

**CITY OF GOODLETTSVILLE
PLANNING COMMISSION MEETING AGENDA
Monday June 1, 2020 5:00 PM**

**Call to Order
Approval of Agenda
Approval of May 21, 2020 Meeting Minutes
Individual Review of Regular Agenda Items**

AGENDA

- Item#1 **PUBLIC HEARING Planning and Development Services Staff:**
Requests an amendment of the City’s Comprehensive Land Use Plan to change an area designation from residential low density to high density residential for the requested rezoning of properties on Dickerson Road. (Rescheduled from May 21st Meeting)
- Item#2 *QuikTrip#7144/Jacobs Engineering Group, INC: Request traffic study approval for an 8,292 sq. ft. building and sixteen (16) fuel pumps on 9.17 acres on Hwy 31W/Louisville Highway. Properties referenced as Sumner County Tax Map 141, Parcels 047.00, 047.01, 048.00, and 050.00 and are zoned CG, Commercial General, Interchange Overlay (9.1# 05-20). Property Owners: Michael and Patsy Donahoe (Site Plan approved at April 27, 2020 Meeting)*
- Item#3 **Northcreek Commons/Armed Services Mutual Benefits, Performance Bond Extension**

Discussion Items:

-Planning Commission Training Session

Public Forum on Planning Related Topics

Agenda Items: Davidson County/ Sumner County

GOODLETTSVILLE CITY HALL MASSIE CHAMBERS

A government committed to operating with efficiency and integrity in all we do as we strive to enhance the quality of life for the community we serve.

105 S. Main Street – Goodlettsville, TN 37072 – 615-851-2200 – Fax 615-851-2212

OFFICIAL MINUTES OF THE MEETING
GOODLETTSVILLE PLANNING AND ZONING COMMISSION

May 21, 2020
5:00 p.m.

Electronic-Remote Format
City Hall Auditorium Closed

Staff presented that the remote electronic format meeting was being completed through the ZOOM hosting site due the impacts of COVID-19 and the Governor's Order including extension to permit the remote electronic meeting format. The intention of the remote electronic format is to protect the health and safety of the Planning Commissioners and Citizens of Goodlettsville while meeting the City's intention to continue the business of the City. The meeting date was rescheduled from the regular meeting date of May 4th.

Present: Chairman Tony Espinosa, David Lynn (available at Item#2), Scott Trew, Mayor Jeff Duncan, Jim Hitt, Grady McNeal, Judy Wheeler, and Jeff Parnell Roll Call Vote-completed and Planning Commissioners stated that no one was in attendance with them at their remote meeting location.

Absent: Bob Whitaker, Vice-Mayor Rusty Tinnin, and Jerry Garrett

Also Present: Addam McCormick, Russell Freeman, Mary Laine Hucks, Tim Ellis, and Greg Edrington

Chairman Espinosa called the meeting to order and offered prayer

Staff discussed the revised meeting format and the revised meeting agenda. Staff discussed the Comprehensive Plan Amendment Public Hearing has been rescheduled again until the June 1st meeting.

Hitt made a motion to approve the agenda, Wheeler seconded the motion. The motion passed unanimously 7-0. Roll call vote completed

Trew made a motion to approve the minutes of the April 27, 2020 meeting, McNeal seconded the motion. Motion approved unanimously 7-0. Roll call vote completed

Wheeler made the motion to suspend the Planning Commission's By-Laws to permit the remote meeting format and prior submitted public forum comments to be reviewed before the regular agenda items, Duncan seconded the motion. The motion passed unanimously 7-0. Roll call vote completed

Public Forum on Planning Related Topics

Staff discussed that no comments received prior to meeting and at the end of the regular agenda staff asked if anyone participating on the zoom format has any comments for the Planning Commissioners and no comments were received.

AGENDA ITEMS

| | |
|---------------|---|
| ITEM#1 | <u>Woodwyn Hills Subdivision Section Five/ Ragan Smith and Associates: Request final subdivision plat for two (2) single family lots</u> |
|---------------|---|

and Lynn Drive road right-of-way dedication on 11.78 acres on Lynn Drive and Kimberly Drive. Property is referenced as Sumner County Tax Map/Parcel# 143 101.00 000 and is zoned R-15, Medium Density Residential. (9.1# 06-20) Property Owner: Woodwyn Hill, LLC.

Item Representative: Tom Darnell, Ragan Smith and Associates

Staff Discussion:

- History of project and property included in Woodwyn Hills Master plan- twenty-seven (27) lots and extension of Lynn Drive to Park Drive
- Request to divide the property into two (2) five (5) plus acre single family lots- and dedication of Lynn Drive right-of-way
- Per previous meeting applicant discussed with topography issues and the costs associated with Lynn Drive extension in relation to potential buildable lot areas
- Lynn Drive originally a temporary cul-de-sac but constructed and paved in 1994 and staff discussed with Public Works Director and when Lynn Drive is repaved the City would include the cul-de-sac area as well since will be within right-of-way
- Other section of Lynn Drive would be changed to Kimberly Drive per Sumner County 911
- Staff determined no cul-de-sac needed on section of roadway since only change with proposal will be a single family house
- Staff discussed recommended stipulations: add notation that homes constructed on lot 1 and lot (2) two to be within 600' feet of a fire hydrant or other fire protection system approved by City of Goodlettsville Fire Department and add notation referencing the Woodwyn Hills restrictive covenants and design guidelines.

Planning Commission Discussion:

- Parnell discussed question in why property was not developed- appears per information could be developed
- Parnell asked with the proposal the only additional approval will be for permits to be requested
- Staff stated yes and if any additional lot subdivisions are proposed the Planning Commission review would be required since right-of-way and cul-de-sac dedication would be needed at short end of Lynn Drive being changed to Kimberly Drive
- Parnell asked about ownership of the property
- Darnell stated the ownership is Woodwyn Hills LLC that is separate from the homeowner's association and was a left over piece of property from development
- Espinosa read the staff stipulations
- Darnel agreed to stipulations

Motion:

Wheeler made the motion to approve the request, seconded by Duncan. The motion passed unanimously 7-0. Roll call vote completed

ITEM#2 **Goodlettsville Hotel, LLC/Mid-TENN Engineering Co: Request site plan approval for a five (5) story -67,560 square feet hotel at 555 Rivergate Parkway. Property is referenced as Davidson County Tax Map/Parcel# 02609009200 and is zoned CSL, Commercial Services**

**Limited within the Interstate Sign District. (9.1#07-20) Property
Owner: Vishal A Banker**

Item Representatives: John Barnett, Project Architect and Evan White, Project Civil Engineer,
and Victor Banker, Property Owner

Staff Discussion:

- Five (5) story building proposed – CSL zoning permits five (5) stories, Commercial Core Overlay four (4) stories but property within the interstate sign zone and per recent amendment can be extended to seven (7) stories- staff determined the five (5) story proposal permitted
- Building design includes fifty-one (51%) percent brick and remainder EIFS construction
- Design Guidelines requires accessory building to match primary building design
- Question for Planning Commission with location of pool house behind primary hotel building and seventeen (17') to twenty-three (23') elevation difference from Rivergate Parkway if design as proposed would meet intention of Design Guidelines
- Property within CCO, Commercial Core Overlay which requires eight (8) feet sidewalks along the street- there is currently a five (5') sidewalk along the property with vegetation covering portions and sections with damage
- Due to property elevation along the property that would prohibit any site development along the sidewalk and location at edge of overlay staff recommends maintaining existing sidewalk width but removal of vegetation and repairs/replacement of damaged sections
- Loden Vision site has the eight (8') feet sidewalk but unsure what was there before site development
- Recent Summerland Apartment Fire- issue with service to apartments with one driveway access
- Fire Chief requested and is working with apartment ownership to include a drive connection between the hotel and apartment with some barrier type to permit only emergency access
- Connection shown on site plan but connection would require both property owners to agree and if the apartment ownership does not approve then drive would not be built
- Driveway access point at the existing Rivergate Parkway median break which includes Loden Vision center additional access point also
- Adjacent professional condo development ownership previously requested a median break along Rivergate Parkway for full access point and was denied by the city
- Staff previously discussed with owner if they would be open to a shared connection that would require agreement between both property owners not a part of this site plan but wanted issue captured in the meeting minutes

Planning Commission Discussion:

- Trew asked about sidewalks and wanted to be consistent with previous projects
- Trew stated previously developments along Dickerson Rd issue came up and sidewalk payment in lieu of fee would be required and would this apply in this case
- Espinosa discussed possible payment and consideration for spending done along sidewalk section including repairs and vegetation removal
- Staff stated unsure if payment in lieu would apply since there is an existing sidewalk along the front of property and if fee charged would have to be calculated based on additional three (3') feet width versus full width of eight (8') feet

- Freeman discussed consistency concerns and some method for a pro-rated fee that would be required for payment in lieu of additional three (3') feet sidewalk width
- Freeman discussed if a variance procedure was even available by the Planning Commission and if grades along Rivergate Parkway could be used as a determination
- Ellis stated with the sidewalk installation a precedent has already been set with the Loden Vision Center development being required to install eight (8') feet sidewalk against the owner's strong desire not to install
- White discussed the cost to widen sidewalk would be cost prohibited with retaining walls and staff requested clarification if he was talking about private walk on-site or along Rivergate Parkway
- White confirmed referring to on-site and additional width along Rivergate Parkway should not require major grading
- Hitt discussed the sidewalk and possible pro-rated cost and requested clarification on which sidewalk was required to widen and if accessibility design was the issue
- Hitt discussed landscape buffer along the school property
- Staff discussed the landscape plan shows some landscaping in storm water area and school property is several hundred feet away from hotel
- Duncan discussed project and that eight (8') sidewalk is needed with a project of this scope and to match what is across the street and grades at school buffer area
- Duncan discussed the shared connection with adjacent office building and that would be a negative appearance and connection but understands the previous request from office condo property owners
- Staff stated the connection to adjacent office building is not part of the site plan since not needed for this project but discussion to just reference in minutes
- Parnell recommended the eight (8') feet sidewalk width in this case and not the payment in lieu of funds option since possible connection for adjacent school
- Parnell discussed sometimes do not agree with wider sidewalk widths but in this case the additional width is needed
- Parnell discussed concern with EIFS construction in this climate
- Staff stated the City's Design Guidelines permit the material as secondary material so can bring a possible amendment back but question at this time is if brick on hotel to be also included on pool house
- Parnell discussed the buffer along school area includes thick tree line but not sure how much to be cut with design
- Parnell asked if fence needed around detention pond
- Ellis discussed school already has a perimeter property fence
- McNeal asked about accessible sidewalk design for internal sidewalk and level areas
- Staff stated the sidewalk includes both walk and ramp sections per ADA requirements including rails and walk areas less than five (5%) percent slopes
- White discussed the sidewalk and ramp design
- Espinosa discussed the stipulations and eight (8') feet sidewalk requirement
- Espinosa discussed pool house design and need for consistency in building design per Design Guidelines

Motion:

Duncan made the motion to approve per staff stipulations one and three (3) and deletion of stipulation two (2), seconded by Trew. Espinosa discussed with motion that Planning Commission determined that stipulation one included brick was required as primary material (51%) on the accessory pool house and stipulation three (3) was for eight (8') feet sidewalk width along Rivergate Parkway. The motion passed unanimously 8-0. Roll call vote completed

ITEM#3 **Zoning Ordinance Amendment-Planning Staff:** Request recommendation to the City Commission to amend the Zoning Ordinance Sections 14-305. Signs Permitted in Commercial and Industrial Districts, (2) Interchange Sign Zone (b) to include increased sign area square footage based on the sign separation distance from the property access roadway

Item Representative: Staff Ordinance Amendment/ Daniel Chambers, QuikTrip Corporation – Signage

Staff Discussion:

- Quik Trip site plan approved at April 27th meeting including a high rise sign at 229 sq. ft
- Zoning Ordinance permits a 175 sq .ft sign and approval was subject to Planning Commission and City Commission approval of zoning ordinance amendment
- Review of Quik Trip proposal and zoning ordinance amendment based on location of the high-rise sign in relation to roadway and sliding scale of sign area increases based on distance but not exceeding thirty (30%) percent increase and streetscape appearance of increased signage area
- Proposed amendment includes review criteria for the Planning Commission to review increased signage area for all projects within the interstate sign zones at I-65 exits 96, 97, and 98
- Proposed review criteria regarding streetscape appearance of increased sign area and impacts onto any adjacent residential areas
- Quik Trip sign is proposed to be 420' feet from Hwy 31W/Louisville Highway and adjacent to I-65

Planning Commission Discussion:

- Wheeler asked staff if there would be any impacts to residential area since staff report states there should not be any impacts
- Staff discussed due to the location of the proposed sign adjacent to I-65 and size of the property the sign would be several hundred feet from adjacent property and across I-65 a house sits on top of the hill that will be above sign- similar to billboard in area
- Duncan discussed liking sign on this property and amendment prepared by staff

Motion:

Hitt made the motion to approve the request, seconded by McNeal. The motion passed unanimously 8-0. Roll call vote completed

ITEM#4 **502 N. Main/Marty Aleman:** Requests approval for a fenced granite slab display area at 502 N. Main Street and 107 New Brick Church Pike. Properties are referenced as Davidson County Tax Map/Parcels#

01816003700 and 01816020200 and are zoned CSL, Commercial Services Limited. Property Owner: Sankumba Diaoune {Deferred at April 27, 2020 Meeting}

Item Representative: N/A

Staff Discussion:

- Deferred item from last meeting was anticipating someone would be on the meeting to represent the project based on emails received with applicant
- No plans or renderings were submitted for display screen
- Recommends the item to be deferred.

