SUBDIVISION REPORT - CONCEPT/DEVELOPMENT PLAN

▶ **FILE #:**	**6-SB-24-C**	**AGENDA ITEM #:**	**21**
	6-E-24-DP	**AGENDA DATE:**	**7/11/2024**
POSTPONEMENT(S):	6/13/2024		
▶ **SUBDIVISION:**	**HOROBET ON BOB GRAY ROAD**		
▶ **APPLICANT/DEVELOPER:**	**ARCIP HOROBET**		
OWNER(S):	Arcip Horobet		
TAX IDENTIFICATION:	118 071	**View map on KGIS**	
JURISDICTION:	County Commission District 3		
STREET ADDRESS:	0 PELLISSIPPI PKWY		
▶ **LOCATION:**	**South side of Bob Gray Rd, west side of Pellissippi Pkwy, northern terminus of Blinken St**		
GROWTH POLICY PLAN:	Planned Growth Area		
WATERSHED:	Turkey Creek		
▶ **APPROXIMATE ACREAGE:**	**9.87 acres**		
▶ **ZONING:**	**PR(k) (Planned Residential) up to 10 du/ac, TO (Technology Overlay)**		
▶ **EXISTING LAND USE:**	**Agriculture/Forestry/Vacant Land**		
▶ **PROPOSED USE:**	**Attached residential subdivision**		
SURROUNDING LAND USE AND ZONING:	North: Rural residential - RA (Low Density Residential), TO (Technology Overlay) South: Multifamily residential - PR (Planned Residential) up to 12 du/ac, TO (Technology Overlay) East: Pellissippi Parkway right-of-way West: Single family residential - RA (Low Density Residential), TO (Technology Overlay)		
▶ **NUMBER OF LOTS:**	**94**		
SURVEYOR/ENGINEER:	David Harbin Batson, Himes, Norvell and Poe		
ACCESSIBILITY:	Access is via Bob Gray Rd, a major collector street with 20 ft of pavement width within 48 ft of right-of-way. Access is also via Boyington Dr, a local street with 26 ft of pavement width within 50 ft of right-of-way.		
▶ **SUBDIVISION VARIANCES REQUIRED:**	**None.**		

STAFF RECOMMENDATION:

▶ **Postpone the concept 30 days until the August 8, 2024 Planning Commission meeting at the request of the applicant.**

- **Postpone the development plan 30 days until the August 8, 2024 Planning Commission meeting at the request of the applicant.**

ESTIMATED TRAFFIC IMPACT: 937 (average daily vehicle trips)

Average Daily Vehicle Trips are computed using national average trip rates reported in the latest edition of "Trip Generation," published by the Institute of Transportation Engineers. Average Daily Vehicle Trips represent the total number of trips that a particular land use can be expected to generate during a 24-hour day (Monday through Friday), with a "trip" counted each time a vehicle enters or exits a proposed development.

ESTIMATED STUDENT YIELD: 5 (public school children, grades K-12)

Schools affected by this proposal: Farragut Primary/Intermediate, Hardin Valley Middle, and Hardin Valley Academy.

- Potential new school population is estimated using locally-derived data on public school student yield generated by new housing.
- Students are assigned to schools based on current attendance zones as determined by Knox County Schools. Students may request transfers to different zones, and zone boundaries are subject to change.
- Estimates presume full build-out of the proposed development. Build-out is subject to market forces, and timing varies widely from proposal to proposal.
- Student yields from new development do not reflect a net addition of children in schools. Additions occur incrementally over the build-out period. New students may replace current population that ages through the system or moves from the attendance zone.

Knoxville-Knox County Planning Commission's approval or denial of this concept plan request is final, unless the action is appealed to Knox County Chancery Court. The date of the Knox County Chancery Court hearing will depend on when the appeal application is filed.

The Planning Commission's approval or denial of this development plan request is final, unless the action is appealed either to the Board of Zoning Appeals or to a court of competent jurisdiction within thirty (30) days of the decision being appealed (Knox County, Tennessee Code of Ordinances, Appendix A, Zoning, 6.50.08).

Planning
KNOXVILLE | KNOX COUNTY

Request to
Postpone • Table • Withdraw

Horobet on Bob Gray — Applicant Name (as it appears on the current Planning Commission agenda)

6-28-24 — Date of Request

July 11, 2024 — Scheduled Meeting Date

File Number(s): 6-SB-24-C; 6-E-24-DP

POSTPONE

☑ **POSTPONE:** All applications are eligible for postponement if the request is received in writing and paid for by noon on Thursday the week prior to the Planning Commission meeting. All requests must be acted upon by the Planning Commission, except new applications which are eligible for one 30-day automatic postponement. If payment is not received by the deadline, the item will be tabled.

SELECT ONE: ☑ 30 days ☐ 60 days ☐ 90 days

Postpone the above application(s) until the August 8, 2024 Planning Commission Meeting.

WITHDRAW

☐ **WITHDRAW:** Applications may be withdrawn automatically if the request is received in writing no later than 3:30pm on Thursday the week prior to the Planning Commission meeting. Requests made after this deadline must be acted on by the Planning Commission. Applicants are eligible for a refund only if a written request for withdrawal is received no later than close of business 2 business days after the application submittal deadline and the request is approved by the Executive Director or Planning Services Manager.

TABLE

**The refund check will be mailed to the original payee.*

☐ **TABLE:** Any item requested for tabling must be acted upon by the Planning Commission before it can be officially tabled. There is no fee to table or untable an item.

AUTHORIZATION

By signing below, I certify I am the property owner, and/or the owners authorized representative.

Applicant Signature

Benjamin C. Mullins — Please Print

865-546-9321 — Phone Number

bmullins@fmsllp.com — Email

STAFF ONLY

Staff Signature — Please Print — Date Paid — ☐ No Fee

Eligible for Fee Refund? ☐ Yes ☐ No Amount:

Approved by: — Date:

Payee Name — Payee Phone — Payee Address

Request to
Postpone • Table • Withdraw

Planning
KNOXVILLE | KNOX COUNTY

Arcip Horobet — Applicant Name (as it appears on the current Planning Commission agenda)

5/23/24 — Date of Request

6/13/24 — Scheduled Meeting Date

File Number(s): 6-C-24-TOB, 6-SB-24-C, 6-E-24-DP

POSTPONE

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AUTHORIZATION

By signing below, I certify I am the property owner, and/or the owners authorized representative.

David Harbin — Applicant Signature / Please Print

865-588-6472 — Phone Number

harbin@bhn-p.com — Email

STAFF ONLY

Whitney Warner — Staff Signature

Whitney Warner — Please Print

Date Paid

☐ No Fee

Eligible for Fee Refund? ☐ Yes ☐ No Amount:

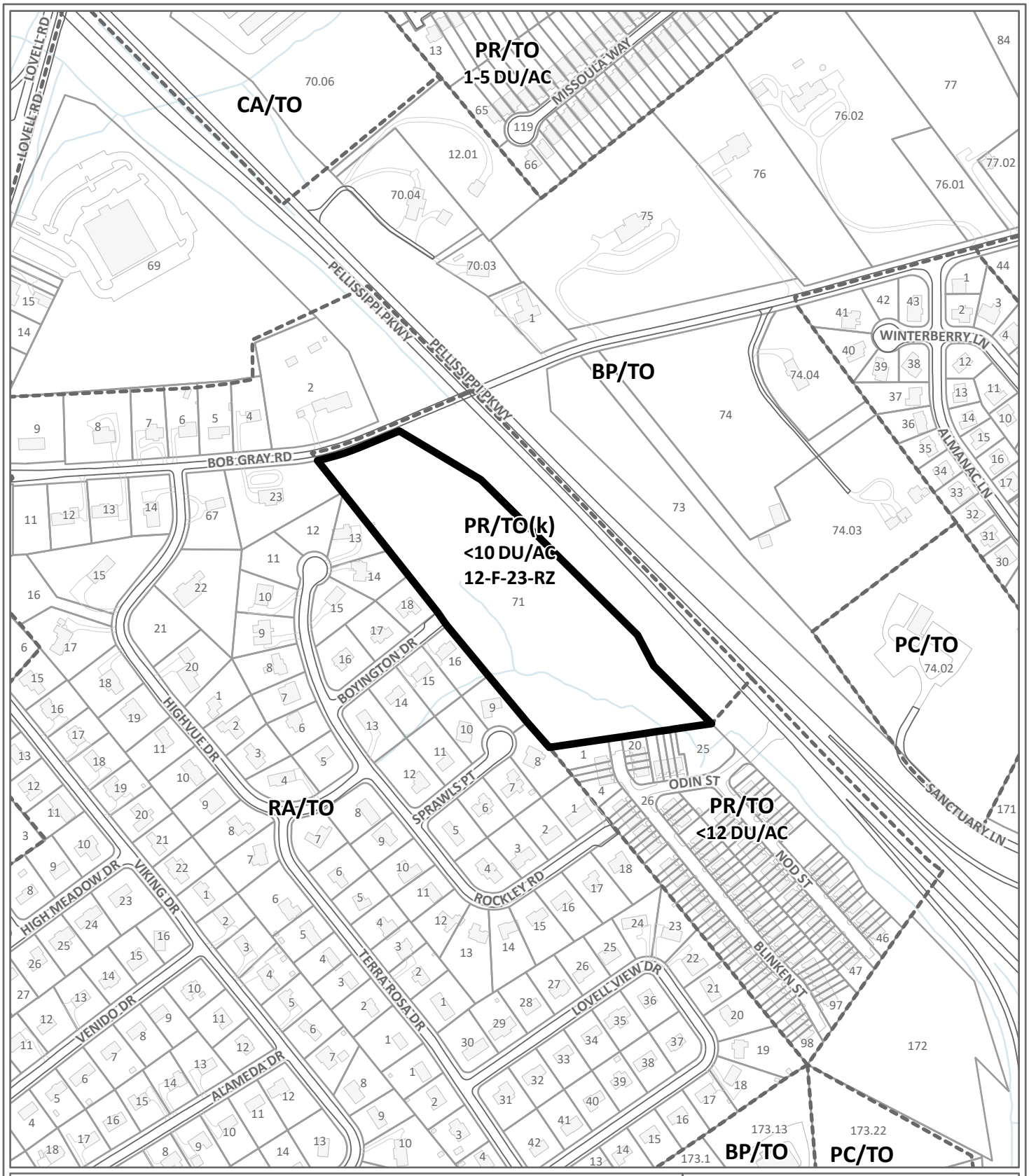
Approved by:

Date:

Payee Name

Payee Phone

Payee Address



CONCEPT PLAN / DEVELOPMENT PLAN **6-SB-24-C / 6-E-24-DP**

Petitioner: Arcip Horobet

Attached residential subdivision in PR(k) (Planned Residential),

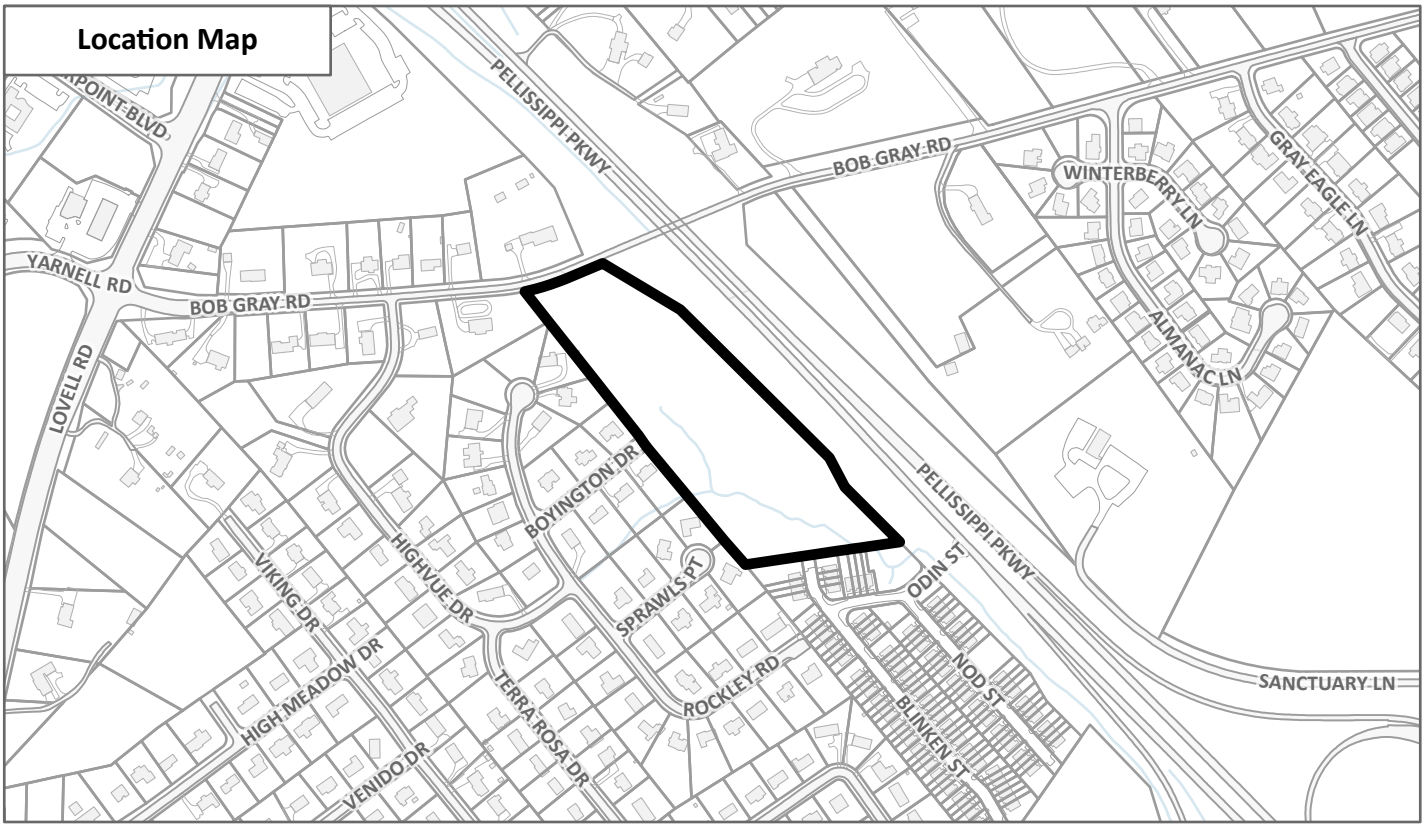
Map No: 118
Jurisdiction: County

0 410
Feet

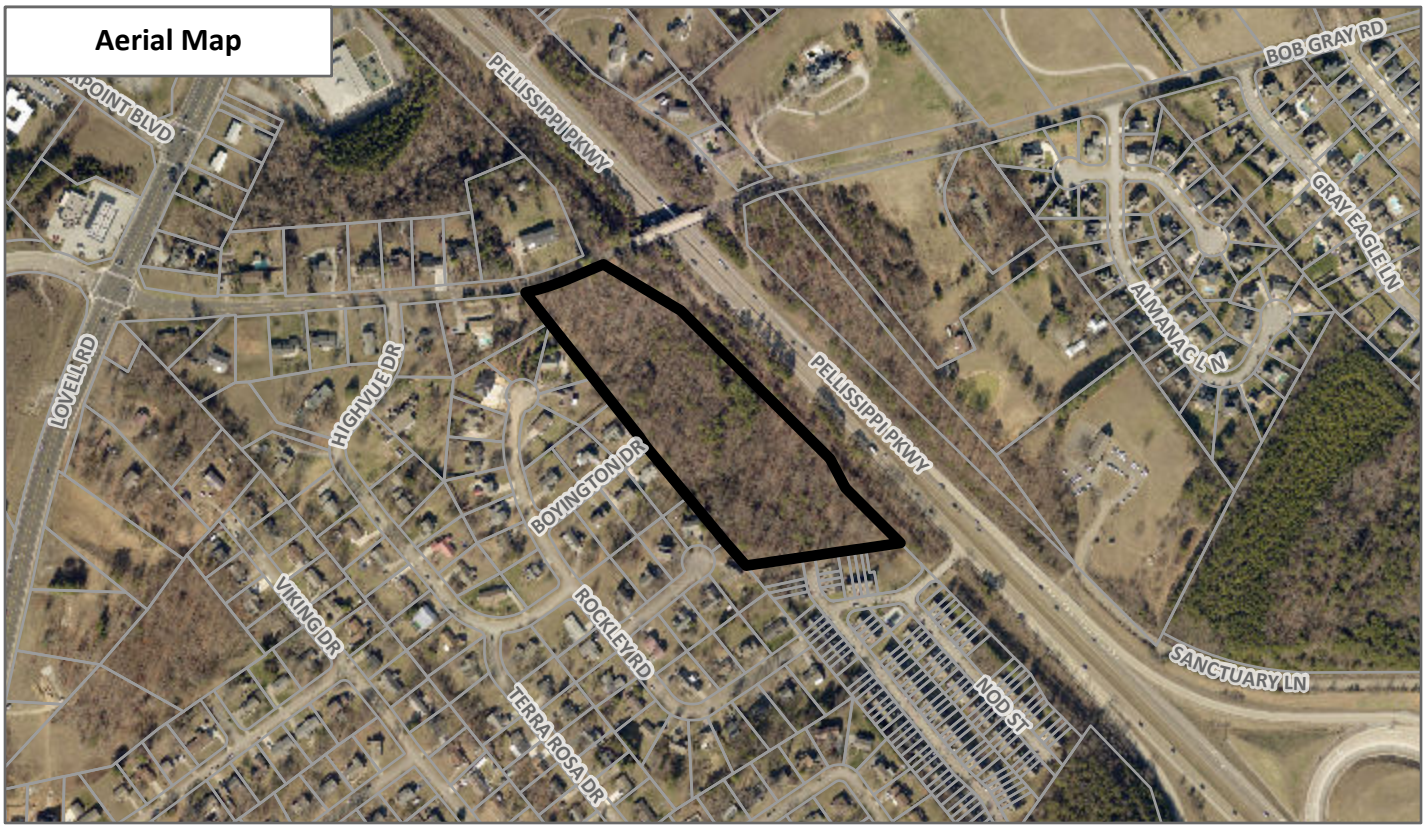
Original Print Date: 5/6/2024
*Knoxville - Knox County Planning Commission * City / County Building * Knoxville, TN 37902*

Exhibit A. Contextual Images

Location Map



Aerial Map



CONTEXTUAL MAPS 1 **6-E-24-DP / 6-SB-24-C**

Case boundary

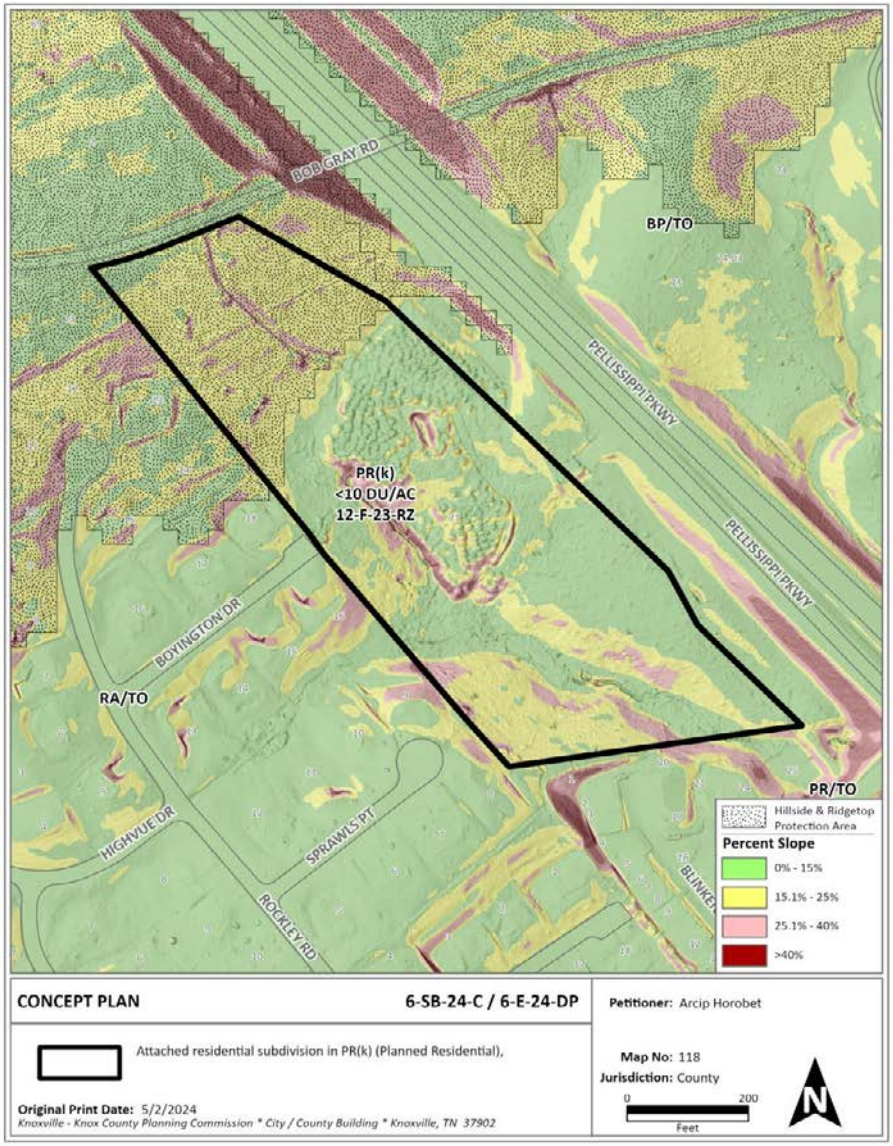
0 660

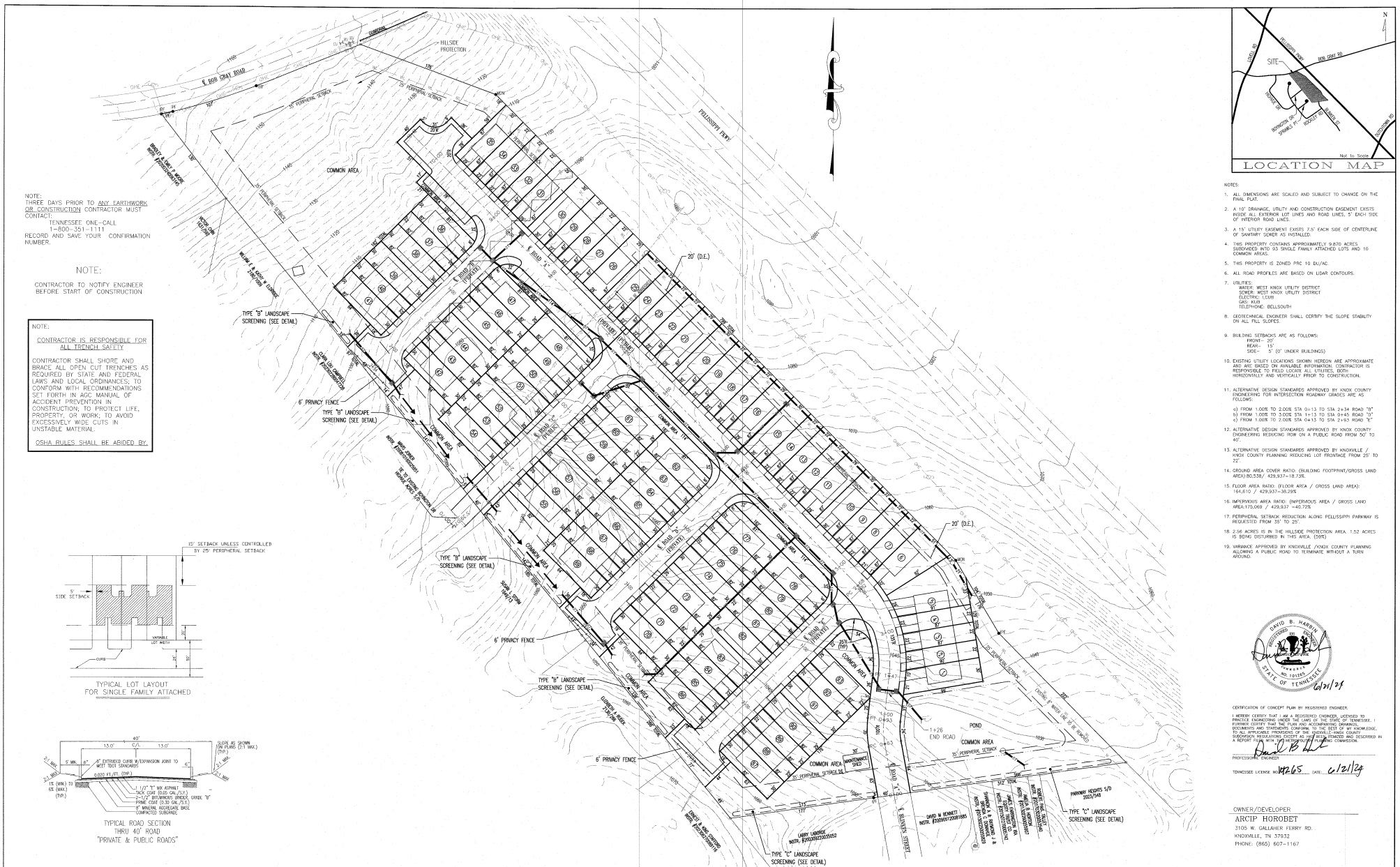
Feet

N

Staff - Slope Analysis
Case: 6-SB-24-C

CATEGORY	ACRES	RECOMMENDED DISTURBANCE BUDGET (Percent)	DISTURBANCE AREA (Acres)
Total Area of Site	**9.8**		
Non-Hillside	7.4	N/A	
0-15% Slope	0.17	100%	0.17
15-25% Slope	1.95	50%	0.98
25-40% Slope	0.25	20%	0.05
Greater than 40% Slope	0.01	10%	0.00
Ridgetops			
Hillside Protection (HP) Area	2.4	Recommended disturbance budget within HP Area (acres)	**1.20**
		Percent of HP Area	**50.3%**





NOTE:
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TENNESSEE ONE-CALL
1-800-351-1111
RECORD AND SAVE YOUR CONFIRMATION NUMBER.

NOTE:
CONTRACTOR TO NOTIFY ENGINEER BEFORE START OF CONSTRUCTION

NOTE:
CONTRACTOR IS RESPONSIBLE FOR ALL TRENCH SAFETY
CONTRACTOR SHALL SHORE AND BRACE ALL OPEN CUT TRENCHES AS REQUIRED BY STATE AND FEDERAL LAWS AND LOCAL ORDINANCES; TO CONFORM WITH RECOMMENDATIONS SET FORTH IN AGC MANUAL OF ACCIDENT PREVENTION IN CONSTRUCTION; TO PROTECT LIFE, PROPERTY, OR WORK; TO AVOID EXCESSIVELY WIDE CUTS IN UNSTABLE MATERIAL.
OSHA RULES SHALL BE ABIDED BY.

TYPICAL LOT LAYOUT
FOR SINGLE FAMILY ATTACHED

TYPICAL ROAD SECTION
THRU 40' ROAD
"PRIVATE & PUBLIC ROADS"

NOTES:
1. ALL DIMENSIONS ARE SCALED AND SUBJECT TO CHANGE ON THE FINAL PLAT.
2. A 10' DRAINAGE, UTILITY AND CONSTRUCTION EASEMENT EXISTS INSIDE ALL EXTERIOR LOT LINES AND ROAD LINES, 5' EACH SIDE OF INTERIOR ROAD LINES.
3. A 15' UTILITY EASEMENT EXISTS 7.5' EACH SIDE OF CENTERLINE OF SANITARY SEWER AS INSTALLED.
4. THIS PROPERTY CONTAINS APPROXIMATELY 9.870 ACRES SUBDIVIDED INTO 93 SINGLE FAMILY ATTACHED LOTS AND 10 COMMON AREAS.
5. THIS PROPERTY IS ZONED PRC 10 DU/AC.
6. ALL ROAD PROFILES ARE BASED ON LIDAR CONTOURS.
7. UTILITIES:
   WATER: WEST KNOX UTILITY DISTRICT
   SEWER: WEST KNOX UTILITY DISTRICT
   ELECTRIC: LCUB
   GAS: KUB
   TELEPHONE: BELLSOUTH
8. GEOTECHNICAL ENGINEER SHALL CERTIFY THE SLOPE STABILITY ON ALL FILL SLOPES.
9. BUILDING SETBACKS ARE AS FOLLOWS:
   FRONT- 20'
   REAR- 15'
   SIDE- 5' (0' UNDER BUILDINGS)
10. EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE AND ARE BASED ON AVAILABLE INFORMATION. CONTRACTOR IS RESPONSIBLE TO FIELD LOCATE ALL UTILITIES, BOTH HORIZONTALLY AND VERTICALLY PRIOR TO CONSTRUCTION.
11. ALTERNATIVE DESIGN STANDARDS APPROVED BY KNOX COUNTY ENGINEERING FOR INTERSECTION ROADWAY GRADES ARE AS FOLLOWS:
    a) FROM 1.00% TO 2.00% STA 0+13 TO STA 2+34 ROAD "B"
    b) FROM 1.00% TO 3.00% STA 1+13 TO STA 0+45 ROAD "D"
    c) FROM 1.00% TO 2.00% STA 0+13 TO STA 2+85 ROAD "E"
12. ALTERNATIVE DESIGN STANDARDS APPROVED BY KNOX COUNTY ENGINEERING REDUCING ROW ON A PUBLIC ROAD FROM 50' TO 40'.
13. ALTERNATIVE DESIGN STANDARDS APPROVED BY KNOXVILLE / KNOX COUNTY PLANNING REDUCING LOT FRONTAGE FROM 25' TO 22'.
14. GROUND AREA COVER RATIO: (BUILDING FOOTPRINT/GROSS LAND AREA)80,538/ 429,937=18.73%.
15. FLOOR AREA RATIO: (FLOOR AREA / GROSS LAND AREA): 164,610 / 429,937=38.29%
16. IMPERVIOUS AREA RATIO: (IMPERVIOUS AREA / GROSS LAND AREA)175,069 / 429,937 =40.72%
17. PERIPHERAL SETBACK REDUCTION ALONG PELLISSIPPI PARKWAY IS REQUESTED FROM 35' TO 25'.
18. 2.56 ACRES IS IN THE HILLSIDE PROTECTION AREA. 1.52 ACRES IS BEING DISTURBED IN THIS AREA. (59%)
19. VARIANCE APPROVED BY KNOXVILLE /KNOX COUNTY PLANNING ALLOWING A PUBLIC ROAD TO TERMINATE WITHOUT A TURN AROUND.

DAVID B. HARBIN
REGISTERED ENGINEER
STATE OF TENNESSEE
No. 102165
6/21/24

CERTIFICATION OF CONCEPT PLAN BY REGISTERED ENGINEER.
I HEREBY CERTIFY THAT I AM A REGISTERED ENGINEER, LICENSED TO PRACTICE ENGINEERING IN THE STATE OF TENNESSEE. I FURTHER CERTIFY THAT THE PLAN AND ACCOMPANYING DRAWINGS, DOCUMENTS AND STATEMENTS CONFORM, TO THE BEST OF MY KNOWLEDGE, TO ALL APPLICABLE PROVISIONS OF THE KNOXVILLE-KNOX COUNTY SUBDIVISION REGULATIONS EXCEPT AS HAVE BEEN ITEMIZED AND DESCRIBED IN A REPORT FILED WITH THE METROPOLITAN PLANNING COMMISSION.

PROFESSIONAL ENGINEER
TENNESSEE LICENSE NO. 102165 DATE: 6/21/24

OWNER/DEVELOPER
ARCIP HOROBET
3105 W. GALLAHER FERRY RD.
KNOXVILLE, TN 37932
PHONE: (865) 607-1167

6-SP-24-C/6-E-24-DP

BATSON, HIMES, NORVELL & POE
REGISTERED ENGINEERS & LAND SURVEYORS
4334 PAPERMILL DRIVE
KNOXVILLE, TENNESSEE 37909
PHONE: (865) 588-6472
FAX: (865) 588-6473
email@bhn-p.com

DESIGNED DBH
DRAWN TPD
CHECKED DBH

NO.	DATE	REVISION	APPR.
1	7-21-24	KKCP COMMENTS	

SCALE
HORIZONTAL: 1"= 50'
VERTICAL: 2' INTERVAL
DATE
5/29/24

DEED REFERENCE: INSTR. #202402010036844

0' 50' 100' 150' 200'
1"=50'

CONCEPT & DEVELOPMENT PLAN FOR
HOROBET ON BOB GRAY ROAD
TAX MAP118 PARCEL 71
6TH CIVIL DISTRICT, KNOX COUNTY, TENNESSEE

25545-SP
SHEET 1 OF 3 SHEET(S)
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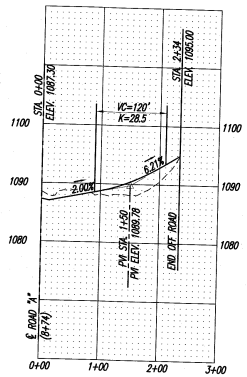
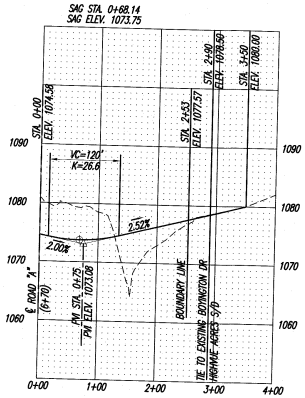
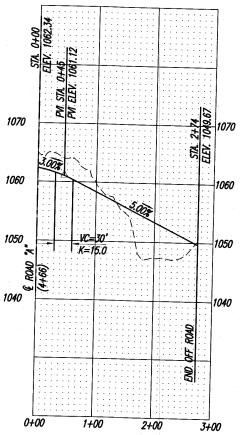


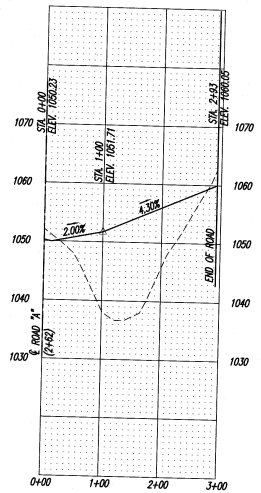
ROAD "B"
PRIVATE ROAD
SCALE: 1"=100' HORIZ.
1" =10' VERT.



ROAD "C"
PUBLIC ROAD
SCALE: 1"=100' HORIZ.
1" =10' VERT.



ROAD "D"
PRIVATE ROAD
SCALE: 1"=100' HORIZ.
1" =10' VERT.



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PRIVATE ROAD
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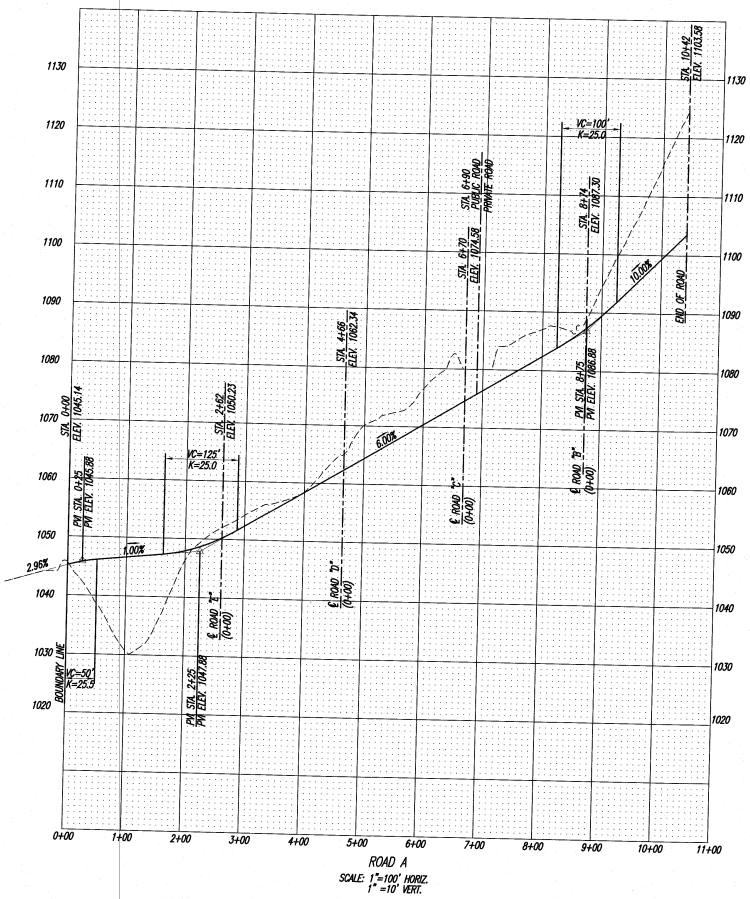
1" =10' VERT.



ROAD A
SCALE: 1"=100' HORIZ.
1" =10' VERT.

