural ditch w/o shoulder	Undivided	45 mph
US-169	Other Freeways and Expressways	4-lane w/ paved inside and outside shoulders	Divided	55 mph to north 65 mph to south
167th Street	Arterial	2-lane rural ditch w/o shoulder	TWLTL to east Undivided to west	35 mph
I-35	Other Freeways and Expressways	6-lane w/ paved inside and outside shoulders	Divided	65 mph

1 - Classifications as listed on Olathe's Major Street Map

PROPOSED CONDITIONS

Proposed Land Use: The proposed development will be constructed in two phases. Phase 1 will consist of a single 447,243 square-foot industrial warehouse building (Building A), and it will be located in the northern portion of the site. Phase 2 will include four industrial warehouse buildings, and they will be located on the southern portion of the site. Building B will be a 124,441 square-foot building, Building C will be a 251,336 square-foot building, Building D will be a 518,057 square-foot building, and Building E will be a 251,336 square-foot building. The traffic analysis included two phases: Phase 1, and the full site which includes the addition of the Phase 2 development. It should be noted that the plan includes future commercial development in the southwest corner of the site; however, this area was not included in the study at this time. An additional traffic study should be completed at the time the commercial area develops. A copy of the proposed site plan is included below on ***Figure 2.*** A full-size version is also included at the end of this report.

Figure 2: Proposed Site Plan



Proposed Access Plan: The development will be accessed from two site driveways along Lone Elm Road and two site driveways along 175th Street. The site drives along Lone Elm Road will be constructed with Phase 1, and the site drives along 175th Street will be constructed with Phase 2. It should be noted that Site Drive 1 will primarily serve truck traffic to and from the development. ***Table 2*** summarizes the access locations. In addition, a 10-foot sidewalk path is included along the east site of Lone Elm Road adjacent to the development.

Table 2: Proposed Site Access

Access Name	Intersecting Roadway	Access Type	Access Location[1]
Site Drive 1	Lone Elm Road	Full Access	Approx. 1,255' north of Site Drive 2
Site Drive 2	Lone Elm Road	Full Access	Approx. 1,230' north of 175th Street
Site Drive 3	175th Street	Full Access	Approx. 800' east of Lone Elm Road
Site Drive 4	175th Street	Full Access	Approx. 1,790' east of Site Drive 3

1 - Distances are taken from the center of the intersection.

The locations of Site Drive 1, Site Drive 2, Site Drive 3, and Site Drive 4 were reviewed in accordance with criteria outlined in the City of Olathe's *Access Management Plan,* dated August 2003. The Plan outlines criteria for the spacing of proposed driveway locations along public roadways. One criterion indicates that no driveway is allowed within an intersection influence area, or within the taper or storage area of a turn lane.

Olathe's Plan indicates that the minimum spacing between driveways along an arterial street should be about 500'. Site Drive 1 and Site Drive 2 along Lone Elm Road meet this spacing criterion. The plan indicates that no driveway shall intersect an expressway, and that full-access, median-break spacing along an expressway is one-half mile (2,640'). Site Drive 3 and Site Drive 4 do not meet the criteria along expressways. Currently, there is no median along 175th Street; however, in the future if the roadway is widened to include a median, and Site Drive 3 and Site Drive 4 are converted to public streets, they will not meet the full-access spacing criteria along an expressway. It should be noted that the property frontage along 175th Street is approximately 2,600', which is less than one-half mile (2,640'). Providing access to the property from 175th Street provides adequate site circulation and traffic flow through the development.

The Plan provides criteria on private driveway throat distances from an arterial roadway. Based on this guidance, internal drives and parking stalls along private driveways accessing industrial sites must be at least 100' from an arterial street. Site Drive 1 and Site Drive 2 both meet this criterion. Olathe's plan does not provide throat-distance criteria along expressways. However, the throat distances along Site Drive 3 and Site Drive 4 are approximately 155' and 130', respectively.