Planning Commission Discussion:

Motion:

Duncan made the motion to defer the request, seconded by Trew. The motion passed unanimously 8-0. Roll call vote completed

DISCUSSION ITEM

June 1st Planning Commission Meeting

-Staff discussed in-person meeting format but would do zoom format also to allow any Planning Commissioner that is not able to attend the in-person meeting to participate. Espinosa discussed with staff to present any comments received since some members of the public might not be able to attend the meeting. Staff discussed the meeting room will be set up including social distancing standards so will look different.

Dry Creek Commons on Dry Creek Road:

Staff stated that the developer has requested to offer for sell the townhouse units from the original proposal for single ownership and rental and they are using the horizontal property regime master deed process per state law. Staff stated the state law states that the subdivision plat process is optional and that city staff will follow state law provisions with master deed process.

With no further business, the meeting adjourned at 6:12 pm.

Tony Espinosa, Chairman

Addam McCormick, Planning Director

**CITY OF GOODLETTSVILLE
PLANNING COMMISSION MEETING AGENDA
Monday June 1, 2020 5:00 PM**

STAFF RECOMMENDATION REPORT

AGENDA

- | | |
|---------------|---|
| Item#1 | <u>PUBLIC HEARING</u> Planning and Development Services Staff: Requests an amendment of the City's Comprehensive Land Use Plan to change an area designation from residential low density to high density residential for the requested rezoning of properties on Dickerson Road. (Rescheduled from May 21st Meeting) |
|---------------|---|

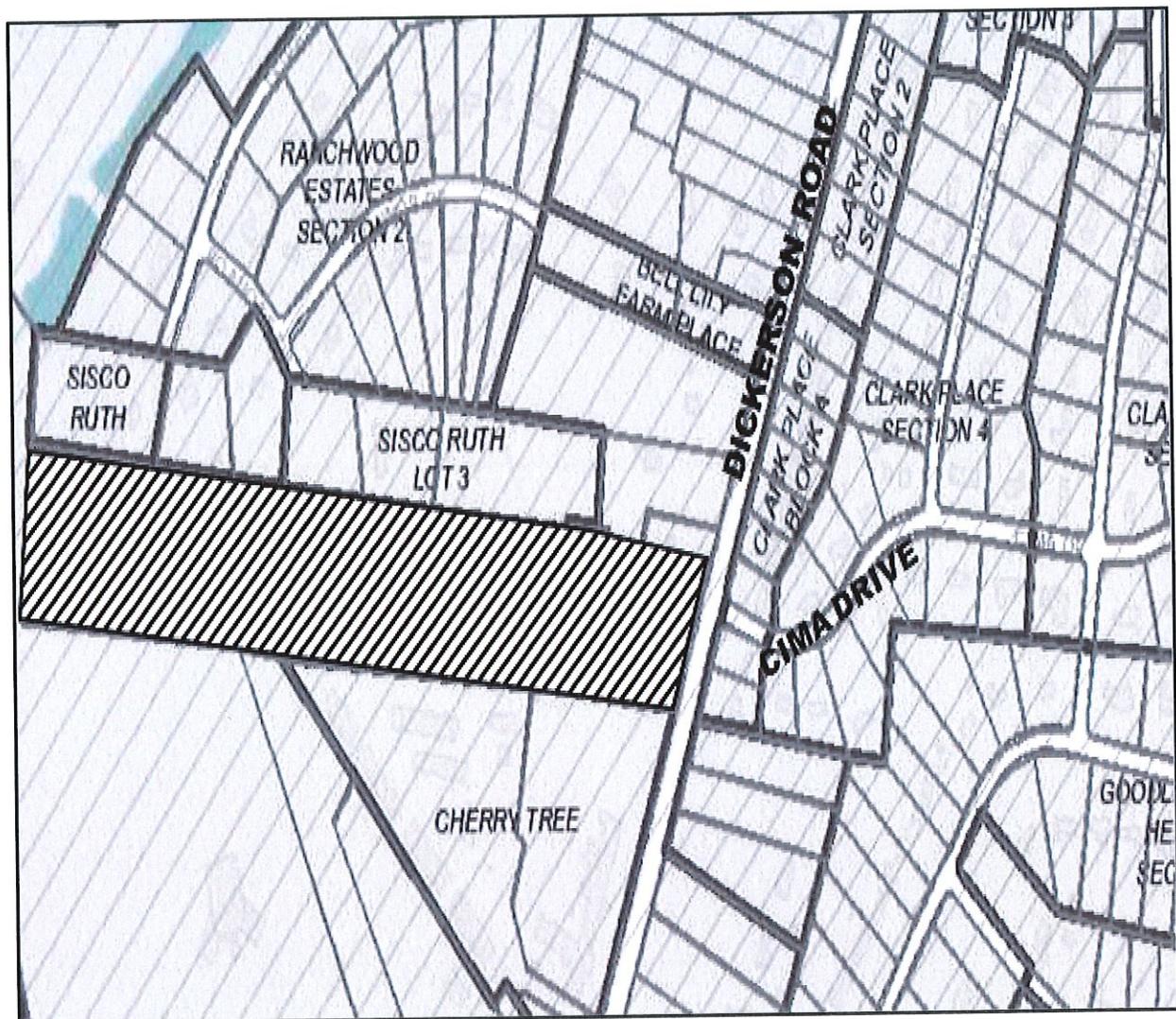
STAFF NOTES:

The Planning Commission at the April 27, 2020 meeting approved a rezoning recommendation request in the proposed amendment area. This item was originally on the same agenda but was rescheduled to include a public hearing. The rezoning recommendation is being held for review by the Goodlettsville City Commission until the Planning Commission's review of the Comprehensive Land Use Plan amendment. The Comprehensive Plan amendment is needed to support the High Density Residential Planned Unit Development proposal. The review of the Comprehensive Land Use Plan amendment to be based on the determined best future development of the area. The Planning Commission is the only board required to review the Comprehensive Land Use Plan amendment which is the reason for the public hearing.

STAFF RECOMMENDATION:

Approval due to the location of the amendment area on Dickerson Road-Hwy 41/SR 11 which is a designated minor arterial route on the City's Major Thoroughfare Plan (2003) and the area would provide a transition between zoned and existing commercial and apartment areas to the south and larger lot single family lots to the north

Proposed Comprehensive Plan Amendment:



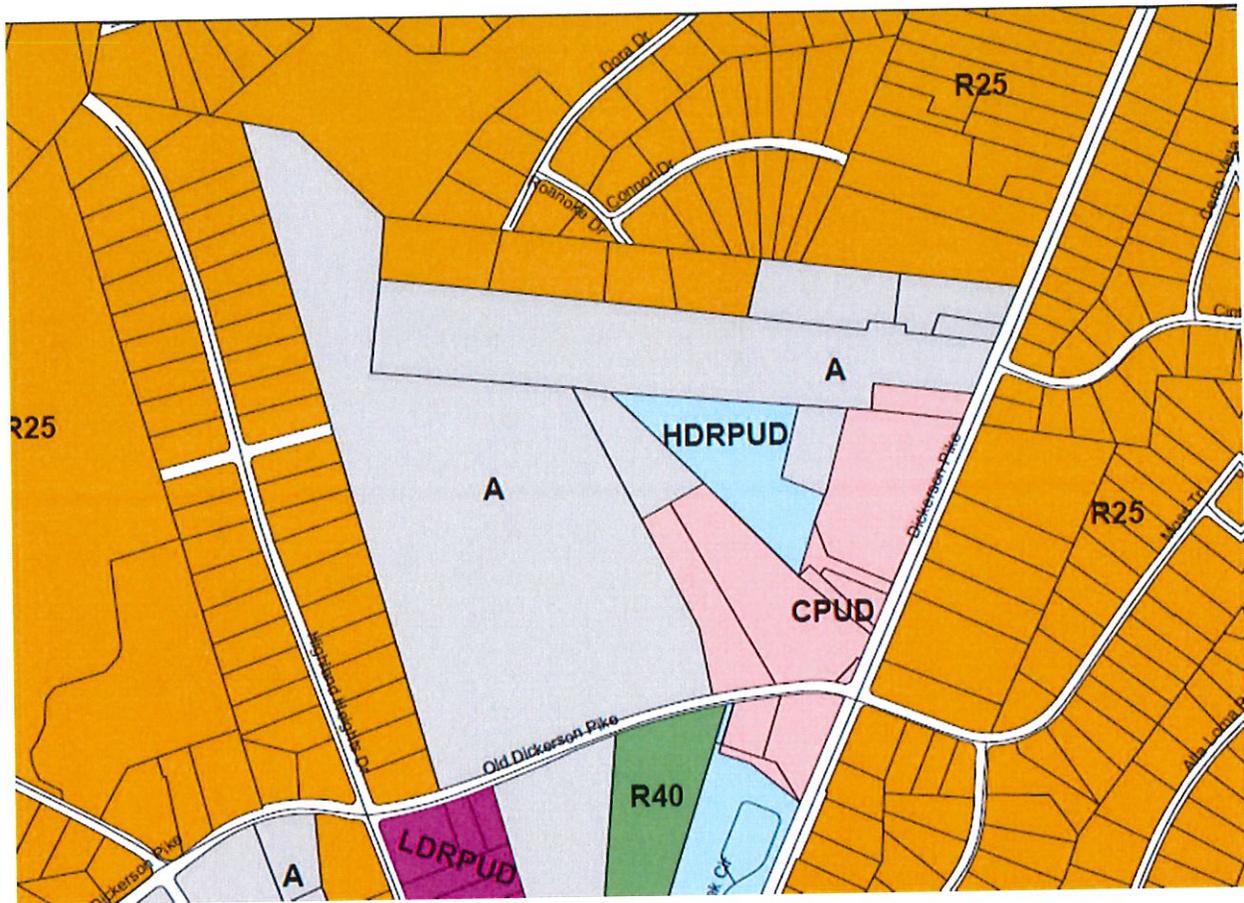
Comprehensive Land Use Plan Map Section:



LEGEND:

- Residential Development High Density
- Residential Development Med. Density
- Residential Development Low Density
- Residential Conservation High Density
- Residential Conservation Med. Density
- Residential Conservation Low Density
- Commercial Development
- Commercial Concentration
- Industrial General
- Office Development
- Park and Open Space
- Public Buildings
- Industrial Restrictive

Zoning Map Section:



Comprehensive Land Use Plan Text Sections:

GENERAL GOALS

The following listing of general goals provides overall direction to the land use policies and to the decision-making process.

- * Preserve the separate and unique identity of the City of Goodlettsville.
- * Provide a high level of public services for the citizenry.
- * Preserve the stability, integrity, and property values of viable residential neighborhoods.
- * Promote high quality commercial and industrial development.
- * Encourage and promote overall community beautification.
- * Encourage and promote redevelopment and beautification of business areas along Main Street.
- * Preserve the floodplains and steep slopes in a natural open space setting.

A. POLICIES FOR RESIDENTIAL DEVELOPMENT

The plan recommends general densities at which residential development should occur. These recommendations are based upon analyses of past and current patterns of development, availability of sanitary sewers, land character, and other factors. The densities are classified into four general categories as follows:

| | |
|--------------------------|------------------|
| Low Density | 1 - 2 dupa* |
| Low Medium Density | 3 - 4 dupa |
| Medium Density | 5 - 6 dupa |
| High Density | 7 and over dupa. |

* dwelling units per acre

Residential areas are further classified as either "residential conservation" or "residential development." Conservation areas are those neighborhoods which are predominantly developed and should be protected. Development areas are those where new development or redevelopment can be permitted at varying densities.

1. Residential conservation areas should be protected from encroachment by incompatible activities. Prevailing lot sizes and densities are to be maintained, and any infill development should occur in a similar pattern.
2. Residential development areas should be permitted to develop at a density appropriate for the area. Where sewer is available, low medium density subdivisions may occur. *Medium and high density development should be restricted to planned unit developments and should provide transition from low to higher densities.*
3. Residential densities in development areas without sewer availability should be one dwelling unit per acre or less, depending upon soil types. As public sanitary sewer is provided, higher densities may be considered.
4. *High density development shall be a planned unit development. These developments should be located with direct access to a major street with no traffic routed through existing neighborhoods.*
5. Planned unit development should be encouraged. Density and design control should be exercised through the PUD review process and through staff implementation.