DAVID B. HARRIS
REGISTERED ENGINEER
No. 101385
STATE OF TENNESSEE
7/24

BATSON, HIMES, NORVELL & POE
REGISTERED ENGINEERS & LAND SURVEYORS
4334 PAPERMILL DRIVE
KNOXVILLE, TENNESSEE 37909
PHONE: (865) 588-6472
FAX: (865) 588-6473
email@bhn-p.com

DESIGNED	DBH
DRAWN	TPD
CHECKED	DBH

NO.	DATE	REVISION	APPR.
1	7-21-24	KKCP COMMENTS	

DATE
4/17/24

ROAD PROFILES FOR
HOROBET ON BOB GRAY ROAD
TAX MAP118 PARCEL 71
6TH CIVIL DISTRICT, KNOX COUNTY, TENNESSEE

25545-RP

SHEET 2 OF 3 SHEET(S)

Q:\25545\25545.DWG

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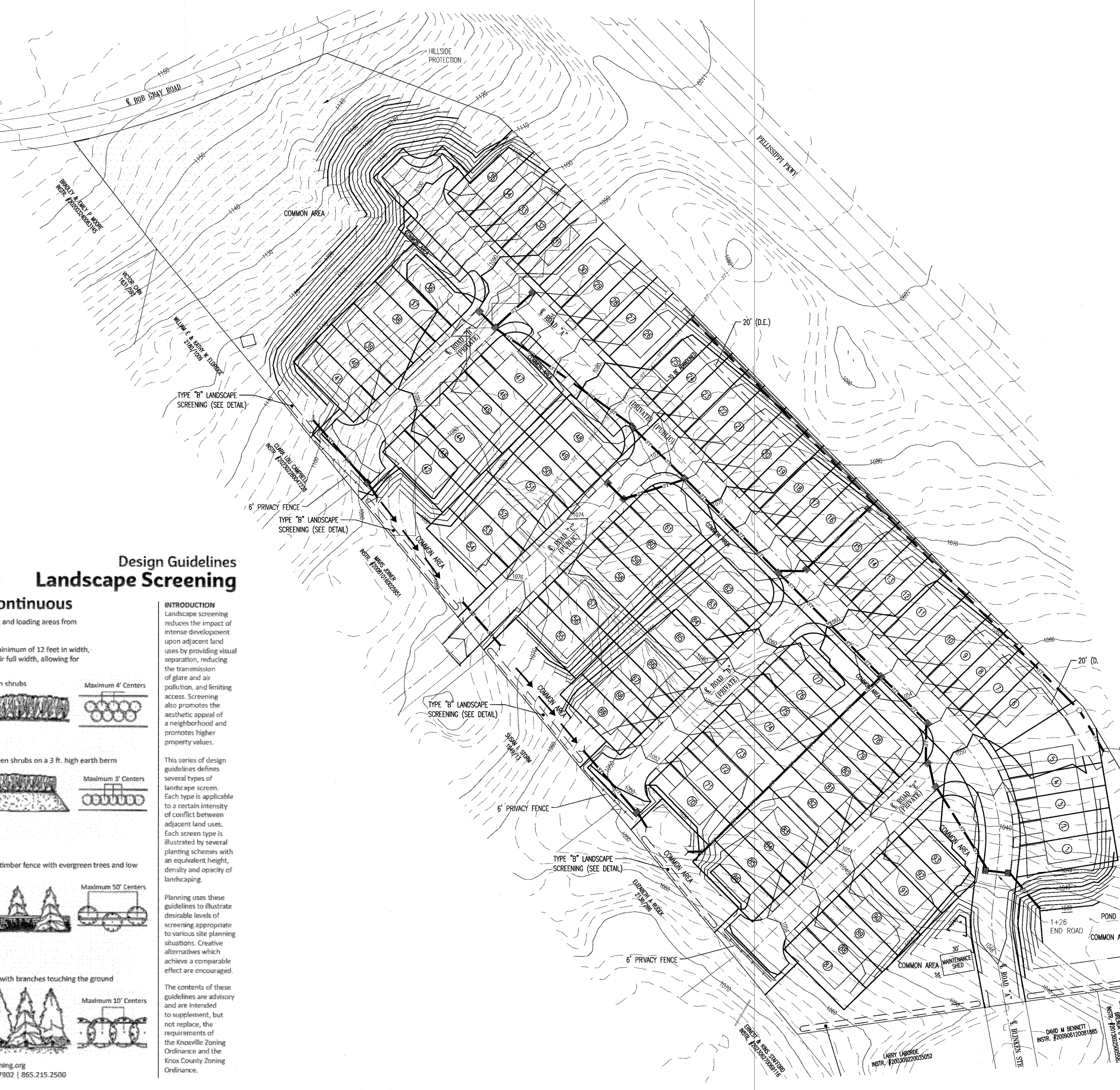
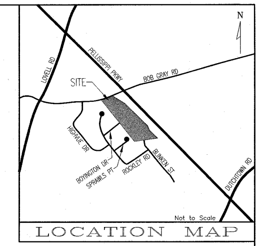




Planning
KNOXVILLE | KNOX COUNTY

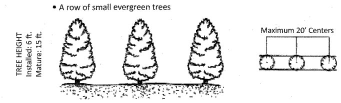
Design Guidelines
Landscape Screening

Type "C" Screen: Partial

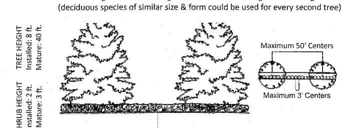
APPROPRIATE LOCATION: Between parking lots and public streets; boundaries of industrial and office development

NOTE: Landscape buffer strips should be a minimum of 8 feet in width, and sown with grass or ground cover for their full width, allowing for mulch at the base of plantings.

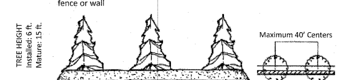
- A row of small evergreen trees



- A row of large broad leaf evergreen trees with a 3 ft. high wall or hedge (deciduous species of similar size & form could be used for every second tree)



- A row of evergreen conifers with a 3 ft. high earth berm or solid fence or wall



INTRODUCTION

Landscape screening reduces the impact of intense development upon adjacent land uses by providing visual separation, reducing the transmission of glare and air pollution, and limiting access. Screening also promotes the aesthetic appeal of a neighborhood and promotes higher property values.

This series of design guidelines defines several types of landscape screen. Each type is applicable to a certain intensity of conflict between adjacent land uses. Each screen type is illustrated by several planting schemes with an equivalent height, density and opacity of landscaping.

Planning uses these guidelines to illustrate desirable levels of screening appropriate to various site planning situations. Creative alternatives which achieve a comparable effect are encouraged.

The contents of these guidelines are advisory and are intended to supplement, but not replace, the requirements of the Knoxville Zoning Ordinance and the Knox County Zoning Ordinance.

Knoxville-Knox County Planning | KnoxPlanning.org
400 Main Street, Suite 403 | Knoxville, TN 37902 | 865.215.2500

Planning
KNOXVILLE | KNOX COUNTY

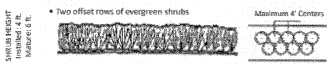
Design Guidelines
Landscape Screening

Type "B" Screen: Continuous

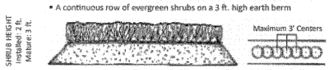
APPROPRIATE LOCATION: Screening parking and loading areas from adjoining residential and office districts

NOTE: Landscape buffer strips should be a minimum of 12 feet in width, and sown with grass or ground cover for their full width, allowing for mulch at the base of plantings.

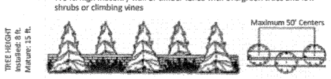
- Two offset rows of evergreen shrubs



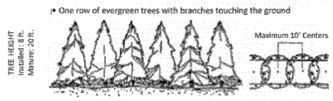
- A continuous row of evergreen shrubs on a 3 ft. high earth berm



- A 5 ft. high masonry wall or timber fence with evergreen trees and low shrubs or climbing vines



- One row of evergreen trees with branches touching the ground



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DAVID B. HARB
REGISTERED ENGINEER
STATE OF TENNESSEE
NO. 101265
6/21/24

OWNER/DEVELOPER
ARCIP HOROBET
3105 W. GALLAHER FERRY RD.
KNOXVILLE, TN 37932
PHONE: (865) 607-1167

BATSON, HIMES, NORVELL & POE
REGISTERED ENGINEERS & LAND SURVEYORS
4334 PAPERMILL DRIVE
KNOXVILLE, TENNESSEE 37909
PHONE: (865) 588-6472
FAX: (865) 588-6473
email@bhn-p.com

DESIGNED DBH								
DRAWN TPD								
CHECKED DBH	1	7-21-24	KKCP COMMENTS					
	NO.	DATE	REVISION	APPR.	NO.	DATE	REVISION	APPR.

SCALE
HORIZONTAL: 1"= 50'
VERTICAL: 2' INTERVAL

DATE
5/29/24

DEED REFERENCE: INSTR. #202402010036844

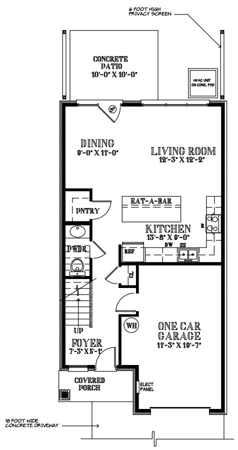
0' 50' 100' 150' 200'
1"=50'

CONCEPT GRADING & DRAINAGE PLAN FOR
HOROBET ON BOB GRAY ROAD
TAX MAP118 PARCEL 71
6TH CIVIL DISTRICT, KNOX COUNTY, TENNESSEE

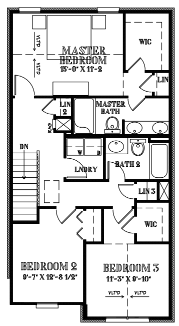
25545-GP

SHEET 3 OF 3 SHEET(S)

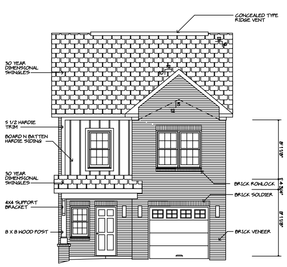
Q:\25545\25545.DWG



MAIN FLOOR PLAN



UPPER FLOOR PLAN



FRONT ELEVATION

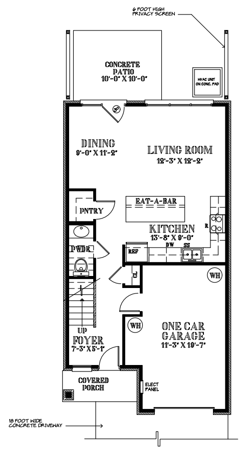
THE CANTER

SINGLE FAMILY ATTACHED HOUSE

OVERALL DIMENSIONS
22 -0 X 42 -0
WIDTH X DEPTH

SQUARE FOOTAGE

MAIN	614 SQ FT
UPPER	904 SQ FT
GARAGE	252 SQ FT



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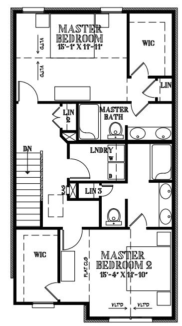

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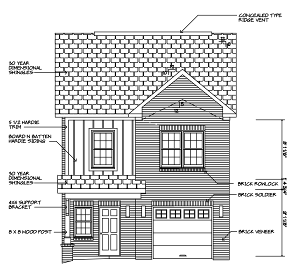


FRONT ELEVATION

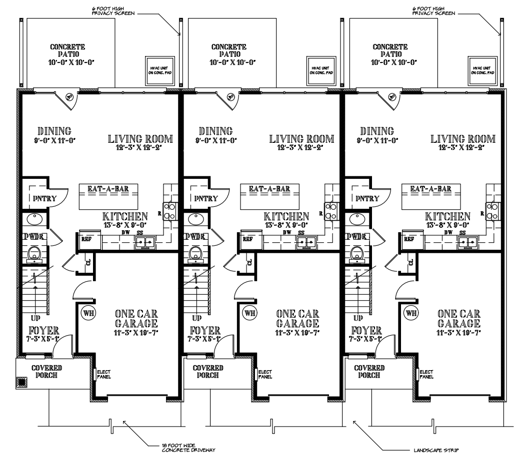
THE WITHERS

SINGLE FAMILY ATTACHED HOUSE

OVERALL DIMENSIONS
22 -0 X 42 -0
WIDTH X DEPTH

SQUARE FOOTAGE

MAIN	614SQ FT
UPPER	904 SQ FT
GARAGE	252 SQ FT



TYPICAL THREE UNIT BUILDING PLAN

TYPICAL THREE UNIT FRONT ELEVATION

OVERALL DIMENSIONS
66 -0 X 42 -0
WIDTH X DEPTH

DO NOT REPRODUCE

REVISIONS

NO.	DESCRIPTION	BY/DATE

WYSTWYND DESIGNS
401 NORTH FOREST PARK BLVD.
KNOXVILLE, TN 37919
PH 865.584.6712 EMAIL drm@wystwynd.com
WEB: wystwynd.com

ELEVATIONS FOR THE BOB GRAY DEVELOPMENT
N KNOXVILLE, TN 37932

DRAWN	DRM
CHECKED	DRM
DATE	06/20/24
FILE NAME:	CANTER AND WITHERS - BRICK 6-21-24.DWG
JOB NO.	1004.24044
SHEET	PR1.01

Friday, June 21, 2024 1:11:12 PM \\WYSTWYND-SERVER\WYSTWYNDSERVER_PROJ\2024\1004 ARCIP HOROBET\24044 - BOB GRAY DEVELOPMENT\CANTER AND WITHERS - BRICK 6-21-24.DWG

Planning
KNOXVILLE | KNOX COUNTY

Variances

The Planning Commission may reduce or otherwise vary the requirements of the Subdivision Regulations when it finds the hardship criteria are met. In granting such variances, the Planning Commission may attach and require whatever conditions it feels are necessary to secure the basic objectives of the varied regulations. Any variance granted by the Planning Commission shall be noted in its official minutes along with the justification for granting the variance (Subdivision Regulations, Section 1.05).

HARDSHIP CONDITIONS TO BE MET:

1 **Conditions Required:** Where the Planning Commission finds that extraordinary hardships or particular difficulties may result from the strict compliance with these regulations, they may, after written application, grant variations to the regulations, subject to specified conditions, so that substantial justice may be done and the public interest secured, provided that such variations shall not have the effect of nullifying the intent and purpose of these regulations or the comprehensive plan.

2 **Evidence of Hardship Required:** The Planning Commission shall not grant variations to these regulations if the purpose of the variation is solely for financial gain. The Planning Commission shall not grant variations to the Subdivision Regulations unless they make findings based upon the evidence presented to them in each specific case that the following hardships are met:

   a. Because of the particular surroundings, shape, or topographical conditions of the specific property involved, a particular hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of the regulations were adhered to.

   b. The conditions upon which the request for a variation is based is unique to the property for which the variation is sought and is not applicable, generally, to other property, and has not been created by any person having an interest in the property.

   c. The granting of the variation will not be detrimental to the public safety, health, or welfare, or injurious to other property or improvements in the neighborhood in which the property is located.

By signing this form, I certify that the criteria for a variance have been met for each request, and that any and all requests needed to meet the Subdivision Regulations are requested above or are attached. I understand and agree that no additional variances can be acted upon by the legislative body upon appeal and none will be requested.

Signature	David Harbin	6/24/24
	Printed Name	Date

It is the applicant's responsibility to identify the hardship that would result, as distinguished from a mere inconvenience, if the strict letter of the regulations was adhered to. Each of the variance criteria must be addressed in the comments below with specific facts regarding the unique details of the property and/or project, as applicable.

1. VARIANCE REQUESTED:

Ending a public Road without constructing a turn-around.

Specify the hardship that would result for each of the variance criteria:

A. Pertaining to the particular surroundings, shape, or topographical conditions of the subject property: This road is being extended to tie to a private road on adjoining property

B. Pertaining to conditions unique to the property that are not applicable to other property and has not been created by any person having an interest in the property.

Not created by my client, Trying to comply with the county's request to extend the public road to the adjacent property.

C. Pertaining to the granting of a variance will not be detrimental to public safety, health, or welfare, or injurious to other property or improvements in the neighborhood in which the property is located. The roadway system will function as a normal road network.

To be completed by the City or County Department of Engineering, as applicable:

Engineering supports the variance requested (to be completed during review process): YES ☐ NO ☐

Engineering Comments:

Planning
KNOXVILLE | KNOX COUNTY

Alternative Design Standards

The minimum design and performance standards shall apply to all subdivisions unless an alternative design standard is permitted within Article 3 Section 3.01.D, Application of Alternative Design Standards, or Article 4.01.C, Street Standards (within Hillside and Ridgetop Areas).

There are some alternative design standards that require Planning Commission approval, and some that can be approved by the Engineering Departments of the City or County. However, the City or County Engineering Departments, as applicable, will provide review comments on any alternative design proposed. These comments will be provided during the review process.

Alternative Design Standards Requiring Planning Commission Approval

Section 3.03.B.2 - Street frontage in the PR (Planned Residential) zone, Knox County
Section 3.03.E.1.e – Maximum grade of private right-of-way
Section 3.03.E.3.a – Pavement width reduction, private rights-of-way serving 6 or more lots
Section 3.04.H.2 – Maximum grade, public streets
Section 3.04.I.1.b.1 – Horizontal curves, local streets in Knox County

Alternative Design Standards Approved by the Engineering Departments of the City of Knoxville or Knox County

Section 3.03.E.3.a – Right-of-way width reduction, private rights-of-way serving 6 or more lots
Section 3.04.A.3.c – Right-of-way dedication, new subdivisions
Section 3.04.F.1 – Right-of-way reduction, local streets
Section 3.04.G.1 – Pavement width reduction, local streets
Section 3.04.H.3 – Intersection grade, all streets
Section 3.04.J.2 – Corner radius reduction in agricultural, residential, and office zones
Section 3.04.J.3 – Corner radius reduction in commercial and industrial zones
Section 3.11.A.2 – Standard utility and drainage easement

By signing this form, I certify that the criteria for a variance have been met for each request, and that any and all requests needed to meet the Subdivision Regulations are requested above or are attached. I understand and agree that no additional variances can be acted upon by the legislative body upon appeal and none will be requested.

Signature	David Horton	6/24/24
	Printed Name	Date

For each alternative design standard requested, identify how the proposed alternative design either meets the intent of the standard in the Subdivision Regulations or meets an alternative, nationally recognized engineering standard such as The American Association of State Highway and Transportation Officials (AASHTO) or Public Right-of-Way Accessibility Guidelines (PROWAG).

1. ALTERNATIVE DESIGN STANDARD REQUESTED:

Roadway grade from 19o+29o, Sta 0+13 to sta 2+84, Road B

Approval required by: Planning Commission ☐ Engineering ☒

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

2. ALTERNATIVE DESIGN STANDARD REQUESTED:

Roadway grade from 19o to 39o, Sta 1+13 to sta 0+85, Road D

Approval required by: Planning Commission ☐ Engineering ☒

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

3. ALTERNATIVE DESIGN STANDARD REQUESTED:

Roadway grade from 19o to 29o, Sta 0+13 to Sta 2+93 Road E'

Approval required by: Planning Commission ☐ Engineering ☒

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

4. ALTERNATIVE DESIGN STANDARD REQUESTED:

Public Right-of-way width from 50' to 40'

Approval required by: Planning Commission ☐ Engineering ☒

Engineering supports the alternative design standard requested (to be completed during review process): YES ☐ NO ☐

Engineering Comments:

5. ALTERNATIVE DESIGN STANDARD REQUESTED:

Lot frontage from 25' to 22'

Approval required by: Planning Commission ☒ Engineering ☐

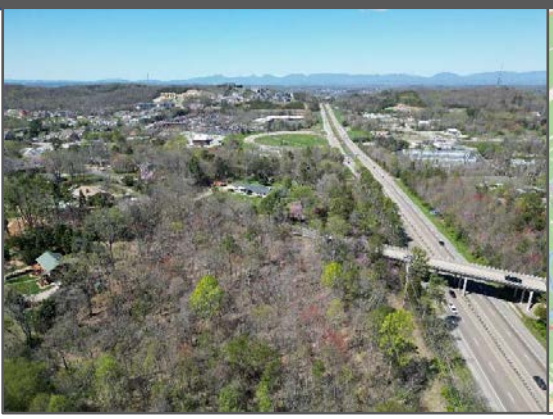
Engineering supports the alternative design standard requested (to be completed during review process): YES ☐ NO ☐

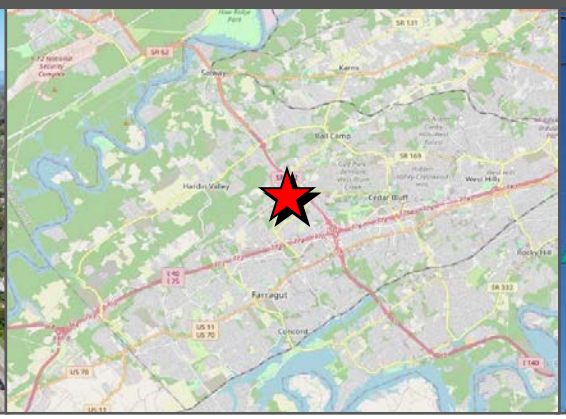
Engineering Comments:

AJAX ENGINEERING

CIVIL ENGINEERING / TRAFFIC ENGINEERING

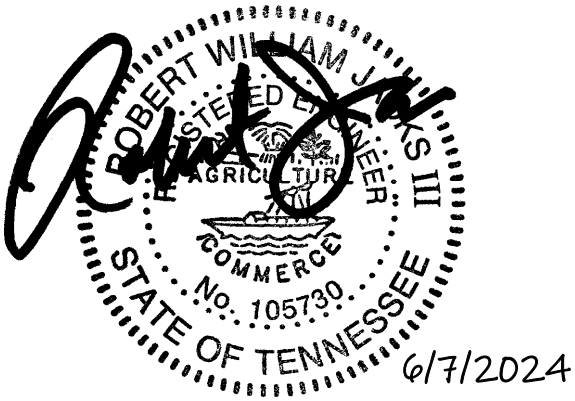
Transportation Impact Study
Bob Gray Road Subdivision
Knox County, Tennessee





Revised June 2024

Prepared for:
Bob Gray Developers, LLC
Mr. Arcip Horobet
3105 W Gallaher Ferry Road
Knoxville, TN 37932



11812 Black Road / Knoxville, TN 37932 • (865) 556-0042 • ajaxengineering@gmail.com

EXECUTIVE SUMMARY

Preface:

Bob Gray Developers, LLC proposes a residential development south of Bob Gray Road and adjacent to Pellissippi Parkway in West Knox County, TN. The proposed development will include constructing a maximum of 94 multi-family attached townhomes on 9.88 +/- acres. The development is named and referenced in this study as "Bob Gray Road Subdivision" since a formal name has not been chosen yet. The development proposes a single entrance via an existing street to the west of the site property in an adjacent subdivision. The residential development is anticipated to be fully built and occupied by 2027.

The primary purpose of this study is to determine and evaluate the potential impacts of the development on the adjacent transportation system. The study includes a review of the primary access roads and intersections, and it is a Level 1 study established by Knoxville/Knox County Planning. This study also includes a review of the impacts if an existing adjacent residential development losing its road access to Pellissippi Parkway and its residents' trips diverted through the proposed Bob Gray Road Subdivision. Recommendations and mitigation measures are offered to accommodate the new residential subdivision if transportation operations are projected to be below recognized engineering standards. The measures also include recommendations if the adjacent subdivision loses its current road access and is routed through the proposed Bob Gray Road Subdivision.

This revised report reflects the proposed site design changes by Batson, Himes, Norvell, and Poe, including a change in proposed road access to the Bob Gray Road Subdivision. It also includes additional discussion regarding the left-turn lane lengths at the signalized intersection of Lovell Road at Bob Gray Road and Yarnell Road, as presented in the Transportation Impact Study produced for the nearby Lovell Crossing Development.

Study Results:

The significant findings of this study include the following:

- The Bob Gray Road Subdivision, with a maximum of 94 multi-family attached townhomes, is estimated to generate 903 trips at full build-out and occupancy on an average weekday. Of these daily trips, 51 are estimated to occur during the AM peak hour and 73 in the PM peak hour in 2027.

- The primary road access for the proposed residential subdivision will be provided via the intersection of Bob Gray Road at Highvue Drive in the adjacent Highvue Acres Subdivision. This unsignalized t-intersection is expected to operate with acceptable vehicle delays in the projected 2027 AM and PM peak hours. The addition of the generated vehicles at this intersection will operate adequately in 2027 with respect to vehicle capacity. Vehicle queues on Highvue Drive at Bob Gray Road are not expected to exceed three vehicles in the peak hours, even with the additional traffic volumes.
- For the future scenario that only includes vehicles generated from the Bob Gray Road Subdivision, a separate eastbound right-turn lane on Bob Gray Road at Highvue Drive will not be warranted based on the projected AM and PM peak hour 2027 traffic volumes. However, a separate westbound left-turn lane on Bob Gray Road in the 2027 PM peak hour will just barely meet the threshold.
- If the adjacent residential development to the south, Parkway Heights, loses its only road access via Pellissippi Parkway, its traffic will need to be re-routed through the new Bob Gray Road Subdivision and subsequently the Highvue Acres Subdivision. If this were to occur, the projected 2027 volumes indicate that the Knox County thresholds for a separate westbound left-turn lane and eastbound right-turn lane on Bob Gray Road at Highvue Drive would be fully met in the PM peak hour.

Recommendations:

The following recommendations are based on the study analyses to minimize the impacts of the proposed development and potential diverted trips on the adjacent transportation system while attempting to achieve an acceptable traffic flow and improved safety. More details regarding all the recommendations are discussed at the end of the report.

Lovell Road at Bob Gray Road and Yarnell Road:

- Knox County Engineering is recommended to modify the traffic signal timing to reduce the considerable vehicle delays for the westbound and eastbound approaches on Bob Gray Road and Yarnell Road in the existing and projected conditions. This modification would include utilizing the optimized green times offered in this report to decrease vehicle delays in the PM peak hour on the westbound and eastbound approaches.
- The existing and projected vehicle queues for this intersection's westbound, eastbound, and south left-turn lanes are calculated to extend past their designated

storage, primarily in the PM peak hour, even with the optimized, modified signal timing. Future restriping projects on the Bob Gray Road and Yarnell Road approaches within the available road section footprints are recommended to address these deficiencies. This action on Yarnell Road would potentially require adding a few feet of asphalt pavement to the inner curve of Yarnell Road's south side to provide the full width for the thru lanes plus the center transition for the left-turn lane. Otherwise, it is recommended that Knox County Engineering re-analyze the traffic signal coordination of the Lovell Road corridor. This analysis should determine if a shorter cycle length currently set to 120 seconds in the PM peak hour could be shortened to reduce the time the southbound left-turn lane on Lovell Road is served, thus reducing the time that vehicle queues could form in this lane.

Bob Gray Road at Highvue Drive:

- Due to the limited right-of-way on Bob Gray Road at Highvue Drive and the fact that it just barely meets the threshold for a left-turn lane in the PM peak hour only, it is not recommended that a left-turn lane be constructed on Bob Gray Road for the scenario that only includes trips generated by the Bob Gray Road Subdivision. However, if Parkway Height Townhouses loses its access to Pellissippi Parkway and its traffic is diverted through the Bob Gray Road and Highvue Acres Subdivisions, it is recommended that a westbound left-turn lane and an eastbound right-turn lane be constructed on Bob Gray Road at Highvue Drive. Any turn lanes provided on Bob Gray Road must be designed and constructed with a minimal lane taper and maximum deceleration length possible within the existing physical limitations. These modifications would need to be coordinated with Knox County Engineering.

Bob Gray Road Subdivision Internal Roads:

- A 25-mph Speed Limit (R2-1) sign is recommended to be posted near the beginning of the development entrance off Boyington Drive. It is also recommended that a "No Outlet" Sign (W14-2a) be posted at the western end of Boyington Drive at Rockley Road in the Highvue Acres Subdivision. This sign can be posted above or below the existing street name sign for Boyington Drive.
- Dual end-of-roadway object markers (OM4-1) should be installed at the end of the internal roads in the subdivision that end in hammerhead turnarounds. These markers should also be installed at the end of Road "A" if the road is not connected

to Blinken Street to the south in the Parkway Heights Subdivision. Furthermore, if an immediate road connection is not made to Blinken Street, an additional sign should be posted at the end of Road "A" to follow Knoxville-Knox County Subdivision regulations. This sign is for notification of a possible future street connection. It should state, "NOTICE – This road may be extended and connected to the south – for more info. contact Knox Co. Engineering & Public Works (865) 215-5800".

- Stop Signs (R1-1) with 24" white stop bars are recommended to be installed at the internal road locations, as shown in the study.
- Sight distance at the new internal intersections must not be impacted by new signage, parked cars, or future landscaping. With a speed limit of 25-mph in the development, the internal intersection sight distance is 250 feet. The required stopping sight distance is 155 feet for a level road grade. The site designer should ensure that internal sight distance lengths are met and account for different proposed road grades.
- It is recommended that a small strip of the development property be reserved as a potential common area for all Bob Gray Road Subdivision residents to walk or ride their bikes to the east. This strip would allow for a pathway to the future Knox to Oak Ridge Greenway if the greenway were constructed adjacent to the subdivision on the west side of Pellissippi Parkway.
- If directed by the local post office, the site designer should include a parking area and a centralized mail delivery center within the development for the subdivision residents.
- All drainage grates and covers for the residential development must be pedestrian and bicycle safe.
- Road "A" will have a long, straight road segment. Straight road segments encourage higher vehicle speeds. Additionally, if Parkway Heights loses its access to Pellissippi Parkway, residents from this other development will increase traffic volumes and may contribute to speeding in the Bob Gray Road Subdivision. It is recommended that the civil site designer consider including traffic calming measures on the internal Road "A", such as speed humps or tables. Specifics regarding this recommendation should be discussed in the design phase with Knox County Engineering.
- All road and intersection elements should be designed to AASHTO and Knox County specifications and guidelines to ensure proper operation.

DESCRIPTION OF EXISTING CONDITIONS

- **STUDY AREA:**

The proposed location of this new residential development is shown on a map in Figure 1. This proposed development will be located south of Bob Gray Road and east of the existing Highvue Acres Subdivision in West Knox County, TN. The development will be constructed on an existing single parcel, with a single entrance tying into the end of Boyington Drive in the adjacent Highvue Acres Subdivision. Transportation impacts associated with the development were analyzed at two intersections on Bob Gray Road, where the proposed development will have road access to and from external destinations.

The scope of work from Knoxville/Knox County Planning requested that the study include a worst-case scenario if the existing adjacent townhouse development to the south, Parkway Heights, loses its current external road access. This worst-case scenario included routing the trips generated by the residents in Parkway Heights through the proposed new subdivision due to a road closure to Pellissippi Parkway. Parkway Heights only has external road access via its entrance at Pellissippi Parkway. Over the past few years, the Tennessee Department of Transportation has made a concerted effort to remove driveway access points and limit access to Pellissippi Parkway, forcing vehicular access to designated interchanges. Thus, this report includes two scenarios: an analysis of the proposed Bob Gray Road Subdivision alone and the other, the worst-case scenario, which includes the Bob Gray Road Subdivision plus the diverted trips from Parkway Heights Townhouses due to a potential entrance closure at Pellissippi Parkway.

View of End of Boyington Drive
(Looking East from Boyington Drive)

The proposed development property is in a suburban area of West Knox County, TN, with many surrounding residential developments and a few commercial properties nearby on Lovell Road to the west. Several established neighborhoods are near the development site, including single-family detached houses, townhouses, and apartments. The site property is a remaining pocket of undeveloped land in an area that has experienced a lot of development over the past few decades. The property has remained undeveloped due to site challenges, including topography, drainage, and road access. However, it has become much more attractive for development due to the enormous residential activity in Knox County and its desirable location in West Knoxville.

The existing development site has steep topography near Bob Gray Road, sloped towards the south, and further to the south, the property slope becomes gentler. The existing property is covered with young forest and is adjacent to and west of Pellissippi Parkway. No existing structures are on the development property.

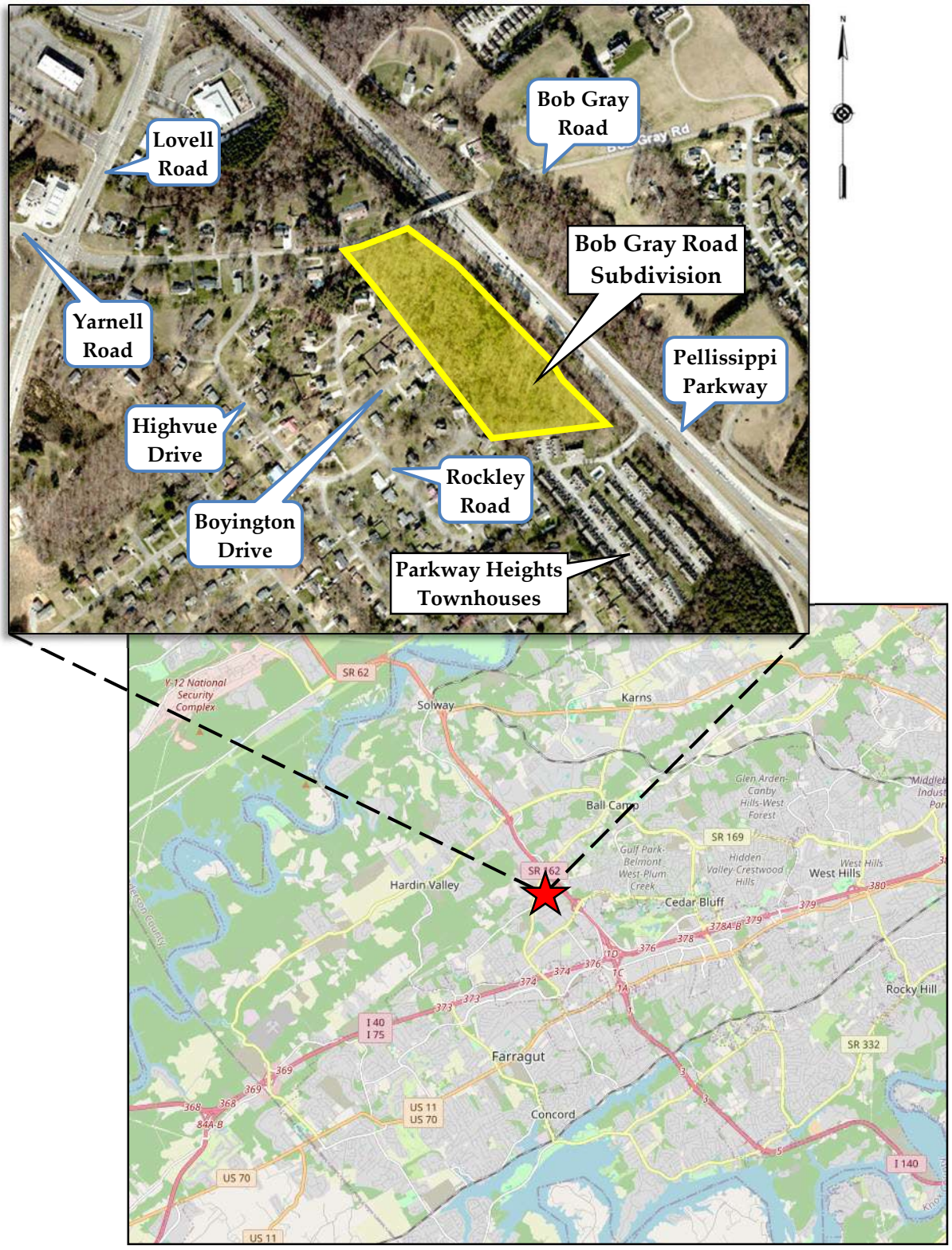


Figure 1
Location Map

- **EXISTING ROADWAYS:**

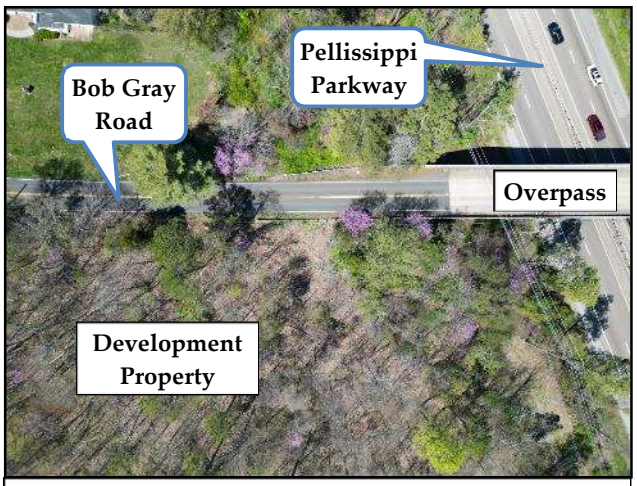
Table 1 lists the characteristics of the existing primary roadways near the development property and included in the study:

TABLE 1
STUDY CORRIDOR CHARACTERISTICS

NAME	CLASSIFICATION [1]	SPEED LIMIT	LANES	ROAD WIDTH [2]	TRANSIT [3]	PEDESTRIAN FACILITIES	BICYCLE FACILITIES
Bob Gray Road	Major Collector	40 mph	2 undivided	20 feet	None	No sidewalks along roadway	No bike lanes
Lovell Road (SR 131)	Minor Arterial	45 mph	4 undivided with TWLTL	70 feet	None	Sidewalks on both sides	Bike lanes on both sides
Yarnell Road	Major Collector	40 mph	2 undivided	25 feet	None	Sidewalk on north side of road for 500 feet at Lovell Road	No bike lanes
Highvue Drive	Local Street	25 mph	2 undivided	26 feet	None	No sidewalks along roadway	No bike lanes
Boyington Drive	Local Street	Not Posted	2 undivided	26 feet	None	No sidewalks along roadway	No bike lanes

[1] 2018 Major Road Plan by Knoxville/Knox County Planning
[2] From edges of pavement and face of curbs near project site
[3] According to Knoxville Area Transit System Map

Bob Gray Road is classified as a Major Collector and traverses generally in a west-east direction with a total length of 3.1 miles. Bob Gray Road begins at the signalized intersection with Lovell Road (SR 131) and Yarnell Road on its west side. On its east side, the road name terminates at the signalized intersection with North Cedar Bluff Road and continues to the east as Old Cedar Bluff Road. Along its length, Bob Gray Road has two roundabout intersections and a few notable vertical curves, but for the most part, the vertical and horizontal elevation changes are gradual. Nearly all properties along Bob Gray Road are residential in nature.



Bob Gray Road Adjacent to Development Property

Bob Gray Road has a 2-lane pavement section with white edge lines and a double yellow centerline adjacent to the development property. Roadway lighting is absent in the

adjacent study area along Bob Gray Road. Other roadway features, including sidewalks, bike lanes, and greenway paths, are not provided along Bob Gray Road. No paved shoulders are on Bob Gray Road, with most of the shoulders outside the pavement consisting of grass surfaces.

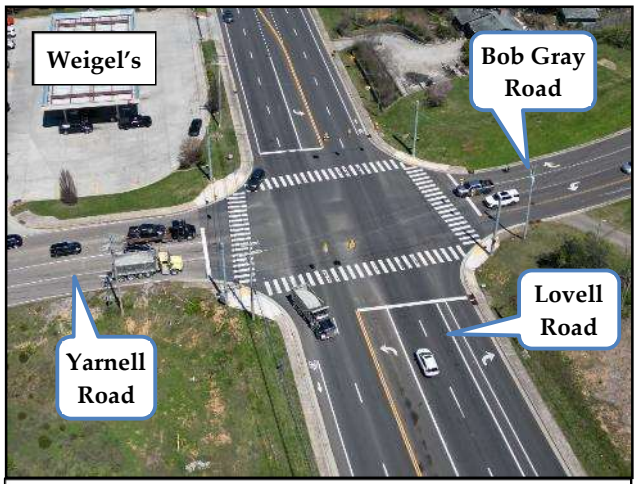
At the traffic signal at Lovell Road and Yarnell Road, Bob Gray Road has three traffic lanes: a left, a thru, and a right-turn lane. At the intersection, Bob Gray Road has concrete curb and gutter on its edges that ends 565 feet to the east.

Just northeast of the development property, Bob Gray Road is delineated with guardrails on both sides before it transitions to an overpass bridge over Pellissippi Parkway. This overpass is designated and signed as a Memorial Bridge for Jackie Carroll Walker, a US Army 1st Lieutenant from Corryton, TN, who was killed in South Vietnam in November 1969. However, the proposed subdivision will not be able to access Bob Gray Road to the north due to limited road frontage availability, sight distance restrictions, and the near presence of this overpass.

Bob Gray Road has relatively good pavement conditions and will be the primary road for future subdivision residents to and from external locations. The asphalt pavement surface outside the white edge lines on Bob Gray Road near the development site ranges from a couple of inches to 6 inches.

The proposed subdivision will have access to Bob Gray Road via Highvue Drive in the Highvue Acres Subdivision. Road access to Highvue Drive in the Highvue Acres Subdivision will be provided to future residents via Boyington Drive and Rockley Road.

