Springdale Apartments Multi-Family Housing Traffic Impact Study

Submitted to:

Kentucky Transportation Cabinet, District 3

Jefferson County, County Engineer

City of Louisville, City Engineer

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Executive Summary

This report presents the Traffic Impact Study for the proposed Springdale Apartments Multi-Family Housing in Louisville, Jefferson County, Kentucky. The new development will be located just south of Gene Snyder Freeway along the northern side of Springdale Road.

Study Area

Traffic data was collected at the following study intersection:

1) Springdale Road at Asbury Park Boulevard – Unsignalized

Traffic data was collected on a typical weekday (Wednesday, June 23, 2021) for the peak hours of 7:00 – 9:00 AM and 4:00 – 6:00 PM to determine the AM and PM peak period volumes. The AM peak period was determined to be from 7:45 – 8:45 AM and the PM peak period was from 5:00 – 6:00 PM.

Trip Generation and Traffic Assignment

Trip generation was conducted using the *ITE Trip Generation Manual (10th Edition, Institute of Transportation Engineers)* and information from the applicant. A conceptual site layout was provided by the applicant. Information from the site layout was used to determine the number of units to be used for the trip generation analysis. The generated new site trips are detailed in **Table 4-1**. In total, the development is projected to generate 109 AM peak hour trips and 133 PM peak hour trips.

Table ES-1 – Trip Generation Summary

ITE Land Use		Size	Daily Trips	AM Peak			PM Peak		
Code	Description			Total	Entering	Exiting	Total	Entering	Exiting
221	Multifamily Housing (Mid-Rise)	302 Dwelling Units	1,643	109	28	81	133	81	52

Capacity Analysis Results

Traffic operations analysis was performed at all the study intersections under the following analysis scenarios:

- Open Year (2023) No Build and Build Conditions
- Design Year (2033) No Build and Build Conditions

Synchro 11 was used to conduct intersection capacity analysis for each intersection and time period based on the *KYTC Traffic Impact Study Requirements (2012 Policy)*, and the software outputs were evaluated to determine if any roadway improvements (additional or lengthened turn lanes, installation of traffic signals, etc.) are warranted in order to maintain an acceptable level of service. Additional traffic operations analysis was conducted to analyze performance with the added roadway improvements. Open and Design Year LOS and delay results are summarized in **Table ES-2**.

Conclusions

With and without the new development, LOS for all intersections and scenarios was B or better. The addition of the facility and associated traffic will add additional trips to the network, but not substantially to result in the recommendation for any improvements. No turn lanes were found to be warranted for any scenario.

Table ES-2. 2023 (Open Year) and 2033 (Design Year) Intersection Level of Service and Delay Summary

Intersections and Movements / Approaches	2023 No Build				2023 Build			
	AM Peak		PM Peak		AM Peak		PM Peak	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1-Asbury Park Blvd / Springdale Rd								
Westbound Left	A	7.5	A	7.6	A	7.6	A	7.7
Northbound	A	9.5	A	9.6	B	10.0	B	10.0
2-Springdale Rd / Entrance 1								
Eastbound Left	-	-	-	-	A	7.5	A	7.9
Southbound	-	-	-	-	B	10.3	B	11.9
3-Springdale Rd / Entrance 2								
Eastbound Left	-	-	-	-	A	7.4	A	7.8
Southbound	-	-	-	-	A	9.3	A	10.3

Intersections and Movements / Approaches	2033 No Build				2033 Build			
	AM Peak		PM Peak		AM Peak		PM Peak	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1-Asbury Park Blvd / Springdale Rd								
Westbound Left	A	7.5	A	7.7	A	7.7	A	7.8
Northbound	A	9.7	A	9.8	B	10.2	B	10.1
2-Springdale Rd / Entrance 1								
Eastbound Left	-	-	-	-	A	7.5	A	7.9
Southbound	-	-	-	-	B	10.4	B	12.4
3-Springdale Rd / Entrance 2								
Eastbound Left	-	-	-	-	A	7.5	A	7.9
Southbound	-	-	-	-	A	9.4	B	10.6

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Section 1
Project Background

The consultant team was contracted by Sabak, Wilson & Lingo, Inc. to prepare a Traffic Impact Study for the proposed Springdale Apartments Multi-Family Housing in Louisville, Jefferson County, Kentucky. The purpose of this report is to document the study area, site conditions, analysis, and findings. Kentucky Transportation Cabinet (KYTC) Traffic Impact Study Requirements (2012 Policy) was followed.

1.1 Site Description

The new development will be located along Springdale Road between Gene Snyder Freeway and I-71, near Asbury Park Boulevard. The conceptual site plan is shown in **Appendix A**. There are two main proposed site entrances for the development located along the northern side of Springdale Road. A third access location is located on the eastern edge of the development, but it is disconnected from the other parking lots and was not evaluated given the low utilization of this parking lot.

1.2 Study Area

The study area is illustrated in **Figure 1-1**. Traffic data was collected at the following study intersection:

1. Springdale Road at Asbury Park Boulevard – Unsignalized

Figure 1-1 Study Area

Section 2
Existing (2021) Condition Analysis

This section describes the existing roadways in the vicinity of the proposed development.

2.1 Existing Roadway Conditions

The consultant team collected intersection geometry as required for capacity analysis including approach lane configurations, departure lane configurations, number and length of turn lanes, presence of channelizing devices, and type of traffic control.

2.1.1 Springdale Road

- Springdale Road is a two-lane urban major collector running east-west in the study area with a posted speed limit of 35 miles per hour (mph). The road ends at the intersections with Brownsboro Road in the east and Wolf Pen Branch Road in the west near Green Spring Drive.
- The last AADT collected by KYTC for Springdale Road between Brownsboro Road and Wolf Pen Branch Road was 4,000 vehicles per day (vpd) in 2016.
- There are 10-foot lanes, no median, no turn lanes, and one-foot paved shoulders within the study area.

2.1.2 Asbury Park Boulevard

- Asbury Park Boulevard is a neighborhood roadway for a small subdivision with no additional outlets.

2.2 Existing Turning Movement Data

Traffic data was collected on a typical weekday (Wednesday, June 23, 2021) for the peak hours of 7:00 – 9:00 AM and 4:00 – 6:00 PM to determine the AM and PM peak period volumes. The AM peak period was determined to be from 7:45 – 8:45 AM and the PM peak period was from 5:00 – 6:00 PM. The peak hour data collected is presented in **Appendix B.**

Figure 2-1. 2021 Turn Movement Volumes

2.3 Level of Service Criteria

Level of Service (LOS) is a term used to represent different traffic conditions and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists or passengers". Level of Service varies from Level A, representing free flow, to Level F, where traffic breakdown conditions are evident. Level B represents good progression with minimal congestion. At Level C, the number of vehicles stopping is significant, although many still pass through the intersection without stopping. Level D represents more congestion, but the overall operations are generally considered acceptable by most agencies. At Level E, freedom to maneuver within the traffic stream is more difficult with driver frustration being higher.

For signalized intersections, service levels pertain to each approach as well as an overall intersection. The unsignalized intersection analysis method in the ***Highway Capacity Manual 6th Edition*** assigns LOS values for each movement that yields the right-of-way, but not to the overall intersection. This movement is generally a secondary movement from a minor street. At an unsignalized intersection, the primary traffic on the main roadway is virtually uninterrupted. Therefore, the overall level of service is usually much better than what is represented by the results of the minor street movements. With the current method of reporting levels of service for unsignalized intersections, it is not uncommon for some of the minor street movements to be operating at LOS F during the peak hours. The delay thresholds for Level of Service are higher for signalized intersections since drivers know that their turn is coming and are willing to wait longer. They also don't have the decision making involved in looking for a gap to proceed through the intersection.

Level of Service and delay for each intersection using methods outlined in the ***Highway Capacity Manual*** were calculated using Synchro 11. **Table 2-1** displays the current Level of Service criteria for signalized and unsignalized intersections.

Table 2-1 Level of Service Criteria for Signalized and Unsignalized Intersections

Level of Service	Description	Control Delay Per Vehicle (sec/veh)	
		Signalized Intersections	Unsignalized Intersections
A	Little or no delay	<10	<10
B	Short traffic delay	>10 and <20	>10 and <15
C	Average traffic delay	>20 and <35	>15 and <25
D	Long traffic delay	>35 and <55	>25 and <35
E	Very long traffic delay	>55 and <80	>35 and <50
F	Unacceptable delay	>80	>50

Source: Highway Capacity Manual, 6th Edition, Transportation Research Board

2.4 Existing Conditions Analysis

Table 2-2 displays the 2021 Existing LOS and delay for the existing study intersection. The full Existing and No Build Synchro outputs can be found in **Appendix C**. Since the intersection of Springdale Road and Asbury Park Boulevard is aligned at a skewed angle from the cardinal direction of Springdale Road, it should be noted that Asbury Park Boulevard was chosen to be the north-south road in the analysis so that Springdale Road could have a coordinated direction amongst intersections.

The intersection of Springdale Road and Asbury Park Boulevard currently operates at LOS A for all movements and approaches for both AM and PM peaks.

Table 2-2. Intersection Level of Service and Delay Summary – 2021 Existing Conditions

Intersections and Movements / Approaches	2021 Existing			
	AM Peak		PM Peak	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1-Asbury Park Blvd / Springdale Rd				
Westbound Left	A	7.5	A	7.6
Northbound	A	9.5	A	9.6

Section 3
2023 and 2033 No Build Scenario Analysis

3.1 Traffic Volume Projections

The expected future analysis open year for the proposed Springdale Apartments Multi-Family Housing is 2023. Based on historical KYTC count data near the study area, an annual growth factor of one percent (1%) was applied to existing traffic volumes to account for the expected ambient traffic growth between the base year (2021), open year (2023) and design year (2033).