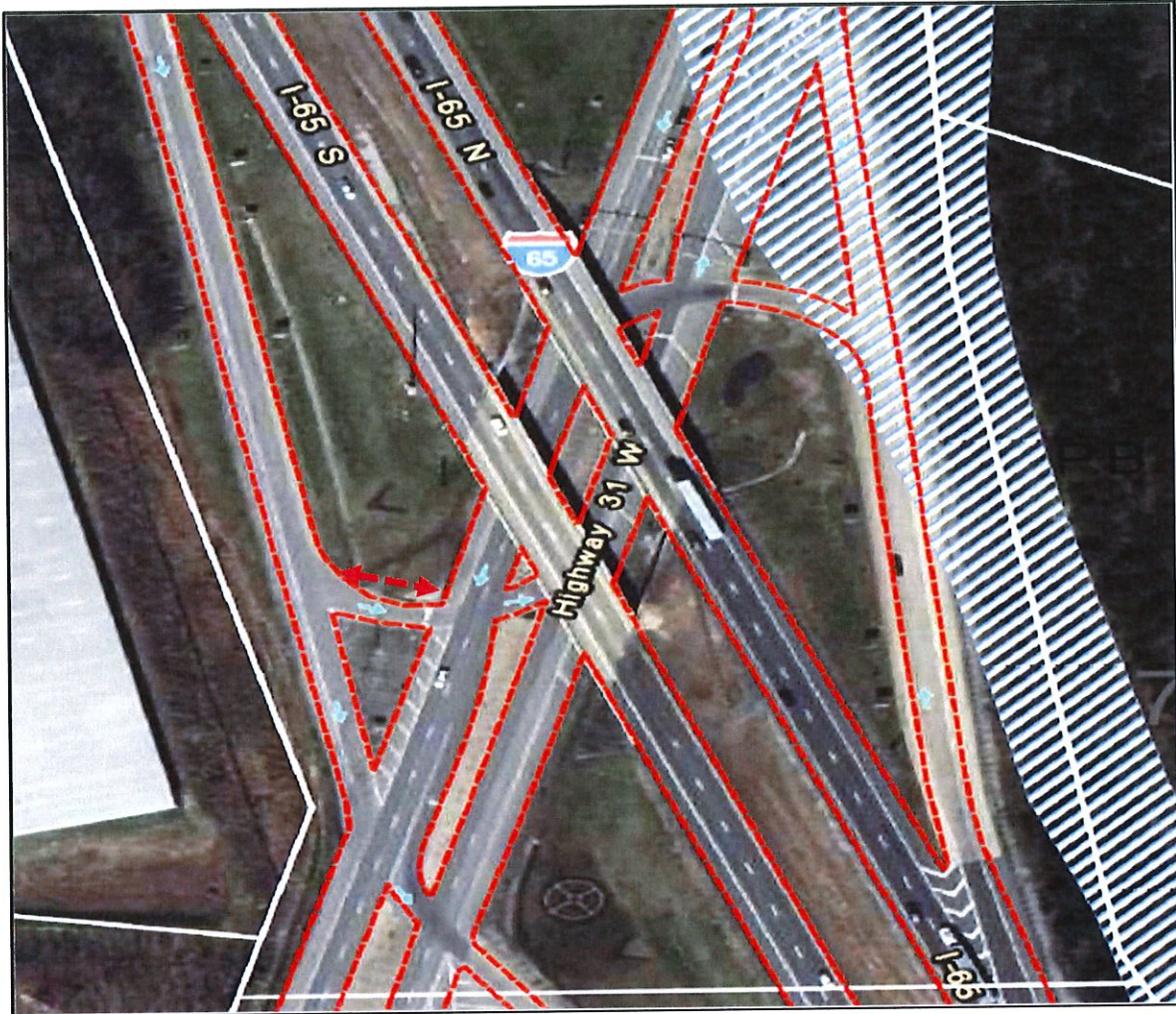
6. Overzoning, i.e., zoning districts which have lot size requirements smaller than the prevailing developed lot size, should be discouraged and corrected as opportunities exist.

Item#2 **QuikTrip#7144/Jacobs Engineering Group, INC:** Request traffic study approval for an 8,292 sq. ft. building and sixteen (16) fuel pumps on 9.17 acres on Hwy 31W/Louisville Highway. Properties referenced as Sumner County Tax Map 141, Parcels 047.00, 047.01, 048.00, and 050.00 and are zoned CG, Commercial General, Interchange Overlay (9.1# 05-20). Property Owners: Michael and Patsy Donahoe (Site Plan approved at April 27, 2020 Meeting)

STAFF NOTES:

The Planning Commission approved the Quik Trip Site Plan at the April 27, 2020 meeting with the stipulation for a project traffic study to review impacts onto adjacent turn lane and traffic signals. The traffic study does not include any recommended off-site improvements. The Quik Trip site plan includes the design recommendations for the three (3) project driveway access points. The traffic study does reflect an estimated peak traffic flow level of service impact for the Exit 98- I-65 south bound ramp (left turn or access to Hwy 31W North). The current left turn lane section is limited in length to eighty (80') feet. The start of the left turn lane per Google Earth measurement is 860 feet from the beginning of the south bound ramp. The total length of the south boundary ramp is 1,050 feet from the beginning of the ramp to Hwy 31W. Staff discussed the ramp left turn lane issue with the traffic engineer including possible additional detailed turn movement studies but the estimated worse case scenario peak hour vehicle delay concern would be vehicles backing up at the beginning of the left turn lane section on the exit ramp to Hwy 31W not the entire ramp. See Table 7. Study Intersections 95th Percentile Queue Length on page#26. The Tennessee Department of Transportation (TDOT) controls all interstate ramp design issues and with this case if any additional ramp lane width improvement would be needed to increase the separation distance for the ramp left turn and right turn lane sections.

STAFF RECOMMENDATION: Approval with stipulation for applicant to submit traffic study to TDOT to review the I-65 exit 98 south bound left turn lane to determine if any ramp improvements would be required by TDOT.



Item#3 Northcreek Commons/Armed Services Mutual Benefits, Performance Bond Extension

Project Status: One of five (5) commercial lots completed in project but one of four (4) lots complete that are accessed from Windsor Green Ct / twenty (20%) percent lot construction completed

Subdivision Plat Information: North Creek Commons Lots 23-27 – Recorded May 31, 2018

Subdivision Roadways: Windsor Green Court

Subdivision Bond Information: Performance Bond \$ 333,000- July 10, 2020 Expiration

Remaining Improvements:

-Conference Drive/ Windsor Green Ct Intersection Traffic Signalization and Turn Lane Striping- included with the City of Goodlettsville Conference Drive Project

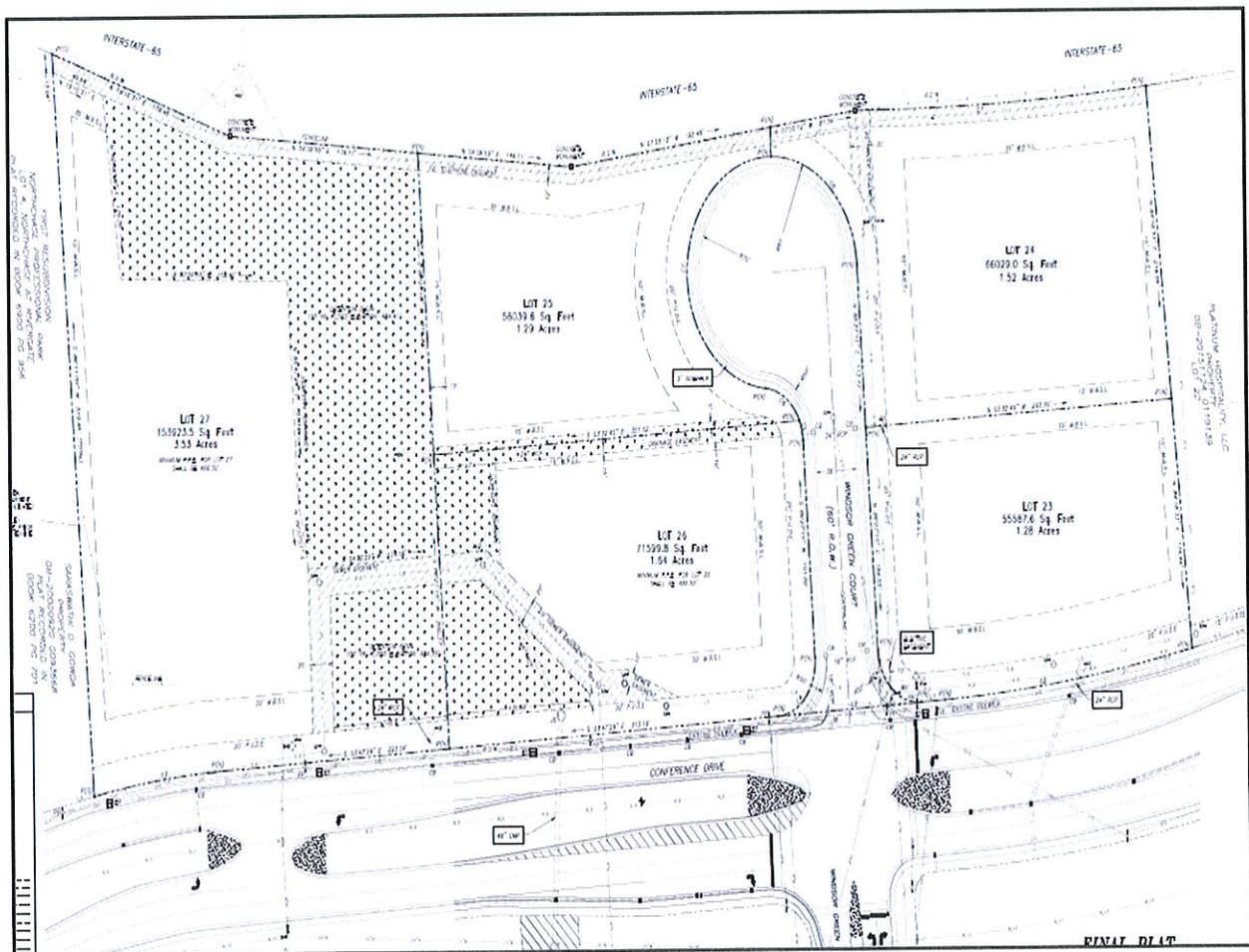
-Any additional storm water site stabilization or erosion control issues that might occur with additional lot construction

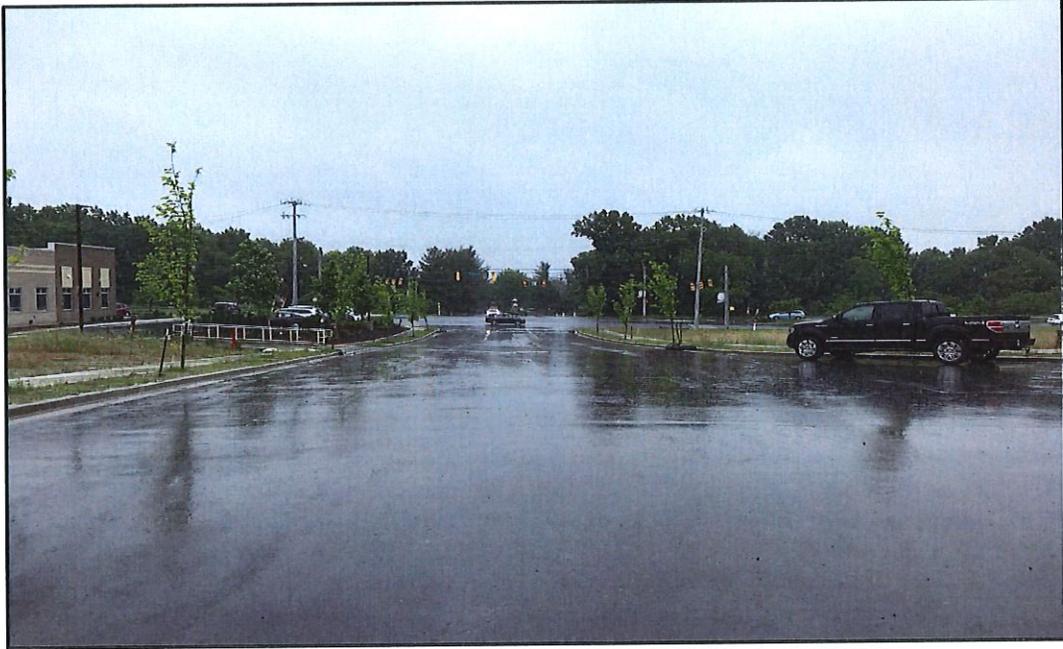
Remaining Improvement Cost Estimate: \$ 150,000 Estimate for Traffic Signalization and Turn Lane Restriping

STAFF NOTES:

The original project agreement was for the Conference Drive and Windsor Green Ct traffic signalization alteration and restriping of existing lane for a left turn lane from Conference Drive into Windsor Green Ct to be completed by the City of Goodlettsville with the City's Conference Drive Project. The City's project is currently anticipated to begin within fourteen (14) to fifteen (15) months. Additional TDOT, Tennessee Department of Transportation funds were recently added to the project and the project is required to be re-bid. The original project agreement also included the developer paying the City for the signalization and restriping required for the North Creek Commons project. The project bond will need to include enough funds to ensure the future payment.

STAFF RECOMMENDATION: Approval of one-year bond extension but owner may submit formal street acceptance during the one-year period





DISCUSSION ITEMS:

-Planning Commission Training Session

Staff intends to reschedule the residential development tour previously discussed for April/May to later this fall. The tour will be contingent upon the status of COVID-19. At the August Planning Commission Meeting, staff will start scheduling short training sessions at the end of each Planning Commission agenda.