Lovell Road (SR 131) is classified as a Minor Arterial and generally traverses north to south and is crossed by significant roadways along its route. Lovell Road is a Tennessee State Route and is maintained by TDOT. Lovell Road begins on the south side at the signalized intersection of Kingston Pike (SR 1) at Canton Hollow Road. Lovell Road formally ends on its north side at the signalized intersection with Middlebrook Pike, Ball Camp Byington Road, and Ball Camp Pike. Lovell Road has a total length of 6 miles. According to online



Lovell Road at the Signalized Intersection with Bob Gray Road and Yarnell Road

sources at the Knoxville Civil War Roundtable website, Lovell was a "corrupted" village name that used to exist near the intersection of Kingston Pike and the current Lovell Road. This village was known as Loveville and was established in 1797 by Robert Loveville, a companion of General James White, recognized as the founder of Knoxville, TN.

Closer to the study area, Lovell Road provides convenient access to Pellissippi Parkway to the north for travel to the south towards Interstate 40/75/140 and, in particular, for travel to the north towards Oak Ridge, TN. To the south, Lovell Road provides access to Interstate 40/75, the Turkey Creek Shopping area, and Kingston Pike. The posted speed limit on Lovell Road is 45 mph near the project site. Lovell Road is a 4-lane undivided roadway near the proposed development site with a continuous center two-way left-turn lane (TWLTL). The TWLTL has a width of 12 feet with 11.5-foot wide dual-thru lanes in both directions. Each side of Lovell Road is flanked by 4.5-foot wide bike lanes, curb and gutter, and concrete sidewalks 4.5 feet wide. Road signage and pavement markings delineate the bike lanes on Lovell Road.

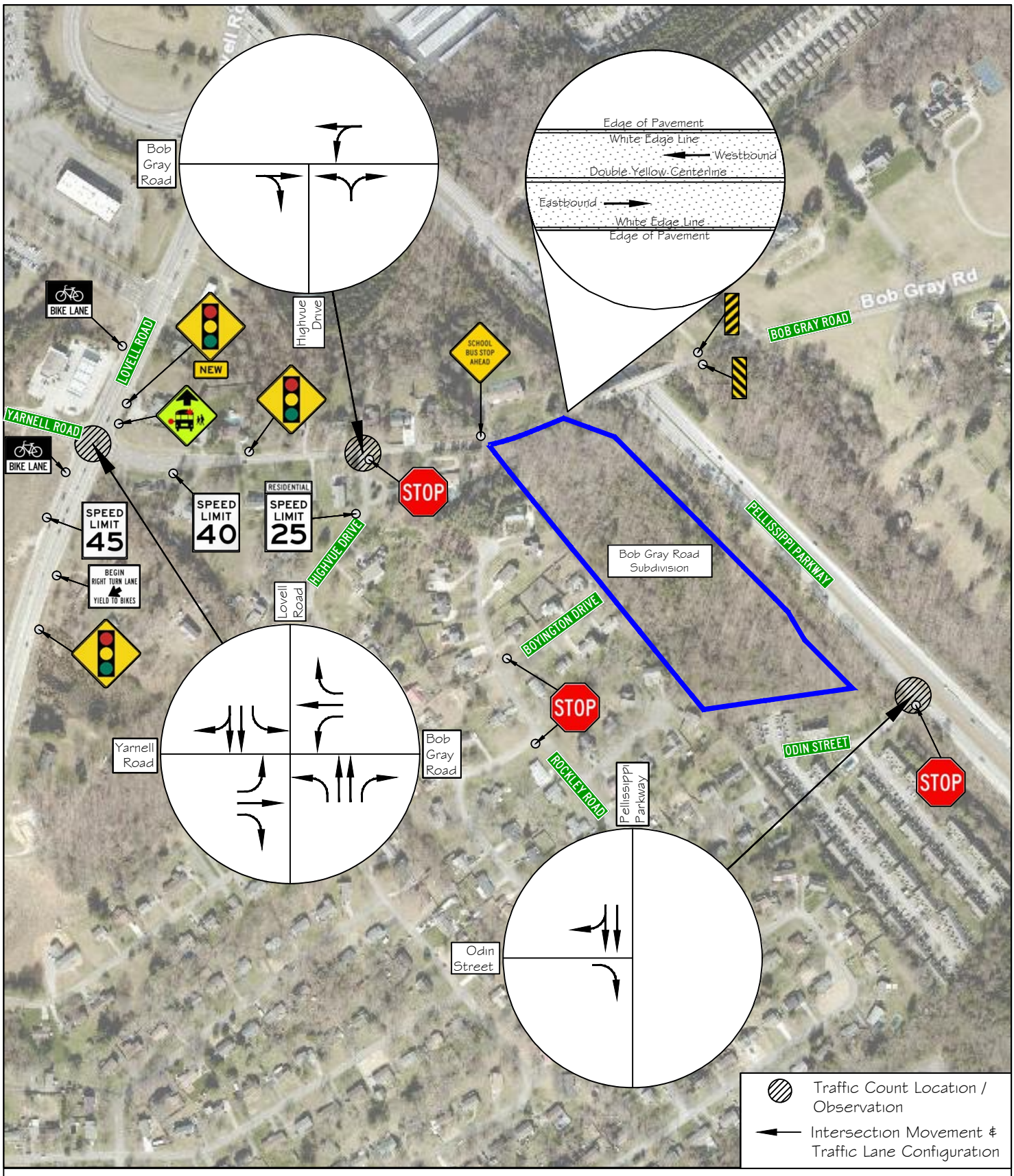
Recent improvements have been made along Lovell Road and at the signalized intersection of Lovell Road at Bob Gray Road and Yarnell Road. These improvements included repaving and restriping, new sidewalk ramps, pedestrian crossing buttons and signals, and detectable warning surfaces to meet ADA (Americans with Disabilities Act) regulations. The traffic signal at the intersection of Lovell Road at Bob Gray Road and Yarnell Road is supported by strain poles, and the signal heads are hung on span wires. Pedestrian crosswalks are provided on all the approaches at the traffic signal.

Yarnell Road is classified as a Major Collector and traverses generally in a southwest-northeast direction. Yarnell Road begins at the unsignalized t-intersection with Everett Road on its southwest side and traverses 5.5 miles to its end to the northeast. Yarnell Road terminates at the signalized intersection with Lovell Road and Bob Gray Road on its northeast end. A driveway for a Weigel's Convenience Store is located just to the northwest of this signalized intersection. Yarnell Road has no bike lanes but has a short concrete sidewalk 500 feet in length on its north side between Lovell Road and the Lovell Crossing Apartments to the west. The sidewalk is 5 feet in width with a 6" curb. Outside the short section on its north side, Yarnell Road does not have any road curbing.

Highvue Drive and Boyington Drive are classified as Local Streets and traverse within the Highvue Acres Subdivision. The posted speed limit on Highvue Drive is 25 mph and is assumed to be the speed limit in the subdivision, including Boyington Drive. These residential roads are

26 feet in width. Highvue Drive intersects Bob Gray Road at an unsignalized t-intersection, with the traffic movements from Highvue Drive controlled by a Stop Sign (R1-1). Highvue Drive begins in the Highvue Acres Subdivision at the intersection with Rockley Road. Boyington Drive intersects Rockley Road, 206 feet north of this intersection. Boyington Drive ends abruptly on its eastern end and intersects Rockley Road to the west at a t-intersection totaling 400 feet. At Rockley Road, Boyington Drive is controlled by a Stop Sign (R1-1), with Rockley Road traffic operating freely. Boyington Drive provides access to five single-family detached houses, each with a separate driveway.

Figure 2 shows the existing lane configurations of the roadways examined in the study, the traffic count locations, and the current traffic signage in the study area. The traffic signage shown in Figure 2 only includes warning and regulatory signage near the development site. The pages following Figure 2 give a further overview of the site study area with photographs.



AJAX ENGINEERING
11812 Black Road
Knoxville, TN 37932
Phone: (865) 556-0042
Email: ajaxengineering@gmail.com

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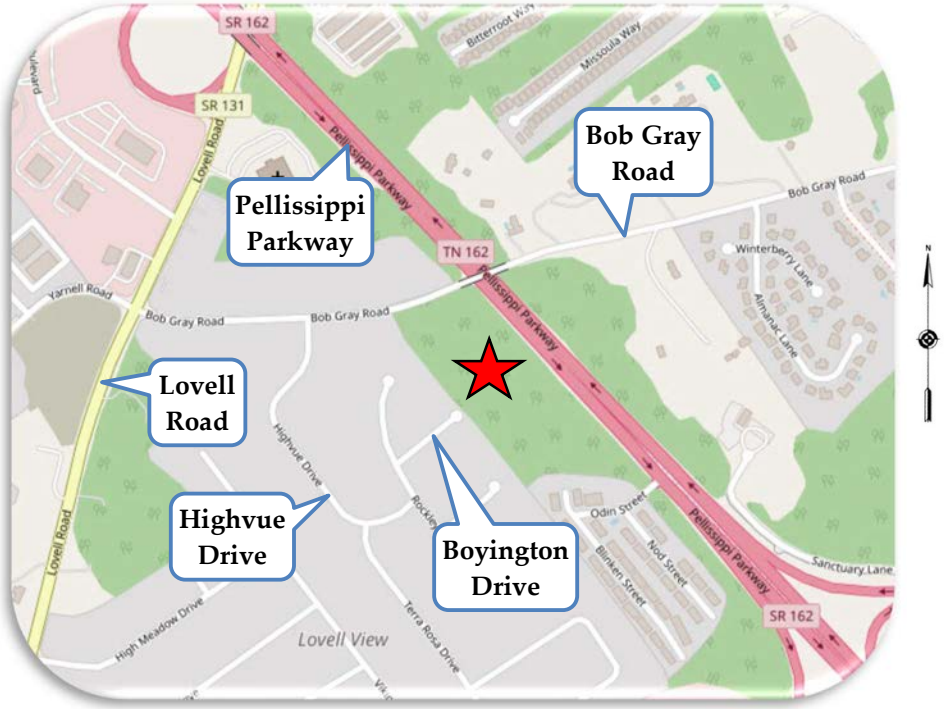
NORTH

FIGURE 2

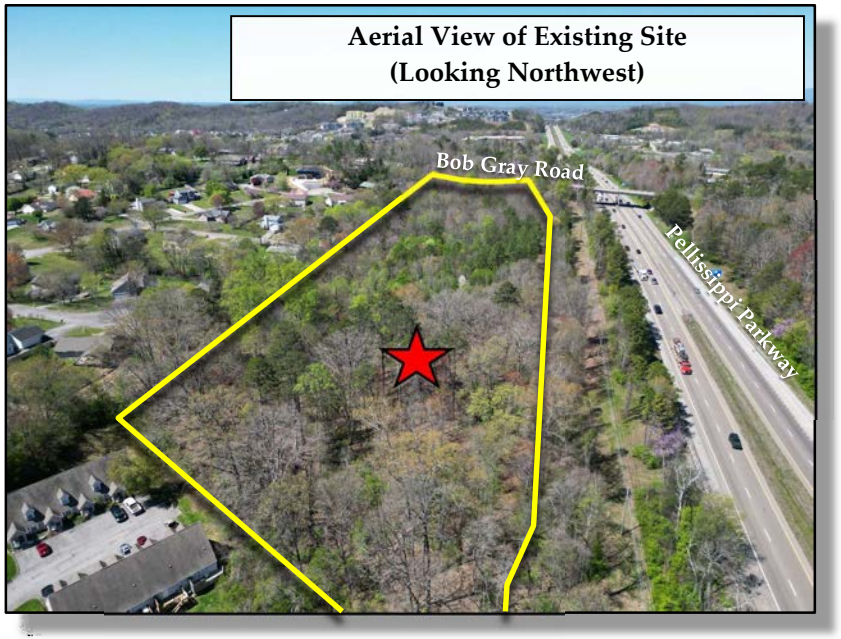
Bob Gray Road Subdivision

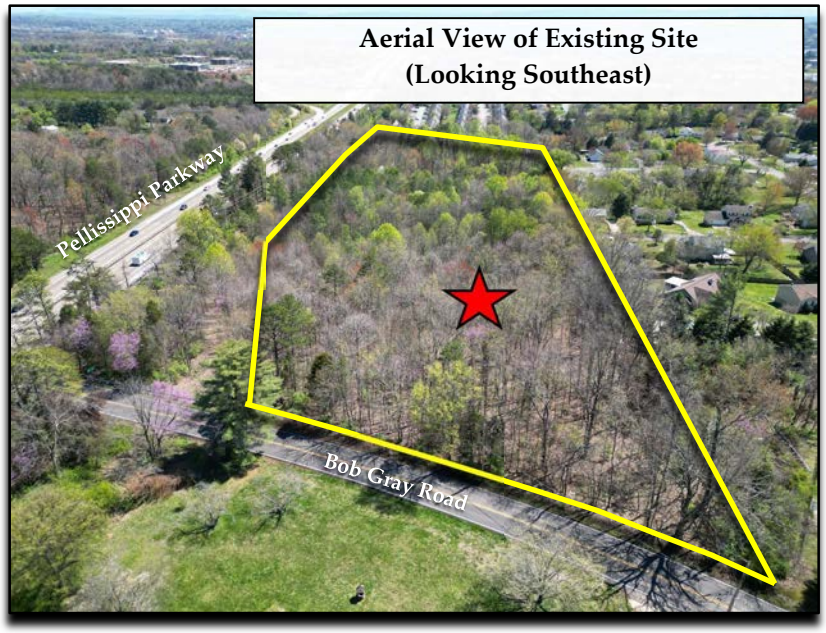
Traffic Count Locations, Traffic Signage & Existing Lane Configurations

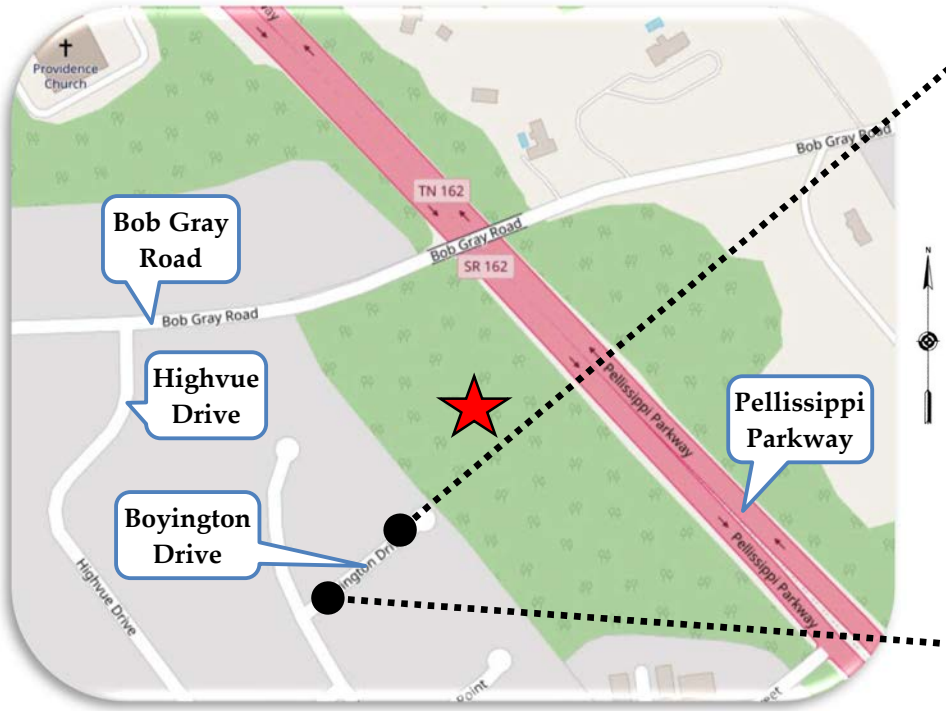
PHOTO EXHIBITS



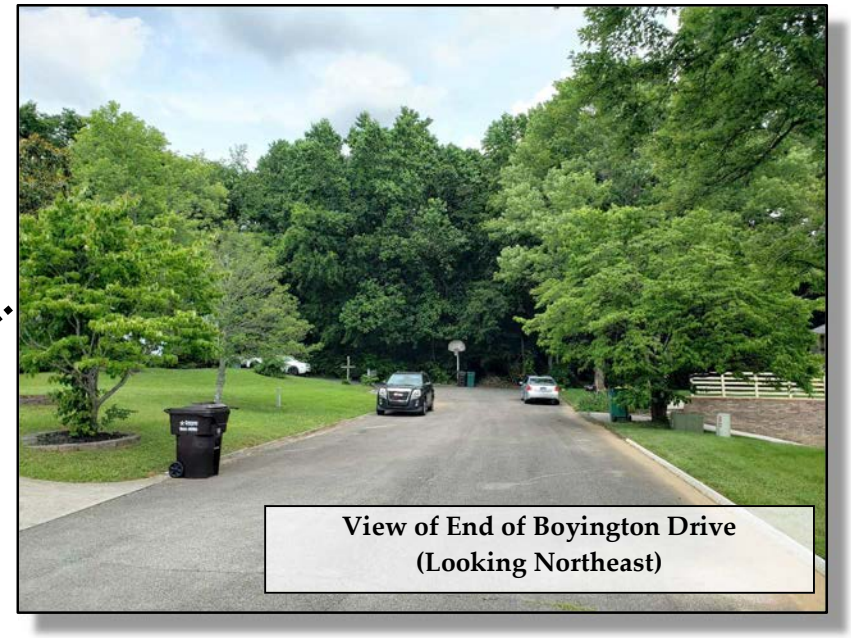
Proposed Development Area







Boyington Drive at the Proposed Development Site



View of End of Boyington Drive (Looking Northeast)

View of Boyington Drive at Rockley Road (Looking Southwest)

- **EXISTING TRANSPORTATION VOLUMES PER MODE**:

Three annual vehicular traffic count locations are in the study area, and the Tennessee Department of Transportation (TDOT) and the Knoxville Regional Transportation Planning Organization (TPO) conduct these counts. The count location data is the following and can be viewed with further details in Appendix A:

- Existing vehicular roadway traffic:
  - TDOT reported an Average Daily Traffic (ADT) on Bob Gray Road, east of Pellissippi Parkway and the proposed development site, at 3,401 vehicles per day in 2023. From 2016 to 2023, this count station has indicated a 2.5% average annual traffic growth rate.
  - TDOT reported an Average Daily Traffic (ADT) on Yarnell Road, west of Lovell Road and the proposed development site, at 3,636 vehicles per day in 2023. From 2013 to 2023, this count station has indicated a 1.7% average annual traffic growth rate.
  - TPO reported an Average Daily Traffic (ADT) on Lovell Road, north of Bob Gray Road and northwest of the proposed development site, at 22,090 vehicles per day in 2022. From 2012 to 2022, this count station has indicated a 1.5% average annual traffic growth rate.

- Existing bicycle and pedestrian volumes:
  The average daily pedestrian and bicycle traffic along Bob Gray Road is unknown. However, with the lack of sidewalks and bike lanes, this roadway is assumed to have minimal pedestrian and bicyclist activity. During the traffic counts for this project, no bicyclists or pedestrians were observed along Bob Gray Road near the development site. However, a few pedestrians were observed on the sidewalk on the north side of Yarnell Road, the sidewalks on Lovell Road, and a few bicyclists were observed traveling on Lovell Road in the designated bike lanes.

  An online website, strava.com, provides "heat" maps detailing routes taken by pedestrians, joggers, and bicyclists. The provided heat maps show the last two years of data, are updated monthly, and are gathered from individuals allowing their smart devices to track and compile their routes (millions of users). The activities in the maps are shown on the roads with color intensities with darker colors signifying higher activity. The Strava heat maps show some bicycle activity but no pedestrian activity

along Bob Gray Road adjacent to the development site. However, quite a bit of pedestrian and bicyclist activity is shown along Lovell Road and Yarnell Road to the west of the development site and in the adjacent Highvue Acres Subdivision.

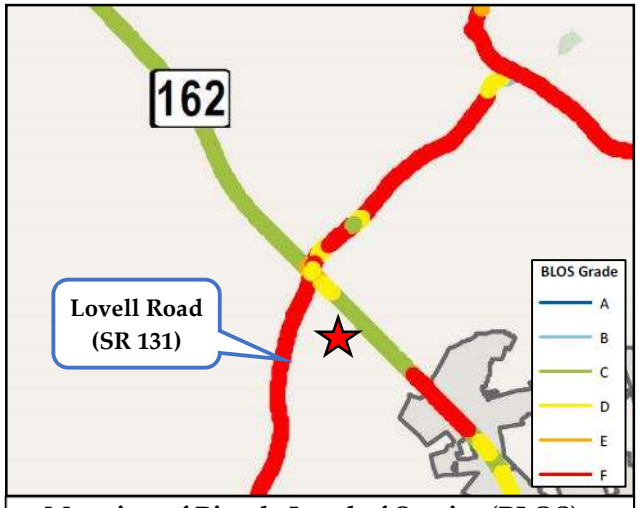
Strava Heat Map for Pedestrian and Joggers

Strava Heat Map for Bicyclists

- **PEDESTRIAN AND BICYCLE FACILITIES**:

Sidewalks and bike lanes are not provided on Bob Gray Road. However, bike lanes are provided on Lovell Road. These bike lanes exist in both directions on Lovell Road between Cedardale Lane to the north and Gilbert Drive to the south, a total of 2.0 miles. Bike lanes will be extended further to the north on Lovell Road in 2030 when TDOT widens the roadway between Cedardale Lane and the intersection of Hardin Valley Road/Middlebrook Pike and Ball Camp Pike to a 5-lane section.

TDOT has published mapping illustrating the Bicycle Level of Service (BLOS) for State Routes. BLOS is a nationally used measure of bicyclist comfort based on a roadway's geometry and traffic conditions. BLOS A designates the route as most suitable for bicyclists and BLOS F as the least suitable. The BLOS for Lovell Road (SR 131) near Bob Gray Road and Yarnell Road has a poor grade of F, even though bicycle lanes are provided.

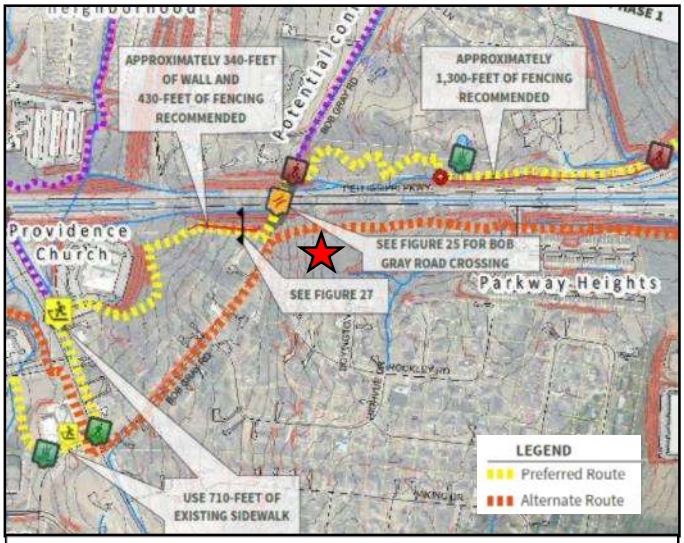


Mapping of Bicycle Level of Service (BLOS) - TDOT

Note: it is unknown when TDOT's BLOS data was determined and whether it was calculated for Lovell Road before the bike lanes were installed in 2012 during the reconstruction of the roadway.

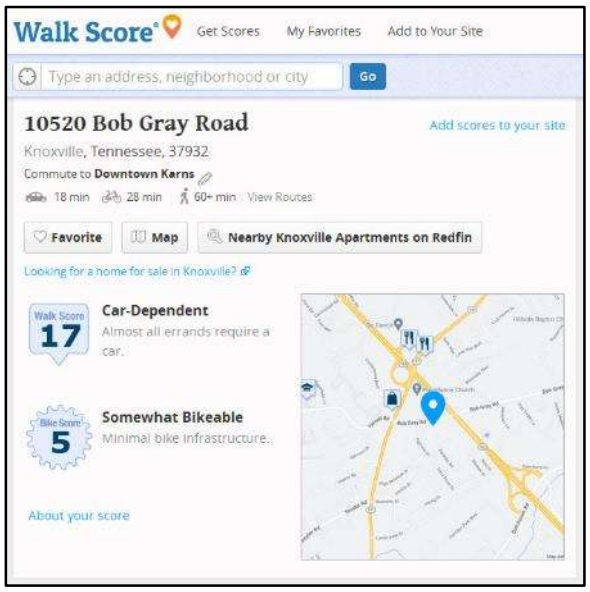
- **FUTURE GREENWAY**:

A Greenway Master Plan for Knox County to Oak Ridge was developed in 2015 by the Knoxville TPO. The plan developed potential routes to connect Knoxville, Knox County, and Oak Ridge communities via trails and greenways. Several maps in this report illustrated the preferred and alternate routes for a greenway between Knox County and Oak Ridge. Appendix B and the adjacent image show a detailed map of the potential greenway routes near the proposed Bob Gray Road Subdivision area. This map shows two distinct paths near the subdivision – the preferred route traversing across the Bob Gray Road overpass bridge to the other side of Pellissippi Parkway and an alternate route running adjacent to the proposed Bob Gray Road Subdivision and along the right-of-way for Pellissippi Parkway. The proposed Bob Gray Road Subdivision development is not expected to adversely impact the proposed greenway if the alternate route is selected.



Knox to Oak Ridge Greenway Study – Corridor Design

- **WALK SCORE**:



A private company offers a website at walkscore.com that grades and gives scores to locations within the United States based on "walkability", "bikeability", and transit availability based on a patented system. According to the website, the numerical values assigned for the Walk Score and the Bike Score are based on the distance to the closest amenity in various relevant categories (businesses, schools, parks, etc.) and are graded from 0 to 100.

Appendix C shows maps and other information for the Walk Score at the approximate development property address at 10520 Bob Gray Road. The project site location is graded with a Walk Score of 17. This Walk Score indicates that the site is car-dependent and that all errands currently require a vehicle for travel to and from the development property. The site is given a Bike Score of 5. The lack of pedestrian and bike facilities and the distance to amenities reduce the Walk and Bike Scores at the development site. The site is not given a Transit Score since public transportation is unavailable near the development site.

Due to the lack of sidewalks and bike facilities, it is not expected that any measurable bicycle or pedestrian trips will be generated to reduce vehicle trips to and from the proposed development on Bob Gray Road. Thus, these potential alternative transportation modes are not used for vehicle trip reductions.

- **TRANSIT SERVICES**:

The City of Knoxville has a network of public transit opportunities offered by Knoxville Area Transit (KAT). Bus service is not available near the development site. The overall KAT bus system map is provided in Appendix D.

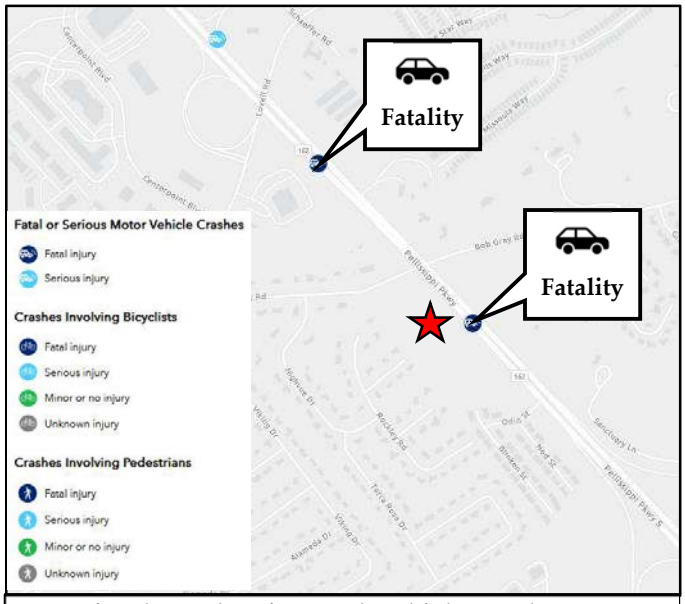
KAT Route 16

The closest public transit bus service is 3.0 miles to the

east at the corner of North Cedar Bluff Road and Dutchtown Road and is Route 16, "Cedar Bluff". It operates on weekdays and Saturdays, and this route map is included in Appendix D. Since the COVID-19 pandemic, KAT had to reduce its service schedule due to workforce shortages. These changes took place on August 29th, 2022, and the reduced schedule for this route is also included in Appendix D. However, KAT increased services on April 8, 2024, for some routes on Sundays and evenings, but this did not include Route 16. Other transit services in the area include the East Tennessee Human Resource Agency (ETHRA) and the Community Action Committee (CAC), which provides transportation services when requested.

Since the distance to the nearest public bus service is several miles away, with no sidewalks or bike lanes available to access the bus stop without using a private vehicle, the proposed development is not expected to have any reduced vehicle trips due to public transit usage.

- **CRASH DATA**:



Bicycle, Pedestrian, and Vehicle Crash Data in Study Area

The Knoxville TPO provides a website that lists bicycle, pedestrian, and vehicle severe or fatal crashes from October 2016 to September 2021. The data shows none of these incidents occurred near the development site on Bob Gray Road, Lovell Road, or Yarnell Road during that time period. However, unfortunately, two fatalities are shown to have occurred on Pellissippi Parkway near the development site. These two fatalities occurred in two separate crashes on March 8th, 2017, and December 11th, 2017.

PROJECT DESCRIPTION

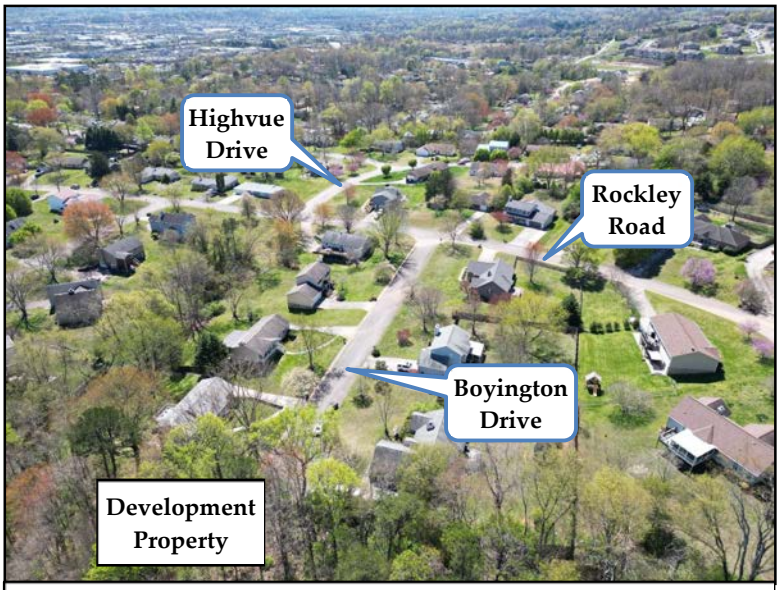
- **LOCATION AND SITE PLAN:**

The proposed plan layout with a maximum of 94 multi-family attached townhomes on 9.88 +/- acres is designed by Batson, Himes, Norvell, and Poe and is shown in Figure 3. (Note: 93 townhouses are currently shown in the layout plan.) The design shows five new streets constructed for the residential development, Roads "A" – "E". As shown in the figure, a single entrance will be constructed for the development to tie into Boyington Drive in the adjacent Highvue Acres Subdivision to the west. The entrance road from Boyington Drive, Road "C", will intersect Road "A", the main internal subdivision roadway, at a t-intersection.

Internally, Road "A" will provide access to three shorter feeder roads that include Roads "B", "D", and "E". These feeder roads and Road "A" will all end at hammerhead turnarounds. Road "C" and the portion of Road "A" to the south of Road "C" will be public roads, with the rest of the internal roads remaining private.

Aerial View of Parkway Heights Townhouse Development (Looking South)

As shown in Figure 3, Road "A" will traverse from north to south, and on its south end, it will be terminated near the property line to allow for a potential future connection to the existing townhouse development to the south. This residential development to the south, Parkway Heights, has 123 townhouses and only has external road access to Pellissippi Parkway via Odin Street. At the Parkway Heights entrance, access to Pellissippi Parkway is restricted to right-turns in and right-turns out only (RIRO) since a median opening is not provided on Pellissippi Parkway. This arrangement only allows residents to exit to the south and enter from the north, which is beneficial for the residents if this is their intended travel direction but is detrimental for the residents wishing to travel in the opposite direction. As stated previously, TDOT desires to eliminate all entrances and driveways from Pellissippi Parkway due to the large vehicular volumes and high speeds and restrict access to designated interchanges. No specific



Existing Highvue Acres Subdivision (Looking West)

plans or timelines have been offered for when Odin Street in Parkway Heights may be closed to Pellissippi Parkway. However, this study was asked to include this possibility, which would force all trips generated by the Parkway Heights Townhouses to be re-routed to and from the north through the proposed Bob Gray Road Subdivision and, thus, the existing Highvue Acres Subdivision as well.

The Bob Gray Road Subdivision will have a fair amount of open space on the north and south sides of the development, which will include common areas and areas for stormwater control. An existing power transmission line runs between the development property and Pellissippi Parkway, with cleared and maintained vegetation below the transmission line.

The typical lot dimensions for the multi-family attached townhouses in the development will be 80 feet deep and 20 feet wide, providing an area of 1,600 square feet. Each townhouse will have a garage and driveway. The developer is not proposing on-site amenities for the future subdivision residents other than providing open common areas. Internal sidewalks are not proposed either. However, 22 parking spaces will be provided along the north side of Road "A" in two separate bays for visitors and overflow parking.

The schedule for the completion of this new residential development depends on economic factors and construction timelines. This project is also contingent on permitting, design, and other regulatory approvals. This study assumed that the total construction build-out of the development and full occupancy would occur within the next three years (2027).

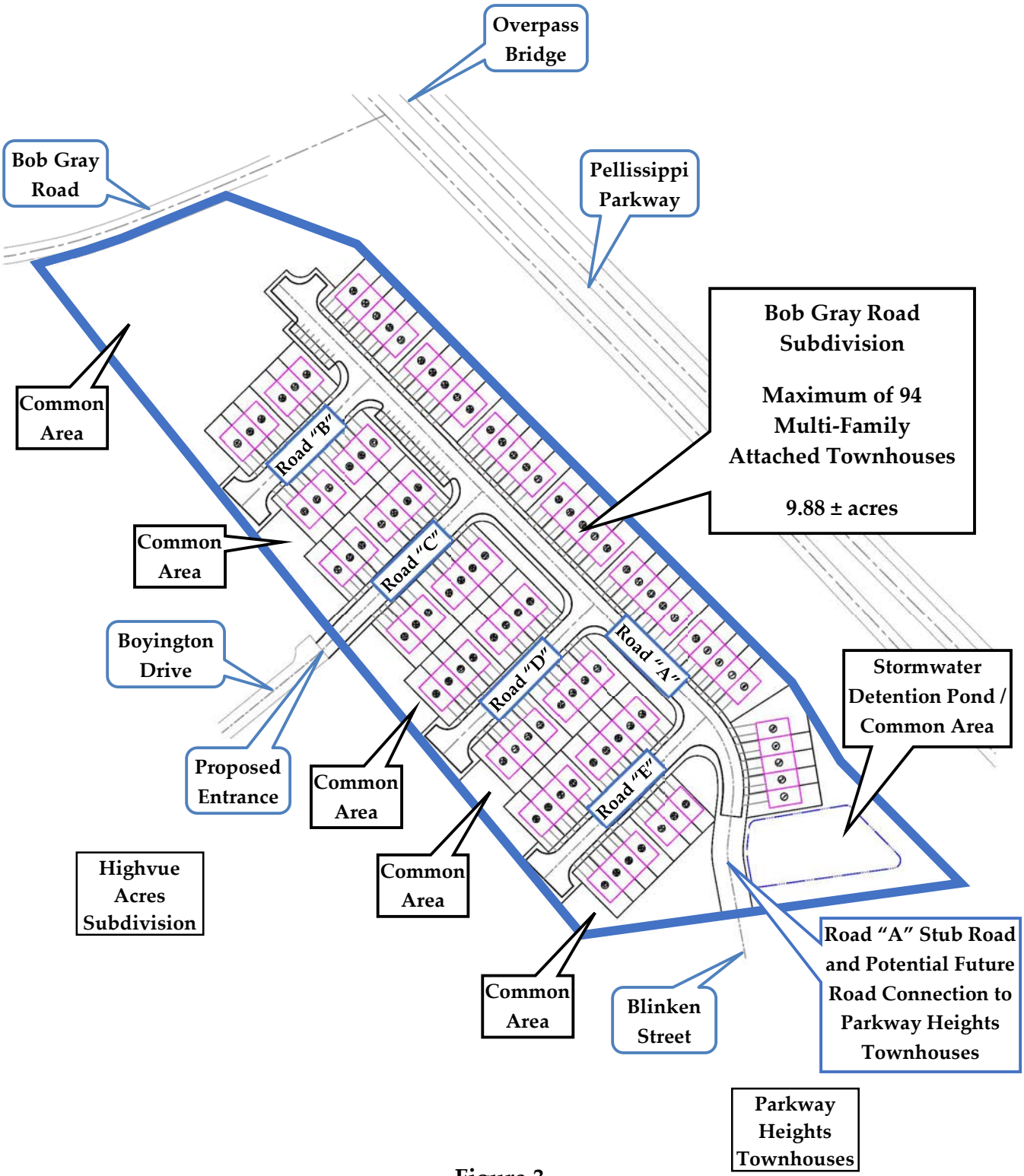


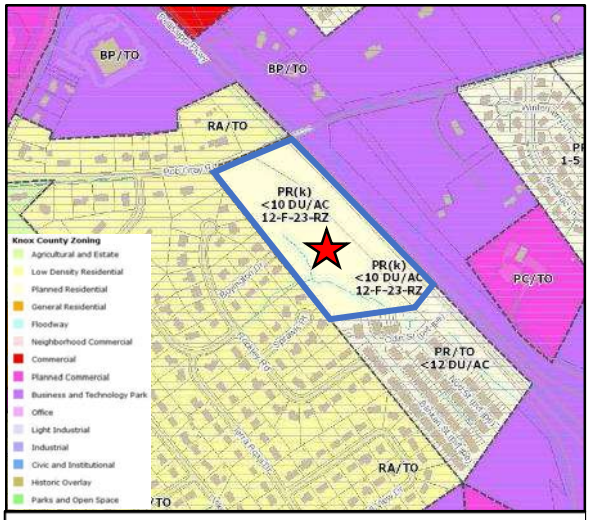
Figure 3
Proposed Plan Layout
Bob Gray Road Subivision

Not to Scale

- **PROPOSED USES AND ZONING REQUIREMENTS:**

The existing parcel comprising the Bob Gray Road Subdivision development property is in Knox County and was recently requested to be rezoned. Knox County Commission approved the rezoning on January 22nd, 2024. The property's existing zoning was Business and Technology Park (BP), and it was requested to be changed to Planned Residential (PR). Knoxville/Knox County Planning and Knox County Commission approved the property rezoning with a density of up to 10 units per acre. Uses permitted in the Planned Residential (PR) zone include single-family dwellings, duplexes, and multi-dwelling structures and developments. All the properties in this area along Pellissippi Parkway are overlaid with a Technology (TO) zone. According to the Knoxville/Knox County Planning website, the Technology (TO) overlay zone is described as a means to "encourage technology and related land uses while preserving forested ridges, rolling hills, and broad valleys. The zoning is fairly flexible and allows most types of office and light industry, with limits on retail development". This overlay designation was not changed. The most recently published online KGIS zoning map is provided in Appendix E. The existing adjacent surrounding zoning and land uses are the following:

- Bob Gray Road binds the development site to the north and northwest. Across Bob Gray Road, one parcel is zoned Low Density Residential (RA) and is occupied by a single-family detached house. The house at 10519 Bob Gray Road has a single driveway on its west side.
- Seven adjacent properties to the west are in the Highvue Acres Subdivision, are zoned as Low Density Residential (RA), and are occupied by single-family detached houses. These properties have road access to Rockley Road, Boyington Drive, and Sprawls Point inside the Highvue Acres Subdivision.
- Several small parcels to the south and southeast are zoned as Planned Residential (PR) and include attached townhouses in the Parkway Heights Townhouse development. These townhouses have access to Blinken Street and Odin Street, which are private roads with joint permanent easements. Odin Street provides the only road access to Pellissippi Parkway for this development.
- Pellissippi Parkway binds the development property to the east and is shown within the Business and Technology Park (BP) zone. This zone is also applied to the properties to the east and on the other side of Pellissippi Parkway.