Olathe's Plan indicates dedicated left-turn and right-turn lanes are required along expressways and arterial streets at intersecting streets or driveways. Left-turn and right-turn lanes on expressways should include 300' of storage plus taper. Left-turn lanes on arterials should include 200' of storage plus taper, and right-turn lanes should include 150' of storage plus taper. In addition, left-turn lanes are required along driveways intersecting arterials streets with a minimum distance of 150' plus taper. To meet these criteria, it would be appropriate to construct the following:

Lone Elm Road & Site Drive 1

- Southbound left-turn lane with 200’ of storage plus appropriate taper
- Northbound right-turn lane with 150’ of storage plus appropriate taper
- Westbound left-turn lane with 150’ of storage plus appropriate taper

Lone Elm Road & Site Drive 2

- Southbound left-turn lane with 200’ of storage plus appropriate taper
- Northbound right-turn lane with 150’ of storage plus appropriate taper
- Westbound left-turn lane with 150’ of storage plus appropriate taper

175th Street & Site Drive 3

- Eastbound left-turn lane with 300’ of storage plus appropriate taper
- Westbound right-turn lane with 300’ of storage plus appropriate taper
- Southbound left-turn lane with 150’ of storage plus appropriate taper

175th Street & Site Drive 4

- Eastbound left-turn lane with 300’ of storage plus appropriate taper
- Westbound right-turn lane with 300’ of storage plus appropriate taper
- Southbound left-turn lane with 150’ of storage plus appropriate taper

It should be noted that the 300’ eastbound left-turn lane at Site Drive 3 will most likely extend into the westbound left-turn lane at the 175th Street & Lone Elm Road intersection. Therefore, the eastbound left-turn lane at Site Drive 3 should include as much storage as possible plus appropriate taper. As discussed in subsequent sections, eastbound queues are expected to be approximately one vehicle at this location.

Intersection Sight Distance: Intersection sight-distance measurements were taken in the field for the site driveway approaches to Lone Elm Road and 175th Street. The sight-distance measurements were recorded in accordance with guidance in the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* 7th Edition. Based on criteria outlined in Olathe’s *Access Management Plan*, the amount of sight distance that is desirable in both directions from a stop-sign-controlled driveway intersecting Lone Elm Road, which has a 45-mph posted speed limit, is 529’ for a passenger car and 795’ for a combination truck. The amount of sight distance that is desirable in both directions from a stop-sign-controlled driveway intersecting 175th Street, which has a 50-mph posted speed limit, is 590’ for a passenger car and 885’ for a combination truck.

The results of the intersection sight distances recorded in the field are summarized below. It should be noted that if available sight distance was excessively over the recommended value, a field measured value of “>*distance*” is recorded below. If the sight-distance requirements were not easily reached by simple observation, actual distances were recorded.

Lone Elm Road & Site Drive 1

	Olathe Recommended	Field Measured
Left-Turning Passenger Car	529’	>529’
Left-Turning Combination Truck	795’	>795’
Right-Turning Passenger Car	529’	>529’
Right-Turning Combination Truck	795’	>795’

Lone Elm Rd & WB Site Drive 1: Looking Left (S) – Right-Turn

Lone Elm Rd & WB Site Drive 1: Looking Right (N) – Left-Turn

Lone Elm Road & Site Drive 2

	Olathe Recommended	Field Measured
Left-Turning Passenger Car	529’	567’
Left-Turning Combination Truck	795’	>795’
Right-Turning Passenger Car	529’	>529’
Right-Turning Combination Truck	795’	>795’

Lone Elm Rd & WB Site Drive 2: Looking Left (S) – Right-Turn

Lone Elm Rd & WB Site Drive 2: Looking Right (N) – Left-Turn

175th Street & Site Drive 3

	Olathe Recommended	Field Measured
Left-Turning Passenger Car	590’	>590’
Left-Turning Combination Truck	885’	>885’
Right-Turning Passenger Car	590’	>590’
Right-Turning Combination Truck	885’	>885’

175th Street & SB Site Drive 3: Looking Left (E) – Right-Turn

175th Street & SB Site Drive 3: Looking Right (W) – Left-Turn

175th Street & Site Drive 4

	Olathe Recommended	Field Measured
Left-Turning Passenger Car	590’	>590’
Left-Turning Combination Truck	885’	>885’
Right-Turning Passenger Car	590’	>590’
Right-Turning Combination Truck	885’	>885’

175th Street & SB Site Drive 4: Looking Left (E) – Right-Turn

175th Street & SB Site Drive 4: Looking Right (W) – Left-Turn

Trip Generation: The estimated trip generation for the proposed industrial development was based upon the 11th Edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual.* Outputs from this manual are included in ***Appendix C.***

In developing the trip generation for Phase 1 of the proposed development, various land uses were considered. The land uses studied included: *150: Warehousing*, *154: High-Cube Transload and Short-Term Storage Warehouse*, and *157: High-Cube Cold Storage Warehouse*. The AM and PM peak hours of the generator trip generation for Land Use 154 gave the closest estimate to the anticipated trips given the shift data provided by the owner for the site during peak hours.