STAFF PLAN APPROVALS:

-Hill Place- Old Brick Church Pike

The Planning Commission and City Commission in October 2019 approved a Hill Place Master Plan Amendment to convert the lower level of six (6) buildings for additional residential units. Staff received a site plan for the twelve (12) additional parking spaces and a storm water facility to handle the increased run-off with the parking lot addition. The owner will be installing additional trees similar to existing trees in the area of the parking lot addition.

-New Heights Church- 363 Caldwell Lane

Staff approved a 1,500 sq. ft open pavilion. Planning, Engineering, and Storm Water staff previously meet with church representatives regarding a storm water facility to handle the storm water from the previous limited parking addition (still awaiting pavement) and the pavilion.



TRAFFIC IMPACT STUDY

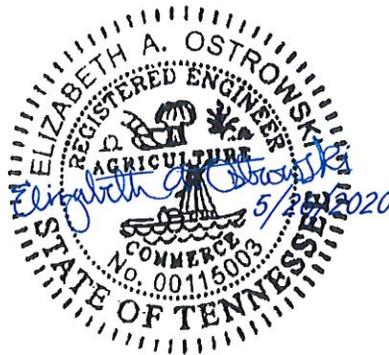
QUIKTRIP – LOUISVILLE HIGHWAY
GOODLETTSVILLE, TENNESSEE



PREPARED FOR:
QUIKTRIP
MAY 2020

TRAFFIC IMPACT STUDY
QUIKTRIP – LOUISVILLE HIGHWAY
GOODLETTSVILLE, TENNESSEE

PREPARED FOR:
QUIKTRIP



PREPARED BY:
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EXECUTIVE SUMMARY

Project Description

The proposed QuikTrip development is located along Louisville Highway in Goodlettsville, Tennessee. According to the developer, the proposed development includes an approximately 8,292 square foot super convenience store with 24 fueling positions. Access to the development is planned to be provided by three driveways on Louisville Highway. The purpose of this study is to analyze the access plan and the traffic impacts associated with this proposed development.

Data Collection

For the traffic impact analysis, the following intersections were analyzed:

1. Louisville Highway and I-65 Southbound Ramps (unsignalized)
2. Louisville Highway and I-65 Northbound Off-Ramp Left-Turn (signalized)
3. Louisville Highway and I-65 Northbound Ramps (unsignalized)

Due to circumstances caused by COVID-19, accurate turning movement counts could not be collected at the study intersections. Through coordination with the City of Goodlettsville and TDOT, hourly volume counts from 2019 along Louisville Highway and the interchange ramps were obtained. Utilizing these volume counts, turning movement volumes were estimated at the study intersections for both the AM and PM peak hours. These turning movement volumes were utilized for the analyses under existing conditions.

Projection of Future Traffic Volumes

In order to account for the traffic growth prior to the completion of the proposed project, background traffic volumes were established. Then, the estimated total project-generated traffic volumes for the proposed development were added to the background peak hour traffic volumes in order to obtain the total projected peak hour traffic volumes for the study area intersections.

Conclusions and Recommendations

The analyses presented in this study indicate that the impacts of the proposed project on the existing street network will be manageable by providing the recommendations below. These specific recommendations will provide safe and efficient traffic operations within the study area following the completion of the proposed project. The recommendations are as follows:

Louisville Highway and Site Access A

- The southbound approach from the site should include one ingress lane and two egress lanes.

Louisville Highway and Site Access B

- The southbound approach from the site should include one ingress lane and two egress lanes.

Louisville Highway and Site Access C

- The southbound approach from the site should include one ingress lane and one egress lane.

General

- As part of the construction of the project, all site accesses should be designed such that the departure sight triangles, as specified by AASHTO, will be clear of all sight obstructions, including landscaping, existing vegetation, monument signs/walls, fences, etc.
- Wayfinding signage should be provided on-site in order to clarify passenger and truck access and circulation.

In summary, based on the analyses conducted, no further recommendations are presented for the proposed QuikTrip development.

1. INTRODUCTION AND PROJECT DESCRIPTION

The purpose of this study is to analyze the traffic impacts and access plan associated with the proposed QuikTrip development located along Louisville Highway Goodlettsville, Tennessee. According to the developer, the proposed development includes approximately 8,292 square feet super convenience store with 24 fueling positions.

As shown by Figure 1, the property is located along Louisville Highway north of the I-65 interchange with Louisville Highway. The property is currently zoned CG (General Commercial). The proposed development is within an area that is characterized by low-density land uses. The property is generally bounded on the north by commercial use, on the west by I-65, on the south by commercial uses, and on the east by Louisville Highway.

The current site plan for the QuikTrip development is shown in Appendix A. Based on this site plan, proposed vehicular access for the development is planned to be provided by three driveways on Louisville Highway. The western site access (Site Access A) is planned to include 2 egress lanes and 1 ingress lane. The middle site access (Site Access B) is planned to include 2 egress lanes and 1 ingress lane. The eastern site access (Site Access C) is planned to be the truck access to the site. Surface parking is planned to accommodate the proposed development.

In this study, the current operating characteristics of the adjacent roadways and intersections in the vicinity of the project site are evaluated. The expected trips generated by the proposed development are determined and distributed to the roadway network. The adjacent roadways and intersections are then reevaluated to determine the anticipated traffic impacts of the project. Finally, recommendations are presented, including roadway improvements and/or traffic control improvements that are needed to accommodate the expected traffic.

FIGURE 1. LOCATION OF THE PROJECT SITE



Location of the Project Site
(Not to Scale)

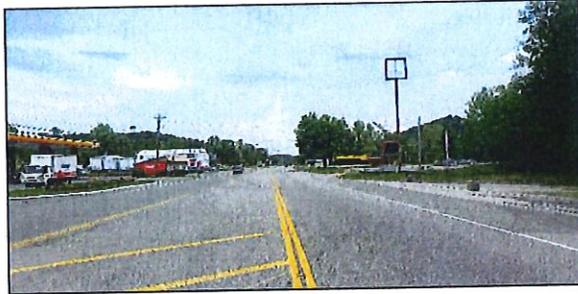
Figure 1.

2. EXISTING CONDITIONS

2.1 Existing Roadway Network

Local access to the site will be provided by I-65 and Louisville Highway. A description of these roadways within the project vicinity is as follows:

Louisville Highway is a two-way roadway that generally travels in the north-south direction, however, due to the proximity to I-65 Louisville Highway is modeled as an east-west roadway in this report. The number of lanes varies due to the proximity to the interchange, but generally includes three lanes to the east of the interchange. Within the study area, Louisville Highway provides connection between Donelson Pike, I-65, and Millersville. According to TDOT functional classification, Louisville Highway is classified as a principle arterial. The posted speed limit on Louisville Highway is 40 mph. Sidewalk, on-street parking, and transit facilities are not provided on Louisville Highway.



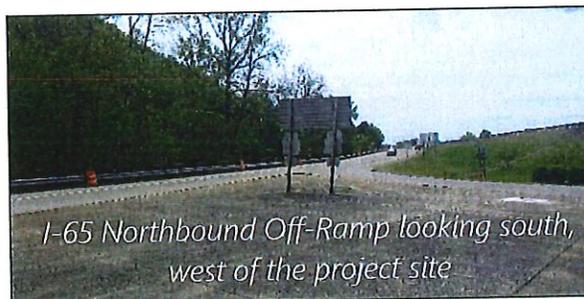
*Louisville Highway looking east,
west of the project site*

I-65 Southbound Ramps are one-way ramps that generally travel in the north-south direction. Each ramp has one lane. The ramps connect I-65 Southbound to Louisville Highway. Sidewalk, on-street parking, and transit facilities are not provided on the ramps.



*I-65 Southbound On-Ramp looking north,
west of the project site*

I-65 Northbound Ramps are one-way ramps that generally travel in the north-south direction. The on-ramp includes one lane. The off-ramp includes two lanes. The ramps connect I-65 Northbound to Louisville Highway. Sidewalk, on-street parking, and transit facilities are not provided on the ramps.



*I-65 Northbound Off-Ramp looking south,
west of the project site*

The study area includes three existing intersections described as follows:

Louisville Highway and I-65 Southbound Ramps is an unsignalized intersection with four approaches. The eastbound approach of Louisville Highway is free flowing and includes two through lanes and a right turn channel. The southbound approach of the southbound off-ramp is stop controlled and includes a right turn lane and a left turn bay with approximately 100 feet of storage. The westbound approach to Louisville Highway is free flowing and includes two through lanes and a left turn bay with approximately 145 feet of storage. Pedestrian facilities are not provided at this intersection.



Louisville Highway looking north, at the off-ramp

Louisville Highway and I-65 Northbound Off-Ramp Left-Turn is a signalized intersection with three approaches. The northbound approach of the northbound off ramp includes one lane allowing left turns only. The eastbound approach includes one through lane. The westbound approach of Louisville Highway includes two through lanes. Pedestrian facilities are not provided at this intersection.



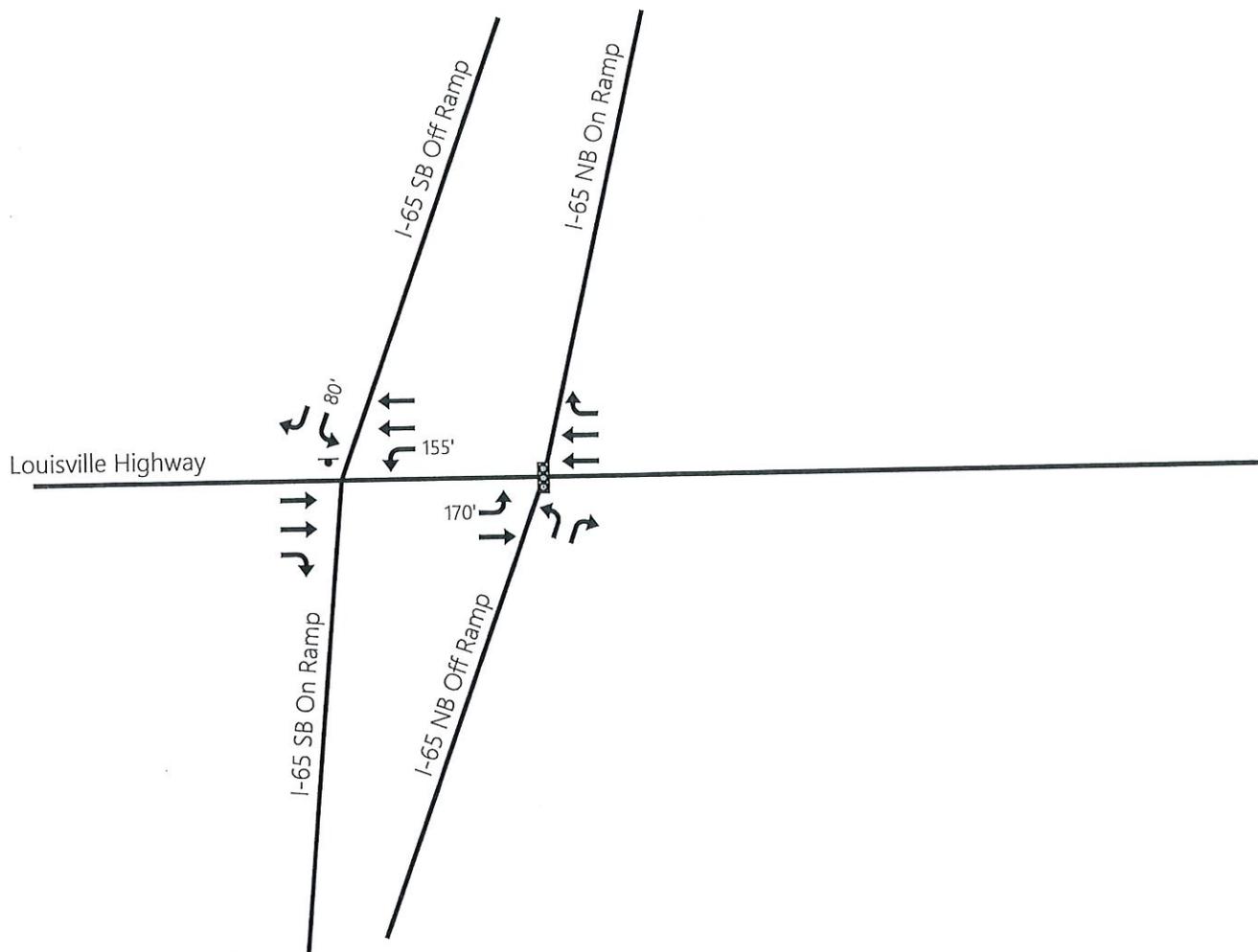
Louisville Highway looking west, at the off-ramp

Louisville Highway and I-65 Northbound Ramps is an unsignalized intersection with four approaches. The northbound approach of the northbound off-ramp includes one right-turn lane and if free-flowing into an add lane on Louisville Highway. The eastbound approach of Louisville Highway includes a through lane and a left-turn bay with approximately 170 feet of storage. The westbound approach of Louisville Highway includes two through lanes and a right turn channel. Pedestrian facilities are not provided at this intersection.



Off-ramp looking north, at Louisville Highway

The existing laneage at the study intersections is illustrated in Figure 2.