KGIS Existing Zoning Map

KGIS Existing Land Use Map

- **ON-SITE CIRCULATION:**

The total length of the internal Bob Gray Road Subdivision roads will be 2,133 feet (0.4 miles), designed and constructed to Knox County specifications, and all will end at hammerhead turnarounds except for Road "C". Road "C" is the road that will tie into Boyington Drive in the Highvue Acres Subdivision. The development will have asphalt-paved internal roadways with 8" extruded concrete curbs. The lane widths internally will be 13 feet each for a total 26-foot pavement width. The public right-of-way width within the development will be 50 feet. The internal roads will be a mixture of public and private roads. Knox County will maintain Road "C" and the portion of Road "A" to the south of Road "C" after construction, and these will be dedicated public roads. The rest of the internal roads will remain private.

- **SERVICE AND DELIVERY VEHICLE ACCESS AND CIRCULATION:**

Besides residential passenger vehicles, the internal roadways will provide access to service, delivery, maintenance, and fire protection/rescue vehicles. These vehicle types will not impact roadway operations except when they occasionally enter and exit the development. Curbside private garbage collection services are expected to be available for this residential subdivision if desired. The new public streets will be designed and constructed to Knox County specifications and are expected to be adequate for fire protection and rescue vehicles, trash collection trucks, and single-unit delivery trucks. The development's internal drives will accommodate the larger vehicle types and residents' standard passenger vehicles with hammerhead layouts at the road ends sufficiently sized to allow vehicles to turn around.

ANALYSIS OF EXISTING AND PROJECTED CONDITIONS

- **EXISTING TRAFFIC CONDITIONS:**

This study conducted traffic counts at three intersections near the proposed development site on Thursday, March 28th, 2024. An 8-hour traffic count was conducted at the signalized intersection of Lovell Road at Bob Gray Road and Yarnell Road, and a 6-hour traffic count was conducted at the unsignalized t-intersection of Bob Gray Road at Highvue Drive. A limited traffic count was also conducted at the intersection of Odin Street at Pellissippi Parkway.

Manual traffic counts were conducted to identify and tabulate the morning and afternoon peak period volumes and the travel directions near the proposed development site. Local public schools were in session when the traffic counts were conducted. The signalized intersection of Lovell Road at Bob Gray Road and Yarnell Road was observed having an AM and PM peak hour at 7:30 – 8:30 a.m. and 4:45 – 5:45 p.m. The AM and PM peak hours at the t-intersection of Bob Gray Road at Highvue Drive were 7:30 – 8:30 a.m. and 4:30 – 5:30 p.m. At the intersection of Odin Street at Pellissippi Parkway, only the entering and exiting traffic was tabulated, and the AM and PM peak hours for these movements occurred at 7:30 – 8:30 a.m. and 3:45 – 4:45 p.m. The manual tabulated traffic counts can be reviewed in Figure 4 and Appendix F. Some observations of the vehicular traffic at the intersections include the following:

Lovell Road at Bob Gray Road and Yarnell Road

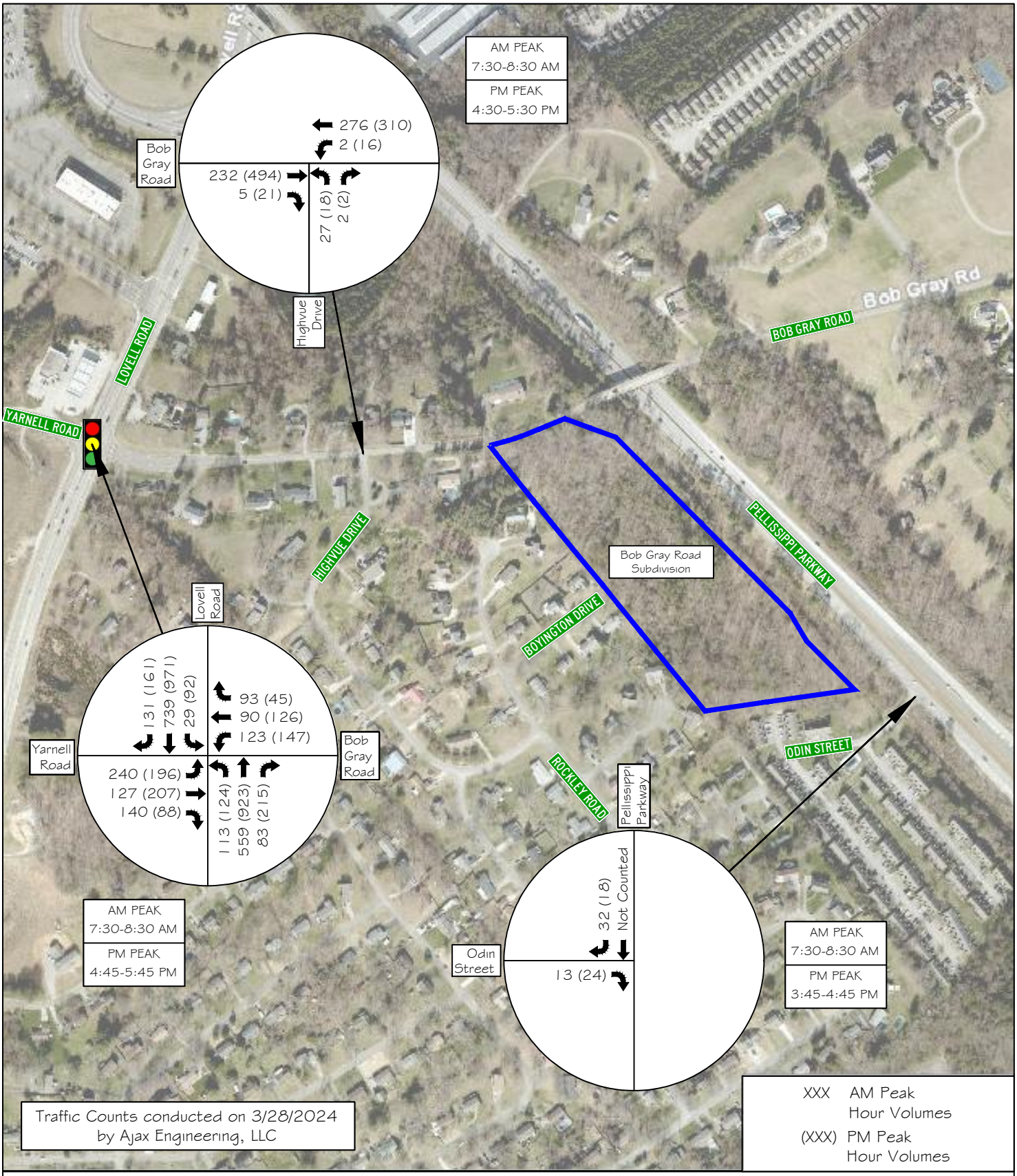
- No pedestrians or bicyclists were observed in the morning. In the afternoon, three bicyclists traveled on the bike lanes on Lovell Road, and two pedestrians were observed on the sidewalks on Lovell Road.
- Most vehicles at this intersection were passenger vehicles, but school buses, semi-tractor trailer trucks, single-unit trucks, and construction vehicles with trailers were observed.
- In the afternoon peak times, occasional, brief, and limited backups occurred for northbound traffic on Lovell Road from the adjacent signalized intersection to the north at Centerpoint Boulevard.
- Fairly substantial vehicle queues were observed on Yarnell Road and Bob Gray Road from the signalized intersection, especially during the PM peak hour.
- Much higher eastbound volumes on Yarnell Road and some of the other turning movements at this intersection were observed compared to a previous traffic count in 2015.

Bob Gray Road at Highvue Drive

- Nearly all exiting vehicles from the Highvue Acres Subdivision were observed turning left (westbound). This observation shows a high attraction to Lovell Road to the west versus toward the east from this residential subdivision, especially since only two subdivision entrances are provided. If there were much attraction to the east on Bob Gray Road by the Highvue Acres Subdivision residents, they would be expected to use this entrance intersection.
- Most vehicles at this intersection were passenger vehicles, but a fair amount of school buses were observed, along with some single-unit trucks. Two semi-tractor trailer trucks were observed traveling westbound on Bob Gray Road.
- No bicyclists or pedestrians were observed at this intersection.

Odin Street at Pellissippi Parkway

- Nearly all exiting vehicles from Parkway Heights suffered significant delays due to the high volumes on Pellissippi Parkway.
- The maximum vehicle queue with five passenger vehicles occurred during the morning peak.
- No bicyclists or pedestrians were observed at this intersection.



AJAX ENGINEERING
11812 Black Road
Knoxville, TN 37932
Phone: (865) 556-0042
Email: ajaxengineering@gmail.com

NOT TO SCALE

NORTH

FIGURE 4

Bob Gray Road Subdivision

2024 Peak Hour Traffic Volumes - EXISTING TRAFFIC CONDITIONS

Capacity analyses were undertaken to determine the Level of Service (LOS) for the existing 2024 intersection traffic volumes shown in Figure 4 (except for the intersection of Odin Street at Pellissippi Parkway). The capacity analyses were calculated following the Highway Capacity Manual (HCM) methods and utilizing Synchro Traffic Software (Version 11).

Methodology:

LOS is a qualitative measurement developed by the transportation profession to express how well an intersection or roadway performs based on a driver's perception. LOS designations include LOS A through LOS F. The designation of LOS A signifies a roadway or intersection operating at best, while LOS F signifies road operations at worst. This grading system provides a reliable, straightforward means to communicate road operations to the public. The HCM lists level of service criteria for unsignalized intersections and signalized intersections.

LOS is defined by delay per vehicle (seconds), and roadway facilities are also characterized by the volume-to-capacity ratio (v/c). LOS designations, which are based on delay, are reported differently for unsignalized and signalized intersections. For example, a delay of 20 seconds at an unsignalized intersection would indicate LOS C, representing the additional delay a motorist would experience traveling through the intersection. Also, for example, a v/c ratio of 0.75 for an approach at an unsignalized intersection would indicate that it is operating at 75% of its available capacity. This difference is primarily due to motorists' different expectations between the two road facilities. Generally, for most instances, the LOS D / LOS E boundary is considered the upper limit of acceptable delay during peak periods in urban and suburban areas.

For unsignalized intersections, LOS is measured in terms of delay (in seconds). This measure is an attempt to quantify delay, including travel time, driver discomfort, and fuel consumption. For unsignalized intersections, the analysis assumes that the mainline thru and right-turn traffic does not stop and is not affected by the traffic on the minor side streets. Thus, the LOS for a two-way stop (or yield) controlled intersection is defined by

the delay for each minor approach and major street left-turn movements. Table 2 lists the level of service criteria for unsignalized intersections. The analysis results of unsignalized intersections using the HCM methodologies are conservative due to the more significant vehicle gap parameters used in the method. More often, in normal road conditions, drivers are more willing to accept smaller gaps in traffic than what is modeled using the HCM methodology. The unsignalized intersection methodology also does not account for more significant gaps sometimes produced by nearby upstream and downstream signalized intersections. For unsignalized intersections, in most instances, the upper limit of acceptable delay during peak hours is the LOS D/E boundary at 35 seconds.

For signalized intersections, LOS is based on delay (in seconds) for various movements within the intersection and the overall operation of all the traffic entering the intersection. This delay measures driver discomfort, frustration, fuel consumption, and lost travel time and depends on traffic signal cycle lengths, lengths of green phases, and the quality of traffic progression. This control delay includes deceleration/acceleration delay, queue move-up time, and stopped delay time. For signalized intersections, in most instances, the upper limit of acceptable delay during peak hours is the LOS D/E boundary at 55 seconds. Table 3 lists the level of service criteria for signalized intersections.

TABLE 2
LEVEL OF SERVICE AND DELAY FOR UNSIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	DESCRIPTION	CONTROL DELAY (seconds/vehicle)
A	Little or no delay	0 - 10
B	Short Traffic Delays	>10 -15
C	Average Traffic Delays	>15 - 25
D	Long Traffic Delays	>25 - 35
E	Very Long Traffic Delays	>35 - 50
F	Extreme Traffic Delays	>50

Source: Highway Capacity Manual, 7th Edition

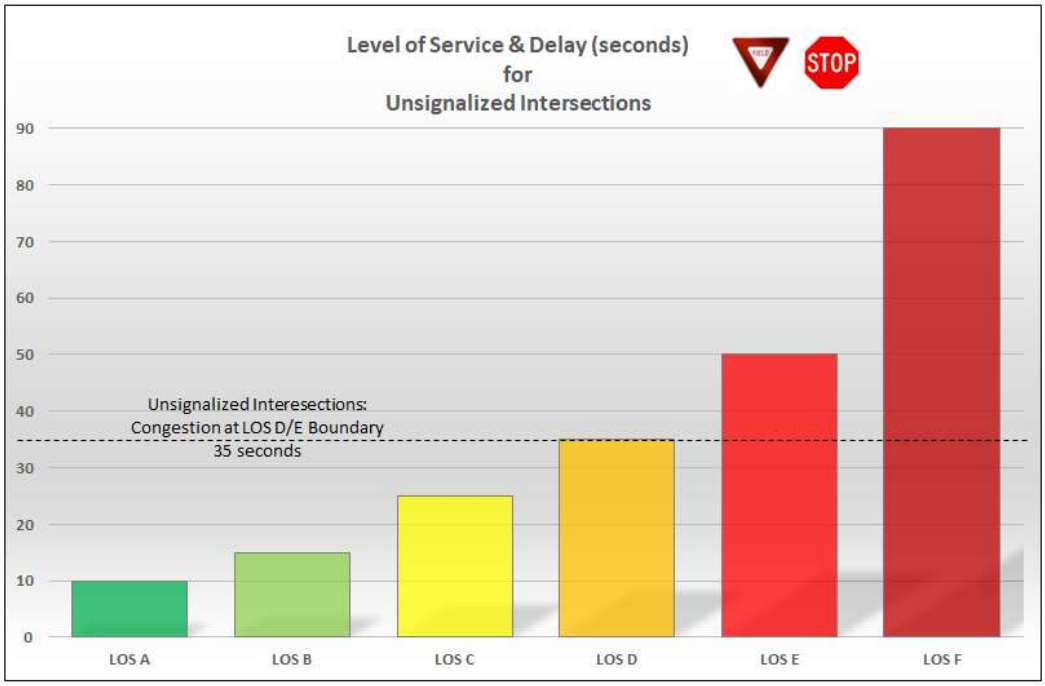
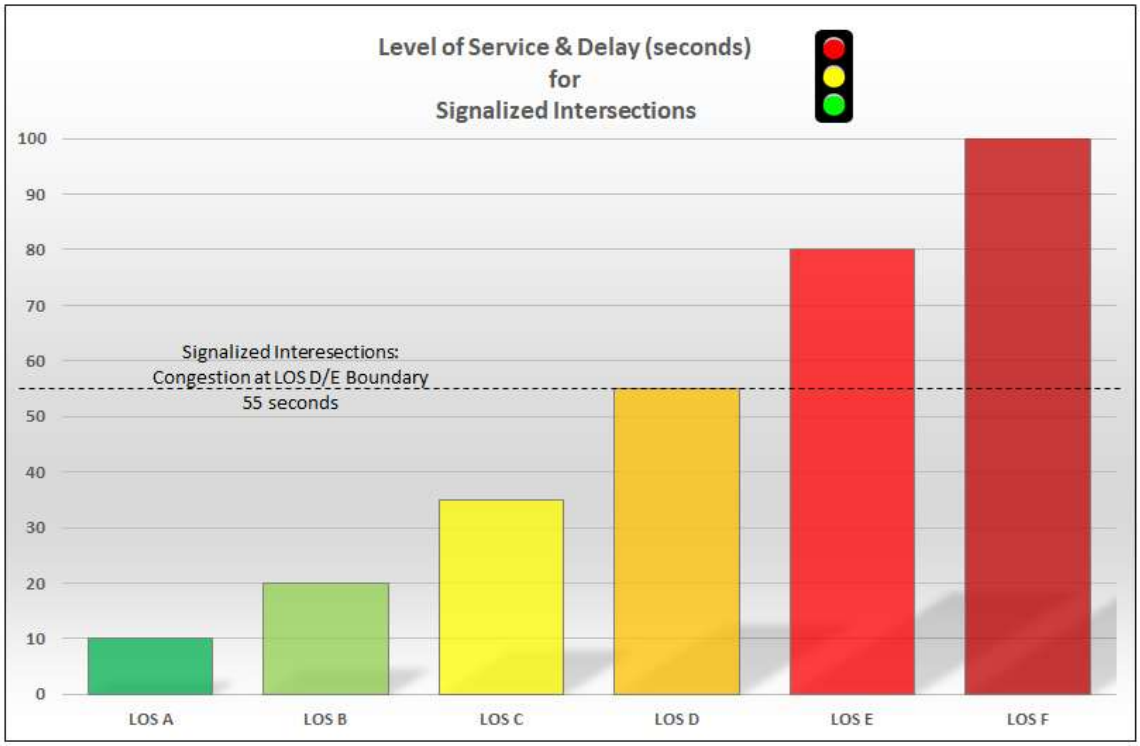


TABLE 3
LEVEL OF SERVICE AND DELAY FOR SIGNALIZED INTERSECTIONS

LEVEL OF SERVICE	DESCRIPTION	CONTROL DELAY (seconds/vehicle)
A	Operation with very low control delay. Progression is extremely favorable and most vehicles do not stop at all.	≤10.0
B	Generally good level of progression. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10 - 20
C	Higher delays with individual cycle failures may begin at this level. Many vehicles may still pass through without stopping.	> 20 - 35
D	Approaching unstable flow. The influence of congestion becomes more noticeable. Many vehicles stop.	> 35 - 55
E	Considered the limit of acceptable delay. High delays indicated by poor progression, long cycle lengths, and high v/c ratios.	> 55 - 80
F	Unacceptable delay occurs. Progression is extremely poor with long cycle lengths and high v/c ratios.	>80

Source: Highway Capacity Manual, 7th Edition



Intersection capacity results from the existing 2024 peak hour traffic are shown in Table 4. The intersections in the table are shown with a LOS designation, delay (in seconds), and v/c ratio (volume/capacity) for the AM and PM peak hours. The intersection of Bob Gray Road at Highvue Drive was not requested to be included in the original scope of work provided by Knoxville/Knox County Planning. However, it is included in the study since it is expected to be the primary access point for future residents in the Bob Gray Road Subdivision and, potentially, for the Parkway Heights Townhouses. Appendix G includes the worksheets for the existing 2024 peak hour capacity analyses.

TABLE 4
2024 INTERSECTION CAPACITY ANALYSIS RESULTS -
EXISTING TRAFFIC CONDITIONS

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS [a]	DELAY [b] (seconds)	v/c [c]	LOS [a]	DELAY [b] (seconds)	v/c [c]
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Signalized	Eastbound	C	29.0		F	102.7	
		Westbound	C	27.5		E	55.4	
		Northbound	B	18.6		B	16.1	
		Southbound	C	29.9		C	22.1	
		Summary	C	26.0	0.740	D	35.0	1.230
Bob Gray Road (WB & EB) at Highvue Drive (NB)	Unsignalized	Northbound Left/Right	B	12.6	0.071	C	15.7	0.087
		Westbound Left	A	8.6	0.004	A	8.7	0.036

Note: All analyses were calculated in Synchro 11 software and reported with HCM 6th Edition methodology
[a] Level of Service , [b] Average Delay (sec/vehicle) , [c] Volume-to-Capacity Ratio

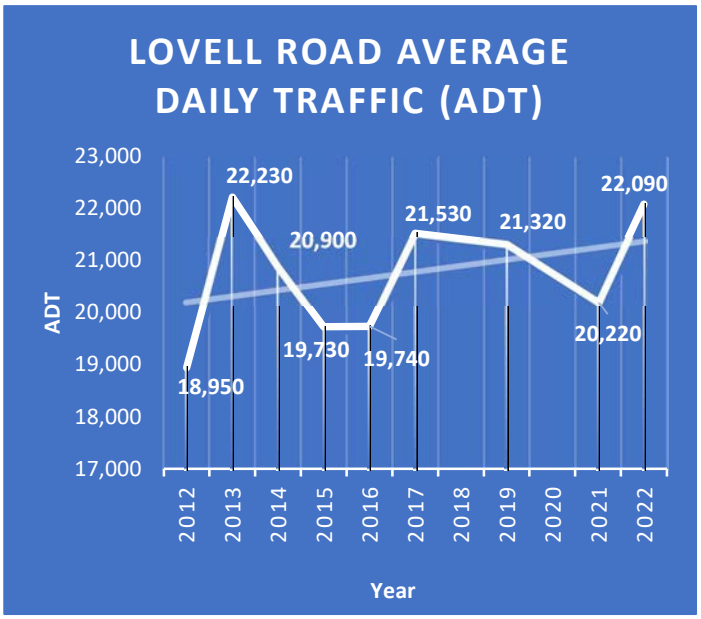
As shown in Table 4, the signalized intersection is calculated to operate with average LOS and reasonable vehicle delays in the existing 2024 conditions for the northbound and southbound approaches of Lovell Road. However, the westbound (Bob Gray Road) approach and especially the eastbound (Yarnell Road) approach have high vehicle delays calculated in the PM peak hour. The maximum v/c ratio for the signalized intersection is also over 1 in the PM peak hour (overcapacity). The unsignalized intersection of Bob Gray Road at Highvue Drive is calculated with good to average LOS and short vehicle delays.

The signal timing used to analyze the Lovell Road at Bob Gray Road and Yarnell Road intersection was obtained from Knox County Engineering and is included in Appendix G. The traffic signal operates on a 100-second cycle length during the identified AM peak hour and a 120-second cycle length during the identified PM peak hour in an actuated-coordinated system. The signal timings were not changed or optimized for the existing analysis and were used as given.

- **PROJECTED TRAFFIC CONDITIONS WITHOUT THE PROJECT:**

Horizon year traffic conditions represent the projected traffic volumes in the study area without the proposed project being developed (no-build option). This proposed development's build-out and full occupancy are assumed to occur by 2027.

According to the nearby TDOT and TPO count stations, vehicular traffic on Lovell Road, Bob Gray Road, and Yarnell Road has grown moderately over the past ten years. The data in Appendix A shows that these roads have experienced annual growth between 1.5 - 2.5% over the past ten years.



For this study, an annual growth rate of +2.5% was used to calculate future growth on the studied intersections up to 2027 to account for potential traffic growth in the study area. The annual growth rate of 2.5% was applied to the existing 2024 volumes tabulated on Lovell Road, Bob Gray Road, and Yarnell Road to estimate the future volumes in the horizon year of 2027 without the potential development traffic. Volumes to and from Highvue Drive were not increased for the future 2027 conditions without the project since this road serves an established residential subdivision and is not expected to generate additional traffic. Figure 5 shows the projected 2027 horizon year traffic volumes at the studied intersections without the project during the AM and PM peak hours.

Capacity analyses were undertaken to determine the projected LOS in 2027 without the project. The signal timings were not changed or optimized for the capacity analyses in the projected conditions without the project. The results are shown in Table 5, and Appendix G includes the capacity analysis worksheets.

As expected, the results in Table 5 show moderately worse vehicle delays for all the intersection approaches in the 2027 projected conditions without the developments' generated trips versus the existing 2024 conditions. The maximum v/c ratio for the signalized intersection is again shown to be over 1 in the PM peak hour (overcapacity).

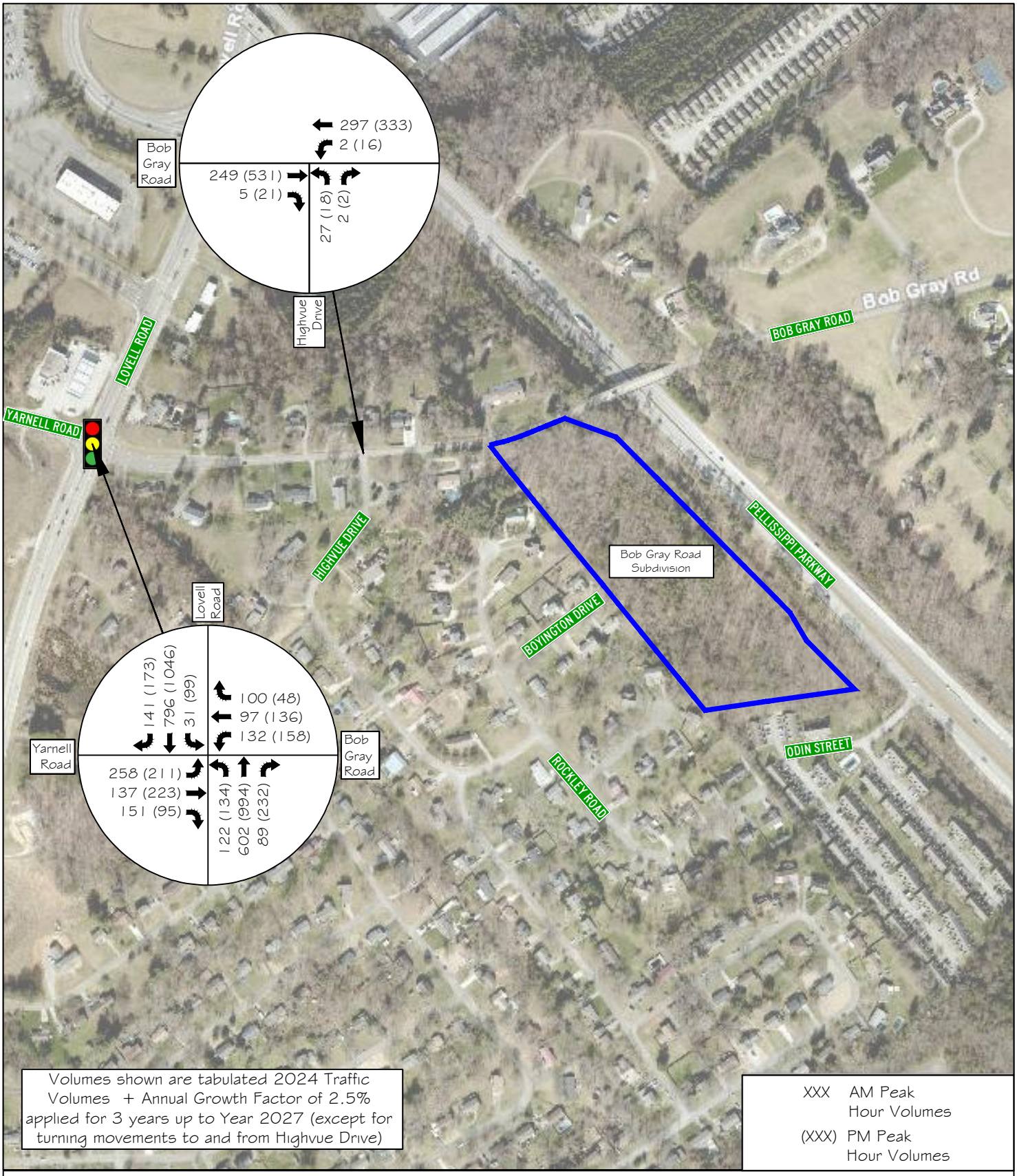


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FIGURE 5

Bob Gray Road Subdivision

2027 Peak Hour Traffic Volumes - PROJECTED TRAFFIC CONDITIONS WITHOUT THE PROJECT

TABLE 5
2027 INTERSECTION CAPACITY ANALYSIS RESULTS -
PROJECTED TRAFFIC CONDITIONS WITHOUT THE PROJECT

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS [a]	DELAY [b] (seconds)	v/c [c]	LOS [a]	DELAY [b] (seconds)	v/c [c]
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Signalized	Eastbound	C	30.0		F	122.9	
		Westbound	C	28.3		E	60.0	
		Northbound	C	20.5		B	17.1	
		Southbound	C	32.8		C	23.9	
		Summary	C	27.9	0.800	D	39.6	1.340
Bob Gray Road (WB & EB) at Highvue Drive (NB)	Unsignalized	Northbound Left/Right	B	13.1	0.075	C	16.6	0.094
		Westbound Left	A	8.7	0.004	A	8.8	0.037

Note: All analyses were calculated in Synchro 11 software and reported with HCM 6th Edition methodology
[a] Level of Service , [b] Average Delay (sec/vehicle) , [c] Volume-to-Capacity Ratio

- **TRIP GENERATION:**

A generated trip is a single or one-direction vehicle movement entering or exiting the study site. The estimated traffic the Bob Gray Road Subdivision will generate was based on the equations provided by Knoxville/Knox County Planning. These equations were developed from an extensive local study to estimate townhouse (and apartment) trip generation in the surrounding area and were published in December 1999. For Knox County, this is the preferred rate to use for townhouses and apartments. This local rate calculates slightly higher trip rates than the similar land use in the often-referenced Institute of Transportation (ITE) Trip Generation Manual.

The data and calculations from the local trip generation study for the proposed land use are shown in Appendix H. A summary of this information is presented in Table 6a:

TABLE 6a
TRIP GENERATION FOR BOB GRAY ROAD SUBDIVISION
94 Multi-Family Attached Townhouses

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Local Trip Rate	Townhouses	94 Townhouses	903	22%	78%		55%	45%	
				11	40	51	40	33	73
Total New Volume Site Trips			**903**	**11**	**40**	**51**	**40**	**33**	**73**

Data from Local Trip Rates and calculated by using Fitted Curve Equations

For the proposed residential development, it is estimated that 11 vehicles will enter and 40 will exit, for a total of 51 generated trips during the AM peak hour in the year 2027. Similarly, it is estimated that 40 vehicles will enter and 33 will exit, for a total of 73 generated trips during the PM peak hour in the year 2027. The calculated trips generated for an average weekday are estimated to be 903 vehicles for the proposed development. No vehicle trip reductions were included in the calculations or analysis.

As part of the scope of work that requested a worst-case scenario analysis, if TDOT closes access to Pellissippi Parkway to the Parkway Heights Subdivision, the trip generation for this existing subdivision was also calculated by utilizing the local trip generation rates described above, and the results are shown in Table 6b.

TABLE 6b
TRIP GENERATION FOR PARKWAY HEIGHTS TOWNHOUSES
123 Multi-Family Attached Townhouses

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Local Trip Rate	Townhouses	123 Townhouses	1,150	22%	78%		55%	45%	
				14	51	65	51	42	93
Total New Volume Site Trips			**1,150**	**14**	**51**	**65**	**51**	**42**	**93**

Data from Local Trip Rates and calculated by using Fitted Curve Equations

Combining the results in Tables 6a and 6b results in the trip volumes shown in Table 6c.

TABLE 6c
TRIP GENERATION FOR COMBINED RESIDENTIAL DEVELOPMENTS

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Local Trip Rate	Townhouses	217 Townhouses	2,053	22%	78%		55%	45%	
				25	91	116	91	75	166
Total New Volume Site Trips			**2,053**	**25**	**91**	**116**	**91**	**75**	**166**

Data from Local Trip Rates and calculated by using Fitted Curve Equations

The trips shown in Table 6c are the projected volumes that would be expected to enter and exit via Boyington Drive in the Highvue Acres Subdivision once the Bob Gray Road Subdivision is constructed and fully occupied, access to Pellissippi Parkway via Odin Street is closed at Parkway Heights, and a road connection between the two subdivisions is provided.

As described earlier, the entering and exiting volumes at the intersection of Odin Street at Pellissippi Parkway were tabulated to determine the peak volumes generated by the townhouses in Parkway Heights. The peak results from this traffic count were the following:

AM Entering Trips = 13	AM Exiting Trips = 32	Total AM Trips = 45
PM Entering Trips = 24	PM Exiting Trips = 18	Total PM Trips = 42

As seen from the traffic count for the entering and exiting trips to and from Parkway Heights, the theoretical, calculated trip volumes shown in Table 6b are much higher. However, the calculated generated trips for Parkway Heights were used instead of the observed volumes to ensure a conservative analysis. In reality, the total number of trips generated by the townhouse developments will likely be less than the calculated used in the analyses.

- **TRIP DISTRIBUTION AND ASSIGNMENT:**

The projected trip distribution and assignment for the Bob Gray Road Subdivision development are based on several sources and engineering judgment. The first source is based on the existing traffic count volumes and the observed travel directions collected on Bob Gray Road near the proposed development site.

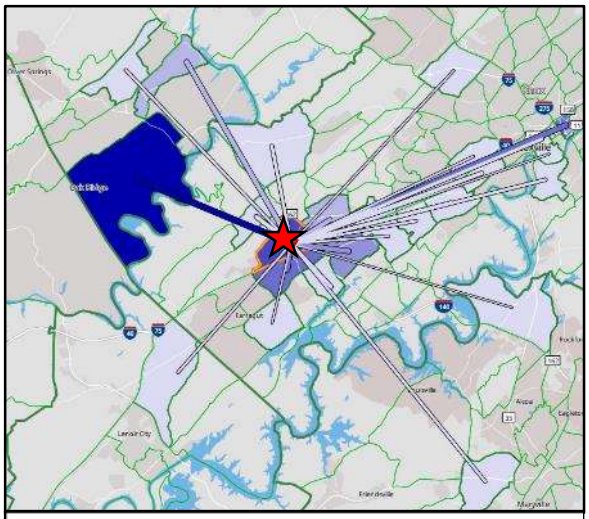
During the traffic count, directional traffic flows were observed for the westbound and eastbound Bob Gray Road volumes during the morning and afternoon peak hours. In the AM peak hour, 54% of traffic on Bob Gray Road was observed traveling west towards Lovell Road and 46% east. In the PM peak hour, the directional splits were more pronounced, with 38% of the traffic on Bob Gray Road traveling westbound and 62% eastbound.

Bob Gray Road at Highvue Drive is an intersection that serves as an entrance to the Highvue Acres Subdivision. This intersection is approximately 650 feet west of the proposed Bob Gray Road Subdivision. This subdivision has dozens of single-family detached houses with two entrances, one at Bob Gray Road on the north side at Highvue Drive and the other at Lovell Road via Lovell View Drive to the southwest. The observed entering and exiting splits on Highvue Drive are projected to be a good analog for the future residents of the Bob Gray Road Subdivision development since this road serves a similar residential land use as proposed for the development site. The entering and exiting percentages during the observed AM and PM peak hours to and from Highvue Drive at Bob Gray Road were the following:

Observed Entering and Exiting Vehicle Distribution at Highvue Drive on Bob Gray Road

AM PEAK HOUR		
ENTER FROM WEST	71%	
ENTER FROM EAST		29%
EXIT TO WEST	93%	
EXIT TO EAST		7%
PM PEAK HOUR		
ENTER FROM WEST	57%	
ENTER FROM EAST		43%
EXIT TO WEST	90%	
EXIT TO EAST		10%

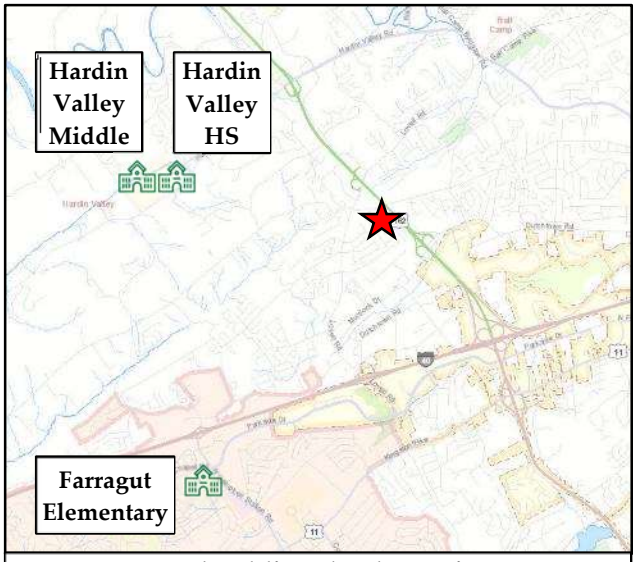
During the traffic count, as shown in the table, most vehicles entered and exited Highvue Drive to and from the west during the AM and PM peak hours.



Top 25 Locations of 2021 Census Bureau Work-Based Trips to & from Census Tract 59.11

The second source for determining the projected trip distribution is based on work-related trips in the local area. Work-based trips will be a significant impetus for trips generated by residential development, and these trips are more likely to travel to and from the northwest and northeast. This assertion is based on data from the United States Bureau website for Census Tract 59.11, where the development property is located. Based on 2021 (latest available) census data shown in Appendix I, most work-based trips in the surrounding area correspond to nearby areas in West Knoxville, downtown Knoxville, the University of Tennessee area, and Oak Ridge. For future work-related travel to and from the development site, the proximity of the Lovell Road interchange on Pellissippi Parkway to the north and the Lovell Road interchange on Interstate 40/75 interchange to the south will draw a good portion of these trips. These trips will follow the pattern observed at the Highvue Acres Subdivision with predominate flows to and from the west on Bob Gray Road.

In addition to employment centers, some generated traffic will travel to and from public and private schools. Schools will be another impetus for external trip-making. The development property is currently zoned for Farragut Elementary, Hardin Valley Middle, and Hardin Valley Academy (High School). These zoned public schools are located northwest and southwest of the development site. For parents and children not utilizing public school bus transportation, the most direct route to these schools would be traveling on Bob Gray Road to Lovell Road and then utilizing other roads to the schools. Farragut Elementary is the closest to the development site at 4.1 miles, and Hardin Valley Middle School is the furthest at just under 5 miles. Hardin Valley Academy is 4.5 miles away, and both this school and the middle school



Zoned Public School Locations

will likely be best accessed during peak hours via Bob Gray Road, Yarnell Road, N Campbell Station Road, and then Hardin Valley Road. Farragut Elementary will require the residents to travel to and from the south on Lovell Road for all students transported by private vehicles.

The Knox County Schools Transportation Department has developed Parental Responsibility Zones (PRZ) to determine whether students are offered transportation services to and from school. The PRZ is defined as being 1.5 miles for grades 6 – 12 and 1.0 miles for grades K – 5 from where the students' parcel is accessed to the point where the buses unload at the school. This development will be outside the PRZ for all the zoned schools, and all school-age children attending public schools in the development will be able to utilize this service if desired.