Figure 3-1 displays the 2023 No Build turning movement volumes and **Figure 3-2** displays the 2033 No Build conditions.

3.2 Level of Service Analysis

Intersection level of service analysis was performed for a typical weekday peak hour using Synchro 11. **Tables 3-1** and **3-2** display the 2023 and 2033 LOS and delay for the study intersection. The full No Build HCS output can be found in **Appendix C** which includes 95th percentile queueing in addition to the LOS and delays presented in the following tables. LOS did not change between any No Build scenarios which were all LOS A.

Table 3-1. Intersection Level of Service and Delay Summary – 2023 No Build Conditions

Intersections and Movements / Approaches	2023 No Build			
	AM Peak		PM Peak	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1-Asbury Park Blvd / Springdale Rd				
Westbound Left	A	7.5	A	7.6
Northbound	A	9.5	A	9.6

Table 3-2. Intersection Level of Service and Delay Summary – 2033 No Build Conditions

Intersections and Movements / Approaches	2033 No Build			
	AM Peak		PM Peak	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1-Asbury Park Blvd / Springdale Rd				
Westbound Left	A	7.5	A	7.7
Northbound	A	9.7	A	9.8

Figure 3-1. 2023 No Build AM and PM Turning Movement Volumes

Figure 3-2. 2033 No Build AM and PM Turning Movement Volumes

Section 4
Trip Generation and Traffic Assignment

There are two main proposed access points for the Springdale Apartments Multi-Family Housing along Springdale Road. A third access location is located on the eastern edge of the development, but it is disconnected from the other parking lots and was not evaluated given the low utilization of this parking lot. Trip generation and distribution were developed based on information from the applicant and conceptual site plan presented in **Appendix A** and as described below.

4.1 Trip Generation

Trip generation was conducted using the *ITE Trip Generation Manual (10th Edition, Institute of Transportation Engineers)* and information from the applicant. A conceptual site layout was provided by the applicant. Information from the site layout was used to determine the number of units to be used for the trip generation analysis. The generated new site trips are detailed in **Table 4-1**. In total, the development is projected to generate 109 AM peak hour trips and 133 PM peak hour trips.

Table 4-1. Site Generated Trips

ITE Land Use		Size	Daily Trips	AM Peak			PM Peak		
Code	Description			Total	Entering	Exiting	Total	Entering	Exiting
221	Multifamily Housing (Mid-Rise)	302 Dwelling Units	1,643	109	28	81	133	81	52

4.2 Trip Distribution and Assignment

Figure 4-1 depicts the peak hour trip distribution percentages. The existing trip distribution derived from the Asbury Park Boulevard subdivision was used as a starting point for the estimated trip distribution for the development and then refined based on analyzing the network. **Figure 4-2** presents the number of expected new trips derived from the estimated trip generation and distribution.

Figure 4-1. Trip Distribution Percentages

Figure 4-2. AM and PM Peak Site Generated Trips

Section 5
2023 and 2033 Build Condition Analysis

The 2023 Build Condition analysis included the 2023 No Build traffic as described in Section 3 as well as site generated trips from the proposed Springdale Apartments Multi-Family Housing as described in Section 4.

5.1 Level of Service Analysis

As shown in **Table 5-1** and **Table 5-2**, LOS is B or better for all scenarios and intersections. The Asbury Park Boulevard northbound approach changes from LOS A in the No Build to LOS B in the Build scenario with a maximum increase in delay of 0.5 seconds.

5.2 Turn Lane Warrants

KYTC turn lane warrants were evaluated at the proposed entrances and Asbury Park Boulevard. No turn lanes were warranted for any scenario analyzed. The turn lane warrant results are presented in **Appendix E**. While each scenario was analyzed, the appendix only includes the worst-case scenarios.

Figure 5-1. 2023 Build AM and PM Turning Movement Volumes

Figure 5-2. 2033 Build AM and PM Turning Movement Volumes

Table 5-1. Intersection Level of Service and Delay Summary – 2023 Build Conditions

Intersections and Movements / Approaches	2023 Build			
	AM Peak		PM Peak	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1-Asbury Park Blvd / Springdale Rd				
Westbound Left	A	7.6	A	7.7
Northbound	B	10.0	B	10.0
2-Springdale Rd / Entrance 1				
Eastbound Left	A	7.5	A	7.9
Southbound	B	10.3	B	11.9
3-Springdale Rd / Entrance 2				
Eastbound Left	A	7.4	A	7.8
Southbound	A	9.3	A	10.3

Table 5-2. Intersection Level of Service and Delay Summary – 2033 Build Conditions

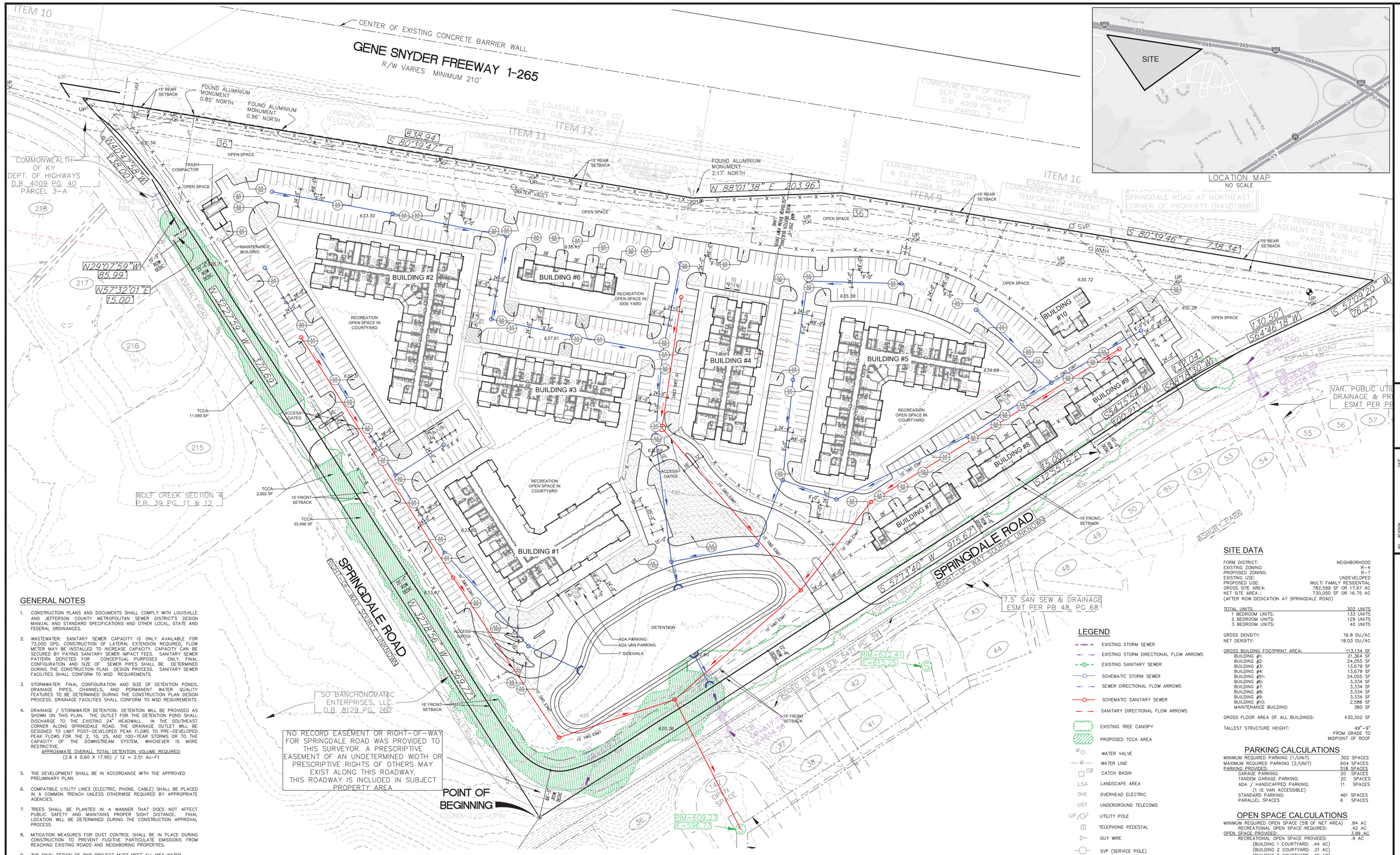
Intersections and Movements / Approaches	2033 Build			
	AM Peak		PM Peak	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
1-Asbury Park Blvd / Springdale Rd				
Westbound Left	A	7.7	A	7.8
Northbound	B	10.2	B	10.1
2-Springdale Rd / Entrance 1				
Eastbound Left	A	7.5	A	7.9
Southbound	B	10.4	B	12.4
3-Springdale Rd / Entrance 2				
Eastbound Left	A	7.5	A	7.9
Southbound	A	9.4	B	10.6

Section 6
Conclusions

With and without the new development, LOS for all intersections and scenarios was B or better. The addition of the facility and associated traffic will add additional trips to the network, but not substantially to result in the recommendation for any improvements. No turn lanes were found to be warranted for any scenario.

The analysis and conclusions from this traffic study are for the development plan and site use as currently provided by the developer. If substantial alterations to either the development plan or site use change, additional study may be required.