- ⏹ - Stop Sign
- ⓧ - Traffic Signal
- XX' - Storage Length
- TWTL - Two-Way Left Turn Lane



Existing Laneage
(Not to Scale)

Figure 2.

2.2 Existing Traffic Volumes

For the traffic impact analysis, the following intersections were analyzed:

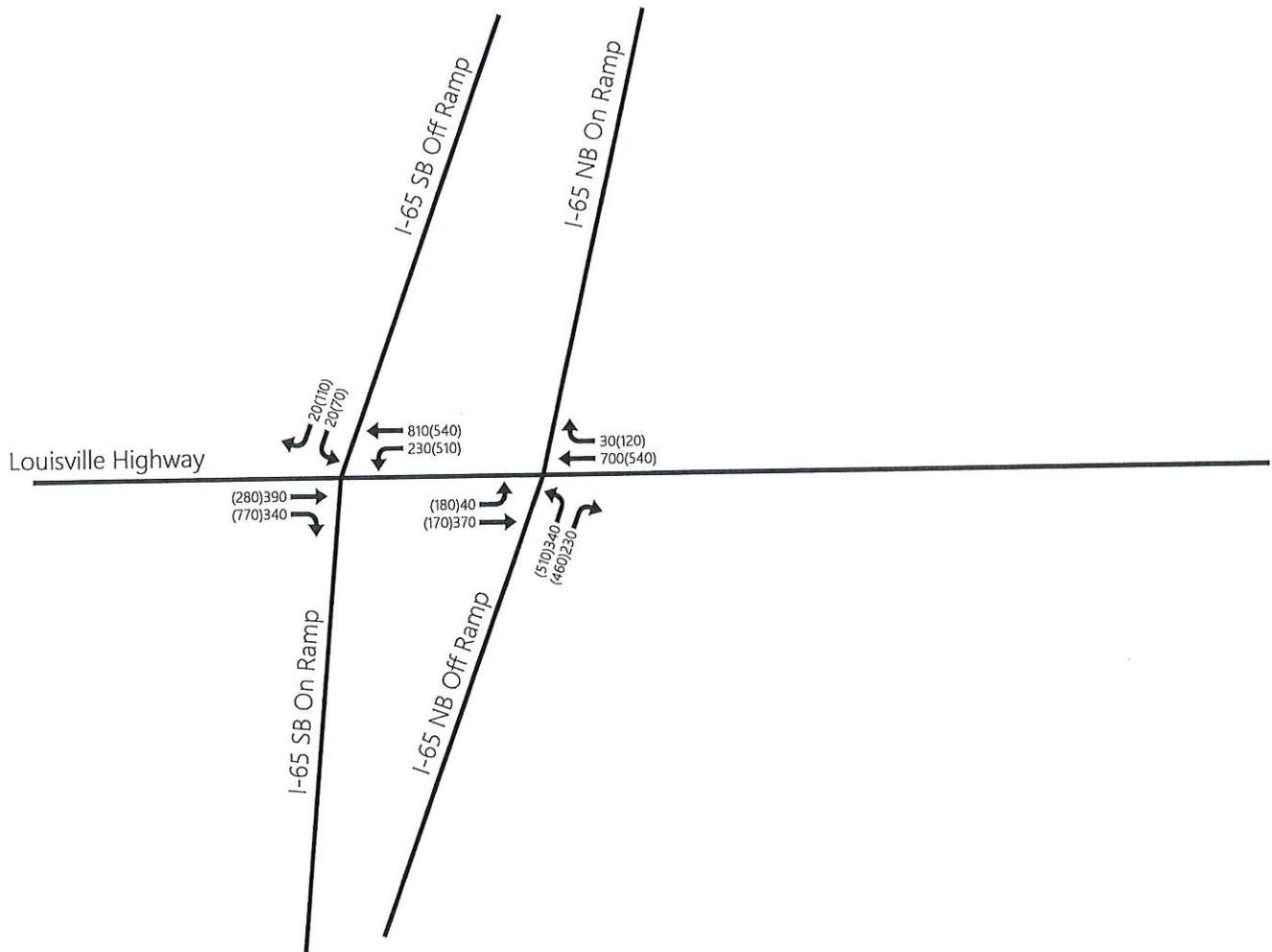
4. Louisville Highway and I-65 Southbound Ramps (unsignalized)
5. Louisville Highway and I-65 Northbound Off-Ramp Left-Turn (signalized)
6. Louisville Highway and I-65 Northbound Ramps (unsignalized)

Due to circumstances caused by COVID-19, accurate turning movement counts could not be collected at the study intersections. Through coordination with the City of Goodlettsville and TDOT, hourly volume counts from 2019 along Louisville Highway and the interchange ramps were obtained. Utilizing these volume counts, turning movement volumes were estimated at the study intersections for both the AM and PM peak hours. These turning movement volumes were utilized for the analyses under existing conditions and are presented in Figure 3. A detailed summary of the tube counts is included in Appendix B.

In addition to the above information, average daily traffic volumes were obtained from the TDOT. There are four TDOT count stations located in the vicinity of the project site. The count station locations and annual average daily traffic (AADT) in 2018 are shown in Table 1. Additional TDOT Count Station data is included in Appendix C.

TABLE 1. TDOT COUNT STATION DATA

| ROADWAY | LOCATION | STATION NO. | 2018 AADT (vpd) |
|--------------------|----------------------------|-------------|-----------------|
| Louisville Highway | West of I-65 | 129 | 20,327 |
| Louisville Highway | Near Davidson County Line | 60 | 11,033 |
| I-65 | Near Sumner County Line | 288 | 97,812 |
| I-65 | Near Robertson County Line | 127 | 56,540 |



XXX - AM Peak Hour
Traffic Volumes
(XXX) - PM Peak Hour
Traffic Volumes



Existing Peak Hour Traffic Volumes
(Not to Scale)

Figure 3.

2.3 Existing Traffic Operations

To determine the current operation of the study intersections, capacity analyses were performed for the AM and PM peak hours. The capacity calculations were performed according to the methods outlined in the *Highway Capacity Manual*, TRB 6th Edition. The capacity analyses result in the determination of a Level of Service (LOS) for an intersection. The LOS is a concept used to describe how well an intersection or roadway operates. LOS A is the best, while LOS F is the worst. LOS D is typically considered as the minimum acceptable LOS for an intersection in an urbanized area. Table 2 presents the descriptions of LOS for signalized and unsignalized intersections.

TABLE 2. DESCRIPTIONS OF LEVEL OF SERVICE

| LEVEL OF SERVICE | DESCRIPTION | UNSIGNALIZED CONTROL DELAY (sec/veh) | SIGNALIZED CONTROL DELAY (sec/veh) |
|------------------|-------------------------|--------------------------------------|------------------------------------|
| A | Little or no delay | ≤ 10.0 | ≤ 10.0 |
| B | Short traffic delay | >10 and ≤ 15 | >10 and ≤ 20 |
| C | Average traffic delay | >15 and ≤ 25 | >20 and ≤ 35 |
| D | Long traffic delay | >25 and ≤ 35 | >35 and ≤ 55 |
| E | Very long traffic delay | >35 and ≤ 50 | >55 and ≤ 80 |
| F | Extreme traffic delay | > 50.0 | > 80.0 |

Source: *Highway Capacity Manual*, TRB 6th Edition

The results of the capacity analyses for the existing conditions at the study intersections are presented in Table 3. As shown, all intersections and critical movements operate at LOS D or better in the AM and PM peak hours with the following exception:

- Louisville Highway and Southbound Ramps
 - The overall intersection operated at LOS E in the PM peak hour.

Due to the configuration of the interchange and limitations of the modeling software, some unsignalized movements were not included in the modeling reports. It is anticipated that these movements operate at LOS C or better based on the expected existing volumes.

Capacity analyses worksheets are included in Appendix D.

TABLE 3. EXISTING PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVEL OF SERVICE (Average Approach Delay in sec/veh) | |
|--|----------------------|---|--------------|
| | | AM Peak Hour | PM Peak Hour |
| Louisville Highway and Southbound Ramps | Southbound Left-Turn | D (34.6) | E (49.3) |
| Louisville Highway and Northbound Off-Ramp Left-Turn | Overall Intersection | B (18.0) | B (19.4) |

Note: For stop-controlled intersections, a LOS is presented for each critical turning movement. For signalized intersections, a LOS is presented for the overall intersection.

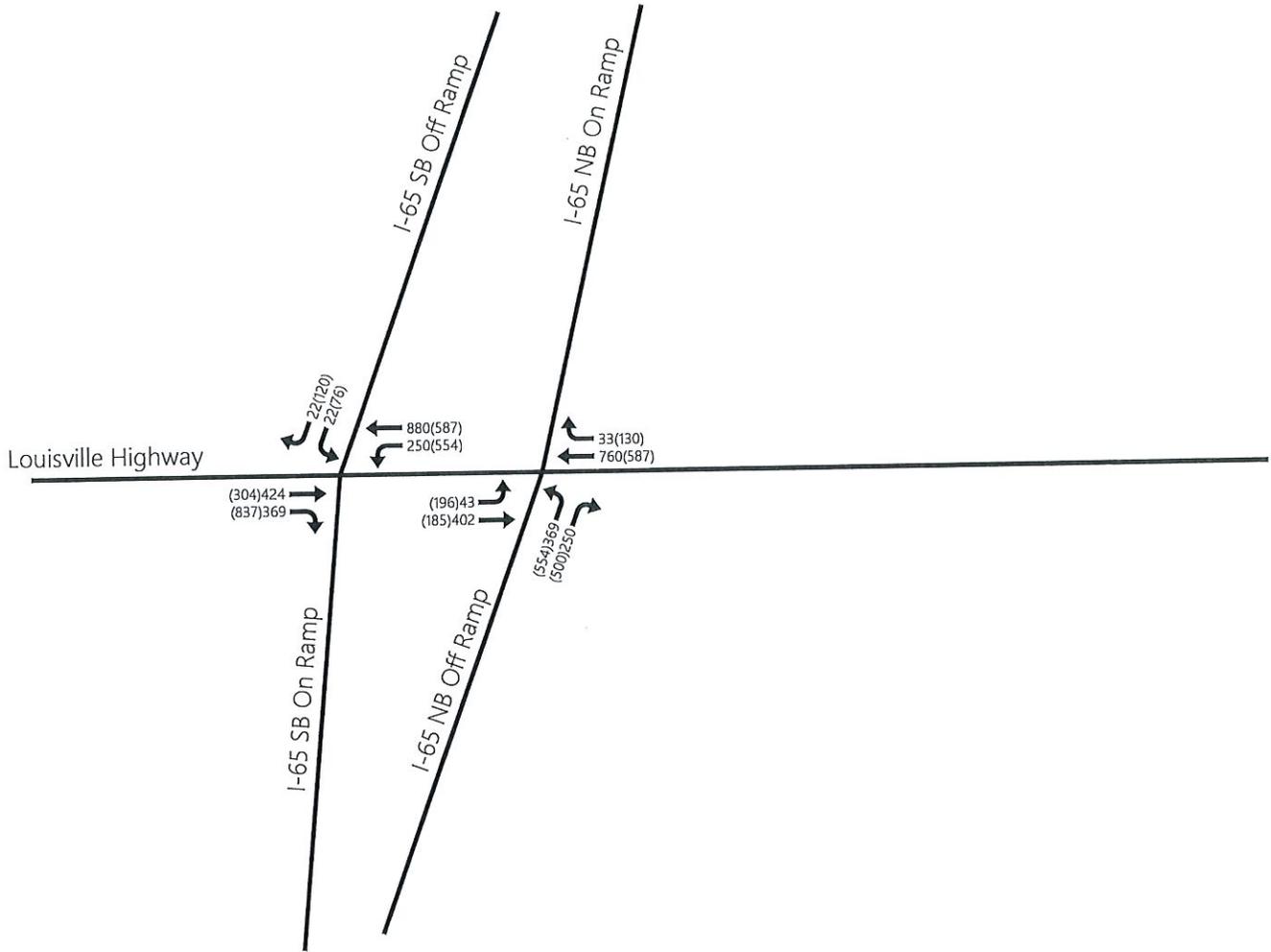
3. BACKGROUND TRAFFIC VOLUMES

3.1 Establishing Background Volumes

In order to account for the traffic growth prior to the completion of the proposed project, background traffic volumes were established. For the purposes of this traffic study, the proposed development was assumed to be completed by the year 2022, which is a 2-year horizon. Historical daily traffic volumes were obtained from the four TDOT count stations located in the vicinity of the project site. Since 2015, the combined traffic at these four TDOT count stations has increased by an average of 2.8% per year. The TDOT count station data is included in Appendix C.

A growth factor was applied to the existing peak hour traffic volumes to account for background growth for the future conditions. The existing peak hour traffic volumes at the study intersections were increased by 2.8% per year for three years to account for anticipated background traffic growth within the study area since the counts were conducted in 2019.

The background peak hour traffic volumes for horizon year 2022 are presented in Figure 4. These volumes represent the peak hour traffic that is expected to be on the roadway in 2022 even if the proposed QuikTrip development is not completed.