Figure 6 shows the projected distribution of traffic entering and exiting the development. Overall, 90% of generated trips are assumed will enter and exit via the intersection of Bob Gray Road at Highvue Drive. The remaining 10% is assumed to enter and exit via the other entrance provided to the Highvue Acres Subdivision to the southwest at Lovell View Drive and Lovell Road. The percentages shown in the figure only pertain to the trips generated by the proposed dwellings in the development calculated from the local trip rates. Residents who desire to travel to and from the south would likely use this secondary Highvue Acres Subdivision entrance at Lovell View Drive more than the 10% assumed since it would be shorter in distance. However, this secondary entrance to the southwest will require travel over several speed humps that are installed on Terra Rose Drive and Lovell View Drive. Three speed humps are installed on Terra Rose Drive, and four are located on Lovell View Drive, and these would discourage trips to and from this direction.

Ultimately, the projected, assumed trip distribution was heavily based on the observed traffic entering and exiting Highvue Drive at Bob Gray Road. The distributions shown in Figure 6 will also apply for the trips to and from the Parkway Heights Townhouses if its access to Pellissippi Parkway is eliminated and routed through the Bob Gray Road and Highvue Acres Subdivisions. The percentages shown at the signalized intersection were based on the observed splits tabulated during the peak hours.

Figure 7a shows the traffic assignment of the computed trips generated by the Bob Gray Road Subdivision only and is based on the assumed distribution of trips shown in Figure 6. Figure 7b shows the traffic assignment of the computed trips generated by the Bob Gray Road Subdivision plus the diverted trips from the Parkway Heights Townhouses if road access for this subdivision to Pellissippi Parkway is removed. This assignment is also based on the trip distributions shown

in Figure 6.

Additionally, Figure 7c includes a minor number of trips generated by a new nearby commercial development proposed on the southwest corner of Lovell Road at Bob Gray Road and Yarnell Road. This commercial development will include a 26,600 ft^2 building that will include retail and office space and is projected to also open by 2027. The assigned volumes shown in Figure 7c were obtained from the Transportation Impact Study for this other proposed development, Lovell Crossing.

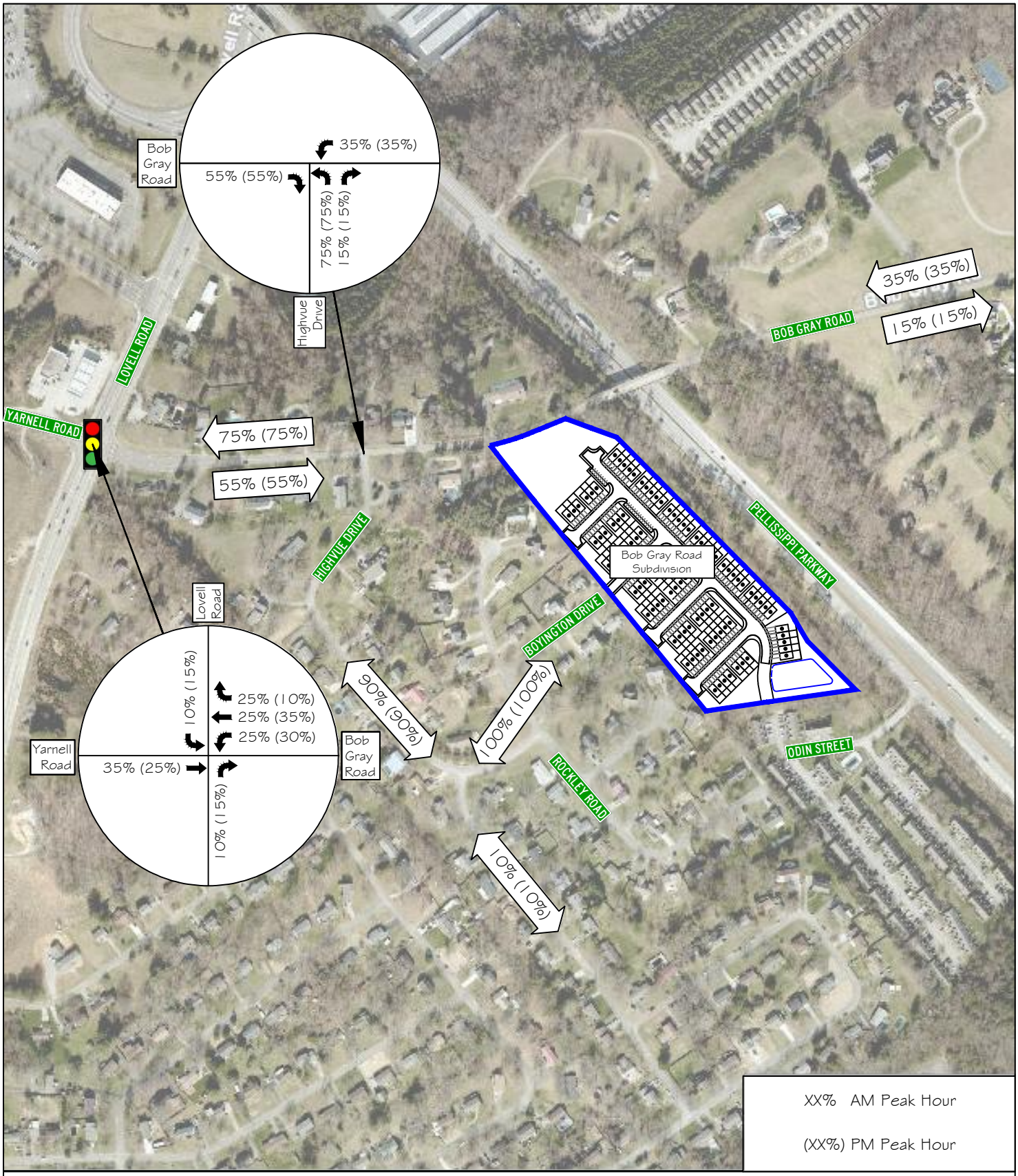


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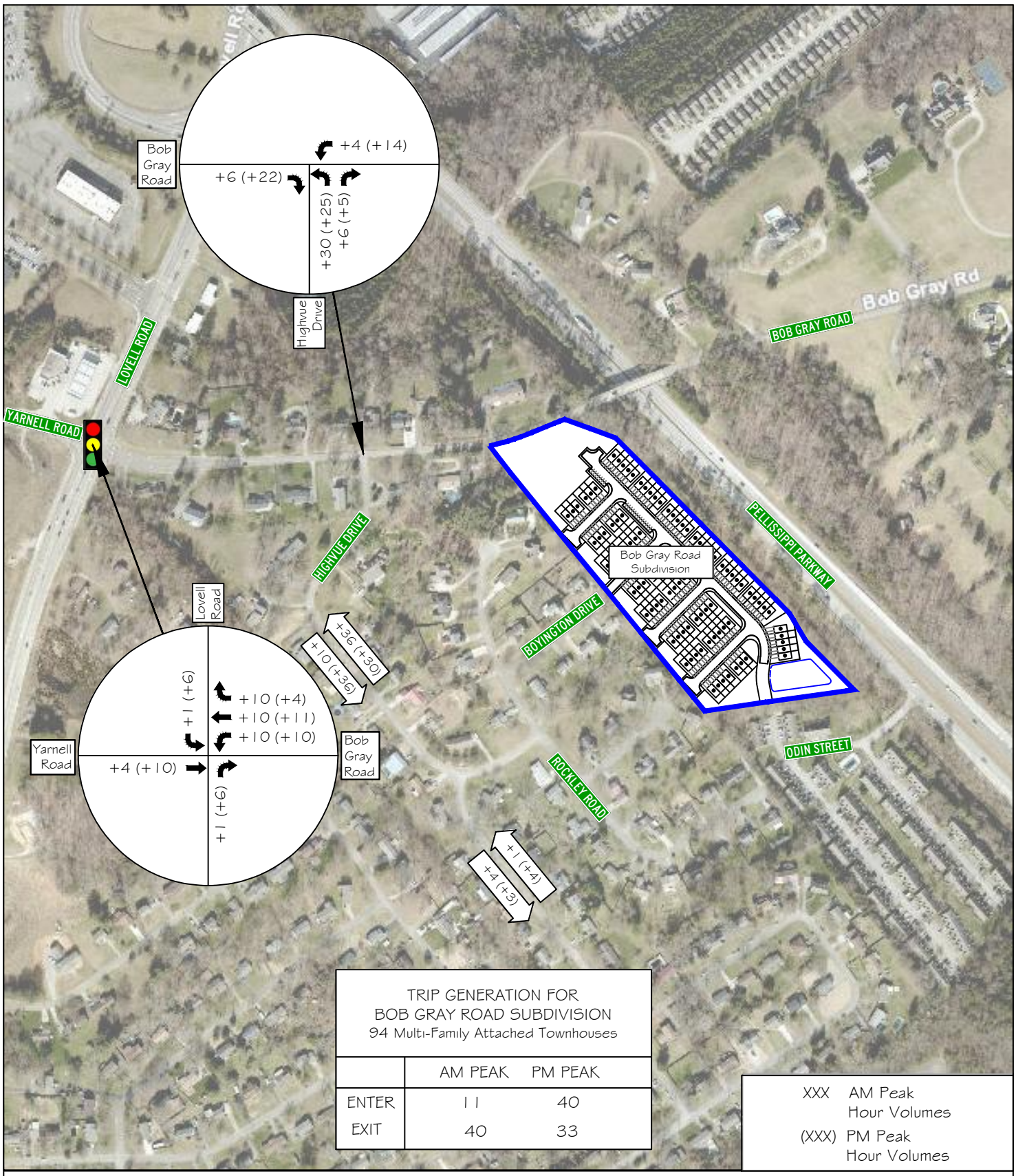
FIGURE 6

Bob Gray Road Subdivision

Directional Distribution of Generated Traffic during AM and PM Peak Hour



TRIP GENERATION FOR
BOB GRAY ROAD SUBDIVISION
94 Multi-Family Attached Townhouses

	AM PEAK	PM PEAK
ENTER	11	40
EXIT	40	33

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

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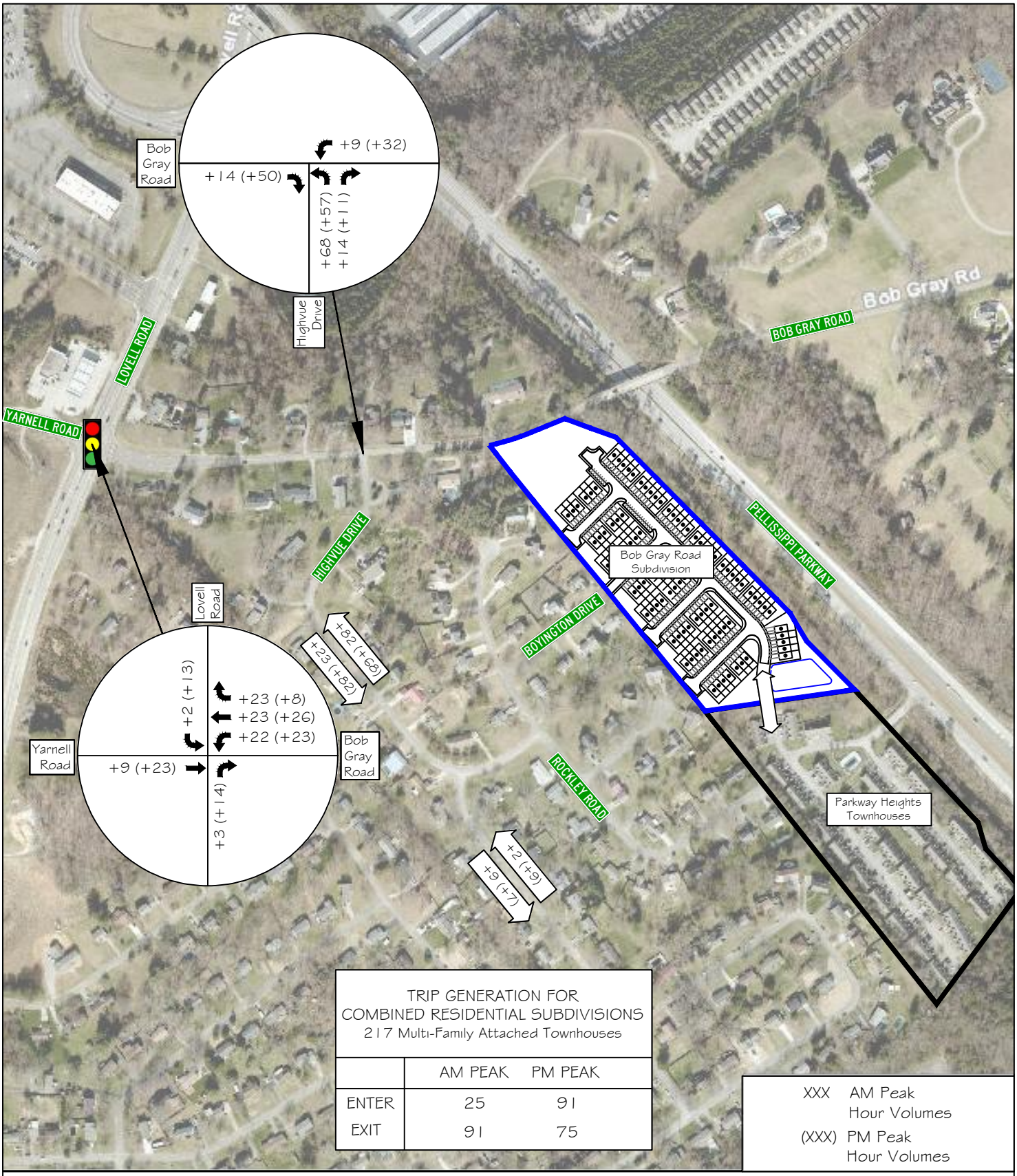
FIGURE 7a

Bob Gray Road Subdivision

Traffic Assignment of Generated Traffic during AM and PM Peak Hour - Bob Gray Road Subdivision Only



TRIP GENERATION FOR
COMBINED RESIDENTIAL SUBDIVISIONS
217 Multi-Family Attached Townhouses

	AM PEAK	PM PEAK
ENTER	25	91
EXIT	91	75

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

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FIGURE 7b

Bob Gray Road Subdivision

Traffic Assignment of Generated Traffic during AM and PM Peak Hour - Combined Residential Subdivisions

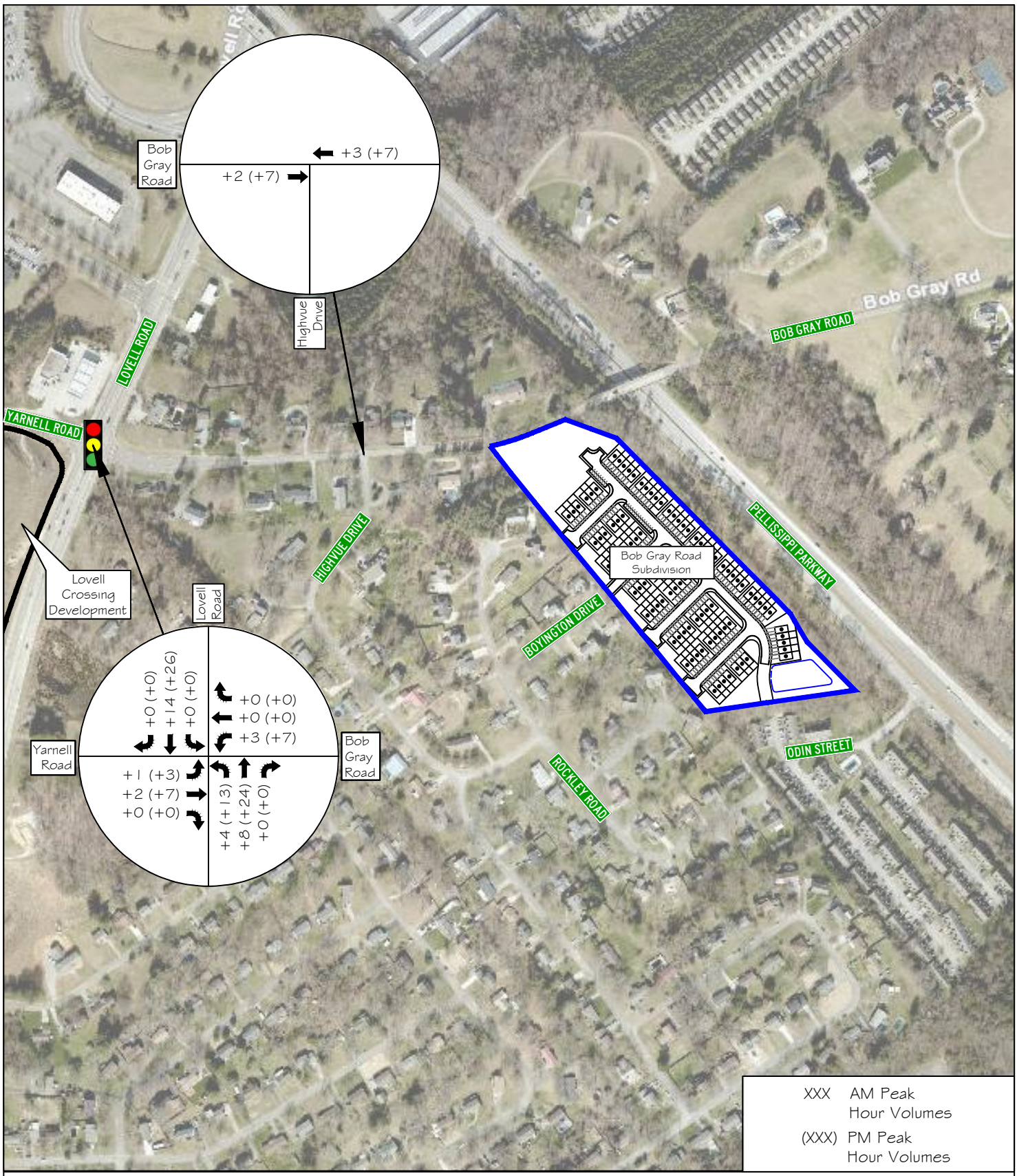

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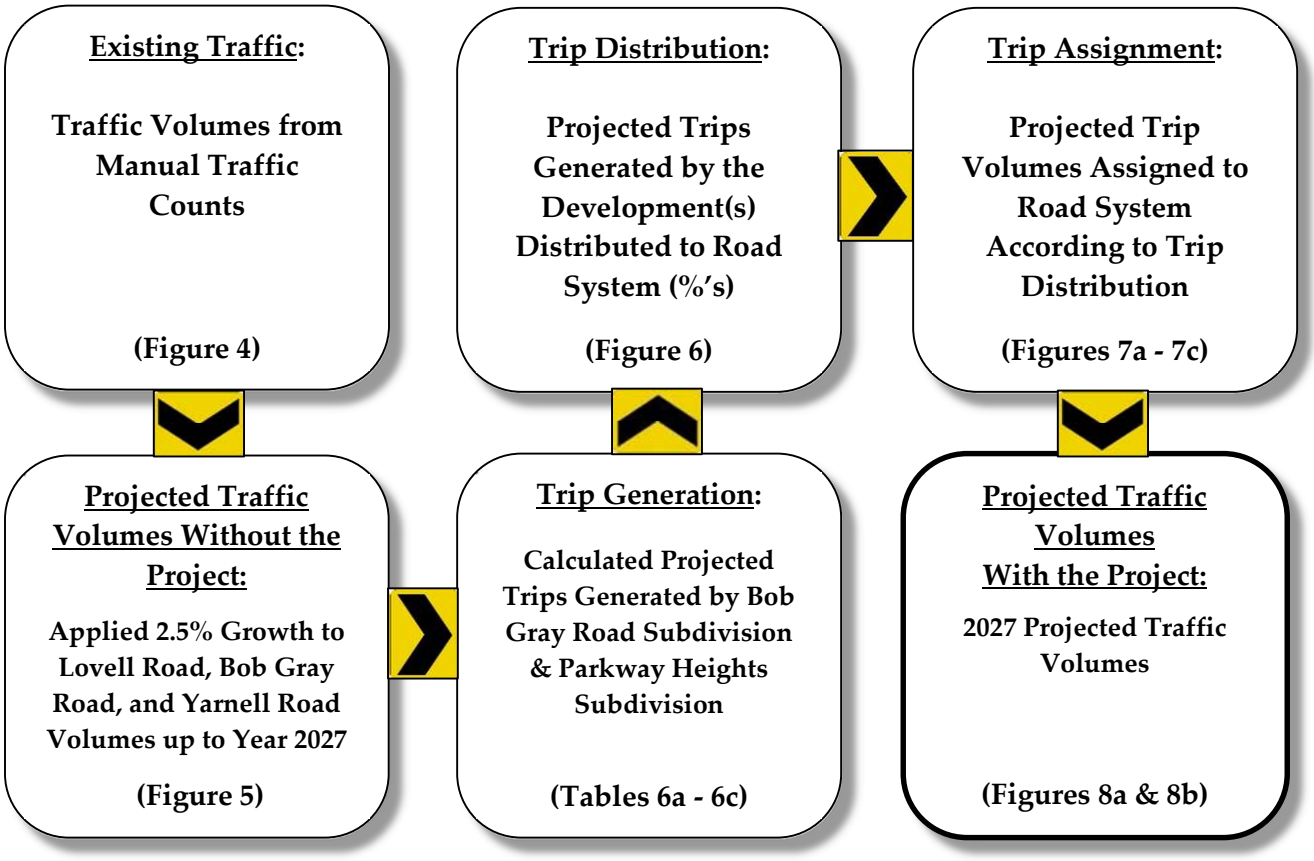
FIGURE 7c

Bob Gray Road Subdivision

Traffic Assignment of Generated Traffic during AM and PM Peak Hour - Lovell Crossing Development

- **PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT:**

Several additive steps were taken to estimate the total projected traffic volumes at the studied intersections when the Bob Gray Road Subdivision is constructed and fully occupied in 2027 and for the Parkway Heights Townhouses if it loses its road access to Pellissippi Parkway. The steps are illustrated below for clarity and review:



The calculated peak hour traffic generated by the Bob Gray Road Subdivision development was added to the 2027 horizon year traffic by following the predicted trip distributions and assignments. This procedure was completed to obtain the total projected traffic volumes at the studied intersections when the Bob Gray Road Subdivision development is fully built and occupied in 2027. In addition to the Bob Gray Road Subdivision trips, projected 2027 volumes were also calculated to include the additional trips if Parkway Heights loses its access to Pellissippi Parkway, with residents diverted through the Bob Gray Road and Highvue Acres Subdivisions for external road access. The calculations also included trips from the nearby proposed Lovell Crossing Development that will be opened in 2027.

Figure 8a shows the projected 2027 AM and PM peak hour volumes for the Bob Gray Road Subdivision trips only, plus the trips from the proposed Lovell Crossing Development. Figure 8b includes the worst-case scenario, which includes the projected 2027 AM and PM peak hour volumes for the Bob Gray Road Subdivision trips, the diverted trips from the Parkway Heights Townhouses, and the proposed Lovell Crossing Development trips.

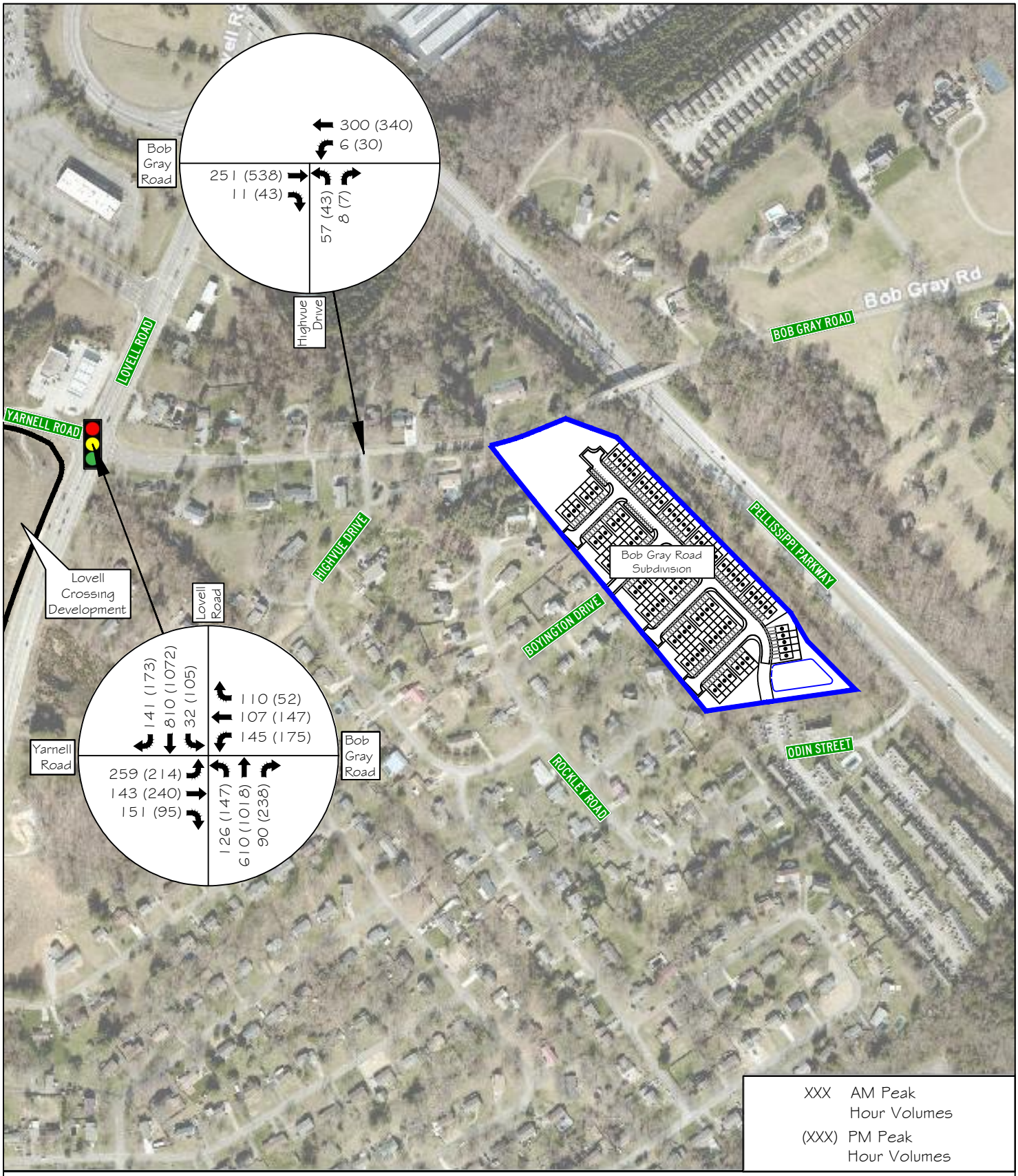


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FIGURE 8a

Bob Gray Road Subdivision

2027 Peak Hour Traffic Volumes - PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT - Bob Gray Road Subdivision Only + Lovell Crossing Development

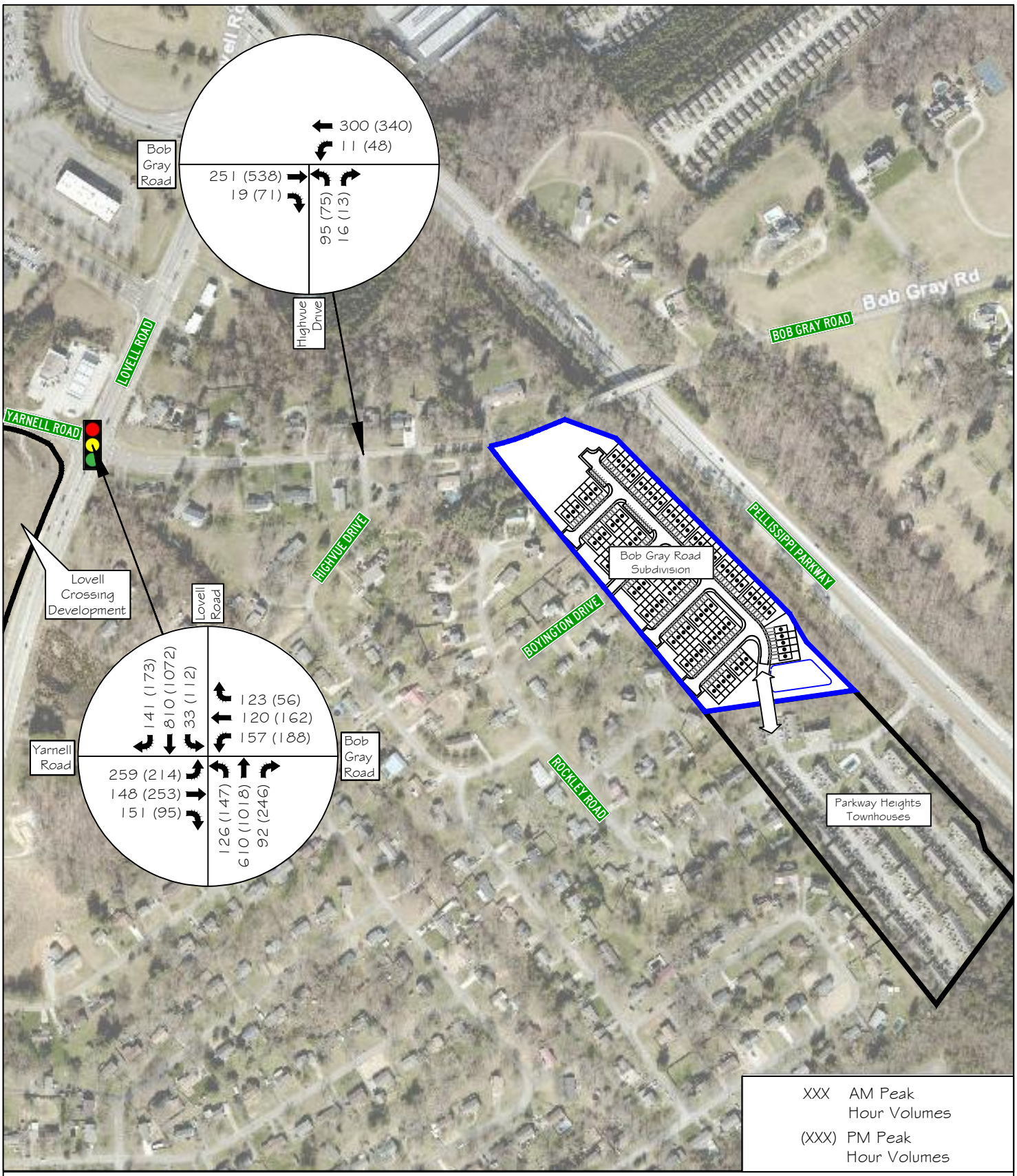

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FIGURE 8b

Bob Gray Road Subdivision

2027 Peak Hour Traffic Volumes - PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT - Combined Residential Subdivisions + Lovell Crossing Development

Capacity analyses were conducted to determine the projected LOS with the development traffic in 2027, shown in Figures 8a and 8b. Intersection capacity results from the projected 2027 peak hour traffic are shown in Tables 7a and 7b. Table 7a shows the projected 2027 AM and PM peak hour results for the Bob Gray Road Subdivision trips only, plus the trips from the Lovell Crossing Development. Table 7b shows the projected 2027 AM and PM peak hour worst-case results for the Bob Gray Road Subdivision trips, plus the diverted trips from the Parkway Heights Townhouses and the Lovell Crossing Development trips.

Appendix G includes the worksheets for the projected 2027 peak hour capacity analyses. The signal timings were not changed or optimized for the projected 2027 conditions results shown in the tables. As shown in Tables 7a and 7b, the unsignalized intersections are calculated to operate adequately with reasonable vehicle delays in the projected 2027 conditions. However, the signalized intersection of Lovell Road at Bob Gray Road and Yarnell Road is calculated to have very high vehicle delays, especially for the eastbound and westbound approaches of Yarnell Road and Bob Gray Road in the PM peak hour.

TABLE 7a
2027 INTERSECTION CAPACITY ANALYSIS RESULTS -
PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT
Bob Gray Road Subdivision Only + Lovell Crossing Development

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS [a]	DELAY [b] (seconds)	v/c [c]	LOS [a]	DELAY [b] (seconds)	v/c [c]
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Signalized	Eastbound	C	30.5		F	150.1	
		Westbound	C	29.7		E	66.1	
		Northbound	C	21.3		B	17.9	
		Southbound	C	33.7		C	24.7	
		Summary	C	28.8	0.820	D	45.0	1.470
Bob Gray Road (WB & EB) at Highvue Drive (NB)	Unsignalized	Northbound Left/Right	B	14.1	0.174	C	21.5	0.272
		Westbound Left	A	8.1	0.010	A	9.1	0.072

Note: All analyses were calculated in Synchro 11 software and reported with HCM 6th Edition methodology
[a] Level of Service , [b] Average Delay (sec/vehicle) , [c] Volume-to-Capacity Ratio

TABLE 7b
2027 INTERSECTION CAPACITY ANALYSIS RESULTS -
PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT
Combined Residential Subdivisions + Lovell Crossing Development

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS [a]	DELAY [b] (seconds)	v/c [c]	LOS [a]	DELAY [b] (seconds)	v/c [c]
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Signalized	Eastbound	C	31.0		F	173.2	
		Westbound	C	31.3		E	76.4	
		Northbound	C	21.4		B	18.0	
		Southbound	C	34.1		C	24.6	
		Summary	C	29.3	0.830	D	50.1	1.560
Bob Gray Road (WB & EB) at Highvue Drive (NB)	Unsignalized	Northbound Left/Right	C	16.0	0.308	E	35.1	0.555
		Westbound Left	A	8.1	0.019	A	9.5	0.120

Note: All analyses were calculated in Synchro 11 software and reported with HCM 6th Edition methodology
[a] Level of Service , [b] Average Delay (sec/vehicle) , [c] Volume-to-Capacity Ratio

- **POTENTIAL TRANSPORTATION SAFETY ISSUES:**

The study area was investigated for potential existing and future safety issues when the development is constructed. These transportation features are discussed in the following pages.

- **EVALUATION OF TURN LANE THRESHOLDS**

The need for separate entering turn lanes was evaluated in the projected 2027 conditions for the intersection of Bob Gray Road at Highvue Drive.

The criteria used for these turn lane evaluations were based on Knox County's "Access Control and Driveway Design Policy". This design policy relates vehicle volume thresholds based on prevailing speeds for two-lane and four-lane roadways. The location of Highvue Drive on Bob Gray Road is within a 40-mph speed zone; thus, it was evaluated based on this speed.

For the scenario that includes the Bob Gray Road Subdivision only, a separate eastbound right-turn lane on Bob Gray Road at Highvue Drive will not be warranted based on the projected 2027 peak hour AM and PM traffic volumes. However, the projected volumes for a westbound left-turn lane on Bob Gray Road at Highvue Drive barely meet the threshold in the PM peak hour.

For the scenario which includes the Bob Gray Road Subdivision and the diverted trips from Parkway Heights, a separate eastbound right-turn lane and a separate westbound left-turn lane on Bob Gray Road at Highvue Drive will both be warranted based on the projected 2027 PM peak hour traffic. The worksheets for these evaluations are provided in Appendix J.

- **PROJECTED VEHICLE QUEUES**

A companion software program was used to calculate the 2027 AM and PM peak hour projected vehicle queues at the studied intersections. The previously mentioned Synchro software includes SimTraffic. The Synchro portion of the software performs the macroscopic calculations for intersections, and SimTraffic performs micro-simulation and animation of vehicular traffic. SimTraffic software was utilized to estimate the projected vehicle queues at the intersections.

The 95th percentile vehicle queue is the recognized measurement in the traffic engineering profession as the design standard used when considering vehicle queue lengths. A 95th percentile vehicle queue length means 95% certainty that the vehicle queue will not extend beyond that

point. The calculated vehicle queue results were based on averaging the outcome obtained during ten traffic simulations in the software. The 95th percentile vehicle queue lengths at the intersections are shown in Table 8a for the projected 2027 conditions with the Bob Gray Road Subdivision only. Table 8b shows the 95th percentile vehicle queue lengths for the projected 2027 conditions with the combined residential subdivisions. The vehicle queue worksheet results from the SimTraffic software are in Appendix K.

TABLE 8a
TURN LANE STORAGE & VEHICLE QUEUE SUMMARY -
2027 PROJECTED PEAK HOUR TRAFFIC WITH THE PROJECT
Bob Gray Road Subdivision Only + Lovell Crossing Development

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	STORAGE LENGTH (ft)	SIMTRAFFIC 95th PERCENTILE QUEUE LENGTH (ft)		ADEQUATE LENGTH?
				AM PEAK HOUR	PM PEAK HOUR	
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Signalized	Eastbound Left	185	217	337	NO
		Eastbound Thru	n/a	178	588	n/a
		Eastbound Right	300	81	603	NO
		Westbound Left	160	135	225	NO
		Westbound Thru	n/a	123	262	n/a
		Westbound Right	215	58	84	✓
		Northbound Left	TWLTL	113	200	✓
		Northbound Thru *	n/a	200	327	n/a
		Northbound Right	245	45	84	✓
		Southbound Left	125	127	208	NO
		Southbound Thru	n/a	310	404	n/a
		Southbound Thru/Right	n/a	262	366	n/a
Bob Gray Road (WB & EB) at Highvue Drive (NB)	Unsignalized	Westbound Left/Thru	n/a	16	63	n/a
		Northbound Left/Right	n/a	52	55	n/a

Note: 95th percentile queues were calculated in SimTraffic 11 software
* Longest queue in dual thru lanes

Tables 8a and 8b show considerable projected vehicle queue lengths at the signalized intersection of Lovell Road at Bob Gray Road and Yarnell Road in the 2027 peak hour conditions in both scenarios, with many extending beyond the available provided vehicle storage.

The projected vehicle queues for the traffic in the 2027 AM and PM peak hours at Highvue Drive are calculated to be very reasonable for either scenario. The longest queue on the northbound (exiting) approach of Highvue Drive at Bob Gray Road is calculated to occur for the scenario with combined residential subdivisions (Table 8b). In this scenario, the longest queue on the northbound (exiting) approach of Highvue Drive at Bob Gray Road with a shared left/right lane was calculated to be only 72 feet, or nearly three vehicles, assuming a length of 25 feet per vehicle.