Appendix A:
Conceptual Site Plan



LOCATION MAP
NO SCALE

GENERAL NOTES

1. CONSTRUCTION PLANS AND DOCUMENTS SHALL COMPLY WITH LOUISVILLE AND JEFFERSON COUNTY METROPOLITAN SEWER DISTRICT'S DESIGN MANUAL AND STANDARD SPECIFICATIONS AND OTHER LOCAL, STATE AND FEDERAL ORDINANCES.
2. WASTEWATER: SANITARY SEWER CAPACITY IS ONLY AVAILABLE FOR 73,000 GPD, CONSTRUCTION OF LATERAL EXTENSION REQUIRED, FLOW METER MAY BE INSTALLED TO INCREASE CAPACITY. CAPACITY CAN BE SECURED BY PAYING SANITARY SEWER IMPACT FEES. SANITARY SEWER PATTERN DEPICTED FOR CONCEPTUAL PURPOSES ONLY. FINAL CONFIGURATION AND SIZE OF SEWER PIPES SHALL BE DETERMINED DURING THE CONSTRUCTION PLAN DESIGN PROCESS. SANITARY SEWER FACILITIES SHALL CONFORM TO MSD REQUIREMENTS.
3. STORMWATER: FINAL CONFIGURATION AND SIZE OF DETENTION PONDS, DRAINAGE PIPES, CHANNELS, AND PERMANENT WATER QUALITY FEATURES TO BE DETERMINED DURING THE CONSTRUCTION PLAN DESIGN PROCESS. DRAINAGE FACILITIES SHALL CONFORM TO MSD REQUIREMENTS.
4. DRAINAGE / STORMWATER DETENTION: DETENTION WILL BE PROVIDED AS SHOWN ON THIS PLAN. THE OUTLET FOR THE DETENTION POND SHALL DISCHARGE TO THE EXISTING 24" HEADWALL IN THE SOUTHEAST CORNER ALONG SPRINGDALE ROAD. THE DRAINAGE OUTLET WILL BE DESIGNED TO LIMIT POST-DEVELOPED PEAK FLOWS TO PRE-DEVELOPED PEAK FLOWS FOR THE 2, 10, 25, AND 100-YEAR STORMS OR TO THE CAPACITY OF THE DOWNSTREAM SYSTEM, WHICHEVER IS MORE RESTRICTIVE.
   APPROXIMATE OVERALL TOTAL DETENTION VOLUME REQUIRED:
   (2.8 X 0.60 X 17.95) / 12 = 2.51 Ac-Ft
5. THE DEVELOPMENT SHALL BE IN ACCORDANCE WITH THE APPROVED PRELIMINARY PLAN.
6. COMPATIBLE UTILITY LINES (ELECTRIC, PHONE, CABLE) SHALL BE PLACED IN A COMMON TRENCH UNLESS OTHERWISE REQUIRED BY APPROPRIATE AGENCIES.
7. TREES SHALL BE PLANTED IN A MANNER THAT DOES NOT AFFECT PUBLIC SAFETY AND MAINTAINS PROPER SIGHT DISTANCE. FINAL LOCATION WILL BE DETERMINED DURING THE CONSTRUCTION APPROVAL PROCESS.
8. MITIGATION MEASURES FOR DUST CONTROL SHALL BE IN PLACE DURING CONSTRUCTION TO PREVENT FUGITIVE PARTICULATE EMISSIONS FROM REACHING EXISTING ROADS AND NEIGHBORING PROPERTIES.
9. THE FINAL DESIGN OF THIS PROJECT MUST MEET ALL MS4 WATER QUALITY REGULATIONS ESTABLISHED BY MSD.
10. ALL STREET NAME SIGNS AND PAVEMENT MARKING SHALL CONFORM WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) REQUIREMENTS AND BE INSTALLED PRIOR TO CONSTRUCTION OF THE FIRST PHASE AND SHALL BE IN PLACE AT THE TIME OF THE BOND RELEASE/PRIOR TO RECEIVING A CERTIFICATE OF OCCUPANCY.
11. ALL RADIUSES, SIDEWALK LOCATIONS AND OFFSETS SHALL BE IN ACCORDANCE WITH METRO PUBLIC WORKS STANDARDS AND APPROVED AT THE TIME OF CONSTRUCTION.
12. ALL ROADWAY AND ENTRANCE INTERSECTIONS SHALL MEET THE REQUIREMENTS FOR LANDING AREAS AS SET BY METRO PUBLIC WORKS.
13. TREE CANOPY CREDIT AREAS (TCCA'S) IDENTIFIED ON THIS PLAN REPRESENT PORTIONS OF THE SITE THE DEVELOPER HAS AGREED TO PRESERVE. THESE ARE PERMANENT PRESERVATION AREAS. ALL CLEARING, GRADING, AND FILL ACTIVITY IN THESE AREAS MUST BE IN KEEPING THE RESTRICTIONS ESTABLISHED AT THE TIME OF PLAN APPROVAL. NO FURTHER CLEARING, GRADING, CONSTRUCTION, OR OTHER LAND DISTURBING ACTIVITY SHALL TAKE PLACE BEYOND PRUNING TO IMPROVE THE GENERAL HEALTH OF THE TREE OR TO REMOVE DEAD OR DECLINING TREES THAT MAY POSE A PUBLIC HEALTH AND SAFETY THREAT.
14. SIDEWALK CONSTRUCTION SHALL BE REQUIRED, TO MEET CURRENT MPW STANDARDS AND SHALL BE INSPECTED PRIOR TO FINAL BOND RELEASE.
15. CONSTRUCTION PLANS, BOND AND PERMIT ARE REQUIRED BY METRO PUBLIC WORKS PRIOR TO CONSTRUCTION APPROVAL.
16. MSD DRAINAGE BOND REQUIRED PRIOR TO CONSTRUCTION PLAN APPROVAL.
17. ALL PARKING AND DRIVE AISLES TO BE HARD AND DURABLE SURFACE.

BENCH MARKS (1983 NAVD)

BM#1062 X-CUT ON CONCRETE WALK 175' NORTHWEST OF THE EASTERNMOST CORNER OF TRACT AND 34.5' FROM CENTERLINE OF CHAMBERLAIN LANE. ELEVATION 709.30

BM#1063 X-CUT ON CONCRETE WALK 345' SOUTH OF THE CENTERLINE OF THE ENTRANCE TO CHAMBERLAIN LANE OFFICE CENTER AND 4' SOUTH OF FIRE HYDRANT. ELEVATION 712.01

BM#1064 X-CUT ON CONCRETE WALK 56' SOUTH OF THE CENTERLINE OF THE ENTRANCE TO CHAMBERLAIN LANE OFFICE CENTER AND 23 FEET WEST OF CENTERLINE OF CHAMBERLAIN LANE. ELEVATION 713.50

BM#1 X-CUT ON TOP OF CONCRETE CURB AT THE ENTRANCE OF CONDO'S ELEVATION 713.89

BM#2 X-CUT ON BACK OF CONCRETE WALK ON CHARTER OAKS DRIVE. ELEVATION 706.52

SWPP NOTES

1) THE APPROVED EROSION PREVENTION AND SEDIMENT CONTROL (EPSC) PLAN SHALL BE IMPLEMENTED PRIOR TO ANY LAND-DISTURBING ACTIVITY ON THE CONSTRUCTION SITE. ANY MODIFICATIONS TO THE APPROVED EPSC PLAN MUST BE REVIEWED AND APPROVED BY M.S.D.'S PRIVATE DEVELOPMENT REVIEW OFFICE. EPSC BMPs SHALL BE INSTALLED PER THE PLAN AND M.S.D. STANDARDS.

2) DETENTION BASINS, IF APPLICABLE, SHALL BE CONSTRUCTED FIRST AND SHALL PERFORM AS SEDIMENT BASINS DURING CONSTRUCTION UNTIL THE CONTRIBUTING DRAINAGE AREAS ARE SEEDED AND STABILIZED.

3) ACTIONS MUST BE TAKEN TO MINIMIZE THE TRACKING OF MUD AND SOIL FROM CONSTRUCTION AREAS ONTO PUBLIC ROADWAYS. SOILS TRACKED ONTO THE ROADWAY SHALL BE REMOVED DAILY.

4) SOIL STOCKPILES SHALL BE LOCATED AWAY FROM STREAMS, PONDS, SWALES, AND CATCH BASINS. STOCKPILES SHALL BE SEEDED, MULCHED, AND ADEQUATELY CONTAINED THROUGH THE USE OF SILT FENCING.

5) ALL STREAM CROSSINGS MUST UTILIZE LOW-WATER CROSSING STRUCTURES PER M.S.D. STANDARD DRAWING ER-02.

6) WHERE CONSTRUCTION OR LAND DISTURBANCE ACTIVITY WILL OR HAS TEMPORARILY CEASED ON ANY PORTION OF A SITE, TEMPORARY SITE STABILIZATION MEASURES SHALL BE REQUIRED AS SOON AS PRACTICABLE, BUT NOT LATER THAN 14 CALENDAR DAYS AFTER THE ACTIVITY HAS CEASED.

7) SEDIMENT-LADEN GROUNDWATER ENCOUNTERED DURING TRENCHING, BORING, OR OTHER EXCAVATION ACTIVITIES SHALL BE PUMPED TO A SEDIMENT TRAPPING DEVICE PRIOR TO BEING DISCHARGED INTO A STREAM, POND, SWALE, OR CATCH BASIN.