XXX - AM Peak Hour
Traffic Volumes
(XXX) - PM Peak Hour
Traffic Volumes



Background Peak Hour Traffic Volumes
(Not to Scale)

Figure 4.

3.2 Background Traffic Operations

To determine the operation of the study area intersections under background conditions, capacity analyses were performed for the AM and PM peak hours. The analyses for the background conditions were based on the same lane configurations and signal timings as the existing conditions.

As shown in Tables 4A and 4B, under background conditions, the capacity analyses indicate that the operational performances of the critical movements at the study intersections are generally expected to continue to operate at the same level of service as under existing conditions or continue to operate at LOS D or better in the AM and PM peak hours with the following exceptions:

- Louisville Highway and Southbound Ramps
 - The southbound left-turn movement is expected to deteriorate from LOS D to LOS E in the AM peak hour and from LOS E to LOS F in the PM peak hour.

Capacity analyses worksheets are included in Appendix D.

TABLE 4A. BACKGROUND AM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVEL OF SERVICE (Average Approach Delay in sec/veh) | |
|--|----------------------|---|------------|
| | | Existing | Background |
| Louisville Highway and Southbound Ramps | Southbound Left-Turn | D (34.6) | E (42.3) |
| Louisville Highway and Northbound Off-Ramp Left-Turn | Overall Intersection | B (18.0) | B (18.2) |

Note: For stop-controlled intersections, a LOS is presented for each critical turning movement. For signalized intersections, a LOS is presented for the overall intersection.

TABLE 4B. BACKGROUND PM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVEL OF SERVICE (Average Approach Delay in sec/veh) | |
|--|----------------------|---|------------|
| | | Existing | Background |
| Louisville Highway and Southbound Ramps | Southbound Left-Turn | E (49.3) | F (71.7) |
| Louisville Highway and Northbound Off-Ramp Left-Turn | Overall Intersection | B (19.4) | B (19.4) |

Note: For stop-controlled intersections, a LOS is presented for each critical turning movement. For signalized intersections, a LOS is presented for the overall intersection.

4. IMPACTS

4.1 Trip Generation

A traffic generation process was used to estimate the amount of traffic expected to be generated by the proposed QuikTrip development. Factors for the trip generation were taken from ITE's *Trip Generation*, 10th Edition. According to the developer, the proposed development includes an approximately 8,292 square feet super convenience store with 24 fueling positions.

Studies have shown that some service/retail developments generate a reduced number of "new" trips. The traffic volumes entering and exiting these service/retail sites are usually either captured ("pass-by") trips from the adjacent street or diverted trips from street serving other destinations. This traffic is already existing on the roadway system and will be passing by the site even if the proposed development is not constructed.

Data presented in the *Trip Generation Handbook* indicate average pass-by percentages for typical peak periods based on the size and type of various land usage. ITE indicates the average daily pass-by percentage for a super convenience store is approximately 76% in the AM peak and 76% in the PM peak,

Therefore, 512 of the total AM and 418 of the total PM peak hour external trips generated by the proposed development were assumed to be pass-by trips.

Table 5 presents the daily, AM and PM peak hour trip generation for the proposed development. As shown in Table 5, the proposed development can be expected to generate approximately 1,328 new vehicle trips per day. The AM and PM peak hour trip generations will equal approximately 162 and 133 new trips, respectively. These trips represent the new traffic that will be generated by the proposed QuikTrip development. The calculations for trip generation are included in Appendix E.

TABLE 5. DEVELOPMENT TRIP GENERATION

| LAND USE | SIZE | DAILY TRAFFIC | GENERATED TRAFFIC | | | |
|---|----------------------|---------------|-------------------|-------------|-------------|-------------|
| | | | AM PEAK | | PM PEAK | |
| | | | Enter | Exit | Enter | Exit |
| Super Convenience Market /Gas Station (LUC 960) | 24 fueling positions | 5,532 | 337 | 337 | 275 | 276 |
| | SUBTOTAL | 5,532 | 337 | 337 | 275 | 276 |
| | | | 674 | | 551 | |
| | <i>Pass-By Trips</i> | <i>-4,204</i> | <i>-256</i> | <i>-256</i> | <i>-209</i> | <i>-209</i> |
| | NEW TRIPS | 1,328 | 81 | 81 | 66 | 67 |
| | | | 162 | | 133 | |

Source: *Trip Generation*, 10th Edition

4.2 Trip Distribution and Traffic Assignment

A directional distribution of traffic generated by the proposed project was established based on the proposed access, the existing roadway network, and the existing travel patterns developed from the existing peak hour traffic counts. As previously discussed, access to the development is planned to be provided by three driveways on Louisville Highway. The western site access (Site Access A) is planned to include 2 egress lanes and 1 ingress lane. The middle site access (Site Access B) is planned to include 2 egress lanes and 1 ingress lane. The eastern site access (Site Access C) is planned to be the truck access to the site.

Separate directional distributions were developed for non-pass-by, AM pass-by, and PM pass-by based on the information provided by the development team. The directional distributions and traffic assignments for the individual modes of transportation are presented in Appendix F.

The overall directional distribution for the non-pass-by distribution for the proposed development is shown in Figure 5. As shown in the figure,

- approximately 40% of the traffic generated by the development will be oriented to the west on Louisville Highway,
- 35% to the east on Louisville Highway,
- 20% to the south on I-65, and
- 5% to the north on I-65.

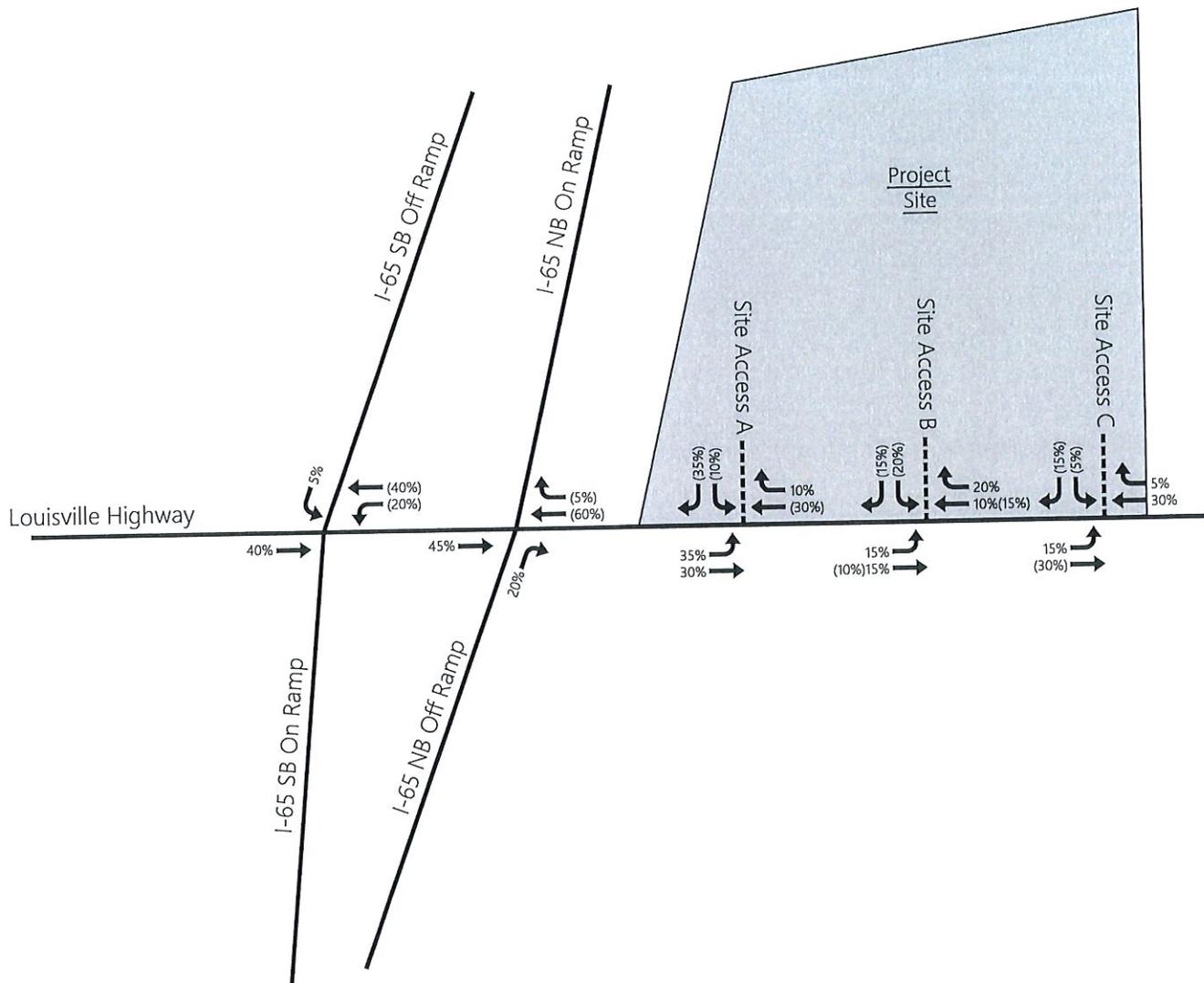
The AM directional distribution for the pass-by distribution for the proposed development is shown in Figure 6. As shown in the figure,

- approximately 55% of the traffic generated by the development will be oriented to the west on Louisville Highway, and
- 45% to the east on Louisville Highway.

The PM directional distribution for the pass-by distribution for the proposed development is shown in Figure 7. As shown in the figure,

- approximately 50% of the traffic generated by the development will be oriented to the west on Louisville Highway, and
- 50% to the east on Louisville Highway.

Based on the directional distribution, the project-generated traffic for the AM and PM peak hour was assigned to the roadway network. The traffic assignment for the proposed development is shown in Figure 8.



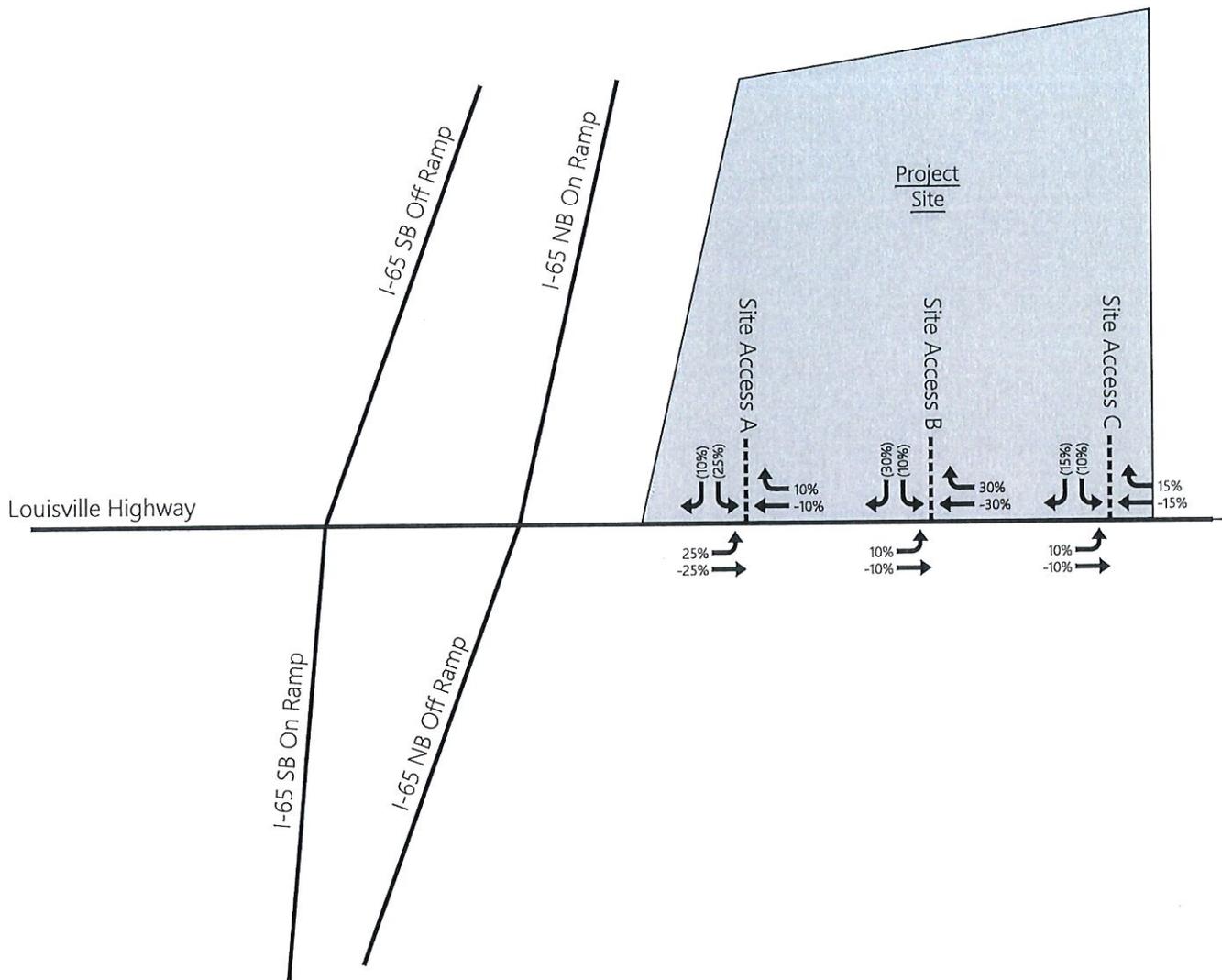
XX% - Enter
(XX%) - Exit

Distribution of Peak Hour Traffic Volumes
Generated by the Project Site

(Not to Scale)

Figure 5.