The *Trip Generation Manual* includes the following description for Land Use 154: High-Cube Transload and Short-Term Storage Warehouse:

> "A high-cube warehouse (HCW) is a building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24 feet or more, and is primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. A typical HCW has a high level of on-site automation and logistics management. The automation and logistics enable highly efficient processing of goods through the HCW. A high-cube warehouse can be free-standing or located in an industrial park."

The trip estimates for Phase 2 of the development utilized trip generation data for the AM and PM peak hours of adjacent street traffic for Land Use 150: Warehousing. The expected trips to be generated by each phase of the proposed development are shown below in ***Table 3.*** It should be noted that the current site plan has been updated since the traffic analysis was completed and the land use densities shown below do not match the current plan. The current plan shows a slight increase in building square footage that is planned to be constructed in Phase 1. This results in an increase of two trips during each of the AM and PM peak hours. These additional trips are negligible and will not change the results of the study. In Phase 2, the current plan shows a slight reduction in building square footage. This results in no change in trips during the PM peak hour and only one less trip during the PM peak hour. This reduction in trips is negligible and will not change the results of the study.

Table 3: Proposed Trip Generation

Land Use	Qty	Unit	Weekday ADT (VPD)	AM Peak Hour (VPH)			PM Peak Hour (VPH)		
				TOTAL	IN	OUT	TOTAL	IN	OUT
Phase 1									
154: High-Cube Transload and Short-Term Storage Warehouse	432,936*	S.F.	606	56	44	12	74	25	49
Phase 2									
150: Warehousing	1,157,860*	S.F.	1,868	163	125	38	165	46	119
Total Site Trips			***2,474***	***219***	***169***	***50***	***239***	***71***	***168***

*Do not match the current plan as traffic analysis was completed prior to current plan being finalized, and the resulting change in trips was negligible.

Due to the industrial nature of the development, it is anticipated that a greater number of trucks will be present on the site driveways and the surrounding road network. Based on information from the development team, Phase 1 is expected to generate 500 truck trips per day balanced evenly throughout a typical 24-hour day. Truck trip generation estimates were calculated for Phase 2 of the development with the *Trip Generation Manual*. These truck volumes were utilized to calculate corresponding truck percentages and were utilized in the capacity analyses. The truck-specific trip generations are shown below in ***Table 4***.

Table 4: Proposed Truck Trip Generation

Land Use	Qty	Unit	Weekday ADT (VPD)	AM Peak Hour (VPH)			PM Peak Hour (VPH)		
				TOTAL	IN	OUT	TOTAL	IN	OUT
Phase 1									
154: High-Cube Transload and Short-Term Storage Warehouse	432,936	S.F.	500	21	11	10	21	11	10
Phase 2									
150: Warehousing	1,157,860	S.F.	695	23	12	11	35	18	17
Total Truck Trips			***1,195***	***44***	***23***	***21***	***56***	***29***	***27***

Trip Distribution: The estimated trips generated by the industrial development were distributed onto the surrounding street system based on the trip distributions summarized in ***Table 5***. The distributions are based primarily on engineering judgement and the existing traffic. The detailed distributions through the study intersections are included in ***Appendix C***.

Table 5: Trip Distribution

Direction To/From	Percentage
North on Lone Elm Road	5%
North on I-35	25%
North on US-169	10%
South on Lone Elm Road	5%
South on US-169	15%
East on 175th Street	10%
West on 175th Street	30%
Total	**100%**

It was assumed that vehicles traveling to/from the south on I-35 will utilize the I-35 & 175th Street interchange and access the development from the west on 175th Street.

Existing + Phase 1 Site Traffic Volumes: The expected Phase 1 development-related traffic volumes were assigned to the existing street system based on the trip distributions discussed

above and then added to the existing traffic volumes to develop the *Existing + Phase 1 Site* AM and PM peak-hour volumes. These volumes are shown in ***Appendix A*** on ***Figures A-2*** and ***A-3***, respectively.

Existing + Full Site Traffic Volumes: The expected development-related traffic volumes for the full development site were assigned to the existing street system based on the trip distributions discussed above and then added to the existing traffic volumes to develop the *Existing + Full Site* AM and PM peak-hour volumes. These volumes are shown in ***Appendix A*** on ***Figures A-4*** and ***A-5***, respectively.