EROSION PREVENTION PLAN

ALL STORM WATER RUNOFF FROM DISTURBED AREAS WILL BE DIRECTED TO DITCH CHECKS OR SILT FENCE PERIMETER CONTROLS UNTIL STORM SEWERS ARE INSTALLED. AFTER STORM SEWER INSTALLATION, ALL STORM INLETS SHALL BE PROTECTED WITH STONE BAGS, SILT SACKS OR OTHER MSD APPROVED INLET CONTROLS. SILT FENCE SHALL BE UTILIZED AS PERIMETER CONTROLS AROUND SENSITIVE AREAS DURING CONSTRUCTION. SMALL WATERSHED AREAS MAY BE PROTECTED WITH SILT FENCE AND/OR DITCH CHECKS BASED ON FINAL GRADING.

UTILITY NOTE

ALL UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE. INDIVIDUAL SERVICE LINES ARE NOT SHOWN. THE CONTRACTOR OR SUBCONTRACTOR SHALL NOTIFY THE UTILITY PROTECTION CENTER "B.U.D." (TOLL FREE PHONE NO. 1-800-752-6007) FORTY-EIGHT HOURS IN ADVANCE OF ANY CONSTRUCTION ON THIS PROJECT. THIS NUMBER WAS ESTABLISHED TO PROVIDE ACCURATE LOCATIONS OF EXISTING BELOW GROUND UTILITIES i.e. CABLES, ELECTRIC WIRES, GAS, AND WATERLINES. WHEN CONTACTING THE "B.U.D." CALL CENTER, PLEASE STATE THAT THE WORK TO BE DONE IS FOR A PROPOSED M.S.D. SEWER OR DRAINAGE FACILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BECOMING FAMILIAR WITH ALL UTILITY REQUIREMENTS SET FORTH ON THE PLANS, IN THE TECHNICAL SPECIFICATIONS, AND SPECIAL PROVISIONS.

LEGEND

- EXISTING STORM SEWER
- EXISTING STORM DIRECTIONAL FLOW ARROWS
- EXISTING SANITARY SEWER
- SCHEMATIC STORM SEWER
- SEWER DIRECTIONAL FLOW ARROWS
- SCHEMATIC SANITARY SEWER
- SANITARY DIRECTIONAL FLOW ARROWS
- EXISTING TREE CANOPY
- PROPOSED TCCA AREA
- WATER VALVE
- WATER LINE
- CATCH BASIN
- LANDSCAPE AREA
- OVERHEAD ELECTRIC
- UNDERGROUND TELECOMS
- UTILITY POLE
- TELEPHONE PEDESTAL
- GUY WIRE
- SVP (SERVICE POLE)
- UNIDENTIFIED UTILITY -UNDERGROUND
- SANITARY SEWER MANHOLE
- MANHOLE - UNKNOWN TYPE
- ELECTRIC MANHOLE
- GAS VALVE
- GAS LINE
- BENCHMARK

SITE DATA

FORM DISTRICT:	NEIGHBORHOOD
EXISTING ZONING:	R-4
PROPOSED ZONING:	R-7
EXISTING USE:	UNDEVELOPED
PROPOSED USE:	MULTI FAMILY RESIDENTIAL
GROSS SITE AREA:	782,599 SF OR 17.97 AC
NET SITE AREA :	730,050 SF OR 16.75 AC
(AFTER ROW DEDICATION AT SPRINGDALE ROAD)	
TOTAL UNITS:	302 UNITS
1 BEDROOM UNITS:	133 UNITS
2 BEDROOM UNITS:	129 UNITS
3 BEDROOM UNITS:	40 UNITS
GROSS DENSITY:	16.8 DU/AC
NET DENSITY:	18.03 DU/AC
GROSS BUILDING FOOTPRINT AREA:	113,134 SF
BUILDING #1:	21,364 SF
BUILDING #2:	24,055 SF
BUILDING #3:	13,679 SF
BUILDING #4:	13,679 SF
BUILDING #5:	24,055 SF
BUILDING #6:	3,334 SF
BUILDING #7:	3,334 SF
BUILDING #8:	3,334 SF
BUILDING #9:	3,334 SF
BUILDING #10	2,586 SF
MAINTENANCE BUILDING:	380 SF
GROSS FLOOR AREA OF ALL BUILDINGS:	430,302 SF
TALLEST STRUCTURE HEIGHT:	49'-9" FROM GRADE TO MIDPOINT OF ROOF

PARKING CALCULATIONS

MINIMUM REQUIRED PARKING (1/UNIT)	302 SPACES
MAXIMUM REQUIRED PARKING (2/UNIT)	604 SPACES
PARKING PROVIDED:	518 SPACES
GARAGE PARKING:	20 SPACES
TANDEM GARAGE PARKING:	20 SPACES
ADA / HANDICAPPED PARKING: (1 IS VAN ACCESSIBLE)	11 SPACES
STANDARD PARKING:	461 SPACES
PARALLEL SPACES	6 SPACES

OPEN SPACE CALCULATIONS

MINIMUM REQUIRED OPEN SPACE (5% OF NET AREA)	.84 AC
RECREATIONAL OPEN SPACE REQUIRED:	.42 AC
OPEN SPACE PROVIDED:	4.96 AC
RECREATIONAL OPEN SPACE PROVIDED:	.9 AC
(BUILDING 1 COURTYARD: .44 AC)	
(BUILDING 2 COURTYARD: .21 AC)	
(BUILDING 5 COURTYARD: .19 AC)	
(BUILDING 6 SIDE YARD: .06 AC)	

ILA/VUA CALCULATIONS

VUA TOTAL:	199,633 SF
ILA REQUIRED: (7.5% of VUA)	14,972 SF
ILA PROVIDED:	40,549 SF
TREES REQUIRED:	647REES

TREE CANOPY CALCULATIONS

GROSS SITE AREA*:	782,599 SF OR 17.97 AC
EXISTING TREE CANOPY:	81,760 SF (10.4%)
TREE CANOPY AT DRIPLINE TO BE PRESERVED:	48,087 SF (6.1%)
TCCA CREDIT FOR PRESERVED CANOPY:	96,174 SF (12.2%)
TOTAL TREE CANOPY REQUIRED (35%):	273,909 SF (35%)
ADDITIONAL TREE CANOPY REQUIRED:	177,735 SF (22.8%)

CASE#
WM #
TAX BLOCK 0060
PARCEL ID: W00600070000
SEWER TREATMENT PLANT: MORRIS FOREMAN
IMPERVIOUS INCREASE: 360,608 +/- SF

OWNER:
ROY F. MCMAHAN
3034 R HUNSINGER LANE
LOUISVILLE, KY 40220
D.B. 9656 PG. 96

DEVELOPER
LIV DEVELOPMENT
2204 LAKESHORE DRIVE, SUITE 450
BIRMINGHAM, AL 35209

NORTH
0 25' 50' 100'
SCALE: 1"=50'-0"

SABAK, WILSON & LINGO, INC
ENGINEERS, LANDSCAPE ARCHITECTS & PLANNERS
THE HENRY CLAY 609 S. THIRD STREET, LOUISVILLE, KENTUCKY 40202 (502) 584 - 6271

NO. REVISION DATE

SHEET TITLE: DISTRICT DEVELOPMENT PLAN
PROJECT TITLE: SPRINGDALE APARTMENTS 5217 SPRINGDALE ROADD LOUISVILLE, KY 40241

JOB NO. 3285
SCALE: 1"=50'
DATE: 05/28/21
DRAWING NO: DDP

SHEET 1 OF 1

Appendix B:

Intersection Turning Movement Counts

Cummins Consulting Services, PLLC
2216 Young Drive, Suite 1, Lexington, KY 40505
www.ccsdata.com <http://www.ccsdata.com>
Office Number: (859) 7851502
"2021- Data Collection Re-Loaded"

80 Degrees - Sunny

File Name : Springdale_Road_at_Asbury_Park_Boulevard_850043_06-23-2021
Site Code : Site 1 - Wednesday
Start Date : 6/23/2021
Page No : 1

Groups Printed- Cars - Buses - Trucks

	Springdale Road From North				Springdale Road From South				Asbury Park Boulevard From West				
Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Int. Total
07:00 AM	18	1	0	19	1	6	0	7	5	1	0	6	32
07:15 AM	20	0	0	20	0	17	0	17	2	1	0	3	40
07:30 AM	19	2	0	21	2	13	0	15	2	5	0	7	43
07:45 AM	31	0	0	31	1	23	0	24	3	4	0	7	62
Total	88	3	0	91	4	59	0	63	12	11	0	23	177
08:00 AM	28	1	0	29	5	19	0	24	3	2	0	5	58
08:15 AM	28	3	0	31	2	24	0	26	2	5	0	7	64
08:30 AM	27	1	0	28	4	16	0	20	4	3	0	7	55
08:45 AM	35	3	0	38	3	12	0	15	0	4	0	4	57
Total	118	8	0	126	14	71	0	85	9	14	0	23	234
04:00 PM	19	3	0	22	2	42	0	44	3	1	0	4	70
04:15 PM	31	2	0	33	8	38	0	46	1	4	0	5	84
04:30 PM	33	5	0	38	3	51	0	54	1	1	0	2	94
04:45 PM	29	2	0	31	1	37	0	38	1	6	0	7	76
Total	112	12	0	124	14	168	0	182	6	12	0	18	324
05:00 PM	30	3	0	33	7	53	0	60	1	8	0	9	102
05:15 PM	39	0	0	39	5	56	0	61	0	7	0	7	107
05:30 PM	50	1	0	51	3	50	0	53	0	3	0	3	107
05:45 PM	45	2	0	47	3	58	0	61	2	9	0	11	119
Total	164	6	0	170	18	217	0	235	3	27	0	30	435
Grand Total	482	29	0	511	50	515	0	565	30	64	0	94	1170
Apprch %	94.3	5.7	0		8.8	91.2	0		31.9	68.1	0		
Total %	41.2	2.5	0	43.7	4.3	44	0	48.3	2.6	5.5	0	8	
Cars	479	29	0	508	49	510	0	559	30	63	0	93	1160
% Cars	99.4	100	0	99.4	98	99	0	98.9	100	98.4	0	98.9	99.1
Buses	1	0	0	1	0	2	0	2	0	0	0	0	3
% Buses	0.2	0	0	0.2	0	0.4	0	0.4	0	0	0	0	0.3
Trucks	2	0	0	2	1	3	0	4	0	1	0	1	7
% Trucks	0.4	0	0	0.4	2	0.6	0	0.7	0	1.6	0	1.1	0.6