TABLE 8b
TURN LANE STORAGE & VEHICLE QUEUE SUMMARY -
2027 PROJECTED PEAK HOUR TRAFFIC WITH THE PROJECT
Combined Residential Subdivisions + Lovell Crossing Development

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	STORAGE LENGTH (ft)	SIMTRAFFIC 95th PERCENTILE QUEUE LENGTH (ft)		ADEQUATE LENGTH?
				AM PEAK HOUR	PM PEAK HOUR	
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Signalized	Eastbound Left	185	210	331	NO
		Eastbound Thru	n/a	168	580	n/a
		Eastbound Right	300	79	602	NO
		Westbound Left	160	139	252	NO
		Westbound Thru	n/a	137	415	n/a
		Westbound Right	215	64	183	✔
		Northbound Left	TWLTL	123	205	✔
		Northbound Thru *	n/a	202	338	n/a
		Northbound Right	245	42	90	✔
		Southbound Left	125	109	222	NO
		Southbound Thru	n/a	310	401	n/a
		Southbound Thru/Right	n/a	262	362	n/a
Bob Gray Road (WB & EB) at Highvue Drive (NB)	Unsignalized	Westbound Left/Thru	n/a	21	83	n/a
		Northbound Left/Right	n/a	71	72	n/a

Note: 95th percentile queues were calculated in SimTraffic 11 software
* Longest queue in dual thru lanes

CONCLUSIONS & RECOMMENDATIONS

The following is an overview of recommendations to minimize the transportation impacts of the Bob Gray Road Subdivision development on the adjacent transportation system while attempting to achieve an acceptable traffic flow and safety level. The recommendations also take into account if Parkway Heights loses its access to Pellissippi Parkway and its trips are routed through the Bob Gray Road and Highvue Acres Subdivisions.

Lovell Road at Bob Gray Road and Yarnell Road: The 2027 projected level of service calculations for this intersection resulted in high vehicle delays and poor LOS for the westbound and eastbound approaches of Bob Gray Road and Yarnell Road, particularly in the PM peak hour. These poor results were also calculated for the existing and projected conditions without the project. The Synchro software was used to optimize the traffic signal timings to combat these poor results and be utilized in the field. The optimization results are presented for the two scenarios included in the report, one for the Bob Gray Road Subdivision only (plus the Lovell Crossing Development) and the other for the combined residential subdivisions (plus the Lovell Crossing Development).

The signal timing for the projected 2027 PM peak hour volumes was optimized in the Synchro software while keeping the same cycle lengths in the AM and PM peak periods since the intersection is in a coordinated system. This optimization substantially reduced vehicle delays for the westbound and eastbound approaches and reduced the vehicle queue lengths. However, the optimization results in the mainline traffic on Lovell Road having slightly increased vehicle delays and queue lengths. It does not eliminate left-turn vehicle queues exceeding their provided storage.

The capacity analysis results of this modified AM and PM signal timing are shown below in Tables 9a and 9b. The capacity analysis results are included in Appendix G. The results in Tables 9a and 9b show the potential reduction in vehicle delays and queues in the AM and PM peak hours due to software optimization compared to the AM and PM peak hour results (Tables 7a and 8a), leaving the traffic signal timing as-is. The results shown in Tables 9a and 9b are for the Bob Gray Road Subdivision only scenario (plus the Lovell Crossing Development). Green and red in the table denote the changes, showing the decreases and increases, respectively.

TABLE 9a
2027 INTERSECTION CAPACITY ANALYSIS RESULTS -
PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT - MODIFIED SIGNAL TIMING
Bob Gray Road Subdivision Only + Lovell Crossing Development

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS [a]	DELAY [b] (seconds)	CHANGE [c] (seconds)	LOS [a]	DELAY [b] (seconds)	CHANGE [c] (seconds)
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Signalized	Eastbound	D	36.4	5.9	D	47.3	-102.8
		Westbound	D	39.1	9.4	D	45.0	-21.1
		Northbound	B	16.0	-5.3	C	24.5	6.6
		Southbound	C	27.9	-5.8	C	34.3	9.6
		Summary	C	27.5	-1.3	C	33.6	-11.4

Note: All analyses were calculated in Synchro 11 software and reported with HCM 6th Edition methodology
[a] Level of Service , [b] Average Delay (sec/vehicle)
[c] Difference between 2027 Projected Vehicle Delay (Table 7a) versus 2027 Projected Vehicle Delay with Modified Signal Timing (Table 9a, this table)

TABLE 9b
TURN LANE STORAGE & VEHICLE QUEUE SUMMARY -
2027 PROJECTED PEAK HOUR TRAFFIC WITH THE PROJECT - MODIFIED SIGNAL TIMING
Bob Gray Road Subdivision Only + Lovell Crossing Development

INTERSECTION	APPROACH/ MOVEMENT	PROVIDED STORAGE LENGTH (ft)	SIMTRAFFIC 95th PERCENTILE QUEUE LENGTH (ft)				ADEQUATE LENGTH?
			AM PEAK HOUR	CHANGE [a] (feet)	PM PEAK HOUR	CHANGE [a] (feet)	
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Eastbound Left	185	220	3	244	-93	NO
	Eastbound Thru	n/a	196	18	320	-268	n/a
	Eastbound Right	300	77	-1	128	-175	✓
	Westbound Left	160	148	13	228	3	NO
	Westbound Thru	n/a	150	27	348	86	n/a
	Westbound Right	215	59	1	149	65	✓
	Northbound Left	TWLTL	109	-4	235	35	✓
	Northbound Thru	n/a	182	-18	349	22	n/a
	Northbound Right	245	43	-2	105	21	✓
	Southbound Left	125	107	-20	238	30	NO
	Southbound Thru	n/a	292	-18	450	46	n/a
	Southbound Thru/Right	n/a	255	-7	414	48	n/a

Note: 95th percentile queues were calculated in SimTraffic 11 software
[a] Difference between 2027 Projected Vehicle Queue (Table 8a) versus 2027 Projected Vehicle Queue with Modified Signal Timing (Table 9b, this table)

The results in Tables 10a and 10b below show the potential reduction in vehicle delays and queues in the AM and PM peak hours due to software optimization compared to the AM and PM peak hour results (Tables 7b and 8b), leaving the traffic signal timing as-is. These results are for the combined residential subdivisions plus the Lovell Crossing Development scenario. Green and red in the table denote the changes, showing the decreases and increases, respectively.

TABLE 10a
2027 INTERSECTION CAPACITY ANALYSIS RESULTS -
PROJECTED TRAFFIC CONDITIONS WITH THE PROJECT - MODIFIED SIGNAL TIMING
Combined Residential Subdivisions + Lovell Crossing Development

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS [a]	DELAY [b] (seconds)	CHANGE [c] (seconds)	LOS [a]	DELAY [b] (seconds)	CHANGE [c] (seconds)
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Signalized	Eastbound	D	36.0	5.0	D	49.4	-123.8
		Westbound	D	38.4	7.1	D	49.1	-27.3
		Northbound	B	16.7	-4.7	C	24.7	6.7
		Southbound	C	28.6	-5.5	C	34.8	10.2
		Summary	C	28.0	-1.3	C	34.7	-15.4

Note: All analyses were calculated in Synchro 11 software and reported with HCM 6th Edition methodology
[a] Level of Service , [b] Average Delay (sec/vehicle)
[c] Difference between 2027 Projected Vehicle Delay (Table 7b) versus 2027 Projected Vehicle Delay with Modified Signal Timing (Table 10a, this table)

TABLE 10b
TURN LANE STORAGE & VEHICLE QUEUE SUMMARY -
2027 PROJECTED PEAK HOUR TRAFFIC WITH THE PROJECT - MODIFIED SIGNAL TIMING
Combined Residential Subdivisions + Lovell Crossing Development

INTERSECTION	APPROACH/ MOVEMENT	PROVIDED STORAGE LENGTH (ft)	SIMTRAFFIC 95th PERCENTILE QUEUE LENGTH (ft)				ADEQUATE LENGTH?
			AM PEAK HOUR	CHANGE [a] (feet)	PM PEAK HOUR	CHANGE [a] (feet)	
Lovell Road (SB & NB) at Bob Gray Road (WB) and Yarnell Road (EB)	Eastbound Left	185	216	6	266	-65	NO
	Eastbound Thru	n/a	181	13	353	-227	n/a
	Eastbound Right	300	80	1	141	-461	✓
	Westbound Left	160	142	3	241	-11	NO
	Westbound Thru	n/a	150	13	356	-59	n/a
	Westbound Right	215	59	-5	141	-42	✓
	Northbound Left	TWLTL	113	-10	226	21	✓
	Northbound Thru	n/a	184	-18	365	27	n/a
	Northbound Right	245	44	2	100	10	✓
	Southbound Left	125	105	-4	240	18	NO
	Southbound Thru	n/a	304	-6	444	43	n/a
	Southbound Thru/Right	n/a	261	-1	415	53	n/a

Note: 95th percentile queues were calculated in SimTraffic 11 software
[a] Difference between 2027 Projected Vehicle Queue (Table 8b) versus 2027 Projected Vehicle Queue with Modified Signal Timing (Table 10b, this table)

Based on these results, Knox County Engineering is recommended to modify the traffic signal timing to reduce the considerable vehicle delays for the westbound and eastbound approaches on Bob Gray Road and Yarnell Road in the existing and projected conditions. This modification would include utilizing the optimized green times offered in this report to decrease vehicle delays in the PM peak hour on the westbound and eastbound approaches. The recommended optimization signal timing changes for the green times are shown in Table 11.

TABLE 11
PROPOSED TRAFFIC SIGNAL GREEN TIME MODIFICATIONS
LOVELL ROAD AT BOB GRAY ROAD AND YARNELL ROAD

AM PEAK HOUR				
PHASE #	MOVEMENT	EXISTING GREEN TIME (seconds)	OPTIMIZED GREEN TIME * (seconds)	CHANGE (seconds)
1	Southbound Left	15	11	-4
2	Northbound Thru/Right	42	52	10
3	Eastbound Left	25	20	-5
4	Westbound Thru/Right	18	17	-1
5	Northbound Left	15	16	1
6	Southbound Thru/Right	42	47	5
7	Westbound Left	20	15	-5
8	Eastbound Thru/Right	23	22	-1
PM PEAK HOUR				
PHASE #	MOVEMENT	EXISTING GREEN TIME (seconds)	OPTIMIZED GREEN TIME * (seconds)	CHANGE (seconds)
1	Southbound Left	22	14	-8
2	Northbound Thru/Right	62	61	-1
3	Eastbound Left	18	20	2
4	Westbound Thru/Right	18	25	7
5	Northbound Left	19	19	0
6	Southbound Thru/Right	65	56	-9
7	Westbound Left	18	17	-1
8	Eastbound Thru/Right	18	28	10

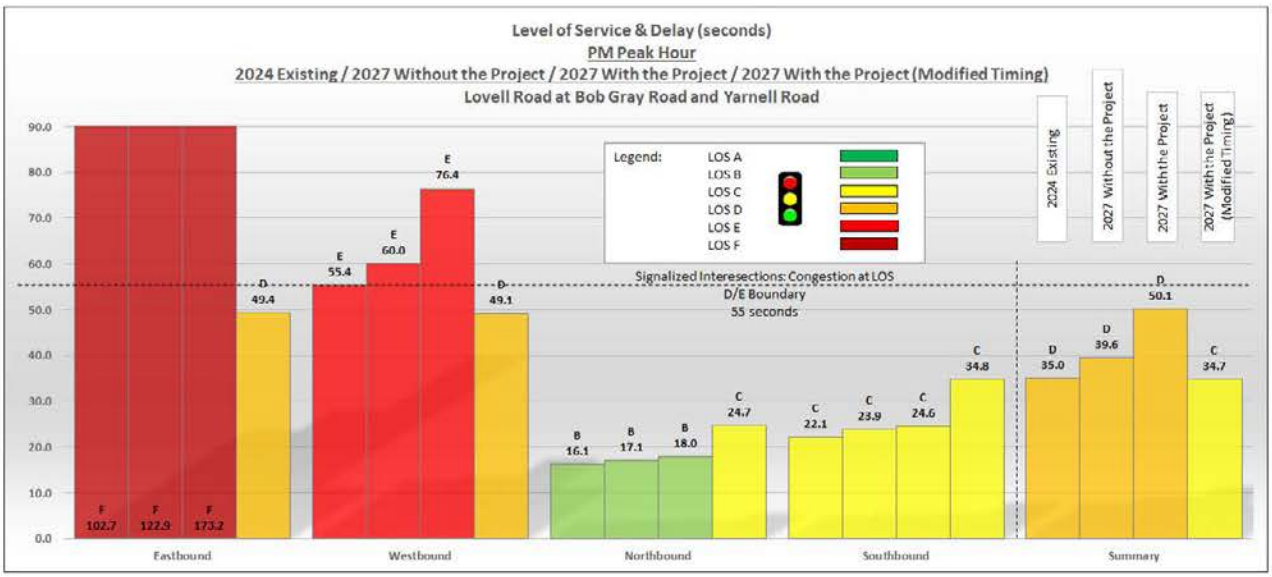
* Optimized output from Synchro 11

A summary of the Lovell Road at Bob Gray Road and Yarnell Road intersection capacity analyses are presented in Table 12. This table provides a side-by-side summary and comparison of the intersection for the 2024 existing conditions, projected conditions in 2027 without the project, the projected conditions in 2027 with the project (with the Bob Gray Road Subdivision, Parkway Heights Townhouses, and Lovell Crossing Development), and the projected conditions in 2027 (with all the developments) with the modified signal timing. As can be seen in Table 12, the optimization provided significant benefits in reducing vehicle delays in the projected 2027 conditions.

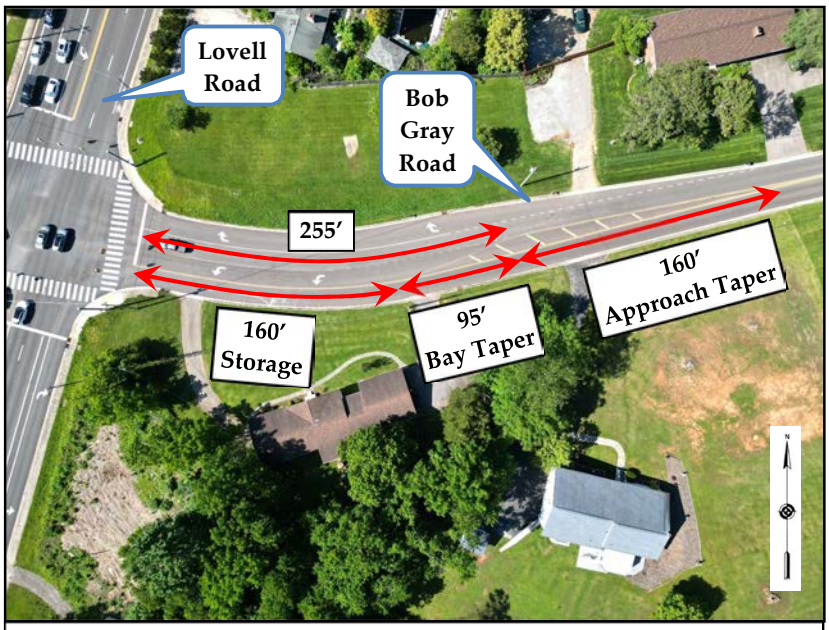
TABLE 12
INTERSECTION CAPACITY ANALYSIS SUMMARY
LOVELL ROAD AT BOB GRAY ROAD AND YARNELL ROAD

APPROACH / PEAK HOUR MOVEMENT	2024 EXISTING		2027 WITHOUT THE PROJECT		2027 WITH THE PROJECT *		2027 WITH THE PROJECT * (MODIFIED TIMING)	
	LOS[a]	Delay[b]	LOS[a]	Delay[b]	LOS[a]	Delay[b]	LOS[a]	Delay[b]
AM Peak								
Eastbound	C	29.0	C	30.0	C	31.0	D	36.0
Westbound	C	27.5	C	28.3	C	31.3	D	38.4
Northbound	B	18.6	C	20.5	C	21.4	B	16.7
Southbound	C	29.9	C	32.8	C	34.1	C	28.6
Summary	C	26.0	C	27.9	C	29.3	C	28.0
PM Peak								
Eastbound	F	102.7	F	122.9	F	173.2	D	49.4
Westbound	E	55.4	E	60.0	E	76.4	D	49.1
Northbound	B	16.1	B	17.1	B	18.0	C	24.7
Southbound	C	22.1	C	23.9	C	24.6	C	34.8
Summary	D	35.0	D	39.6	D	50.1	C	34.7

Note: All analyses were calculated in Synchro 11 software and reported with HCM 6th Edition methodology
[a] Level of Service , [b] Average Delay (sec/vehicle)
* Includes Bob Gray Road Subdivision, Parkway Heights Townhouses, and Lovell Crossing Development

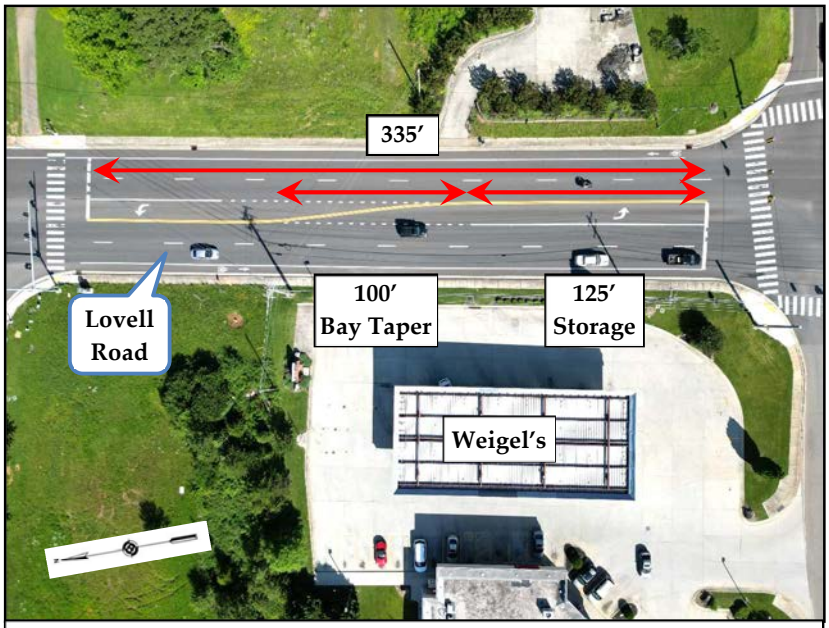


However, even with optimized signal timing, the vehicle queues are projected to exceed the storage lengths provided, particularly in the PM peak hour, even with the optimized, modified signal timing, as shown in Tables 9b and 10b. These excessive vehicle queues are already occurring and are expected to continue in the future 2027 conditions even without the project. The lanes projected to be inadequate in length in 2027 include the westbound, eastbound, and southbound left-turn lanes. Based on these results, the following provides additional information for these left-turn lanes and offers recommendations for remediation. This information was also presented in the Transportation Impact Study for the Lovell Crossing Development.



Bob Gray Road at Lovell Road

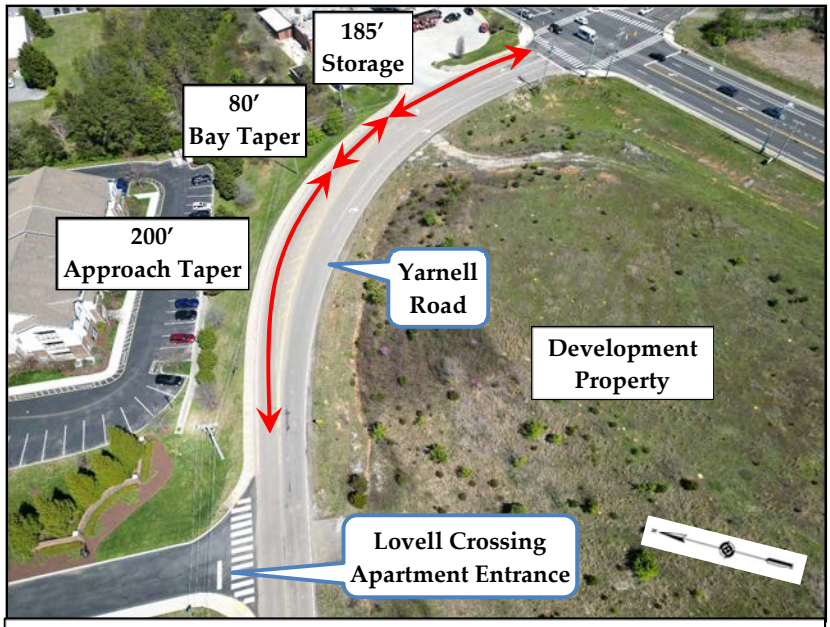
The westbound left-turn lane vehicle queues on Bob Gray Road were observed to extend beyond the provided storage, which is evident based on this lane's pavement marking wear pattern. The storage and bay taper areas provide approximately 255 feet of full-width lane storage, just short of the maximum 95th percentile projected queue length of 260 feet. Providing an additional 100 feet of left-turn storage on this approach will be difficult within the existing curb and gutter and right-of-way footprint. As a means to combat this occurrence, which would result in blocking motorists wanting to travel through the intersection or turn right onto Lovell Road, it is recommended that by 2027, the approach pavement markings be modified. This approach should be considered to be restriped with a decreased approach taper length and bay taper to provide the maximum amount of left-turn storage within the available approach footprint.



Lovell Road between Bob Gray Road/Yarnell Road and Centerpoint Boulevard

For the southbound left-turn lane, the available storage is 120 feet in the center of Lovell Road. This lane is accompanied by a 100-foot bay taper, followed by a bay taper and storage lane for northbound left turns at Centerpoint Boulevard. The calculations projected that the southbound lane in the 2027 conditions would exceed the storage length by 130 feet, with a total length of 255 feet. Due to the limited distance between the two intersections, not much is available physically to resolve this deficiency. Before the recent repaving and restriping project for Lovell Road, this center lane between the intersections was shown with back-to-back left-turn lanes without bay tapers, and this allowed the southbound left-turn lane to have 220 feet of designated storage. The restriping significantly reduced the designated storage for both left-turn lanes. While the restriping provided greater delineation between the two opposite left-turn movements, the pavement markings likely will experience more significant deterioration since the southbound left-turn movement from Lovell Road to Bob Gray Road does and will exceed the bounds of the designated storage.

Otherwise, it is recommended that Knox County Engineering re-analyze the traffic signal coordination of the Lovell Road corridor. This analysis should determine if a shorter cycle length currently set to 120 seconds in the PM peak hour could be shortened to reduce the time the southbound left-turn lane on Lovell Road is served, thus reducing the time that vehicle queues could form in this lane.



Yarnell Road at Lovell Road

The available storage for the eastbound left-turn lane on Yarnell Road is 185 feet. This lane is accompanied by an 80-foot bay taper, followed by an approach taper of 200 feet. The calculations projected that the eastbound left-turn lane queue in the 2027 conditions would exceed the storage length by 52 feet, totaling 237 feet. It is suggested that additional vehicle storage should be provided for the eastbound approach on Yarnell Road by shifting the bay taper and approach taper further to the west so that the approach taper would begin at the driveway entrance to the Lovell Crossing Apartments. This action on Yarnell Road would potentially require adding a few feet of asphalt pavement to the inner curve of Yarnell Road's south side to provide the full width for the thru lanes plus the center transition for the left-turn lane.

Bob Gray Road at Highvue Drive: The 2027 projected level of service calculations for this intersection resulted in average vehicle delays and LOS. Poorer LOS results were calculated for the northbound exiting approach on Highvue Drive in the PM peak hour but are acceptable with respect to vehicle queues.

For the scenario that only includes the Bob Gray Road Subdivision, a separate eastbound right-turn lane on Bob Gray Road at Highvue Drive will not be warranted based on the projected AM and PM peak hour 2027 traffic volumes. However, a separate westbound left-turn lane on Bob Gray Road in the 2027 PM peak hour will barely meet the Knox County threshold. For the scenario which includes the trips generated by the Bob Gray Road Subdivision and the diverted trips from the Parkway Heights Townhouses, a separate eastbound right-turn lane and a separate westbound left-turn lane on Bob Gray Road at Highvue Drive will be fully warranted based on the projected PM peak hour 2027 traffic volumes.

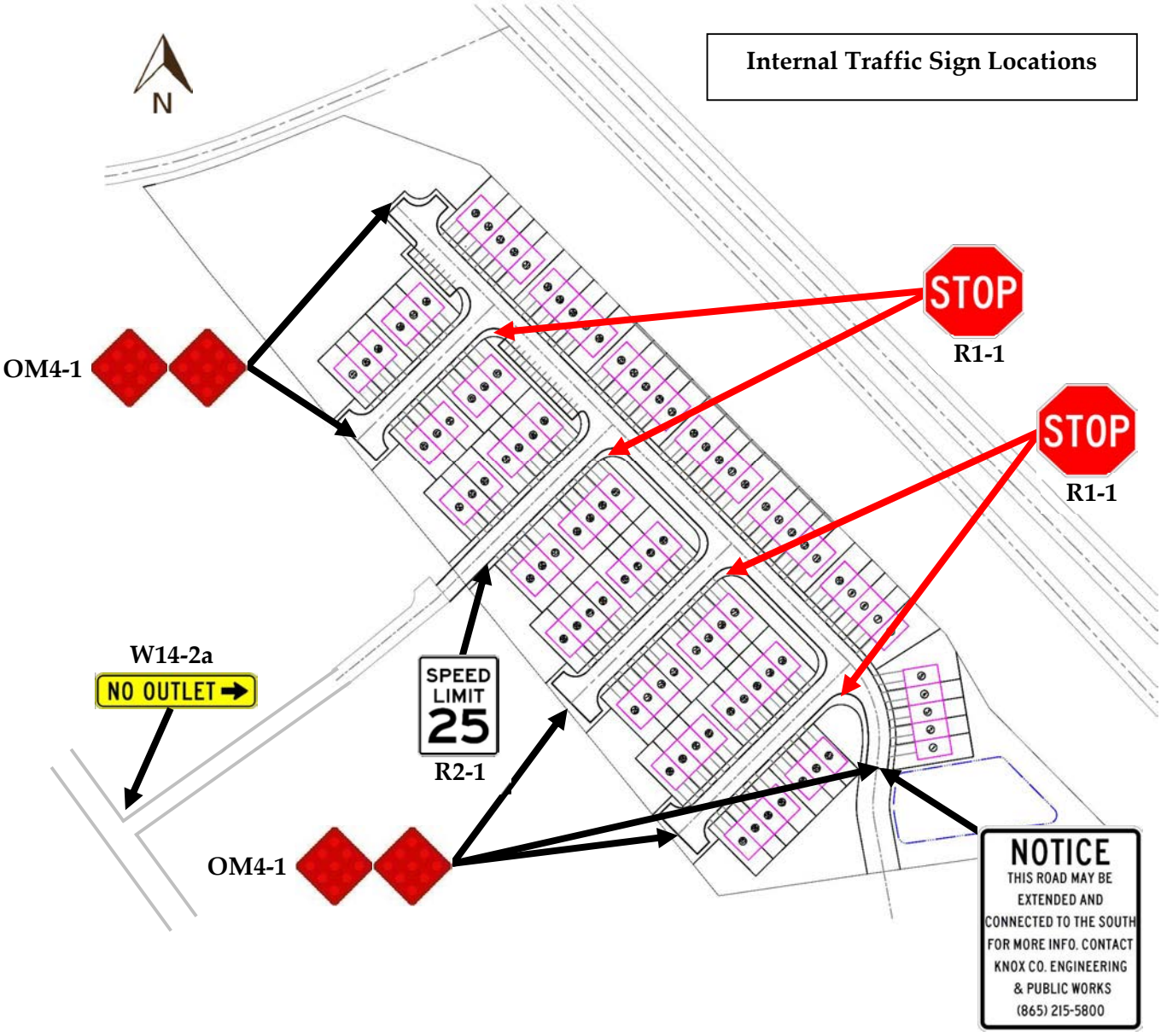
Due to the limited right-of-way on Bob Gray Road at Highvue Drive and the fact that it just barely meets the threshold for a left-turn lane in the PM peak hour only, it is not recommended that a left-turn lane be constructed on Bob Gray Road for the scenario that only includes the Bob Gray Road Subdivision. However, if Parkway Height Townhouses loses its access to Pellissippi Parkway and its traffic is diverted through the Bob Gray Road and Highvue Acres Subdivisions, it is recommended that a westbound left-turn lane and an eastbound right-turn lane be constructed on Bob Gray Road at Highvue Drive. Any turn lanes provided on Bob Gray Road must be designed and constructed with a minimal lane taper and maximum deceleration length possible within the existing physical limitations. These modifications would need to be coordinated with Knox County Engineering.

Furthermore, the analyses showed that an additional northbound lane on Highvue Drive at Bob Gray Road is unnecessary.

3 **Bob Gray Road Subdivision Internal Roads:** The layout plan shows a single entrance at Bob Gray Road constructed for the development, as shown in Figure 3.

3a) A 25-mph Speed Limit (R2-1) sign is recommended to be posted near the beginning of the development entrance off Boyington Drive. It is also recommended that a "No Outlet" Sign (W14-2a) be posted at the western end of Boyington Drive at Rockley Road in the Highvue Acres Subdivision. This sign can be posted above or below the existing street name sign for Boyington Drive.

3b) The image below shows the recommended internal road signage for the proposed subdivision.



Dual end-of-roadway object markers (OM4-1) should be installed at the end of the internal roads in the subdivision that end in hammerhead turnarounds. These markers should also be installed at the end of Road "A" if the road is not connected to Blinken Street to the south in the Parkway Heights Subdivision. Furthermore, if an immediate road connection is not made to Blinken Street, an additional sign should be posted at the end of Road "A" to follow Knoxville-Knox County Subdivision regulations. This sign is for notification of a possible future street connection. It should state, "NOTICE – This road may be extended and connected to the south – for more info. contact Knox Co. Engineering & Public Works (865) 215-5800".

Stop Signs (R1-1) with 24" white stop bars are recommended to be installed at the internal road locations, as shown in the above image.

3c) Sight distance at the new internal intersections must not be impacted by new signage, parked cars, or future landscaping. With a speed limit of 25-mph in the development, the internal intersection sight distance is 250 feet. The required stopping sight distance is 155 feet for a level road grade. The site designer should ensure that internal sight distance lengths are met and account for different proposed road grades.

3d) It is recommended that a small strip of the development property be reserved as a potential common area for all Bob Gray Road Subdivision residents to walk or ride their bikes to the east. This strip would allow for a pathway to the future Knox to Oak Ridge Greenway if the greenway were constructed adjacent to the subdivision on the west side of Pellissippi Parkway.

3e) If directed by the local post office, the site designer should include a parking area and a centralized mail delivery center within the development for the subdivision residents.

3f) All drainage grates and covers for the residential development must be pedestrian and bicycle safe.

3g) Road "A" will have a long, straight road segment. Straight road segments encourage higher vehicle speeds. Additionally, if Parkway Heights loses its access to Pellissippi Parkway, residents from this other development will increase traffic volumes and may contribute to speeding in the Bob Gray Road Subdivision. It is recommended that the civil site designer consider including traffic calming measures on the internal Road "A",

such as speed humps or tables. Specifics regarding this recommendation should be discussed in the design phase with Knox County Engineering.

3h) All road and intersection elements should be designed to AASHTO and Knox County specifications and guidelines to ensure proper transportation operations.

APPENDIX A

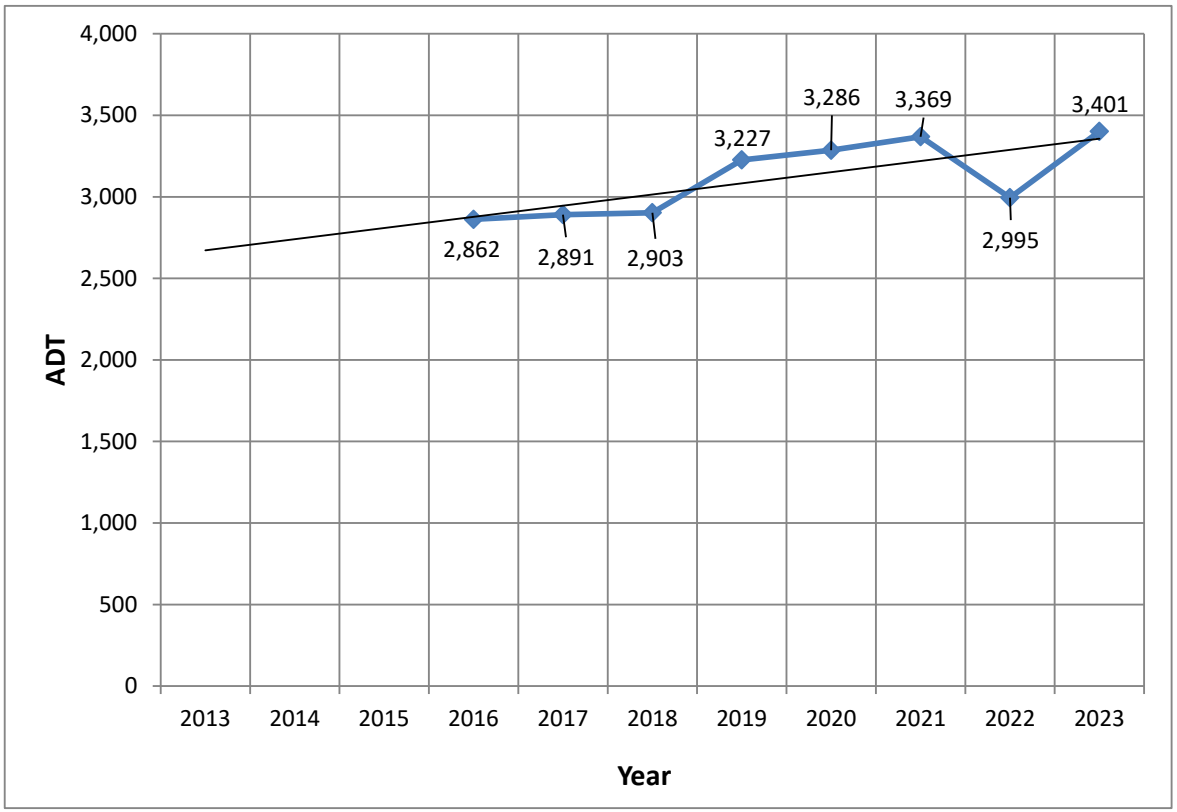
HISTORICAL TRAFFIC COUNT DATA

Historical Traffic Counts

Organization: TDOT
Station ID #: 47000584
Location: Bob Gray Road, east of Pellissippi Parkway

YEAR	ADT
2013	
2014	
2015	
2016	2,862
2017	2,891
2018	2,903
2019	3,227
2020	3,286
2021	3,369
2022	2,995
2023	3,401

Trendline



2016 - 2023 Growth Rate = 18.8%
Average Annual Growth Rate = 2.5%

TDOT Department of Transportation

MS2 Traffic Count Database System (TCDS)

Home | Login | Locate | Locate All | Email This

Auto-Locate OFF

List View | All DIRs

Record 7844 of 15935 Goto Record go

Location ID	47000584	MPO ID	
Type	SPOT	HPMS ID	
On NHS		On HPMS	
LRS ID	4705941001	LRS Loc Pt.	2.64
SF Group	Lower FC	Route Type	
AF Group	Region 1 Urban Minor Collector	Route	
GF Group	Knox	Active	Yes
Class Dist Grp	Region 1 Urban Minor Collector	Category	CC
Seas Clss Grp			
WIM Group			
QC Group	Default		
Fnct'l Class	Minor Collector	Milepost	
Located On	05941		
Loc On Alias	BOB GRAY RD.		
	NEAR PELLISSIPPI PKWY.		
More Detail			

STATION DATA

Directions: 2-WAY

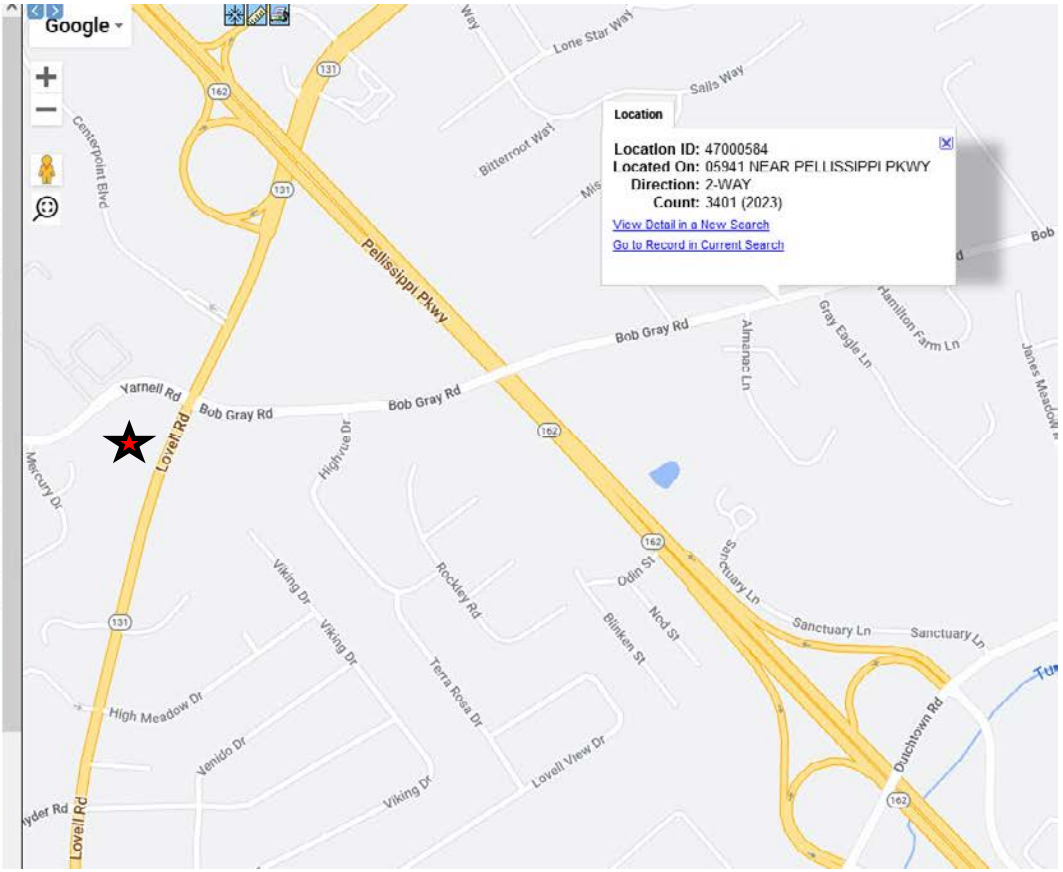
AADT

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2023	3,401	466	14	65	3,292 (97%)	109 (3%)	
2022	2,995	468	16	65	2,920 (97%)	75 (3%)	
2021	3,369	356	11	65	3,322 (99%)	47 (1%)	
2020	3,286	480	15	65	3,170 (97%)	110 (3%)	
2019	3,227		15	65			

|<< < > >>| 1 5 of 8

Travel Demand Model

Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV

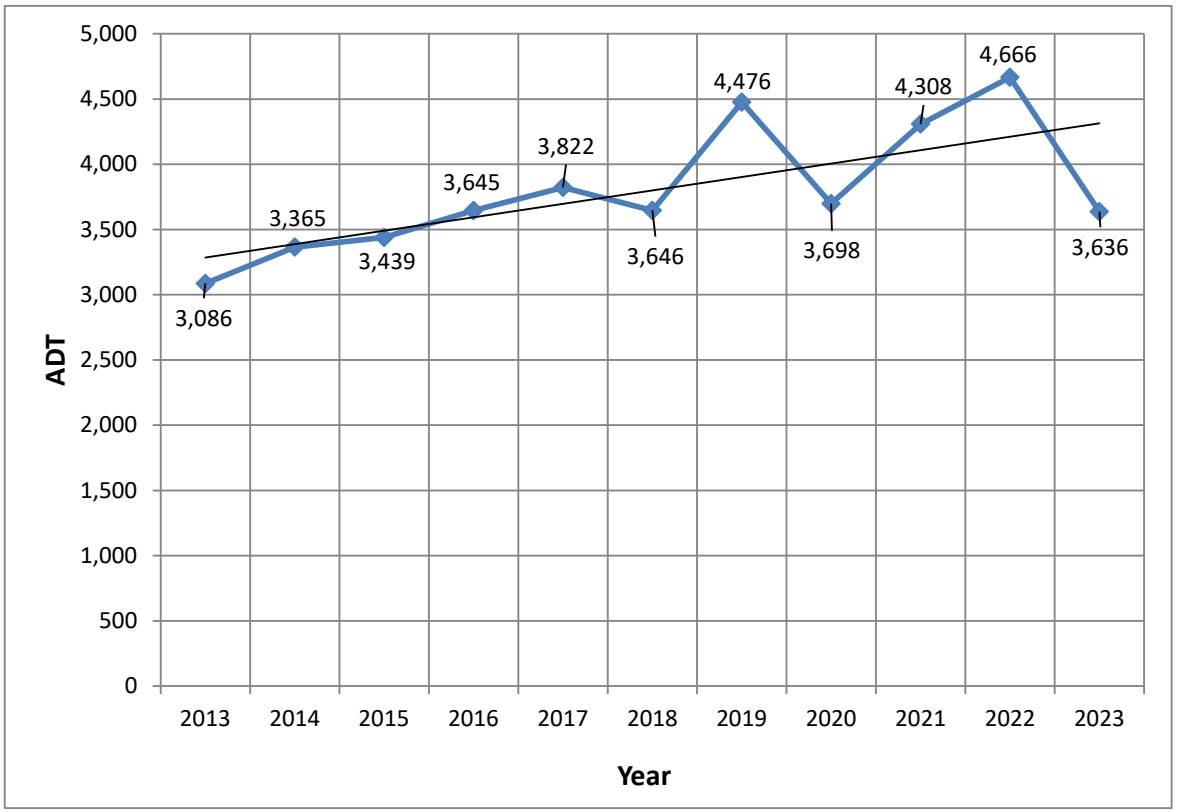


Historical Traffic Counts

Organization: TDOT
Station ID #: 47000134
Location: Yarnell Road, west of Lovell Road