Future Year 2045 + Site + Planned Traffic Volumes: To account for potential traffic-volume growth at the study intersections, traffic projections were developed using an estimated 2.0% annual growth rate. This growth rate was based on traffic-volume outputs from the base year (2016) and future year (2050) Mid-America Regional Council (MARC) travel demand models (TDM). The growth rate was applied to the existing traffic volumes to develop base traffic volumes for future year 2045. These volumes were added to the full site traffic to develop the *Future Year 2045 + Full Site* AM and PM peak-hour traffic volumes. The volumes are shown in ***Appendix A*** on ***Figures A-6*** and ***A-7***, respectively.

ANALYSES

This study analyzes the traffic impacts of the proposed industrial development on the surrounding roadway network for the following scenarios:

- Existing Conditions
- Existing + Phase 1 Site Conditions
- Existing + Full Site Conditions
- Future Year 2045 + Full Site Conditions

Intersection capacity analyses were completed using the Synchro 12 traffic analysis software package based on methodologies outlined in the Transportation Research Board's (TRB) *Highway Capacity Manual (HCM),* 7th Edition. The operating conditions at an intersection are evaluated by the level of service (LOS) experienced by drivers, with LOS "A" representing little or no delay and LOS "F" representing excessive delays. LOS B, C, D, and E reflect incremental increases in delay per vehicle. The control delay thresholds in seconds-per-vehicle for the varying LOS for signalized and unsignalized intersections are shown below in ***Table 6.***

Table 6: Level of Service Delay Thresholds

Level of Service (LOS)	Signalized Intersection Average Control Delay (sec/veh)	Unsignalized Intersection Average Control Delay (sec/veh)
A	<10	<10
B	<20	<15
C	<35	<25
D	<55	<35
E	<80	<50
F	≥80	≥50

Source: HCM 7th Edition

Queues were also evaluated as part of this study. The 95th-percentile queue, or the queue that has only a 5% chance of being exceeded during the peak hour, was used for this analysis. All capacity analysis output files are included in ***Appendix D***.

Existing Conditions: The results of the *Existing* analysis scenario are shown in ***Appendix A*** on ***Figures A-8*** and ***A-9*** for the AM and PM peak-hour traffic volumes, respectively. The City of Olathe provided the existing signal timings at the signalized study intersections along Lone Elm Road for use in this analysis scenario.

As shown on the figures, each of the signalized study intersections currently operates at an overall LOS "D" or better during the AM and PM peak hours except for the SB I-35 Ramps & Lone Elm Road intersection. During the AM peak hour, this location is operating at LOS "E". Some of the individual movements at the signalized study intersections currently operate at lower levels of service.

All the 95th-percentile vehicle queues are contained in existing storage, except the southbound left-turn queue at the 175th Street & Lone Elm Road intersection during the PM peak hour. Additionally, long queues greater than 400' form at the following locations:

US-169 & 175th Street

- Northbound through during the AM peak hour

175th Street & Lone Elm Road

- Southbound through during the PM peak hour

167th Street & Lone Elm Road

- Northbound through during the AM peak hour
- Southbound through during the PM peak hour

SB I-35 Ramps & Lone Elm Road

- Westbound left-turn during the AM and PM peak hours

It should be noted that none of these long queues extend back through adjacent intersections.

Existing + Phase 1 Site Conditions: The results of the *Existing + Phase 1 Site* analysis scenario are shown in ***Appendix A*** on ***Figures A-10*** and ***A-11*** for the AM and PM peak-hour traffic volumes, respectively. This analysis scenario included optimized signal timing splits while maintaining the existing cycle lengths.

As shown on the figures, each of the signalized study intersections is projected to operate at an overall LOS "D" or better during the AM and PM peak hours. Some of the individual movements at the signalized study intersections are projected to operate at lower levels of service. Each of the movements at the unsignalized study intersections is projected to operate at LOS "D" or better during the AM and PM peak hours with queues of one vehicle or less.

All the 95th-percentile vehicle queues are contained in existing storage. However, similar to the *Existing* analysis, long queues greater than 400' continue to form at the following locations:

US-169 & 175th Street
- Northbound through during the AM peak hour

167th Street & Lone Elm Road
- Southbound through during the PM peak hour

SB I-35 Ramps & Lone Elm Road
- Westbound left-turn during the AM and PM peak hours

It should be noted that none of these long queues extend back through adjacent intersections.