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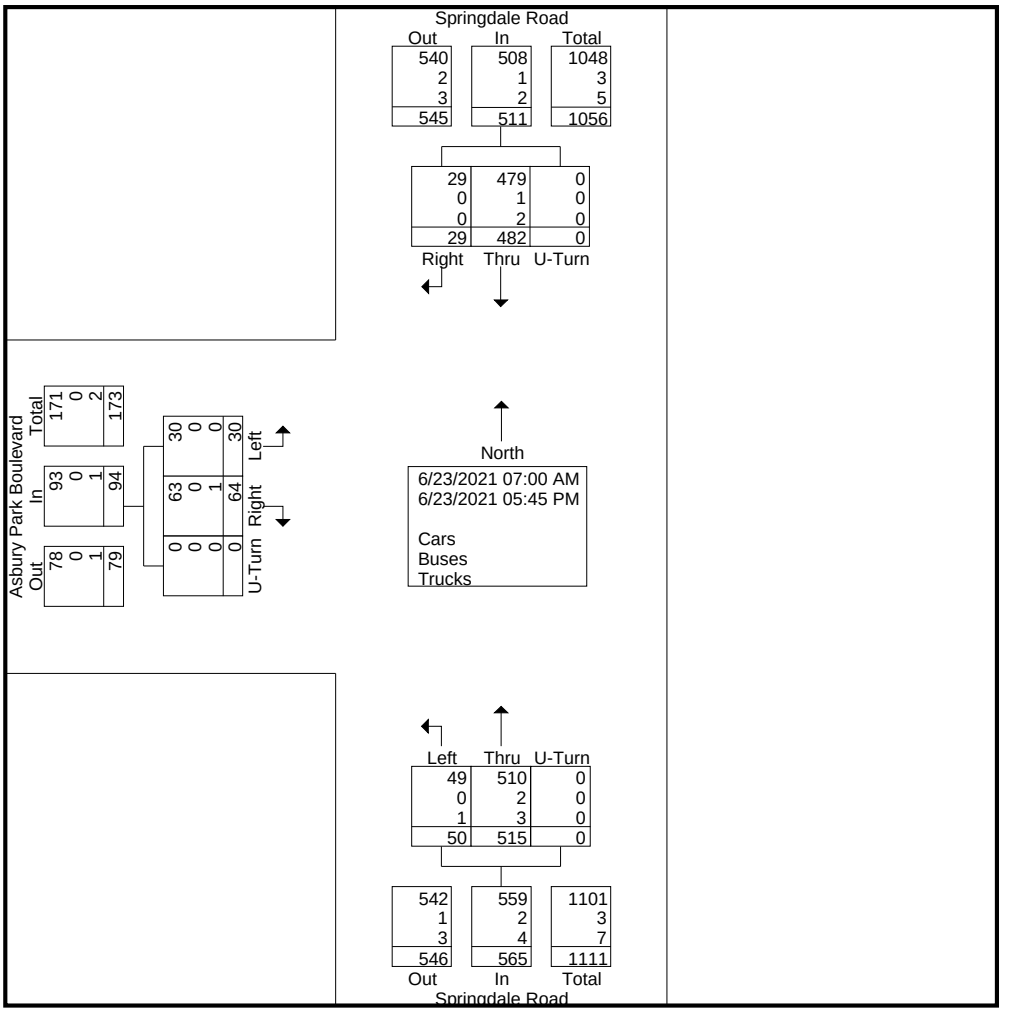
File Name : Springdale_Road_at_Asbury_Park_Boulevard_850043_06-23-2021
Site Code : Site 1 - Wednesday
Start Date : 6/23/2021



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Office Number: (859) 7851502
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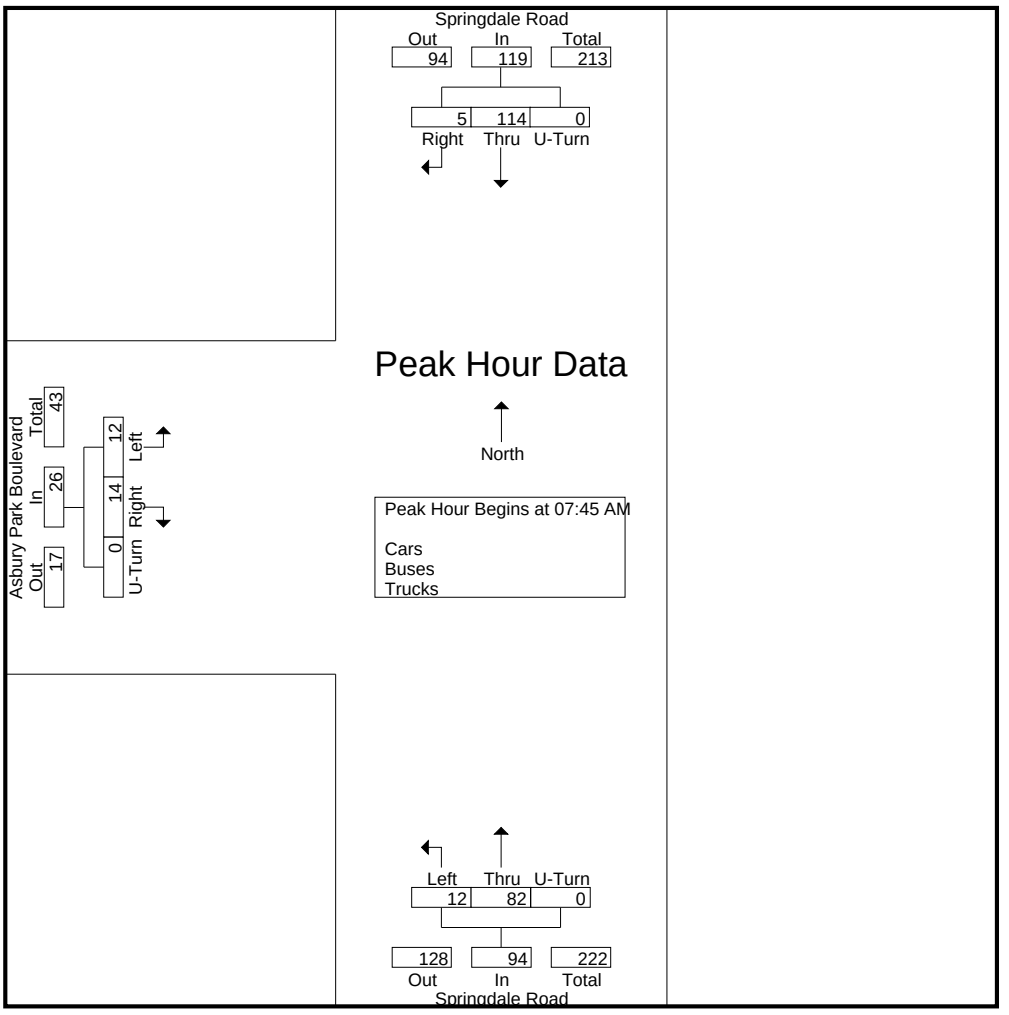
File Name : Springdale_Road_at_Asbury_Park_Boulevard_850043_06-23-2021
Site Code : Site 1 - Wednesday
Start Date : 6/23/2021
Page No : 3

	Springdale Road From North				Springdale Road From South				Asbury Park Boulevard From West				
Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 09:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	**31**	0	0	**31**	1	23	0	24	3	4	0	**7**	62
08:00 AM	28	1	0	29	**5**	19	0	24	3	2	0	5	58
08:15 AM	28	**3**	0	31	2	**24**	0	**26**	2	**5**	0	7	**64**
08:30 AM	27	1	0	28	4	16	0	20	**4**	3	0	7	55
Total Volume	114	5	0	119	12	82	0	94	12	14	0	26	239
% App. Total	95.8	4.2	0		12.8	87.2	0		46.2	53.8	0		
PHF	.919	.417	.000	.960	.600	.854	.000	.904	.750	.700	.000	.929	.934