YEAR	ADT
2013	3,086
2014	3,365
2015	3,439
2016	3,645
2017	3,822
2018	3,646
2019	4,476
2020	3,698
2021	4,308
2022	4,666
2023	3,636

Trendline



2013 - 2023 Growth Rate = 17.8%
Average Annual Growth Rate = 1.7%

TDOT Department of Transportation

MS2

Traffic Count Database System (TCDS)

Home | Login | Locate | Locate All | Email This

Auto-Locate OFF

List View | All DIRs

Record 7403 of 15935 Goto Record go

Location ID	47000134	MPO ID	
Type	SPOT	HPMS ID	
On NHS		On HPMS	Yes
LRS ID	4702420001	LRS Loc Pt.	0.404
SF Group	Lower FC	Route Type	
AF Group	Region 1 Urban Minor Collector	Route	
GF Group	Knox	Active	Yes
Class Dist Grp	Region 1 Urban Minor Collector	Category	CC
Seas Clss Grp			
WIM Group			
QC Group	Default		
Fnct'l Class	Minor Collector	Milepost	
Located On	02420		
Loc On Alias	YARNELL RD.		
	YARNELL RD NEAR BIRDS CHAPEL		
More Detail			

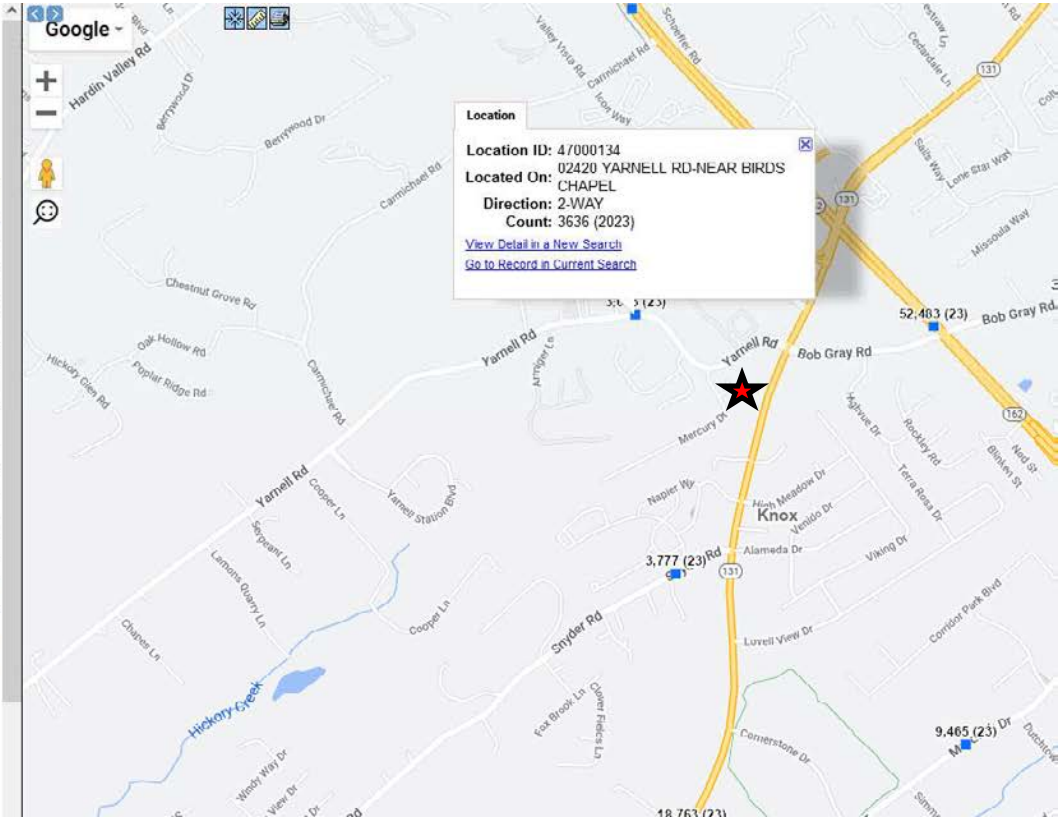
STATION DATA

Directions: Z-WAY

AADT

	Year	AADT	DHV-30	K %	D %	PA	BC	Src
	2023	3,636	461	13	65	3,519 (97%)	117 (3%)	
	2022	4,666	527	11	65	4,549 (97%)	117 (3%)	
	2021	4,308	430	10	65	4,247 (99%)	61 (1%)	
	2020	3,698	548	15	65	3,571 (97%)	127 (3%)	
	2019	4,476		16	65			

<< < > >> 1-5 of 39

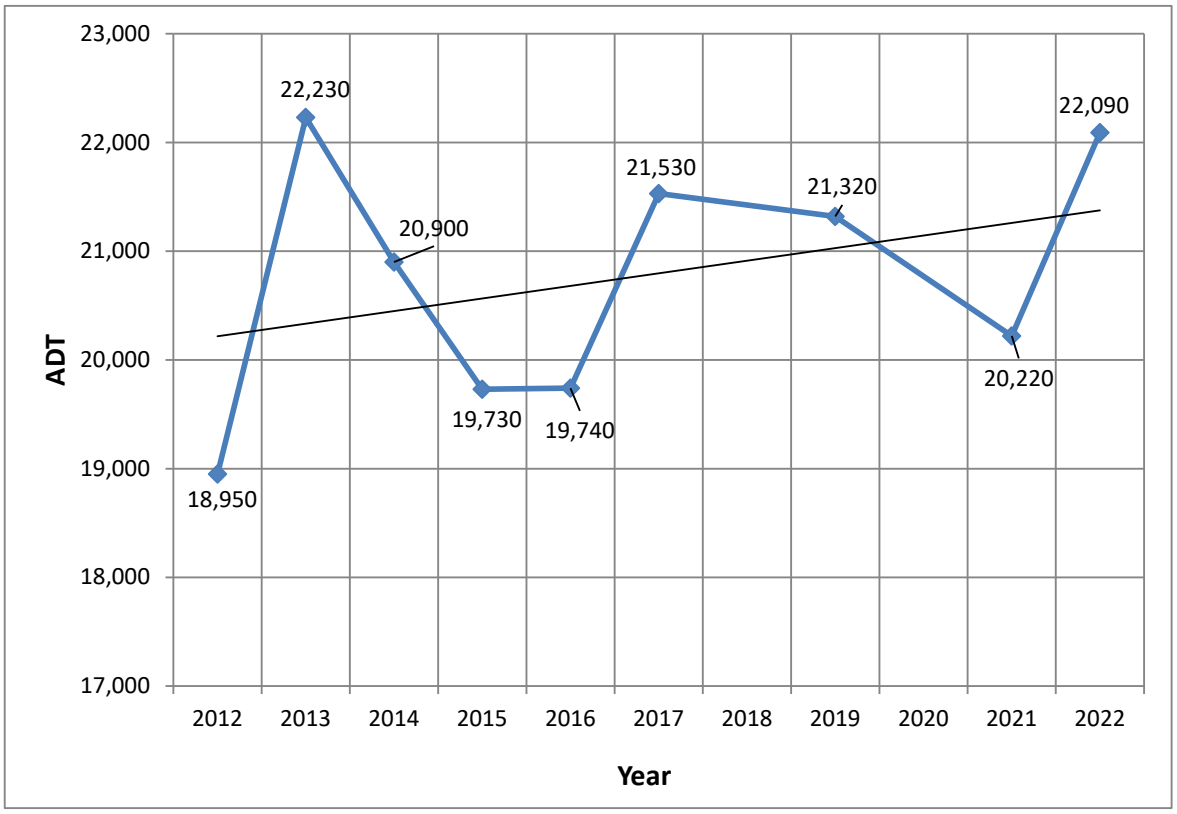


Historical Traffic Counts

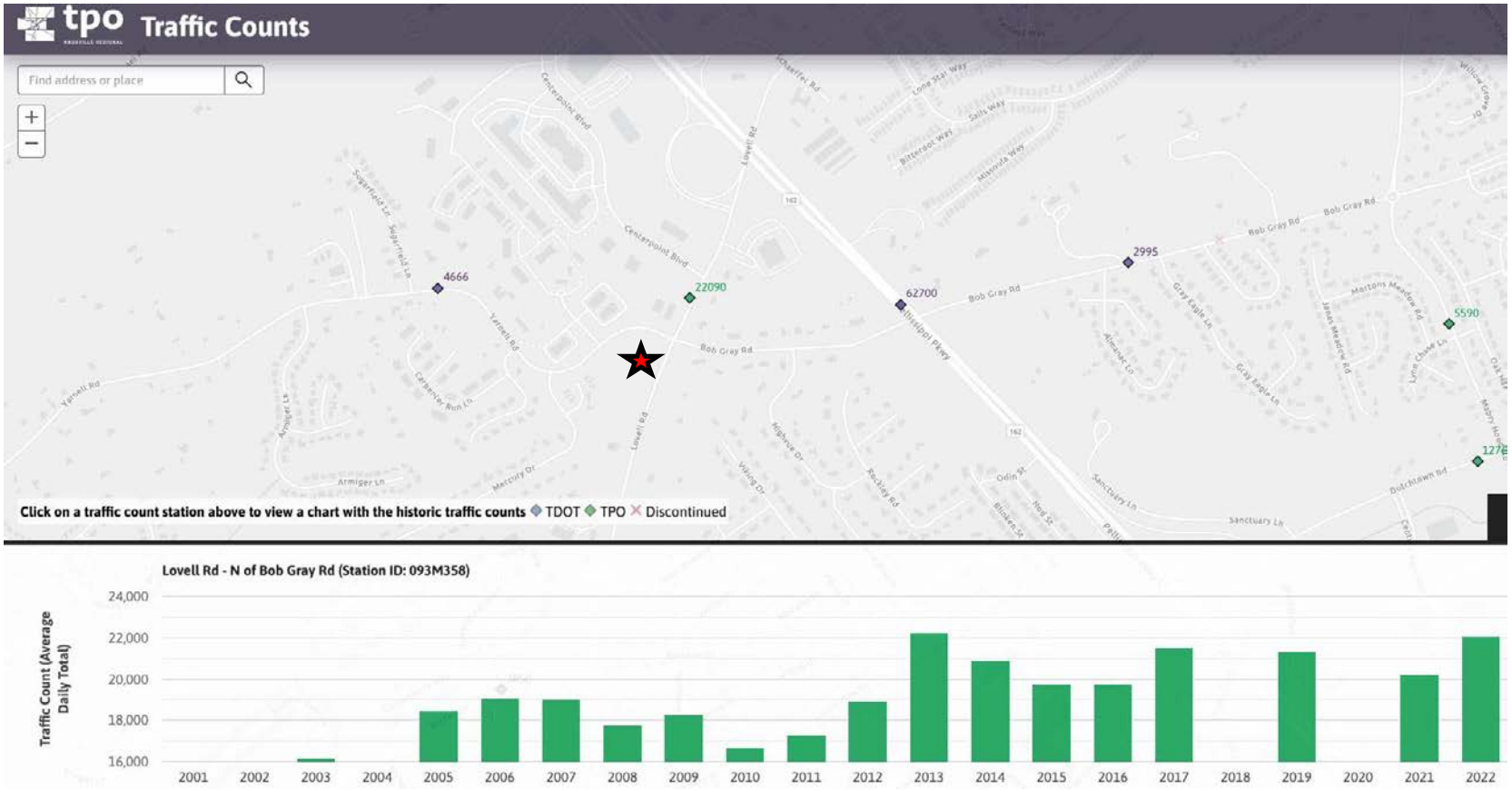
Organization: TPO
Station ID #: 093M358
Location: Lovell Road, north of Bob Gray Road

YEAR	ADT
2012	18,950
2013	22,230
2014	20,900
2015	19,730
2016	19,740
2017	21,530
2018	-
2019	21,320
2020	-
2021	20,220
2022	22,090

Trendline

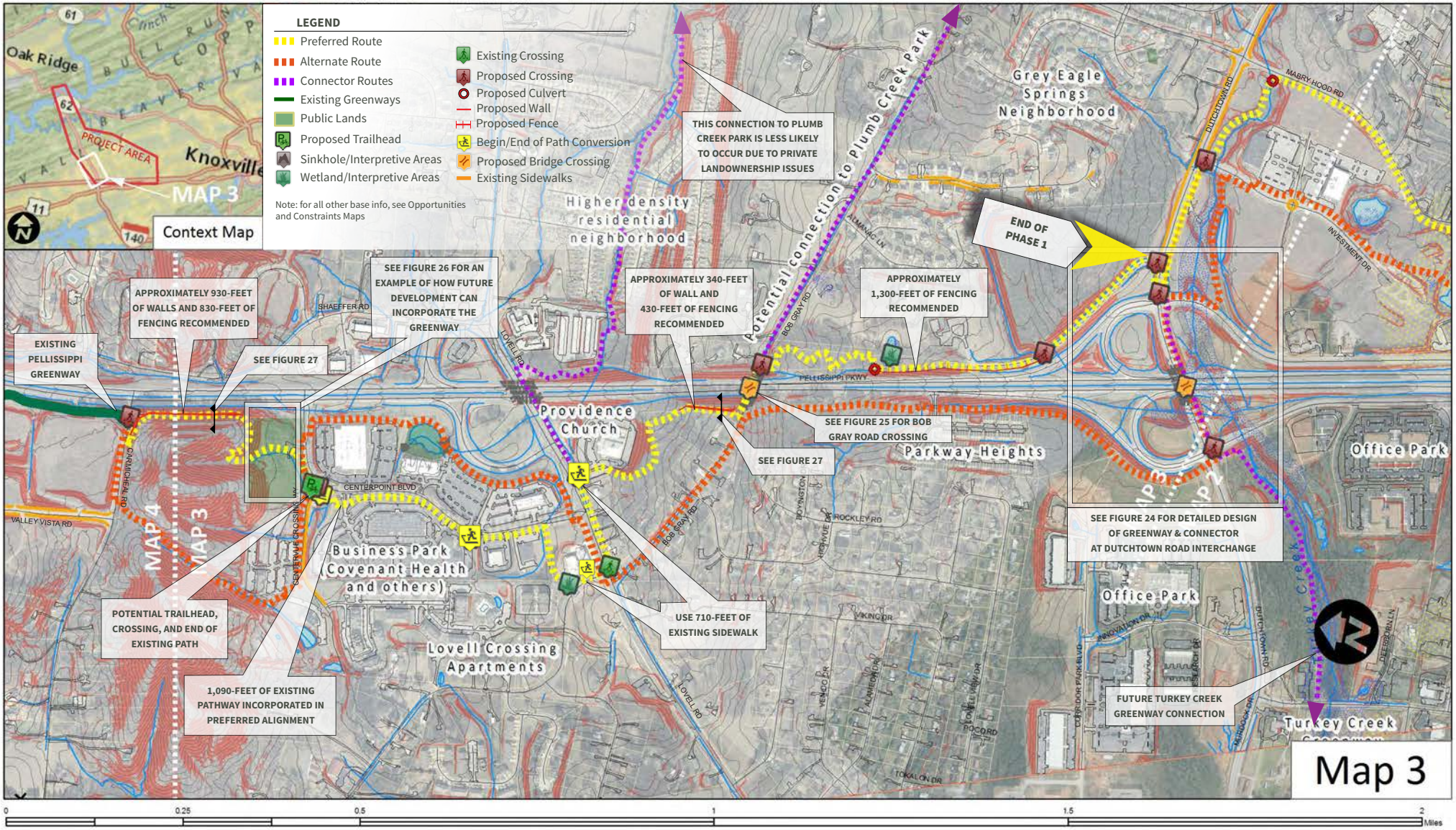


2012 - 2022 Growth Rate = 16.6%
Average Annual Growth Rate = 1.5%


tpo
Traffic Counts
Find address or place
4666
22090
62700
2995
5590
Bob Gray Rd
Lovell Rd
Centerpoint Blvd
Click on a traffic count station above to view a chart with the historic traffic counts
TDOT
TPO
Discontinued
Lovell Rd - N of Bob Gray Rd (Station ID: 093M358)
Traffic Count (Average Daily Total)
24,000
22,000
20,000
18,000
16,000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

APPENDIX B

FUTURE KNOX TO OAK RIDGE GREENWAY STUDY MAP



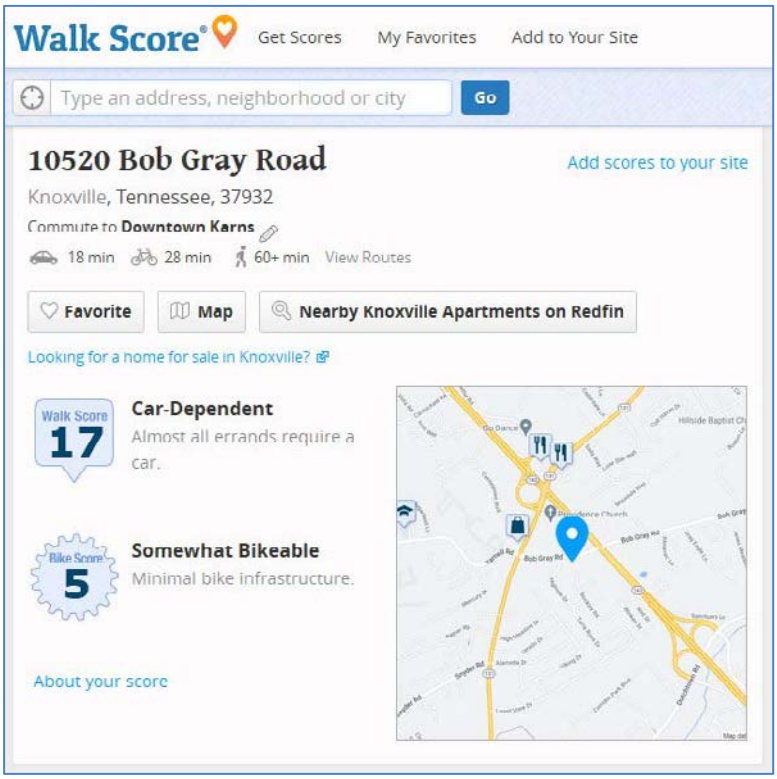
Knox to Oak Ridge Greenway Study • Corridor Design

APPENDIX C

WALK SCORE

WALKSCORE

(from walkscore.com)



Scores for 10520 Bob Gray Road

Walk Score	Transit Score	Bike Score

Transit Score measures how well a location is served by public transit based on the distance and type of nearby transit lines.

90–100	**Rider's Paradise** World-class public transportation
70–89	**Excellent Transit** Transit is convenient for most trips
50–69	**Good Transit** Many nearby public transportation options
25–49	**Some Transit** A few nearby public transportation options
0–24	**Minimal Transit** It is possible to get on a bus

Scores for 10520 Bob Gray Road

Walk Score	Transit Score	Bike Score

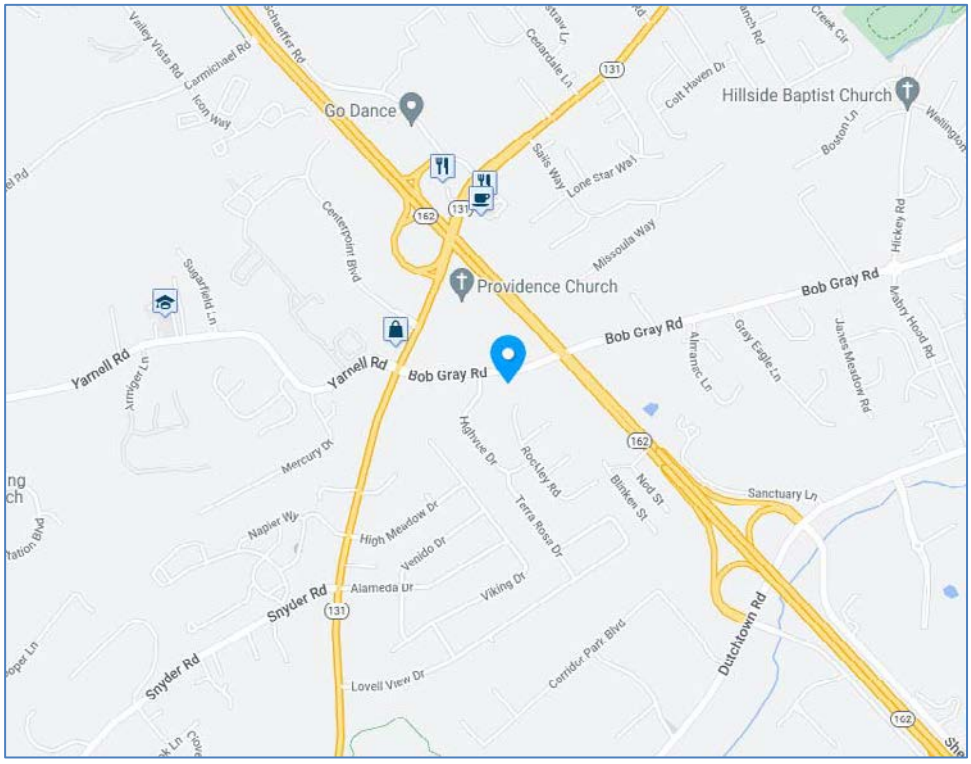
Bike Score measures whether an area is good for biking based on bike lanes and trails, hills, road connectivity, and destinations.

90–100	**Biker's Paradise** Daily errands can be accomplished on a bike
70–89	**Very Bikeable** Biking is convenient for most trips
50–69	**Bikeable** Some bike infrastructure
0–49	**Somewhat Bikeable** Minimal bike infrastructure

Travel Time Map

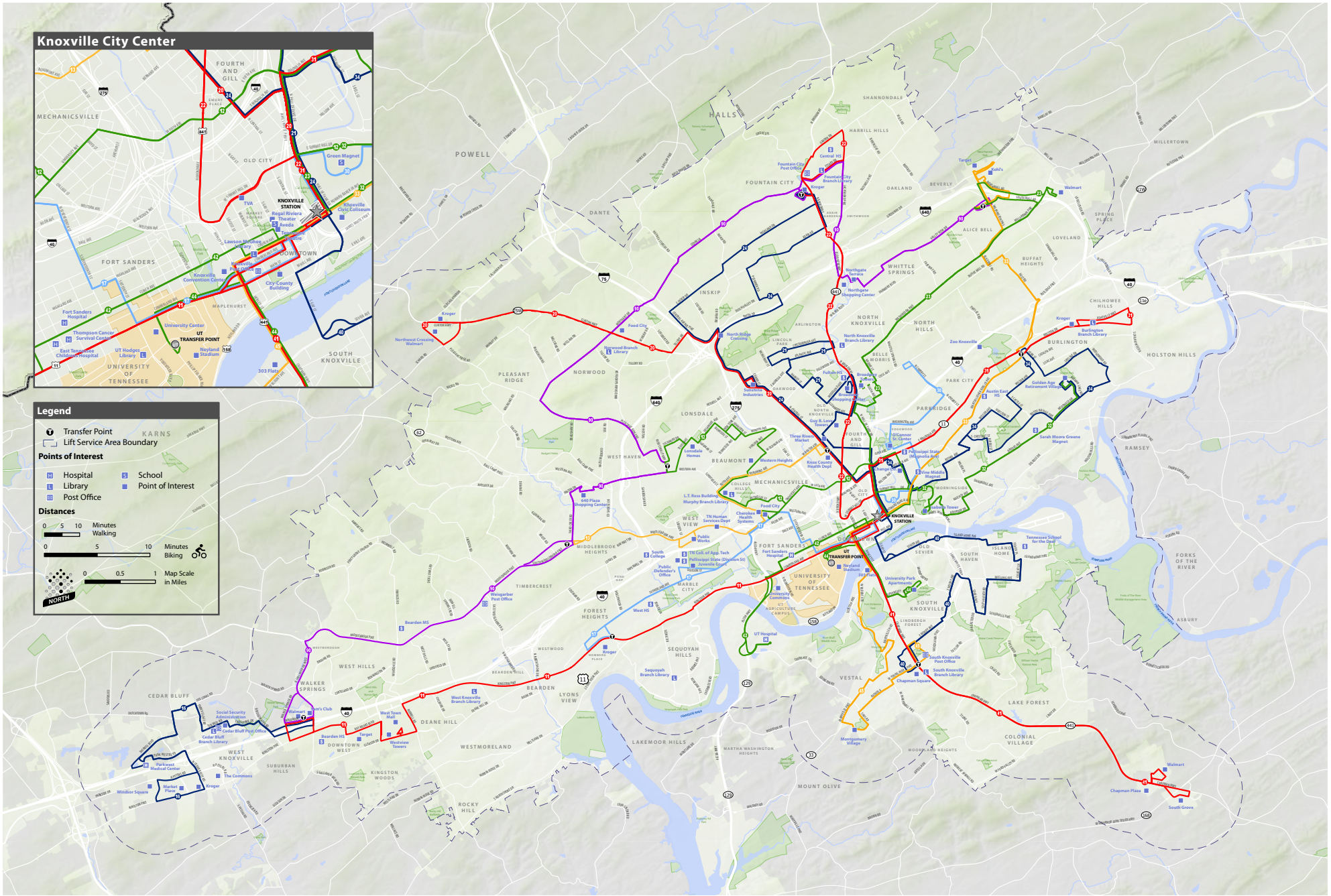
Add to your site

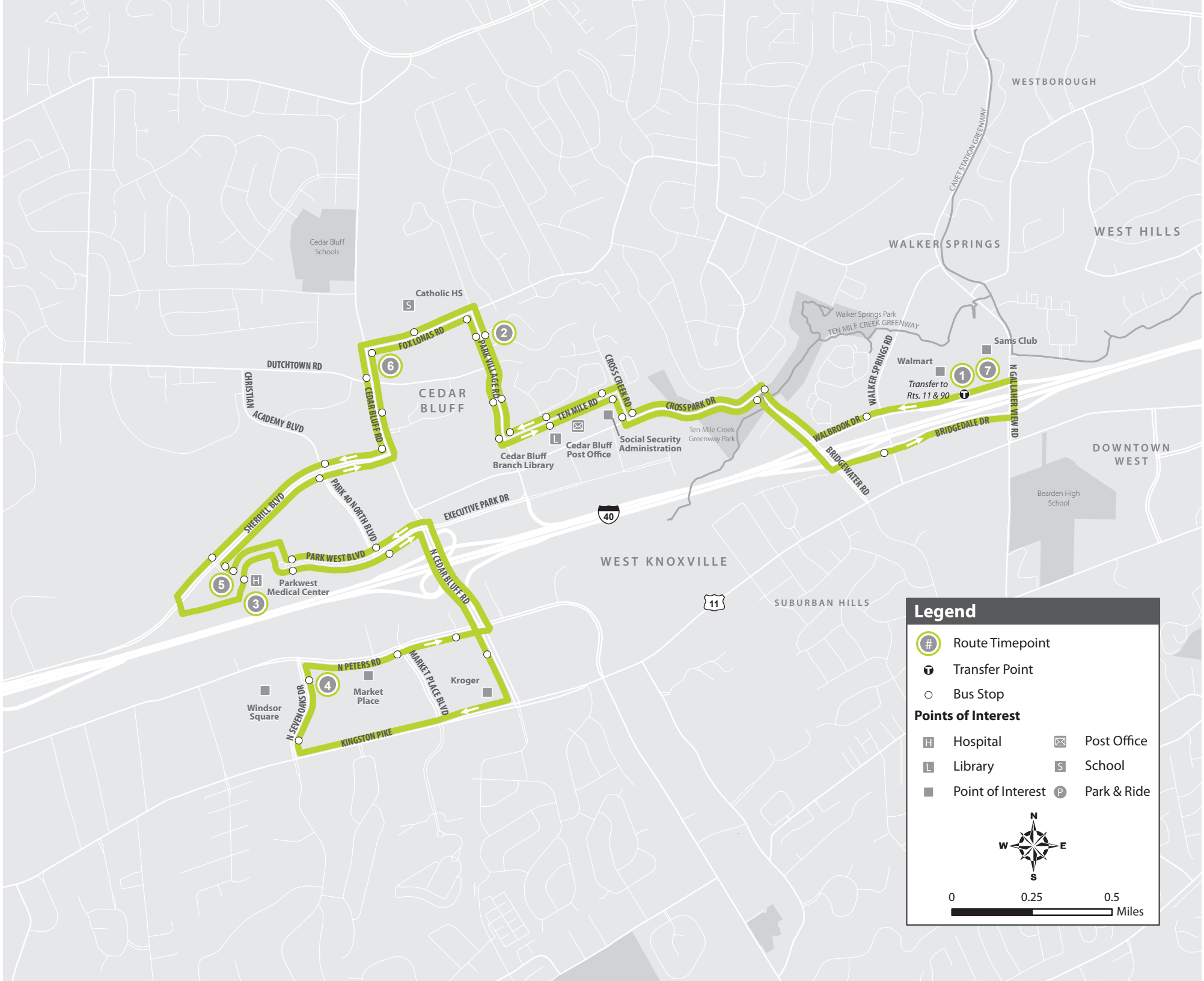
Explore how far you can travel by car, bus, bike and foot from 10520 Bob Gray Road.



APPENDIX D

KNOXVILLE AREA TRANSIT MAP AND INFORMATION


Knoxville City Center
Legend
Transfer Point
Lift Service Area Boundary
Points of Interest
Hospital
Library
Post Office
School
Point of Interest
Distances
0 5 10 Minutes Walking
0 5 10 Minutes Biking
0 0.5 1 Map Scale in Miles
NORTH
KNOXVILLE STATION
UT TRANSFER POINT
DOWNTOWN
FORT SANDERS
UNIVERSITY OF TENNESSEE
OLD CITY
MECHANICSVILLE
FOURTH AND GILL
SOUTH KNOXVILLE
NORTH KNOXVILLE
WEST KNOXVILLE
POWELL
HALLS
KARNS


WESTBOROUGH
CAVET STATION GREENWAY
WEST HILLS
WALKER SPRINGS
Cedar Bluff Schools
Catholic HS
Walker Springs Park
TEN MILE CREEK GREENWAY
Sams Club
Walmart
Transfer to Rts. 11 & 90
WALKER SPRINGS RD
N GALLAHER VIEW RD
FOX LONAS RD
PARK VILLAGE RD
DUTCHTOWN RD
CROSS CREEK RD
CROSS PARK DR
CHRISTIAN ACADEMY BLVD
CEDAR BLUFF
CEDAR BLUFF RD
TEN MILE RD
Cedar Bluff Branch Library
Cedar Bluff Post Office
Social Security Administration
Ten Mile Creek Greenway Park
WALBROOK DR
BRIDGEDALE DR
BRIDGEWATER RD
DOWNTOWN WEST
Bearden High School
SHERRILL BLVD
PARK 40 NORTH BLVD
EXECUTIVE PARK DR
40
PARK WEST BLVD
N CEDAR BLUFF RD
Parkwest Medical Center
WEST KNOXVILLE
11
SUBURBAN HILLS
N PETERS RD
MARKET PLACE BLVD
Kroger
Market Place
Windsor Square
N SEVENOAKS DR
KINGSTON PIKE
Legend
Route Timepoint
Transfer Point
Bus Stop
Points of Interest
Hospital
Post Office
Library
School
Point of Interest
Park & Ride
N
W
E
S
0
0.25
0.5
Miles

Route 16 - Cedar Bluff: Weekdays

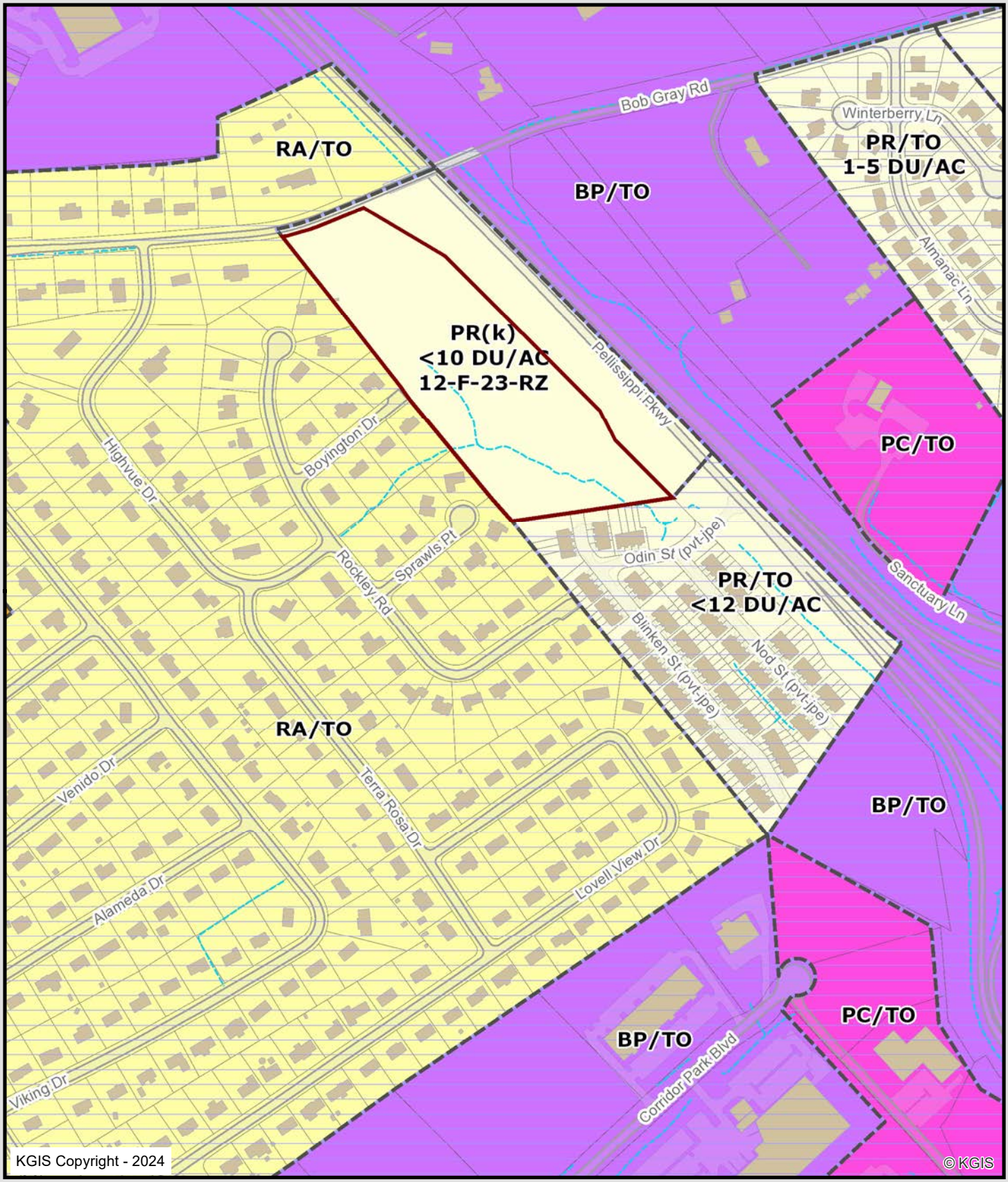
Going away from Walmart				*Going to Walmart*		
Walmart	**Park Village @ Woodpark**	**Parkwest Hospital**	**Windsor Square**	**Parkwest Hospital**	**Cedar Bluff @ Fox Lonas**	**Walmart**
1	**2**	**3**	**4**	**5**	**6**	**7**
6:15 AM	6:27 AM	6:32 AM	6:42 AM	6:50 AM	6:54 AM	7:10 AM
7:15 AM	7:27 AM	7:32 AM	7:42 AM	7:50 AM	7:54 AM	8:10 AM
8:15 AM	8:27 AM	8:32 AM	8:42 AM	8:50 AM	8:54 AM	9:10 AM
9:15 AM	9:27 AM	9:32 AM	9:42 AM	9:50 AM	9:54 AM	10:10 AM
10:15 AM	10:27 AM	10:32 AM	10:42 AM	10:50 AM	10:54 AM	11:10 AM
11:15 AM	11:27 AM	11:32 AM	11:42 AM	11:50 AM	11:54 AM	12:10 PM
12:15 PM	12:27 PM	12:32 PM	12:42 PM	12:50 PM	12:54 PM	1:10 PM
1:15 PM	1:27 PM	1:32 PM	1:42 PM	1:50 PM	1:54 PM	2:10 PM
2:15 PM	2:27 PM	2:32 PM	2:42 PM	2:50 PM	2:54 PM	3:10 PM
3:15 PM	3:27 PM	3:32 PM	3:42 PM	3:50 PM	3:54 PM	4:10 PM
4:15 PM	4:27 PM	4:32 PM	4:42 PM	4:50 PM	4:54 PM	5:10 PM
5:15 PM	5:27 PM	5:32 PM	5:42 PM	5:50 PM	5:54 PM	6:10 PM
6:15 PM	6:27 PM	6:32 PM	6:42 PM	6:50 PM	6:54 PM	7:10 PM
7:15 PM	7:27 PM	7:32 PM	7:42 PM	7:50 PM	7:54 PM	8:10 PM
8:15 PM	8:27 PM	8:32 PM	8:42 PM	8:50 PM	8:54 PM	9:10 PM
9:15 PM	9:27 PM	9:32 PM	9:42 PM	9:50 PM	9:54 PM	10:10 PM