Existing + Full Site Conditions: The results of the *Existing + Full Site* analysis scenario are shown in ***Appendix A*** on ***Figures A-12*** and ***A-13*** for the AM and PM peak-hour traffic volumes, respectively. This analysis scenario included optimized signal timing splits while maintaining the existing cycle lengths.

As shown on the figures, each of the signalized study intersections is projected to operate at an overall LOS "D" or better during the AM and PM peak hours. Some of the individual movements at the signalized study intersections are projected to operate at lower levels of service. Each of the movements at the unsignalized study intersections is projected to operate at LOS "D" or better during the AM and PM peak hours with queues of one vehicle or less.

All the 95th-percentile vehicle queues are contained in existing storage. However, similar to the *Existing* and *Existing + Phase 1 Site* analyses, long queues greater than 400' continue to form at the following locations:

US-169 & 175th Street
- Northbound through during the AM peak hour

167th Street & Lone Elm Road
- Southbound through during the PM peak hour

SB I-35 Ramps & Lone Elm Road
- Westbound left-turn during the AM and PM peak hours

It should be noted that none of these long queues extend back through adjacent intersections.

Future Year 2045 + Full Site Conditions: The results of the *Future Year 2045 + Full Site* analysis scenario are shown in ***Appendix A*** on ***Figures A-14*** and ***A-15*** for the AM and PM peak-hour traffic volumes, respectively.

The *K-7 Corridor Management Plan* completed by the Kansas Department of Transportation (KDOT) in February 2006, the *5-County Regional Transportation Study* completed by KDOT in April 2013, and the Connected KC 2050 regional transportation plan developed by the Mid-America

Regional Council (MARC) all include upgrading US-169 to a freeway section and constructing an interchange at 175th Street. In addition, some of these studies indicate that 175th Street will be upgraded to a four-lane roadway in the future. To be consistent with future plans in the area, this analysis scenario assumed these improvements would be constructed by 2045. There are currently no design plans for the US-169 & 175th Street interchange. It is assumed that the future interchange configuration will accommodate the traffic associated with this development, so the interchange was not included in the future analysis.

In addition to the improvements identified above, the following were included in this analysis scenario to accommodate the projected 20-year traffic volumes:

- Dual westbound left-turn lanes with 400' of storage plus appropriate taper at the SB I-35 Ramps & Lone Elm Road intersection.
- Two northbound and southbound through lanes on Lone Elm Road between 175th Street and the NB I-35 Ramps intersections.
- Optimized signal-timing cycle lengths and splits at all signalized study intersections.

As shown on the figures, each of the signalized study intersections is projected to operate at an overall LOS "D" or better during the AM and PM peak hours with the improvements identified above. Some of the individual movements at the signalized study intersections are projected to operate at lower levels of service. Each of the movements at the unsignalized study intersections is projected to operate at LOS "D" or better during the AM and PM peak hours except for the westbound left-turn movement at the Lone Elm Road & Site Drive 1 intersection. This movement is projected to operate at LOS "E" during the AM and PM peak hours with queues of one vehicle or less. It is not uncommon for stop-controlled, side-street, intersection approaches to operate at lower levels of service during the peak hours.

All the 95th-percentile vehicle queues are contained in existing and proposed storage. However, long queues greater than 400' are projected to form at the following locations:

<u>175th Street & Lone Elm Road</u>

- Southbound through during the PM peak hour

<u>NB I-35 Ramps & Lone Elm Road</u>

- Southbound through during the PM peak hour

It should be noted that none of these long queues extend back through adjacent intersections.

SUMMARY & RECOMMENDATIONS

This traffic study summarizes the anticipated traffic impacts of the proposed industrial development on the surrounding transportation system.

The results of the *Existing* analysis scenario indicate that most of the signalized study intersections currently operates acceptably during both peak hours. However, the SB I-35 Ramps & Lone Elm Road intersection currently operates unacceptably at LOS "E" during the AM peak hour. All the 95th-percentile vehicle queues are contained in existing storage, except the southbound left-turn queue at the 175th Street & Lone Elm Road intersection during the PM peak hour. Additionally, long queues greater than 400' form on some of the intersection approaches, but none of these queues extend back through adjacent intersections.