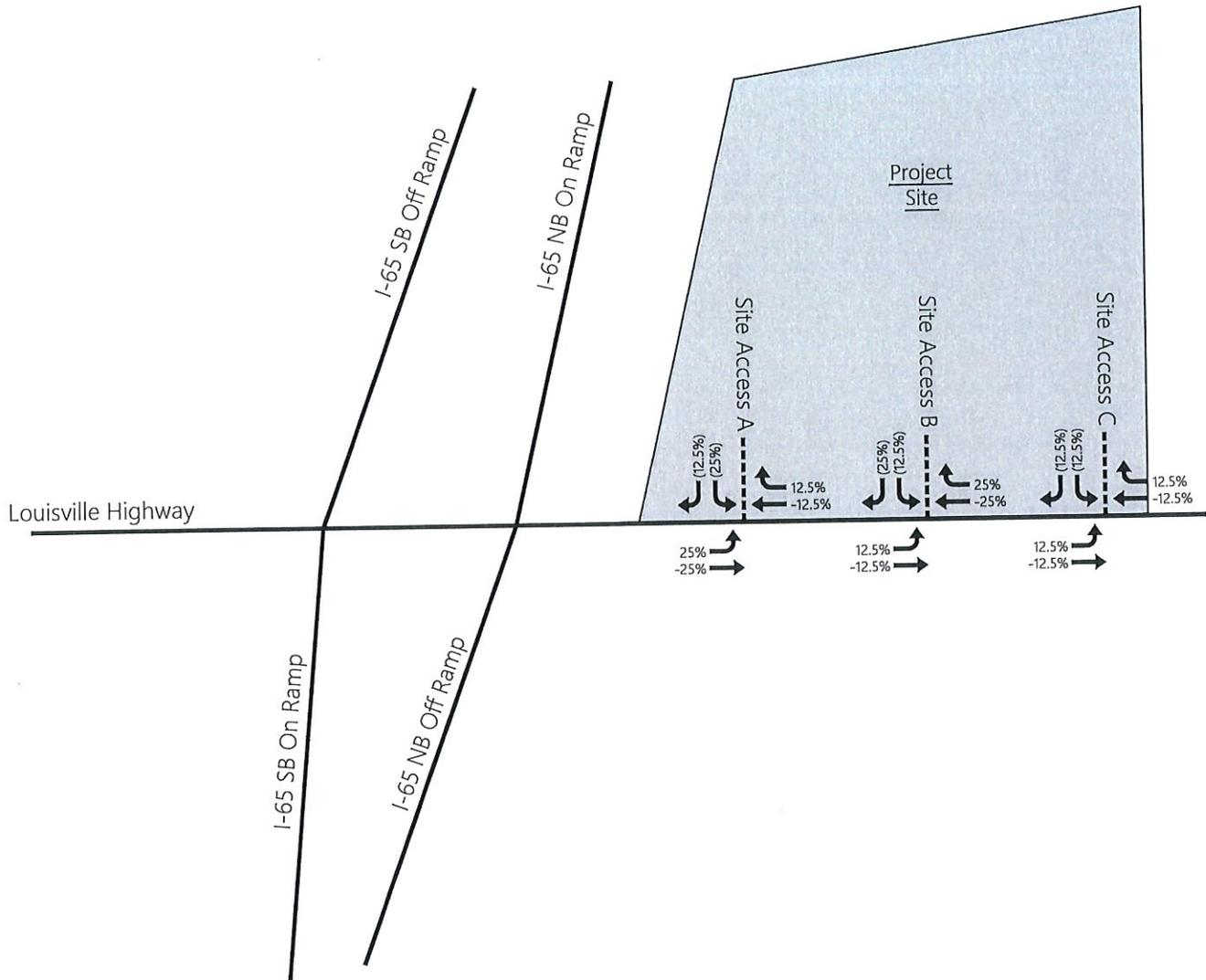
XX% - Enter
(XX%) - Exit

Distribution of AM Peak Hour Traffic Volumes
Generated by the Project Site (Pass-by)



(Not to Scale)

Figure 6.

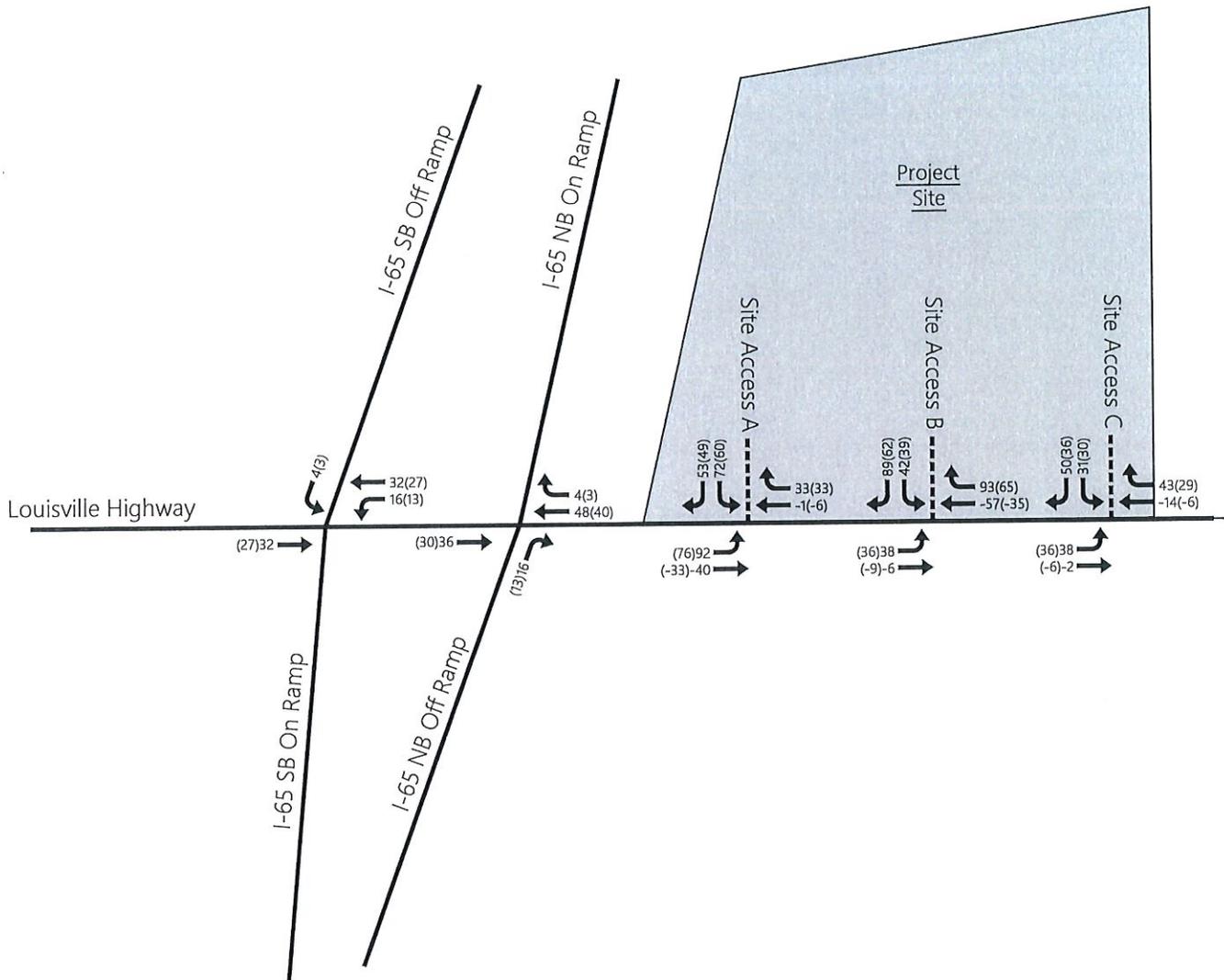


XX% - Enter
(XX%) - Exit



Distribution of PM Peak Hour Traffic Volumes
Generated by the Project Site (Pass-by)
(Not to Scale)

Figure 7.



XXX - AM Peak Hour Traffic Volumes
 (XXX) - PM Peak Hour Traffic Volumes



Total Assignment of Peak Hour Traffic Volumes
 (Not to Scale)

Figure 8.

4.3 Capacity / Level of Service Analyses

The total site-generated traffic volumes were added to the background peak hour traffic volumes for the proposed development in order to obtain the total projected traffic volumes for the study intersections. Figure 9 presents the total projected AM and PM peak hour traffic volumes expected at the completion of the proposed development.

Capacity analyses were performed in order to determine the impact of the project on the study intersections. These capacity analyses were also used to evaluate the need for roadway and traffic control improvements at the intersections studied. The capacity calculations were performed according to the methods outlined in the *Highway Capacity Manual*, TRB 6th Edition. The results of the capacity analyses for the projected conditions at the study area intersections are presented in Tables 6A and 6B. For the analyses, the intersection configurations and signal timings were the same as the existing and background conditions.

Table 6A and 6B show the site accesses as southbound approaches. These approaches are closer to eastbound approaches, however the limitations in the modeling software forced Louisville Highway to be an east-west roadway in order to keep I-65 a north-south interstate.

As shown in Tables 6A and 6B, under projected conditions, the capacity analyses indicate that the operational performances of the critical movements at the study intersections are generally expected to continue to operate at the same level of service as under background conditions or continue to operate at LOS D or better in the AM and PM peak hours.

Due to the configuration of the interchange and limitations of the modeling software, some unsignalized movements were not included in the modeling reports. It is anticipated that these movements operate at LOS D or better based on the expected projected volumes.

TABLE 6A. PROJECTED AM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVEL OF SERVICE (Average Approach Delay in sec/veh) | | |
|--|-----------------------|---|------------|-----------|
| | | Existing | Background | Projected |
| Louisville Highway and Southbound Ramps | Southbound Left-Turn | D (34.6) | E (42.3) | E (49.8) |
| Louisville Highway and Northbound Off-Ramp | Overall Intersection | B (18.0) | B (18.2) | B (18.6) |
| Louisville Highway and Site Access A | Eastbound Left-Turn | -- | -- | B (10.5) |
| | Southbound Left-Turn | -- | -- | D (31.2) |
| | Southbound Right-Turn | -- | -- | C (17.1) |
| Louisville Highway and Site Access B | Eastbound Left-Turn | -- | -- | B (10.1) |
| | Southbound Left-Turn | -- | -- | C (22.7) |
| | Southbound Right-Turn | -- | -- | C (17.5) |
| Louisville Highway and Site Access C | Eastbound Left-Turn | -- | -- | B (10.0) |
| | Southbound Approach | -- | -- | C (22.3) |

Note: For stop-controlled intersections, a LOS is presented for each critical turning movement. For signalized intersections, a LOS is presented for the overall intersection.

TABLE 6B. PROJECTED PM PEAK HOUR LEVELS OF SERVICE

| INTERSECTION | TURNING MOVEMENT | LEVEL OF SERVICE (Average Approach Delay in sec/veh) | | |
|--|-----------------------|---|------------|-----------|
| | | Existing | Background | Projected |
| Louisville Highway and Southbound Ramps | Southbound Left-Turn | E (49.3) | F (71.7) | F (89.9) |
| Louisville Highway and Northbound Off-Ramp | Overall Intersection | B (19.4) | B (19.4) | B (19.5) |
| Louisville Highway and Site Access A | Eastbound Left-Turn | -- | -- | A (9.9) |
| | Southbound Left-Turn | -- | -- | D (26.6) |
| | Southbound Right-Turn | -- | -- | C (15.4) |
| Louisville Highway and Site Access B | Eastbound Left-Turn | -- | -- | A (9.6) |
| | Southbound Left-Turn | -- | -- | C (21.8) |
| | Southbound Right-Turn | -- | -- | C (15.3) |
| Louisville Highway and Site Access C | Eastbound Left-Turn | -- | -- | A (9.6) |
| | Southbound Approach | -- | -- | C (20.1) |

Note: For stop-controlled intersections, a LOS is presented for each critical turning movement. For signalized intersections, a LOS is presented for the overall intersection.

4.4 Queue Length Analysis

95th percentile queue lengths for the critical movements of the study intersections that are expected to be impacted by the proposed development were also analyzed and evaluated under the projected conditions. Table 7 indicates the results of the queue length analyses for the study intersection.