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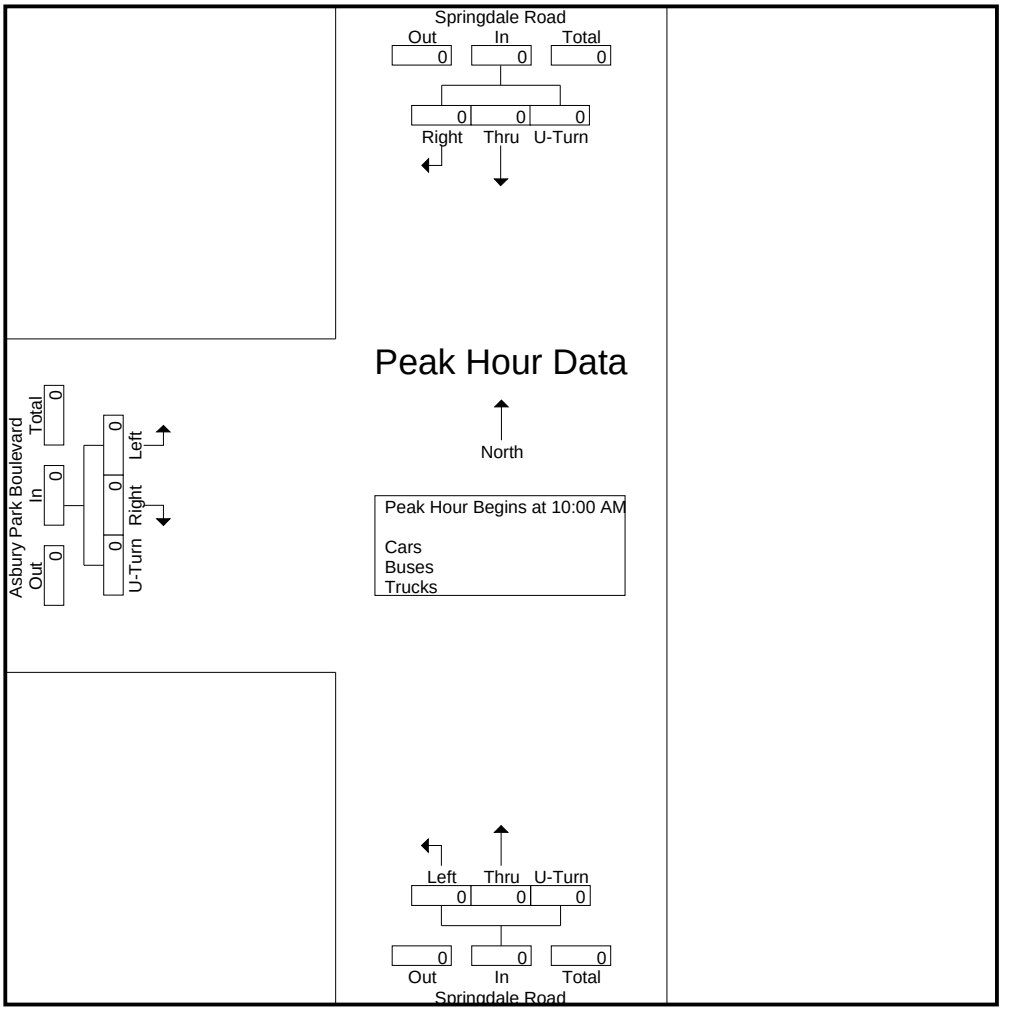
Office Number: (859) 7851502
"2021- Data Collection Re-Loaded"

File Name : Springdale_Road_at_Asbury_Park_Boulevard_850043_06-23-2021
Site Code : Site 1 - Wednesday
Start Date : 6/23/2021
Page No : 4

	Springdale Road From North				Springdale Road From South				Asbury Park Boulevard From West				
Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 10:00 AM													
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



Cummins Consulting Services, PLLC
2216 Young Drive, Suite 1, Lexington, KY 40505
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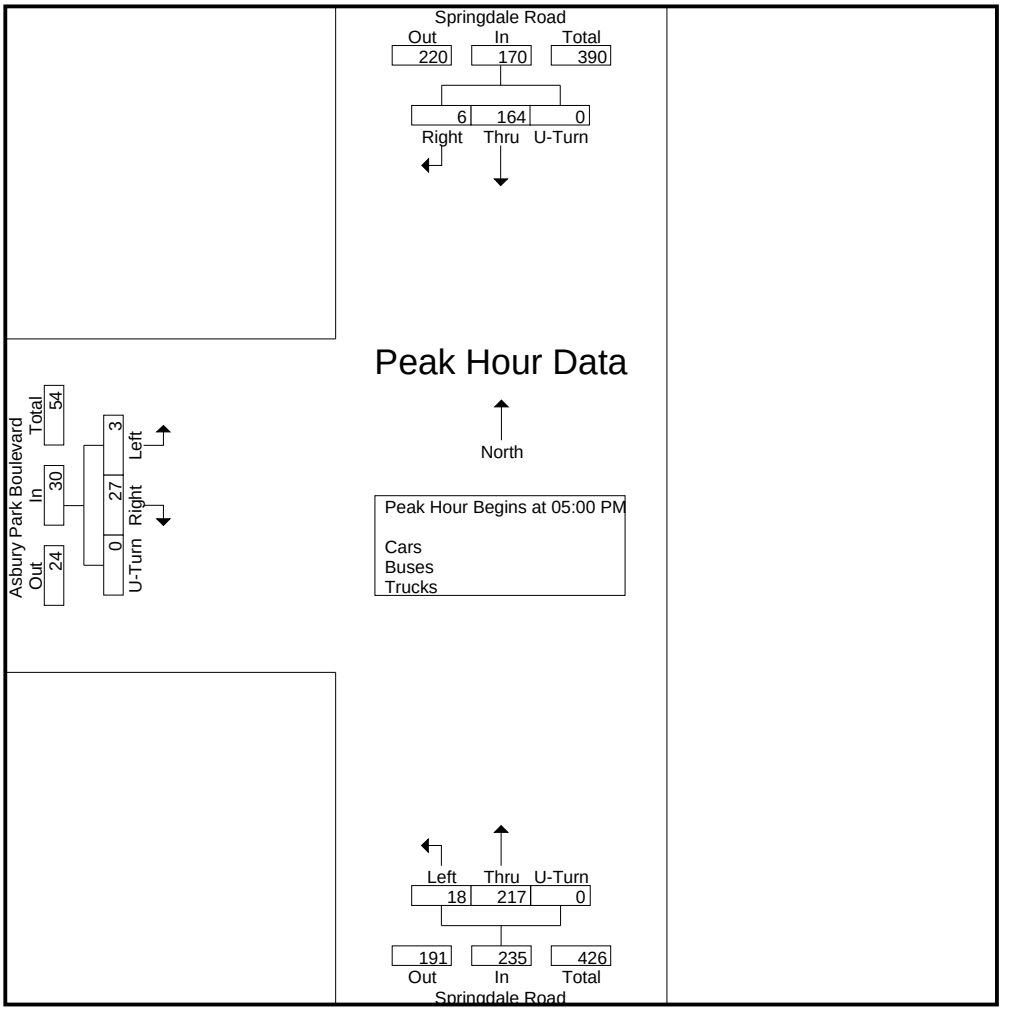
Office Number: (859) 7851502
"2021- Data Collection Re-Loaded"

File Name : Springdale_Road_at_Asbury_Park_Boulevard_850043_06-23-2021
Site Code : Site 1 - Wednesday
Start Date : 6/23/2021
Page No : 5

	Springdale Road From North				Springdale Road From South				Asbury Park Boulevard From West				
Start Time	Thru	Right	U-Turn	App. Total	Left	Thru	U-Turn	App. Total	Left	Right	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	30	**3**	0	33	**7**	53	0	60	1	8	0	9	102
05:15 PM	39	0	0	39	5	56	0	**61**	0	7	0	7	107
05:30 PM	**50**	1	0	**51**	3	50	0	53	0	3	0	3	107
05:45 PM	45	2	0	47	3	**58**	0	61	**2**	**9**	0	**11**	**119**
Total Volume	164	6	0	170	18	217	0	235	3	27	0	30	435
% App. Total	96.5	3.5	0		7.7	92.3	0		10	90	0		
PHF	.820	.500	.000	.833	.643	.935	.000	.963	.375	.750	.000	.682	.914



Appendix C:

Synchro HCM 6th Outputs – 2021 Existing, 2023 No Build, and 2033 No Build

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	114	5	12	82	12	14
Future Vol, veh/h	114	5	12	82	12	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	123	5	13	88	13	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	128	0	240	126
Stage 1	-	-	-	-	126	-
Stage 2	-	-	-	-	114	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1458	-	748	924
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	911	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1458	-	741	924
Mov Cap-2 Maneuver	-	-	-	-	741	-
Stage 1	-	-	-	-	900	-
Stage 2	-	-	-	-	903	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	829	-	-	1458	-
HCM Lane V/C Ratio	0.034	-	-	0.009	-
HCM Control Delay (s)	9.5	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	164	6	18	217	3	27
Future Vol, veh/h	164	6	18	217	3	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	180	7	20	238	3	30

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	187	0	462	184
Stage 1	-	-	-	-	184	-
Stage 2	-	-	-	-	278	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1387	-	558	858
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	769	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1387	-	549	858
Mov Cap-2 Maneuver	-	-	-	-	549	-
Stage 1	-	-	-	-	848	-
Stage 2	-	-	-	-	756	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	812	-	-	1387	-
HCM Lane V/C Ratio	0.041	-	-	0.014	-
HCM Control Delay (s)	9.6	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	116	5	12	84	12	14
Future Vol, veh/h	116	5	12	84	12	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	5	13	90	13	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	130	0	244	128
Stage 1	-	-	-	-	128	-
Stage 2	-	-	-	-	116	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1455	-	744	922
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	909	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1455	-	737	922
Mov Cap-2 Maneuver	-	-	-	-	737	-
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	901	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	826	-	-	1455	-
HCM Lane V/C Ratio	0.034	-	-	0.009	-
HCM Control Delay (s)	9.5	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	167	6	18	221	3	28
Future Vol, veh/h	167	6	18	221	3	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	184	7	20	243	3	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	191	0	471	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	283	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1383	-	551	854
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	765	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1383	-	542	854
Mov Cap-2 Maneuver	-	-	-	-	542	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	752	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	809	-	-	1383	-
HCM Lane V/C Ratio	0.042	-	-	0.014	-
HCM Control Delay (s)	9.6	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	128	6	14	92	14	16
Future Vol, veh/h	128	6	14	92	14	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	138	6	15	99	15	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	144	0	270	141
Stage 1	-	-	-	-	141	-
Stage 2	-	-	-	-	129	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1438	-	719	907
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	897	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1438	-	711	907
Mov Cap-2 Maneuver	-	-	-	-	711	-
Stage 1	-	-	-	-	886	-
Stage 2	-	-	-	-	887	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	804	-	-	1438	-
HCM Lane V/C Ratio	0.04	-	-	0.01	-
HCM Control Delay (s)	9.7	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	185	7	20	245	3	30
Future Vol, veh/h	185	7	20	245	3	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	203	8	22	269	3	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	211	0	520	207
Stage 1	-	-	-	-	207	-
Stage 2	-	-	-	-	313	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1360	-	516	833
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	741	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1360	-	506	833
Mov Cap-2 Maneuver	-	-	-	-	506	-
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	727	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	787	-	-	1360	-
HCM Lane V/C Ratio	0.046	-	-	0.016	-
HCM Control Delay (s)	9.8	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Appendix D:

Synchro HCM 6th Outputs – 2023 Build and 2033 Build

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	173	5	12	104	12	14
Future Vol, veh/h	173	5	12	104	12	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	186	5	13	112	13	15

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	191	0	327	189
Stage 1	-	-	-	-	189	-
Stage 2	-	-	-	-	138	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1383	-	667	853
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	889	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1383	-	660	853
Mov Cap-2 Maneuver	-	-	-	-	660	-
Stage 1	-	-	-	-	843	-
Stage 2	-	-	-	-	880	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	752	-	-	1383	-
HCM Lane V/C Ratio	0.037	-	-	0.009	-
HCM Control Delay (s)	10	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	129	99	17	49	4
Future Vol, veh/h	1	129	99	17	49	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	140	108	18	53	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	126	0	-	0	259	117
Stage 1	-	-	-	-	117	-
Stage 2	-	-	-	-	142	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1460	-	-	-	730	935
Stage 1	-	-	-	-	908	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1460	-	-	-	729	935
Mov Cap-2 Maneuver	-	-	-	-	729	-
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	885	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1460	-	-	-	741
HCM Lane V/C Ratio	0.001	-	-	-	0.078
HCM Control Delay (s)	7.5	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	122	100	3	8	20
Future Vol, veh/h	7	122	100	3	8	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	133	109	3	9	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	112	0	-	0	260	111
Stage 1	-	-	-	-	111	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1478	-	-	-	729	942
Stage 1	-	-	-	-	914	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1478	-	-	-	725	942
Mov Cap-2 Maneuver	-	-	-	-	725	-
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	879	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1478	-	-	-	868
HCM Lane V/C Ratio	0.005	-	-	-	0.035
HCM Control Delay (s)	7.4	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	203	6	18	278	3	28
Future Vol, veh/h	203	6	18	278	3	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	223	7	20	305	3	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	230	0	572	227
Stage 1	-	-	-	-	227	-
Stage 2	-	-	-	-	345	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1338	-	482	812
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	717	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1338	-	473	812
Mov Cap-2 Maneuver	-	-	-	-	473	-
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	704	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	759	-	-	1338	-
HCM Lane V/C Ratio	0.045	-	-	0.015	-
HCM Control Delay (s)	10	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	178	232	49	31	3
Future Vol, veh/h	4	178	232	49	31	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	193	252	53	34	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	305	0	-	0	480	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	201	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1256	-	-	-	545	760
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	833	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1256	-	-	-	543	760
Mov Cap-2 Maneuver	-	-	-	-	543	-
Stage 1	-	-	-	-	765	-
Stage 2	-	-	-	-	833	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1256	-	-	-	557
HCM Lane V/C Ratio	0.003	-	-	-	0.066
HCM Control Delay (s)	7.9	0	-	-	11.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	177	227	8	5	13
Future Vol, veh/h	20	177	227	8	5	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	192	247	9	5	14

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	256	0	-	0	488	252
Stage 1	-	-	-	-	252	-
Stage 2	-	-	-	-	236	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1309	-	-	-	539	787
Stage 1	-	-	-	-	790	-
Stage 2	-	-	-	-	803	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	1309	-	-	-	529	787
Mov Cap-2 Maneuver	-	-	-	-	529	-
Stage 1	-	-	-	-	775	-
Stage 2	-	-	-	-	803	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1309	-	-	-	693
HCM Lane V/C Ratio	0.017	-	-	-	0.028
HCM Control Delay (s)	7.8	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	185	6	14	112	14	16
Future Vol, veh/h	185	6	14	112	14	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	199	6	15	120	15	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	205	0	352	202
Stage 1	-	-	-	-	202	-
Stage 2	-	-	-	-	150	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1366	-	646	839
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	878	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1366	-	638	839
Mov Cap-2 Maneuver	-	-	-	-	638	-
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	867	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	731	-	-	1366	-
HCM Lane V/C Ratio	0.044	-	-	0.011	-
HCM Control Delay (s)	10.2	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	142	109	17	49	4
Future Vol, veh/h	1	142	109	17	49	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	154	118	18	53	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	136	0	-	0	283	127
Stage 1	-	-	-	-	127	-
Stage 2	-	-	-	-	156	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1448	-	-	-	707	923
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	872	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1448	-	-	-	706	923
Mov Cap-2 Maneuver	-	-	-	-	706	-
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	872	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1448	-	-	-	719
HCM Lane V/C Ratio	0.001	-	-	-	0.08
HCM Control Delay (s)	7.5	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	7	135	110	3	8	20
Future Vol, veh/h	7	135	110	3	8	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	147	120	3	9	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	123	0	-	0	285	122
Stage 1	-	-	-	-	122	-
Stage 2	-	-	-	-	163	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1464	-	-	-	705	929
Stage 1	-	-	-	-	903	-
Stage 2	-	-	-	-	866	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1464	-	-	-	701	929
Mov Cap-2 Maneuver	-	-	-	-	701	-
Stage 1	-	-	-	-	898	-
Stage 2	-	-	-	-	866	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1464	-	-	-	850
HCM Lane V/C Ratio	0.005	-	-	-	0.036
HCM Control Delay (s)	7.5	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	221	7	20	302	3	30
Future Vol, veh/h	221	7	20	302	3	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	243	8	22	332	3	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	251	0	623	247
Stage 1	-	-	-	-	247	-
Stage 2	-	-	-	-	376	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1314	-	450	792
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1314	-	441	792
Mov Cap-2 Maneuver	-	-	-	-	441	-
Stage 1	-	-	-	-	794	-
Stage 2	-	-	-	-	679	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	739	-	-	1314	-
HCM Lane V/C Ratio	0.049	-	-	0.017	-
HCM Control Delay (s)	10.1	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	197	256	49	31	3
Future Vol, veh/h	4	197	256	49	31	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	214	278	53	34	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	331	0	-	0	527	305
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	222	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1228	-	-	-	512	735
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	815	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1228	-	-	-	510	735
Mov Cap-2 Maneuver	-	-	-	-	510	-
Stage 1	-	-	-	-	745	-
Stage 2	-	-	-	-	815	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1228	-	-	-	524
HCM Lane V/C Ratio	0.004	-	-	-	0.071
HCM Control Delay (s)	7.9	0	-	-	12.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	196	251	8	5	13
Future Vol, veh/h	20	196	251	8	5	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	213	273	9	5	14

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	282	0	-	0	535	278
Stage 1	-	-	-	-	278	-
Stage 2	-	-	-	-	257	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1280	-	-	-	506	761
Stage 1	-	-	-	-	769	-
Stage 2	-	-	-	-	786	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1280	-	-	-	496	761
Mov Cap-2 Maneuver	-	-	-	-	496	-
Stage 1	-	-	-	-	754	-
Stage 2	-	-	-	-	786	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1280	-	-	-	663
HCM Lane V/C Ratio	0.017	-	-	-	0.03
HCM Control Delay (s)	7.9	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

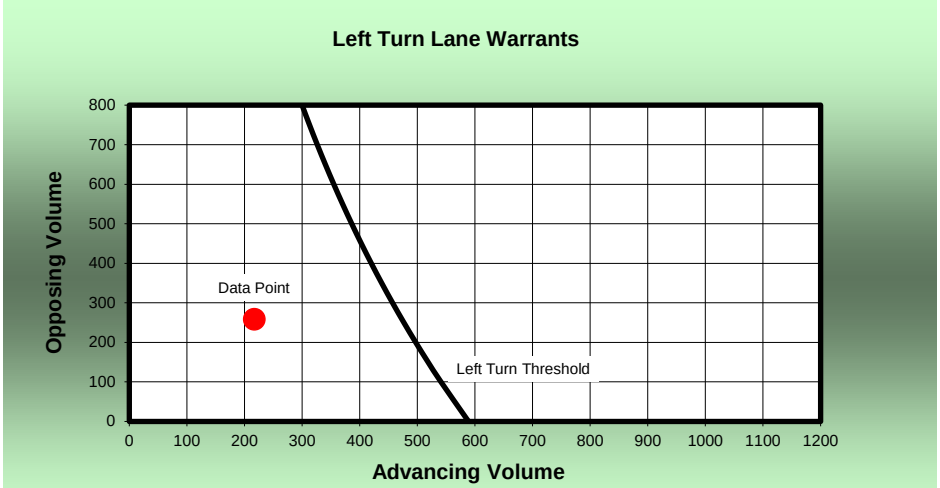
Appendix E:

Turn Lane Warrants

Left Turn Lane Warrants

Input Fields

Left Turn Volume (vph)	20	Speed Limit (mph)	35
Advancing Volume (vph)	216	No. of through lanes	2
Opposing Volume (vph)	259	Percent Heavy Vehicles (decimal percent)	0.02



Left Turn Lane NOT Warranted

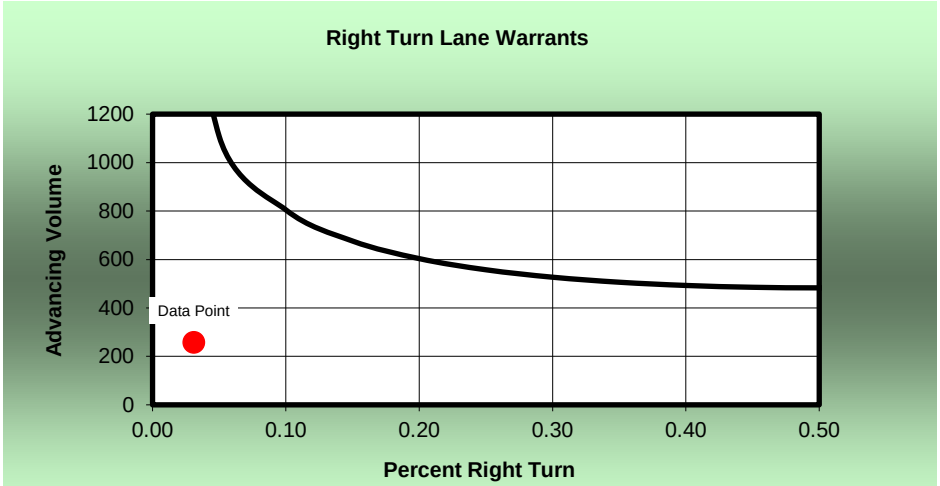
Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

3 - Springdale Rd / Entrance 2
EBL 2033 PM Build

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	8	Speed Limit (mph)	35
Advancing Volume (vph)	259		



Right Turn Lane NOT Warranted

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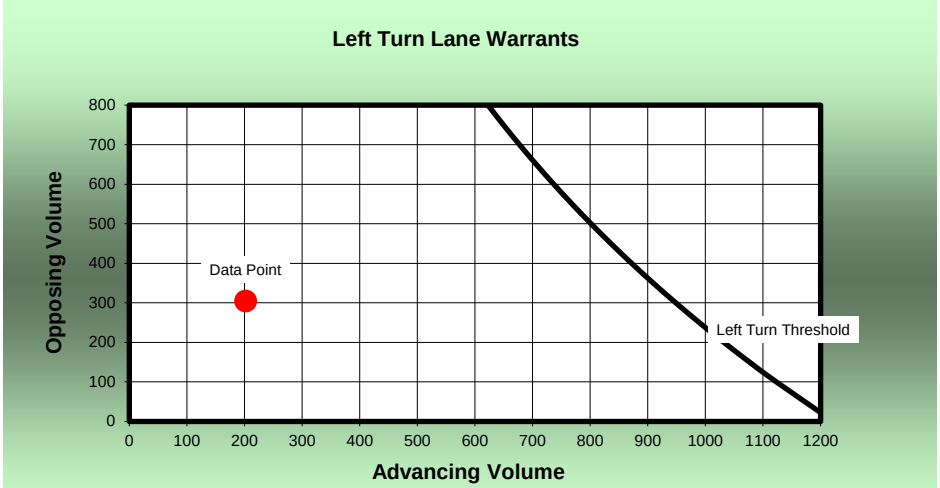
3 - Springdale Rd / Entrance 2
WBR 2033 PM Build

Left Turn Lane Warrants

Input Fields

Left Turn Volume (vph)	4	Speed Limit (mph)	35
Advancing Volume (vph)	201	No. of through lanes	2
Opposing Volume (vph)	305	Percent Heavy Vehicles (decimal percent)	0.02



Left Turn Lane NOT Warranted

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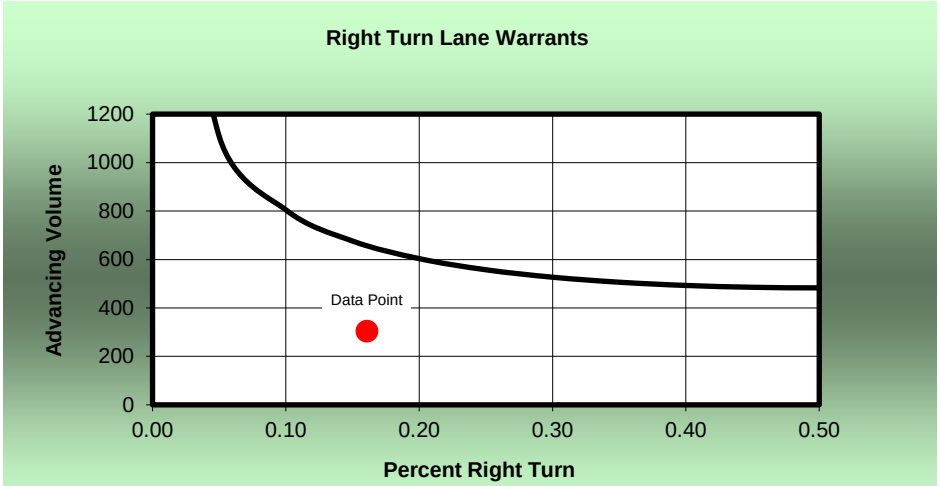
2 - Springdale Rd / Entrance 1
EBL 2033 PM Build

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	49	Speed Limit (mph)	35
Advancing Volume (vph)	305		



Right Turn Lane NOT Warranted

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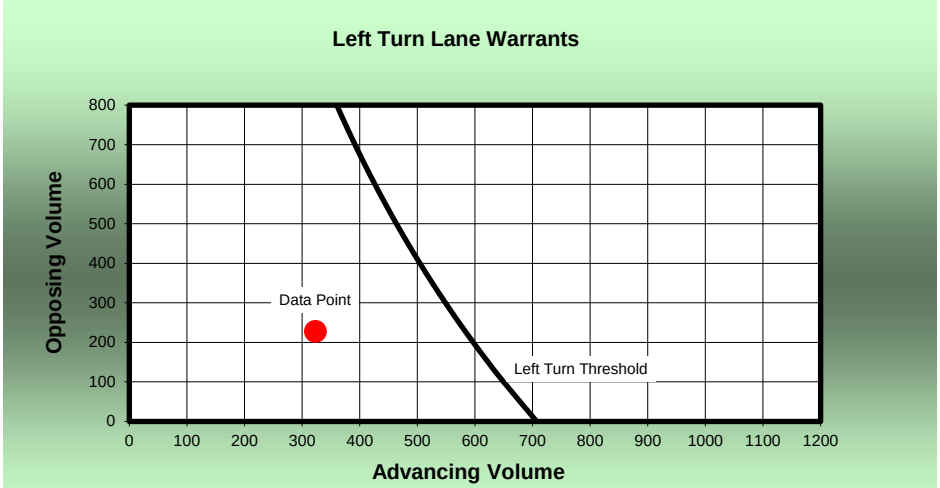
2 - Springdale Rd / Entrance 1
WBR 2033 PM Build

Left Turn Lane Warrants

Input Fields

Left Turn Volume (vph)	20	Speed Limit (mph)	35
Advancing Volume (vph)	322	No. of through lanes	2
Opposing Volume (vph)	228	Percent Heavy Vehicles (decimal percent)	0.02



Left Turn Lane NOT Warranted

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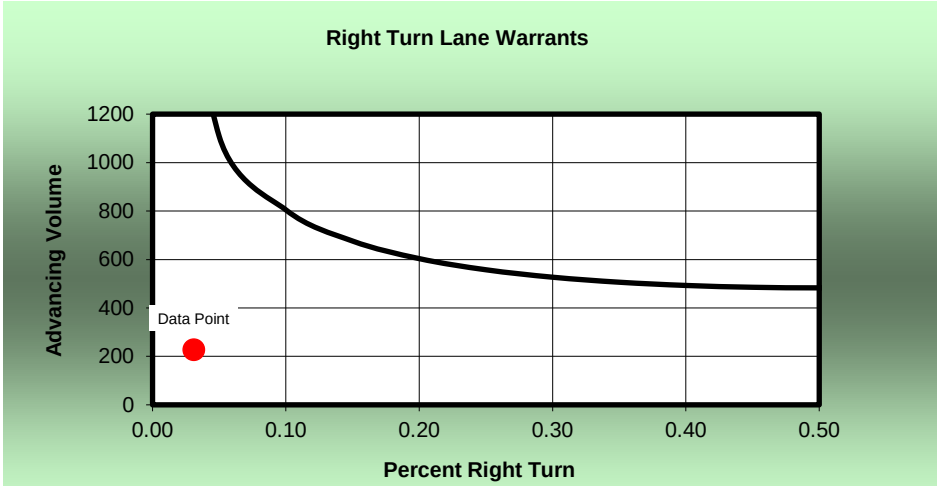
1- Springdale Rd / Asbury Park Blvd
WBL 2033 PM Build

Right Turn Lane Warrants

Input Fields

Right Turn Volume (vph)	7	Speed Limit (mph)	35
Advancing Volume (vph)	228		



Right Turn Lane NOT Warranted

Note: This spreadsheet is intended to supplement the guidance provided in the Auxiliary Turn Lane policy outlined in the KYTC Highway Design Manual. This policy should be fully reviewed and understood prior to using this application.

1- Springdale Rd / Asbury Park Blvd
EBR 2033 PM Build