The following improvements were included in the *Existing + Phase 1 Site* analysis scenario to meet criteria outlined in the City of Olathe's *Access Management Plan:*

Lone Elm Road & Site Drive 1

- Construct a southbound left-turn lane with 200' of storage plus appropriate taper
- Construct a northbound right-turn lane with 150' of storage plus appropriate taper
- Construct a westbound left-turn lane with 150' of storage plus appropriate taper

Lone Elm Road & Site Drive 2

- Construct a southbound left-turn lane with 200' of storage plus appropriate taper
- Construct a northbound right-turn lane with 150' of storage plus appropriate taper
- Construct a westbound left-turn lane with 150' of storage plus appropriate taper

The *Existing + Phase 1 Site* analysis scenario includes optimized signal-timing splits while maintaining the existing cycle lengths. The results indicate that each of the signalized study intersections is projected to operate acceptably during both peak hours. Furthermore, each of the movements at the unsignalized study intersections is projected to operate acceptably during both peak hours with queues of one vehicle or less. All the 95th-percentile vehicle queues are contained in existing storage. However, similar to the *Existing* analysis, long queues greater than 400' continue to form on some of the intersection approaches. None of these long queues extend back through adjacent intersections.

The City of Olathe's *Access Management Plan* indicates that no driveway shall intersect an expressway, and that full-access median break spacing along an expressway is one-half mile (2,640'). Site Drive 3 and Site Drive 4, which are located along 175th Street, do not meet these criteria. Currently, there is no median along 175th Street. In the future if the roadway is widened to include a median, and Site Drive 3 and Site Drive 4 are converted to public streets, they will not meet the full-access spacing criteria along an expressway. It should be noted that the property frontage along 175th Street is approximately 2,600', which is less than one-half mile (2,640'). Providing access to the property from 175th Street provides adequate site circulation and traffic flow through the development. The following turn-lane improvements were included in the *Existing + Full Site* analysis scenario at Site Drive 3 and Site Drive 4*:*

175th Street & Site Drive 3

- Eastbound left-turn lane with 300' of storage plus appropriate taper
- Westbound right-turn lane with 300' of storage plus appropriate taper
- Southbound left-turn lane with 150' of storage plus appropriate taper

175th Street & Site Drive 4

- Eastbound left-turn lane with 300' of storage plus appropriate taper
- Westbound right-turn lane with 300' of storage plus appropriate taper
- Southbound left-turn lane with 150' of storage plus appropriate taper

The 300' eastbound left-turn lane at Site Drive 3 will most likely extend into the westbound left-turn lane at the 175th Street & Lone Elm Road intersection. Therefore, the eastbound left-turn lane at Site Drive 3 should include as much storage as possible plus appropriate taper. The analysis indicates that the eastbound queues are expected to be approximately one vehicle at this location.

The *Existing + Full Site* analysis scenario include optimized signal timings splits while maintaining the existing cycle lengths. The results indicate that each of the signalized study intersections is projected to operate acceptably during both peak hours. Furthermore, each of the movements at the unsignalized study intersections is projected to operate acceptably during both peak hours with queues of one vehicle or less. All the 95th-percentile vehicle queues are contained in existing storage. However, similar to the *Existing* and *Existing + Phase 1 Site* analysis scenarios, long queues greater than 400' continue to form on some of the intersection approaches. None of these long queues extend back through adjacent intersections.

The *Future Year 2045 + Site* analysis scenario included additional through lanes along 175th Street and Lone Elm Road to accommodate the projected traffic volumes. In addition, some geometric improvements were also included at the SB I-35 Ramps & Lone Elm Road intersection. The results of this scenario indicate that each of the signalized study intersections is projected to operate acceptably during both peak hours. Furthermore, each of the movements at the unsignalized study intersections is projected to operate acceptably during both peak hours except for the westbound left-turn movement at the Lone Elm Road & Site Drive 1 intersection during both peak hours. The queues for this movement are projected to be one vehicle or less. It is not uncommon for stop-controlled side-street approaches to operate at lower levels of service during the peak hours. All the 95th-percentile vehicle queues are contained in existing and proposed storage. However, long queues greater than 400' are projected to form on some of the intersection approaches. None of these long queues extend back through adjacent intersections.

We appreciate the opportunity to serve you on this very important project. Please feel free to contact us if you should have any questions.

Respectfully submitted,

Merge Midwest Engineering, LLC

Michael Hare, P.E., PTOE
Sr. Engineer

Janelle M. Clayton, P.E., PTOE
Manager / Co-Owner