As shown in Table 7, the 95th percentile queue lengths for the majority of critical movements of the study intersections are less than the available storage length with the following exceptions:

- The southbound approach at the intersection of Louisville Highway at Southbound Ramps during the PM peak hour. It should be noted that the background queue length for this movement is 83 feet.
-

TABLE 7. STUDY INTERSECTIONS 95TH PERCENTILE QUEUE LENGTH

| INTERSECTION TURNING | MOVEMENT AVAILABLE | STORAGE (FEET) | 95 TH QUEUE LENGTH (FEET) | |
|--|-----------------------|-------------------|---|-----------------|
| | | | AM Peak Hour | PM Peak Hour |
| Louisville Highway and Southbound Ramps | Southbound Left-Turn | 80 | 25 | 100 |
| Louisville Highway and Northbound Off-Ramp Left-Turn | Eastbound Approach | 210 | 204 | 188 |
| | Westbound Approach | 155 | 145 | 117 |
| | Northbound Left-Turn | 355 | 163 | #295 |
| Louisville Highway and Site Access A | Eastbound Left-Turn | 215 | 13 | 8 |
| | Southbound Left-Turn | -- | 40 | 28 |
| | Southbound Right-Turn | -- | 15 | 13 |
| Louisville Highway and Site Access B | Eastbound Left-Turn | 250 | 5 | 5 |
| | Southbound Left-Turn | -- | 18 | 15 |
| | Southbound Right-Turn | -- | 25 | 15 |
| Louisville Highway and Site Access C | Eastbound Left-Turn | 200 | 5 | 3 |
| | Southbound Approach | -- | 30 | 27 |
| #: 95 th percentile volume exceeds capacity, queue may be longer. m: Volume for 95 th percentile queue is metered by upstream signal. | | | | |

5. ANALYSIS OF SITE PLAN

5.1 Site Access Review

According to the information provided by the developer, the proposed QuikTrip development includes an approximately 8,292 square feet super convenience store with 24 fueling positions

Access to the development is planned to be provided via three driveways on Louisville Highway. The western site access (Site Access A) is planned to include 2 egress lanes and 1 ingress lane. The middle site access (Site Access B) is planned to include 2 egress lanes and 1 ingress lane. The eastern site access (Site Access C) is planned to be the truck access to the site

5.2 Lane Warrant Analysis

The westbound approaches of Louisville Highway at Site Access A, Site Access B, and Site Access C were evaluated for the need to provide a right-turn lane based on the projected traffic volumes during the AM and PM peak hours. This analysis was based on the TDOT basic standard requiring state routes with 300 right-turning vehicles or greater during the peak hour. The results of the analysis indicate that a right-turn lane is not warranted at Site Access A, Site Access B, or Site Access C during either the AM or PM peak hours.

The southbound approach of the proposed Site Access A, Site Access B, and Site Access C were evaluated for the need to provide a two-lane approach based on the projected traffic volumes during the AM and PM peak hours. According to *Evaluating Intersection Improvements: An Engineering Study Guide* (NCHRP 457) Figure 2-4, a two-lane approach is warranted for the southbound approaches of Site Access A and Site Access B during the AM.

All warrant analyses are included in Appendix G.

6. CONCLUSIONS AND RECOMMENDATIONS

The analyses presented in this study indicate that the impacts of the proposed project on the existing street network will be manageable by providing the recommendations below. These specific recommendations will provide safe and efficient traffic operations within the study area following the completion of the proposed project. The recommendations are as follows:

Louisville Highway and Site Access A

- The southbound approach from the site should include one ingress lane and two egress lanes.

Louisville Highway and Site Access B

- The southbound approach from the site should include one ingress lane and two egress lanes.

Louisville Highway and Site Access C

- The southbound approach from the site should include one ingress lane and one egress lane.

General

- As part of the construction of the project, all site accesses should be designed such that the departure sight triangles, as specified by AASHTO, will be clear of all sight obstructions, including landscaping, existing vegetation, monument signs/walls, fences, etc.
- Wayfinding signage should be provided on-site in order to clarify passenger and truck access and circulation.

In summary, based on the analyses conducted, no further recommendations are presented for the proposed QuikTrip development.

APPENDIX E TRIP GENERATION CALCULATIONS

TRIP GENERATION

Super Convenience Market/Gas Station

960 ITE Land Code

Vehicle Fueling
24 Positions

Average Daily Traffic:

$$T = 230.52 * (X)$$

$$T = 230.52 * (24)$$

| |
|------------|
| $T = 5532$ |
|------------|

A.M. Peak Hour:

$$T = 28.08 * (X)$$

$$T = 28.08 * (24)$$

| |
|-----------|
| $T = 674$ |
|-----------|

Enter = 337 50%

Exit = 337 50%

P.M. Peak Hour:

$$T = 22.96 * (X)$$

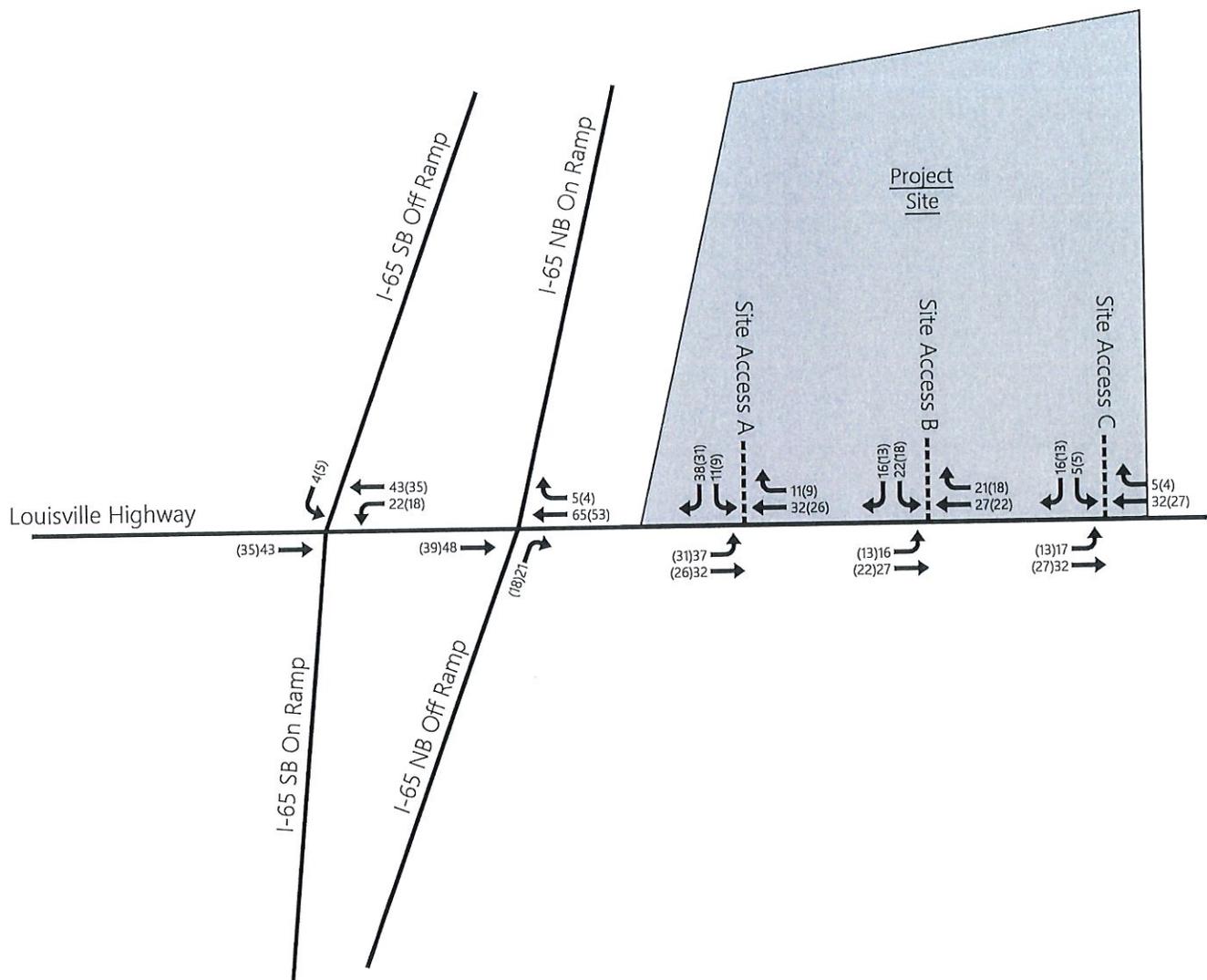
$$T = 22.96 * (24)$$

| |
|-----------|
| $T = 551$ |
|-----------|

Enter = 275 50%

Exit = 276 50%

APPENDIX F
TRIP DISTRIBUTION AND ASSIGNMENT



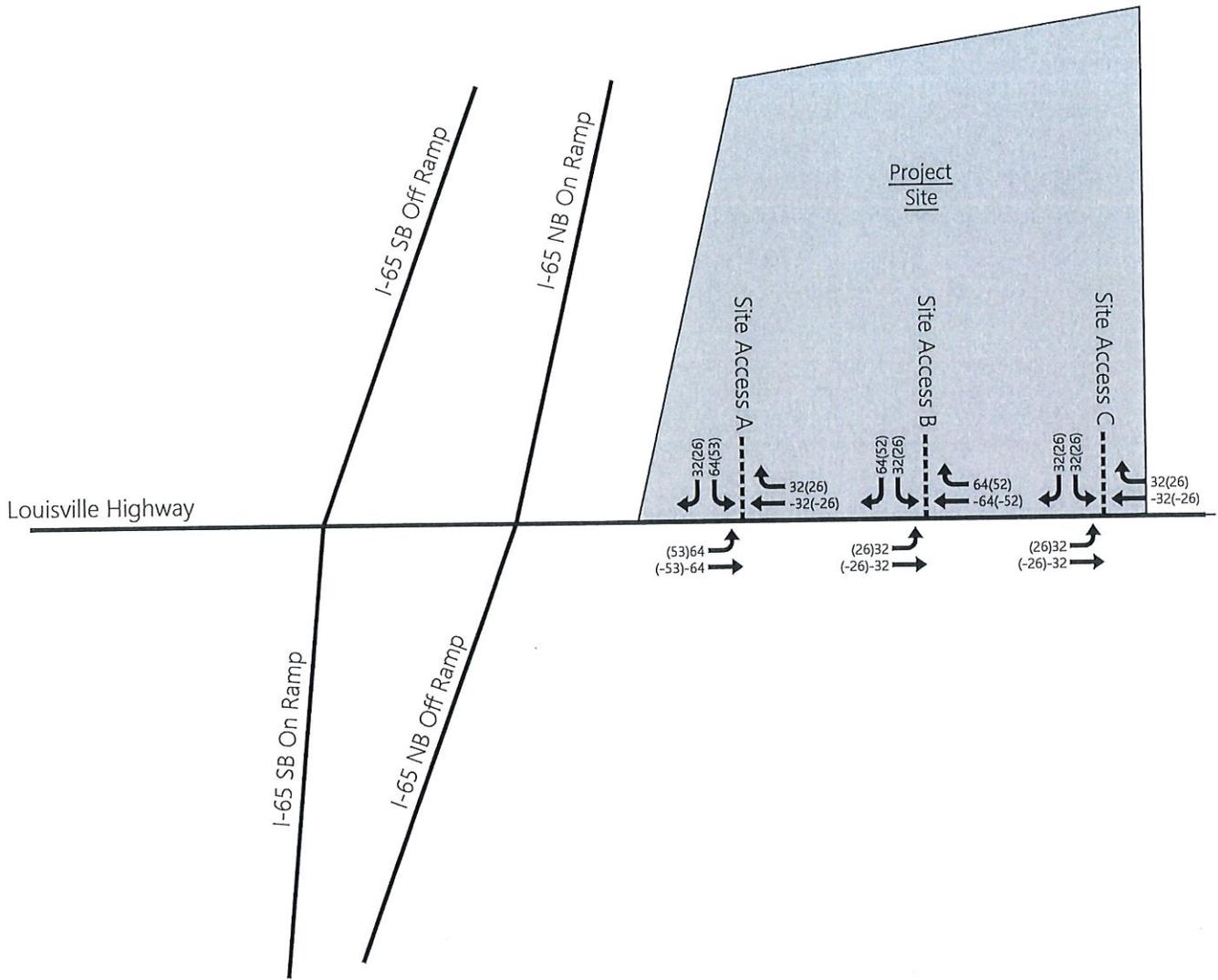
XXX - AM Peak Hour Traffic Volumes
 (XXX) - PM Peak Hour Traffic Volumes



Assignment of Peak Hour Traffic Volumes Generated by the Project Site

(Not to Scale)

Figure F1.



XXX - AM Peak Hour Traffic Volumes
 (XXX) - PM Peak Hour Traffic Volumes

Assignment of Peak Hour Traffic Volumes
 Generated by the Project Site (Pass-by)
 (Not to Scale)



Figure F2.

**APPENDIX G
WARRANT ANALYSIS**

Projected Conditions (Peak Hours)
 MINOR APPROACH ANALYSES
 (Based on Intersection Channelization Design Guide)

| Intersection Approach | | AM Peak Hour | | | PM Peak Hour | | |
|--------------------------------------|---|-------------------|-------------------|------------------|-------------------|-------------------|------------------|
| | | Minor Road Volume | Major Road Volume | 2-Lane Approach? | Minor Road Volume | Major Road Volume | 2-Lane Approach? |
| Louisville Highway and Site Access A | ● | 125 | 1529 | Y | 109 | 1471 | Y |
| Louisville Highway and Site Access B | ● | 131 | 1513 | Y | 101 | 1458 | N |
| Louisville Highway and Site Access C | ● | 81 | 1510 | N | 66 | 1454 | N |