Route 16 - Cedar Bluff: SATURDAYS

Going away from Walmart				*Going to Walmart*		
Walmart	**Park Village @ Woodpark**	**Parkwest Hospital**	**Windsor Square**	**Parkwest Hospital**	**Cedar Bluff @ Fox Lonas**	**Walmart**
1	**2**	**3**	**4**	**5**	**6**	**7**
7:15 AM	7:27 AM	7:32 AM	7:42 AM	7:50 AM	7:54 AM	8:10 AM
8:15 AM	8:27 AM	8:32 AM	8:42 AM	8:50 AM	8:54 AM	9:10 AM
9:15 AM	9:27 AM	9:32 AM	9:42 AM	9:50 AM	9:54 AM	10:10 AM
10:15 AM	10:27 AM	10:32 AM	10:42 AM	10:50 AM	10:54 AM	11:10 AM
11:15 AM	11:27 AM	11:32 AM	11:42 AM	11:50 AM	11:54 AM	12:10 PM
12:15 PM	12:27 PM	12:32 PM	12:42 PM	12:50 PM	12:54 PM	1:10 PM
1:15 PM	1:27 PM	1:32 PM	1:42 PM	1:50 PM	1:54 PM	2:10 PM
2:15 PM	2:27 PM	2:32 PM	2:42 PM	2:50 PM	2:54 PM	3:10 PM
3:15 PM	3:27 PM	3:32 PM	3:42 PM	3:50 PM	3:54 PM	4:10 PM
4:15 PM	4:27 PM	4:32 PM	4:42 PM	4:50 PM	4:54 PM	5:10 PM
5:15 PM	5:27 PM	5:32 PM	5:42 PM	5:50 PM	5:54 PM	6:10 PM
6:15 PM	6:27 PM	6:32 PM	6:42 PM	6:50 PM	6:54 PM	7:10 PM
7:15 PM	7:27 PM	7:32 PM	7:42 PM	7:50 PM	7:54 PM	8:10 PM
8:15 PM	8:27 PM	8:32 PM	8:42 PM	8:50 PM	8:54 PM	9:10 PM
9:15 PM	9:27 PM	9:32 PM	9:42 PM	9:50 PM	9:54 PM	10:10 PM

APPENDIX E

ZONING MAP



Zoning Map

3.22.24

Knoxville - Knox County - KUB Geographic Information System

Printed: 3/22/2024 at 5:02:16 PM

0 200 400 800

ft

APPENDIX F

MANUAL TRAFFIC COUNT DATA

TRAFFIC COUNT DATA

Major Street: Lovell Road (SB and NB)
Minor Street: Bob Gray Road (WB) and Yarnell Road (EB)
Traffic Control: Traffic Signal

3/28/2024 (Thursday)
Mostly Sunny and Mild
Conducted by: Ajax Engineering

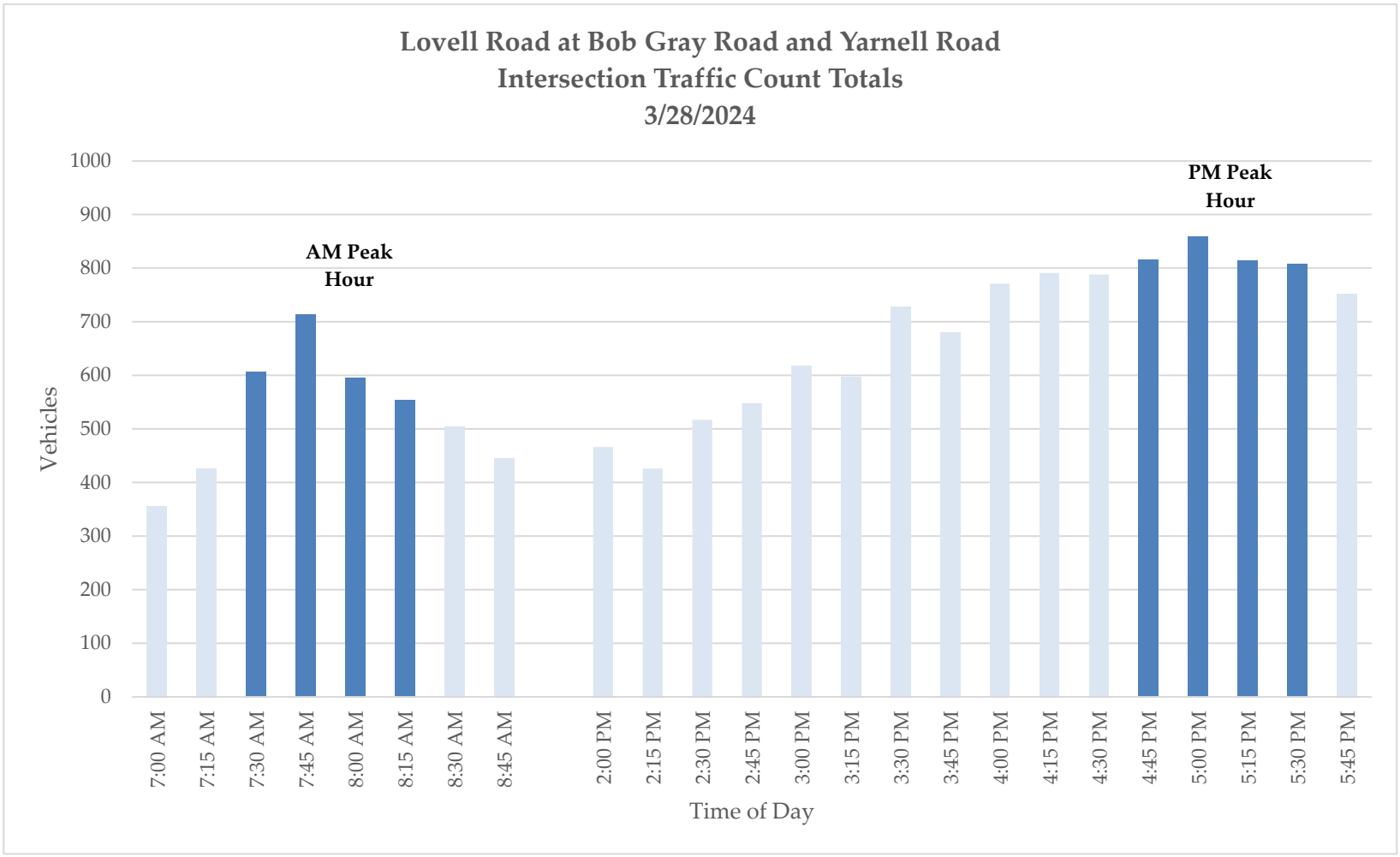
	Lovell Road			Bob Gray Road			Lovell Road			Yarnell Road				
TIME	SOUTHBOUND			WESTBOUND			NORTHBOUND			EASTBOUND			VEHICLE	PEAK
BEGIN	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	TOTAL	HOUR
7:00 AM	7	128	17	8	5	14	14	105	6	30	4	17	355	
7:15 AM	4	146	20	22	8	24	10	106	5	46	14	21	426	
7:30 AM	7	186	47	38	13	17	22	135	17	61	28	35	606	**7:30 AM - 8:30 AM**
7:45 AM	9	211	42	40	29	29	37	123	30	65	49	49	713	
8:00 AM	6	166	19	25	30	17	26	161	21	62	33	29	595	
8:15 AM	7	176	23	20	18	30	28	140	15	52	17	27	553	
8:30 AM	6	174	18	10	7	16	22	134	12	58	19	28	504	
8:45 AM	11	157	25	10	4	9	23	123	11	42	10	20	445	
TOTAL	57	1344	211	173	114	156	182	1027	117	416	174	226	4197	
2:00 PM	15	144	26	13	8	5	18	158	21	27	12	19	466	
2:15 PM	11	127	26	12	9	8	19	132	20	33	13	16	426	
2:30 PM	9	161	31	27	8	8	14	176	14	39	10	20	517	
2:45 PM	15	174	33	21	12	6	19	167	19	37	20	25	548	
3:00 PM	10	181	42	24	16	8	32	194	31	35	20	25	618	
3:15 PM	15	178	35	26	22	7	24	164	30	45	30	21	597	
3:30 PM	21	210	39	36	28	10	21	229	27	50	29	28	728	
3:45 PM	18	222	48	36	24	11	20	177	26	50	20	27	679	
4:00 PM	22	275	32	29	12	10	25	219	41	44	36	26	771	
4:15 PM	24	236	37	21	23	11	36	224	42	66	54	17	791	
4:30 PM	38	226	38	31	20	20	28	207	54	58	47	21	788	
4:45 PM	24	237	45	44	32	11	29	221	45	58	40	29	815	**4:45 PM - 5:45 PM**
5:00 PM	33	252	41	32	37	6	34	248	67	40	46	23	859	
5:15 PM	24	228	39	41	31	16	34	231	48	47	57	18	814	
5:30 PM	11	254	36	30	26	12	27	223	55	51	64	18	807	
5:45 PM	21	257	38	49	20	15	29	176	40	42	41	24	752	
TOTAL	311	3362	586	472	328	164	409	3146	580	722	539	357	10976	

2024 AM Peak Hour **7:30 AM - 8:30 AM**

	Lovell Road			Bob Gray Road			Lovell Road			Yarnell Road		
TIME	SOUTHBOUND			WESTBOUND			NORTHBOUND			EASTBOUND		
BEGIN	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT
7:30 AM	7	186	47	38	13	17	22	135	17	61	28	35
7:45 AM	9	211	42	40	29	29	37	123	30	65	49	49
8:00 AM	6	166	19	25	30	17	26	161	21	62	33	29
8:15 AM	7	176	23	20	18	30	28	140	15	52	17	27
TOTAL	**29**	**739**	**131**	**123**	**90**	**93**	**113**	**559**	**83**	**240**	**127**	**140**
TRUCK %	**0.0%**	**1.4%**	**1.5%**	**0.0%**	**0.0%**	**2.1%**	**1.8%**	**2.9%**	**0.0%**	**0.8%**	**0.0%**	**1.4%**
PHF $_{mvmt}$	**0.81**	**0.88**	**0.70**	**0.77**	**0.75**	**0.78**	**0.76**	**0.87**	**0.69**	**0.92**	**0.65**	**0.71**
PHF $_{app}$		**0.86**			**0.78**			**0.91**			**0.78**	
PHF $_{int}$						**0.87**						

2024 PM Peak Hour **4:45 PM - 5:45 PM**

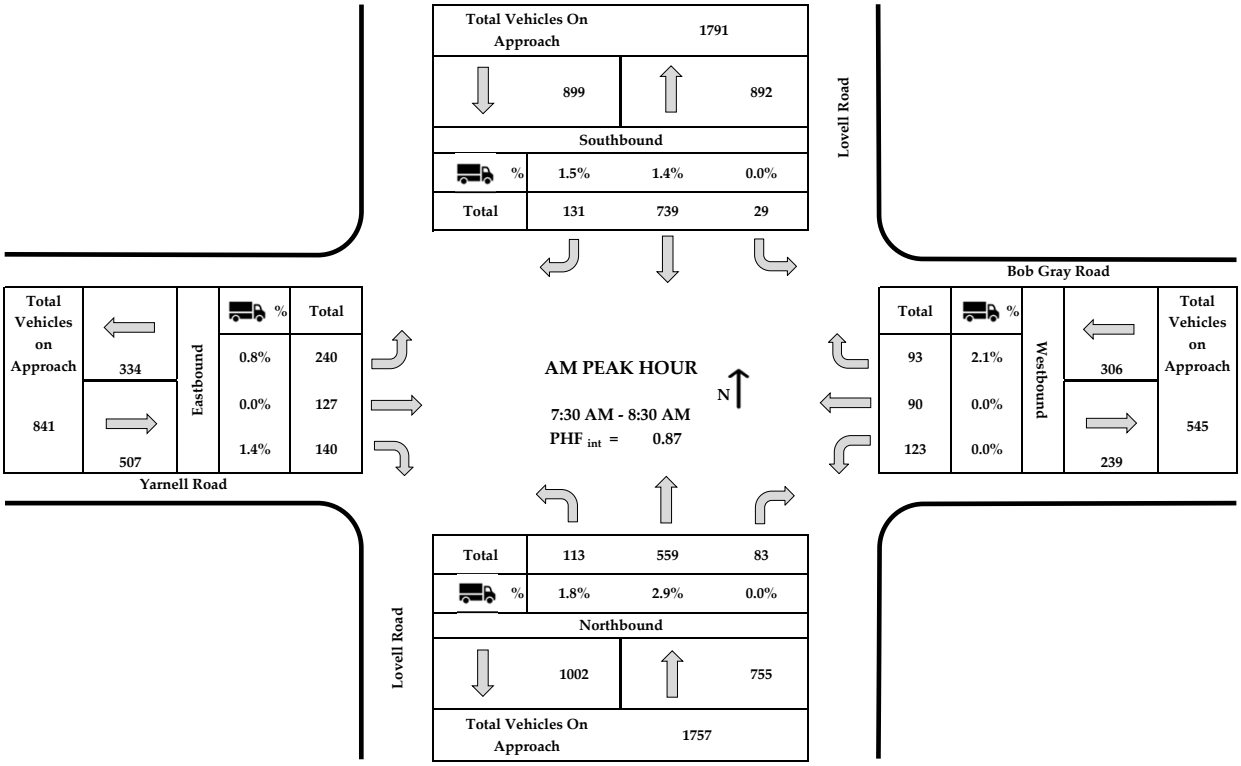
	Lovell Road			Bob Gray Road			Lovell Road			Yarnell Road		
TIME	SOUTHBOUND			WESTBOUND			NORTHBOUND			EASTBOUND		
BEGIN	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT	LT	THRU	RT
4:45 PM	24	237	45	44	32	11	29	221	45	58	40	29
5:00 PM	33	252	41	32	37	6	34	248	67	40	46	23
5:15 PM	24	228	39	41	31	16	34	231	48	47	57	18
5:30 PM	11	254	36	30	26	12	27	223	55	51	64	18
TOTAL	**92**	**971**	**161**	**147**	**126**	**45**	**124**	**923**	**215**	**196**	**207**	**88**
TRUCK %	**0.0%**	**1.4%**	**1.5%**	**0.0%**	**0.0%**	**2.1%**	**1.8%**	**2.9%**	**0.0%**	**0.8%**	**0.0%**	**1.4%**
PHF $_{mvmt}$	**0.70**	**0.96**	**0.89**	**0.84**	**0.85**	**0.70**	**0.91**	**0.93**	**0.80**	**0.84**	**0.81**	**0.76**
PHF $_{app}$		**0.94**			**0.90**			**0.90**			**0.92**	
PHF $_{int}$						**0.96**						

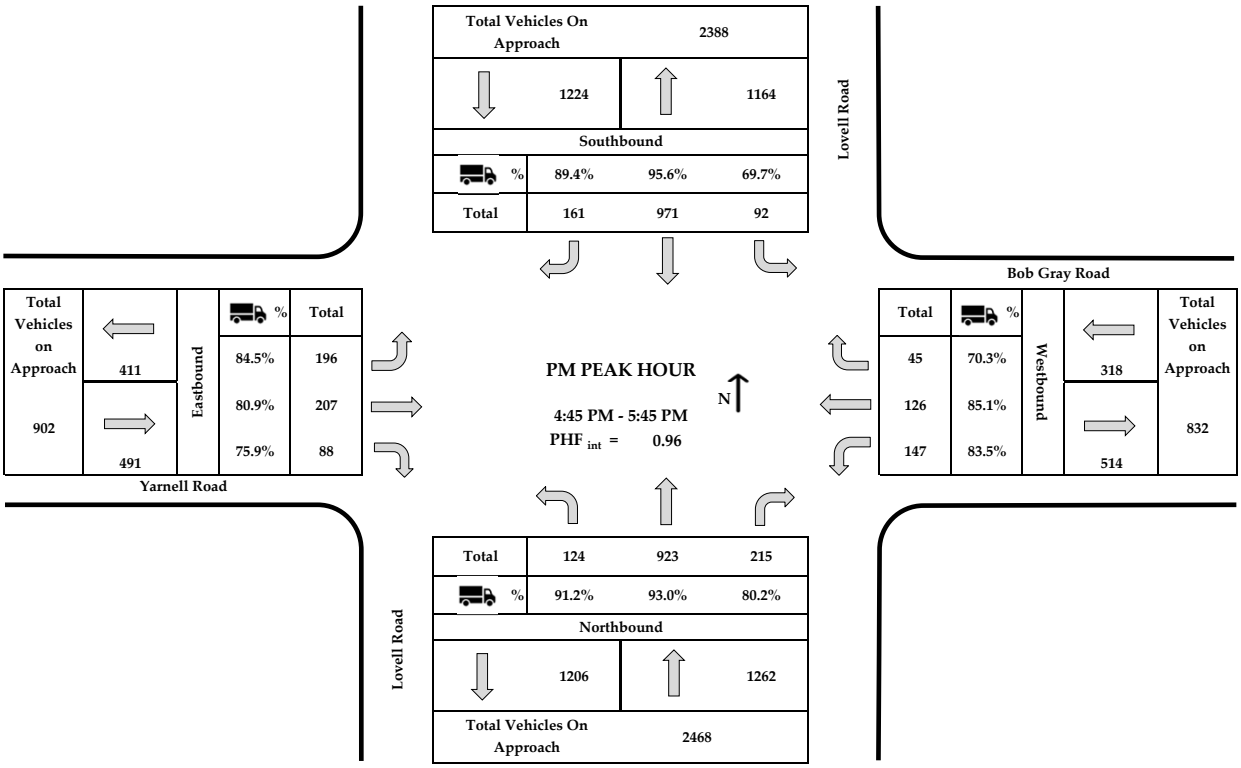

Lovell Road at Bob Gray Road and Yarnell Road
Intersection Traffic Count Totals
3/28/2024
Vehicles
1000
900
800
700
600
500
400
300
200
100
0
AM Peak Hour
PM Peak Hour
7:00 AM
7:15 AM
7:30 AM
7:45 AM
8:00 AM
8:15 AM
8:30 AM
8:45 AM
2:00 PM
2:15 PM
2:30 PM
2:45 PM
3:00 PM
3:15 PM
3:30 PM
3:45 PM
4:00 PM
4:15 PM
4:30 PM
4:45 PM
5:00 PM
5:15 PM
5:30 PM
5:45 PM
Time of Day

PEAK HOUR DATA

Major Street: Lovell Road (SB and NB)
Minor Street: Bob Gray Road (WB) and Yarnell Road (EB)
Traffic Control: Traffic Signal

3/28/2024 (Thursday)
Mostly Sunny and Mild
Conducted by: Ajax Engineering





TRAFFIC COUNT DATA

Major Street: Bob Gray Road (EB and WB)
Minor Street: Highvue Drive (NB)
Traffic Control: Stop Sign on Minor Street

3/28/2024 (Thursday)
Mostly Sunny and Mild
Conducted by: Ajax Engineering

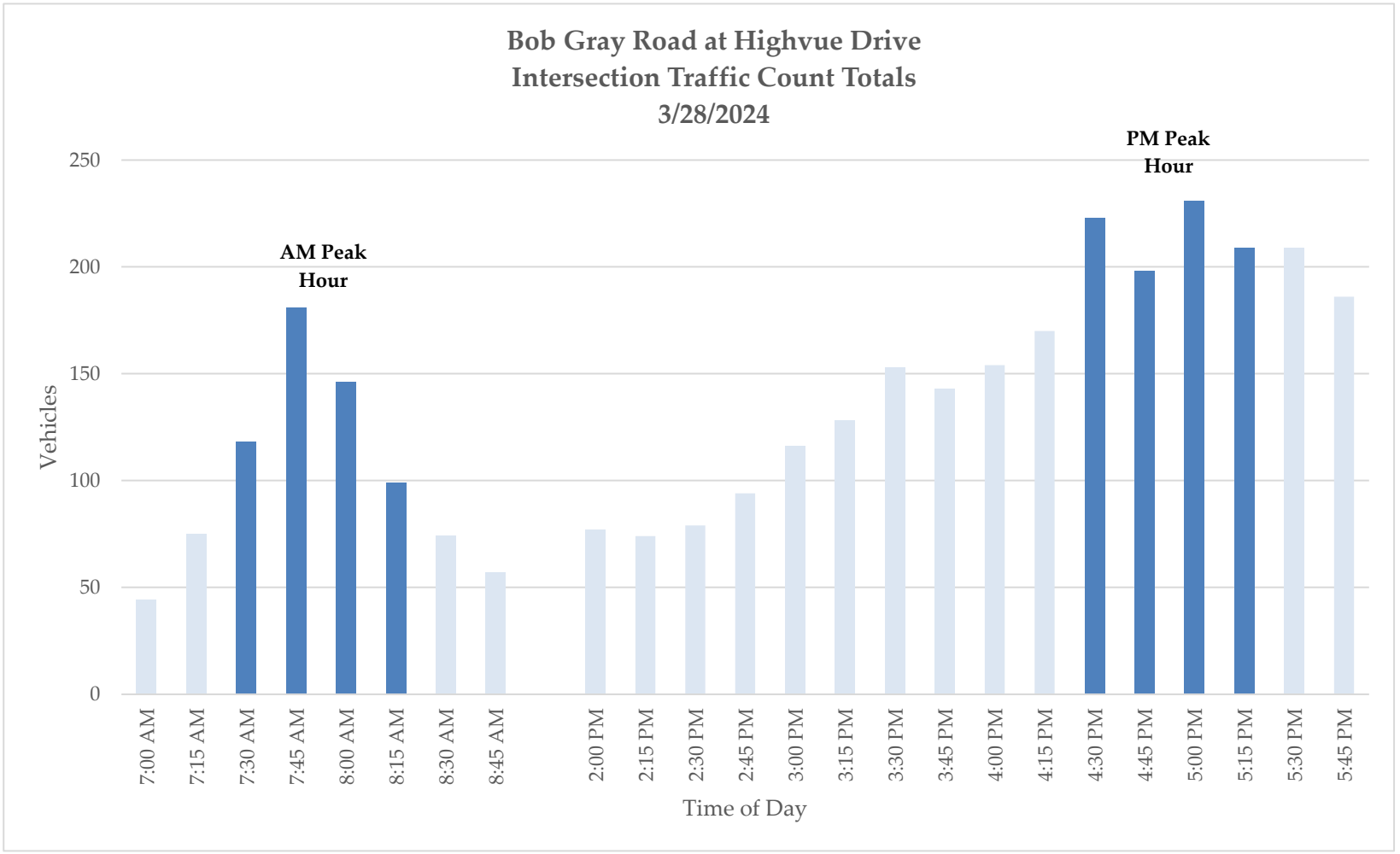
	Bob Gray Road		Highvue Drive		Bob Gray Road			
TIME	WESTBOUND		NORTHBOUND		EASTBOUND		VEHICLE	PEAK
BEGIN	LT	THRU	LT	RT	THRU	RT	TOTAL	HOUR
7:00 AM	0	21	6	1	14	2	44	
7:15 AM	0	48	7	0	20	0	75	
7:30 AM	1	60	8	0	47	2	118	**7:30 AM - 8:30 AM**
7:45 AM	0	92	5	1	82	1	181	
8:00 AM	0	72	6	0	66	2	146	
8:15 AM	1	52	8	1	37	0	99	
8:30 AM	0	30	5	1	38	0	74	
8:45 AM	2	19	2	2	32	0	57	
TOTAL	4	394	47	6	336	7	794	
2:00 PM	0	27	1	1	45	3	77	
2:15 PM	2	27	1	1	40	3	74	
2:30 PM	1	45	0	0	29	4	79	
2:45 PM	2	32	4	0	55	1	94	
3:00 PM	0	51	1	1	58	5	116	
3:15 PM	2	52	2	0	65	7	128	
3:30 PM	2	72	2	2	65	10	153	
3:45 PM	3	68	4	1	59	8	143	
4:00 PM	0	42	7	1	97	7	154	
4:15 PM	3	51	0	0	109	7	170	
4:30 PM	9	70	5	0	136	3	223	**4:30 PM - 5:30 PM**
4:45 PM	2	81	5	0	103	7	198	
5:00 PM	3	88	1	1	132	6	231	
5:15 PM	2	71	7	1	123	5	209	
5:30 PM	1	71	2	2	129	4	209	
5:45 PM	2	75	5	3	92	9	186	
TOTAL	34	923	47	14	1337	89	2444	

2024 AM Peak Hour **7:30 AM - 8:30 AM**

	Bob Gray Road		Highvue Drive		Bob Gray Road	
TIME	WESTBOUND		NORTHBOUND		EASTBOUND	
BEGIN	LT	THRU	LT	RT	THRU	RT
7:30 AM	1	60	8	0	47	2
7:45 AM	0	92	5	1	82	1
8:00 AM	0	72	6	0	66	2
8:15 AM	1	52	8	1	37	0
TOTAL	**2**	**276**	**27**	**2**	**232**	**5**
PHF	**0.50**	**0.75**	**0.84**	**0.50**	**0.71**	**0.63**
Truck %	**50.0%**	**0.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

2024 PM Peak Hour **4:30 PM - 5:30 PM**

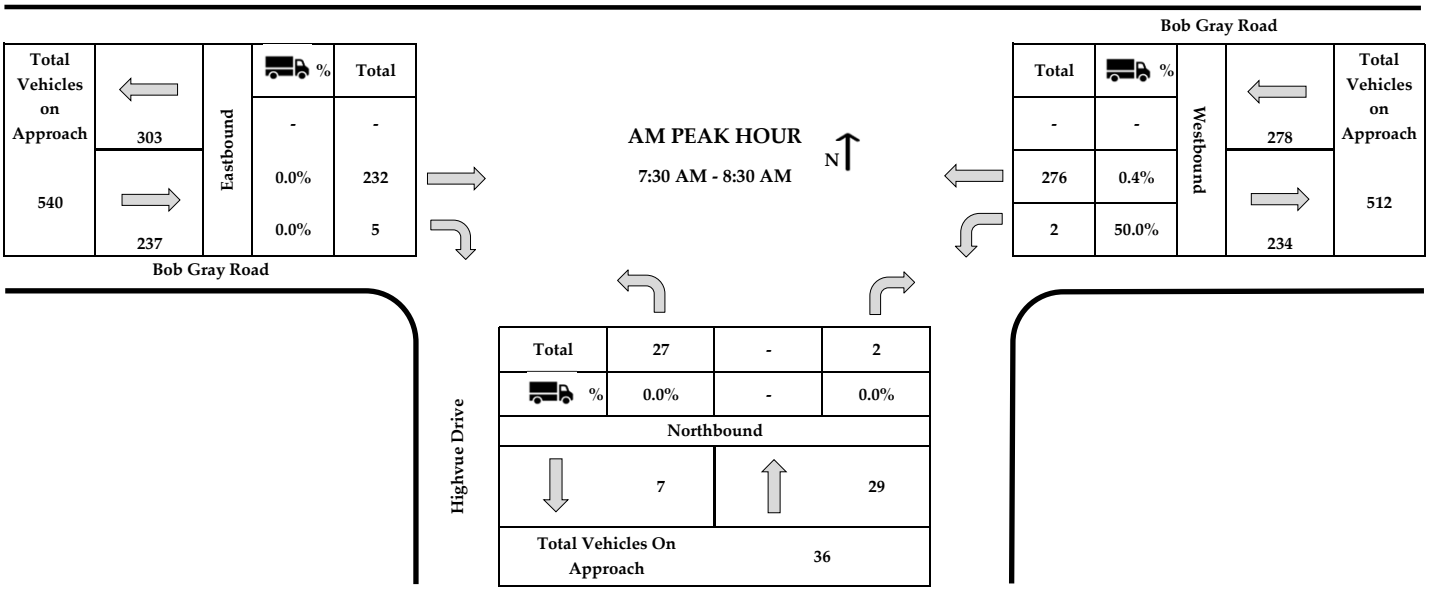
	Bob Gray Road		Highvue Drive		Bob Gray Road	
TIME	WESTBOUND		NORTHBOUND		EASTBOUND	
BEGIN	LT	THRU	LT	RT	THRU	RT
4:30 PM	9	70	5	0	136	3
4:45 PM	2	81	5	0	103	7
5:00 PM	3	88	1	1	132	6
5:15 PM	2	71	7	1	123	5
TOTAL	**16**	**310**	**18**	**2**	**494**	**21**
PHF	**0.44**	**0.88**	**0.64**	**0.50**	**0.91**	**0.75**
Truck %	**0.0%**	**0.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

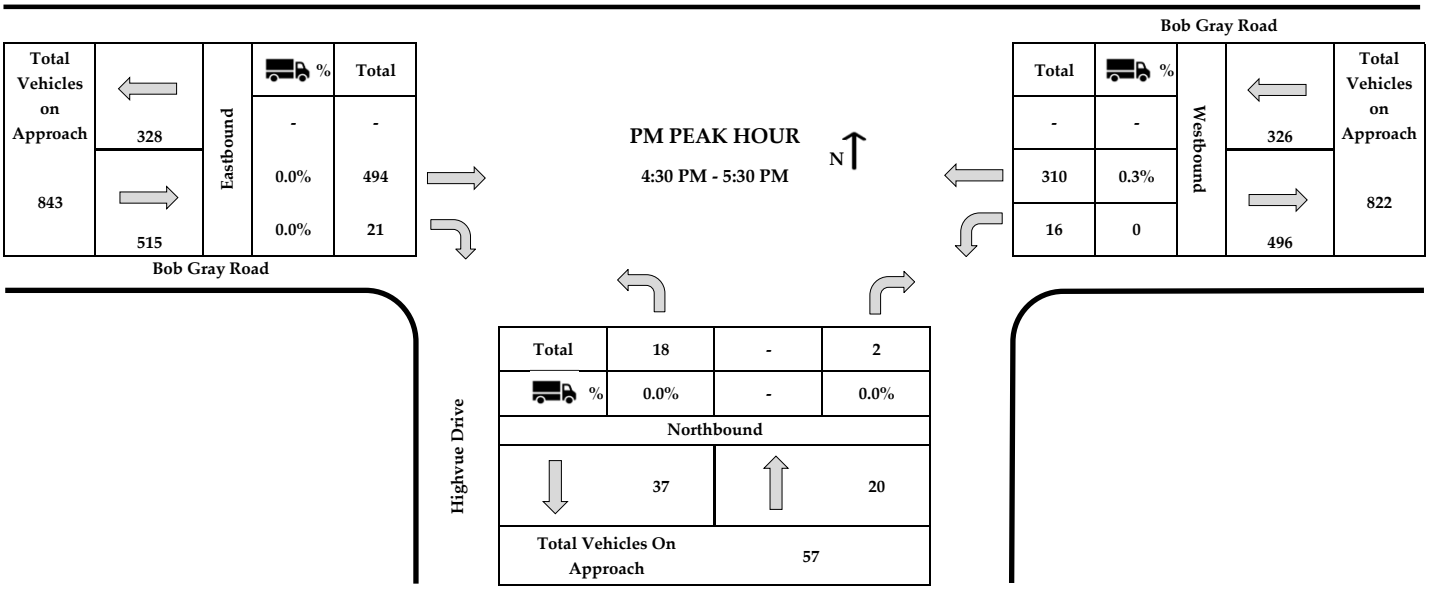

Bob Gray Road at Highvue Drive
Intersection Traffic Count Totals
3/28/2024
PM Peak Hour
AM Peak Hour
250
200
150
100
50
0
Vehicles
7:00 AM
7:15 AM
7:30 AM
7:45 AM
8:00 AM
8:15 AM
8:30 AM
8:45 AM
2:00 PM
2:15 PM
2:30 PM
2:45 PM
3:00 PM
3:15 PM
3:30 PM
3:45 PM
4:00 PM
4:15 PM
4:30 PM
4:45 PM
5:00 PM
5:15 PM
5:30 PM
5:45 PM
Time of Day

PEAK HOUR DATA

Major Street: Bob Gray Road (EB and WB)
Minor Street: Highvue Drive (NB)
Traffic Control: Stop Sign on Minor Street

3/28/2024 (Thursday)
Mostly Sunny and Mild
Conducted by: Ajax Engineering





TRAFFIC COUNT DATA

Major Street: Pellissippi Parkway (SB and NB)
Minor Street: Odin Street (EB)
Traffic Control: Stop Sign on Odin Street

3/28/2024 (Thursday)
Mostly Sunny and Mild
Conducted by: Ajax Engineering

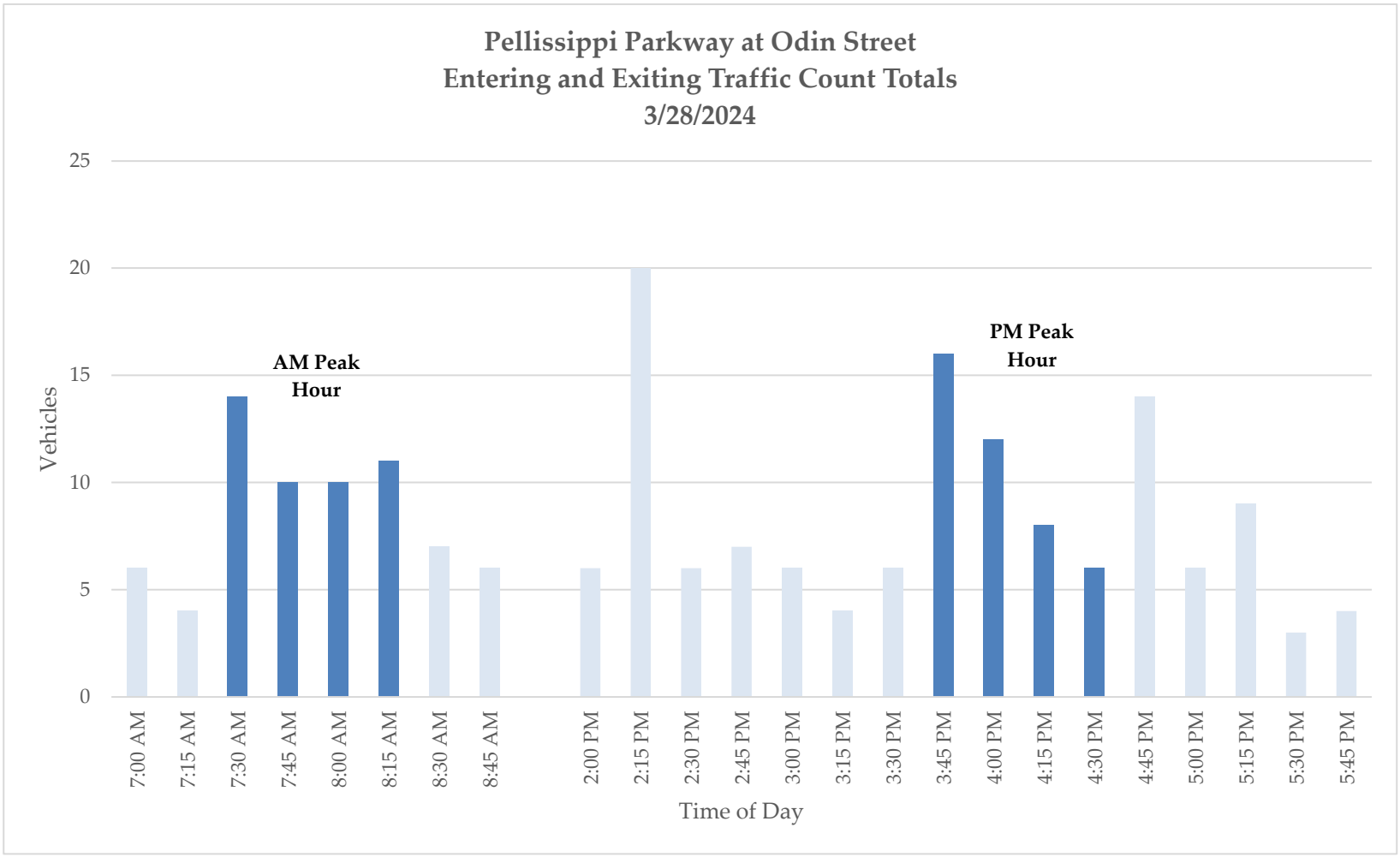
	Pellissippi Parkway		Pellissippi Parkway		Odin Street			
TIME	SOUTHBOUND		NORTHBOUND		EASTBOUND		VEHICLE	PEAK
BEGIN	THRU	RT	LT	THRU	LT	RT	TOTAL	HOUR
7:00 AM	-	0	-	-	-	6	6	
7:15 AM	-	0	-	-	-	4	4	
7:30 AM	-	6	-	-	-	8	14	**7:30 AM - 8:30 AM**
7:45 AM	-	1	-	-	-	9	10	
8:00 AM	-	3	-	-	-	7	10	
8:15 AM	-	3	-	-	-	8	11	
8:30 AM	-	2	-	-	-	5	7	
8:45 AM	-	1	-	-	-	5	6	
TOTAL	-	16	-	-	-	52	68	
2:00 PM	-	4	-	-	-	2	6	
2:15 PM	-	10	-	-	-	10	20	
2:30 PM	-	2	-	-	-	4	6	
2:45 PM	-	2	-	-	-	5	7	
3:00 PM	-	3	-	-	-	3	6	
3:15 PM	-	3	-	-	-	1	4	
3:30 PM	-	5	-	-	-	1	6	
3:45 PM	-	9	-	-	-	7	16	**3:45 PM - 4:45 PM**
4:00 PM	-	6	-	-	-	6	12	
4:15 PM	-	5	-	-	-	3	8	
4:30 PM	-	4	-	-	-	2	6	
4:45 PM	-	9	-	-	-	5	14	
5:00 PM	-	4	-	-	-	2	6	
5:15 PM	-	7	-	-	-	2	9	
5:30 PM	-	1	-	-	-	2	3	
5:45 PM	-	3	-	-	-	1	4	
TOTAL	-	77	-	-	-	56	133	

2024 AM Peak Hour **7:30 AM - 8:30 AM**

	Pellissippi Parkway		Pellissippi Parkway		Odin Street	
TIME	SOUTHBOUND		NORTHBOUND		EASTBOUND	
BEGIN	THRU	RT	LT	THRU	LT	RT
7:30 AM	-	6	-	-	-	8
7:45 AM	-	1	-	-	-	9
8:00 AM	-	3	-	-	-	7
8:15 AM	-	3	-	-	-	8
TOTAL	**-**	**13**	**-**	**-**	**-**	**32**
PHF	**-**	**0.54**	**-**	**-**	**-**	**0.89**
TRUCK %	**-**	**0.0%**	**-**	**-**	**-**	**0.0%**

2024 PM Peak Hour **3:45 PM - 4:45 PM**

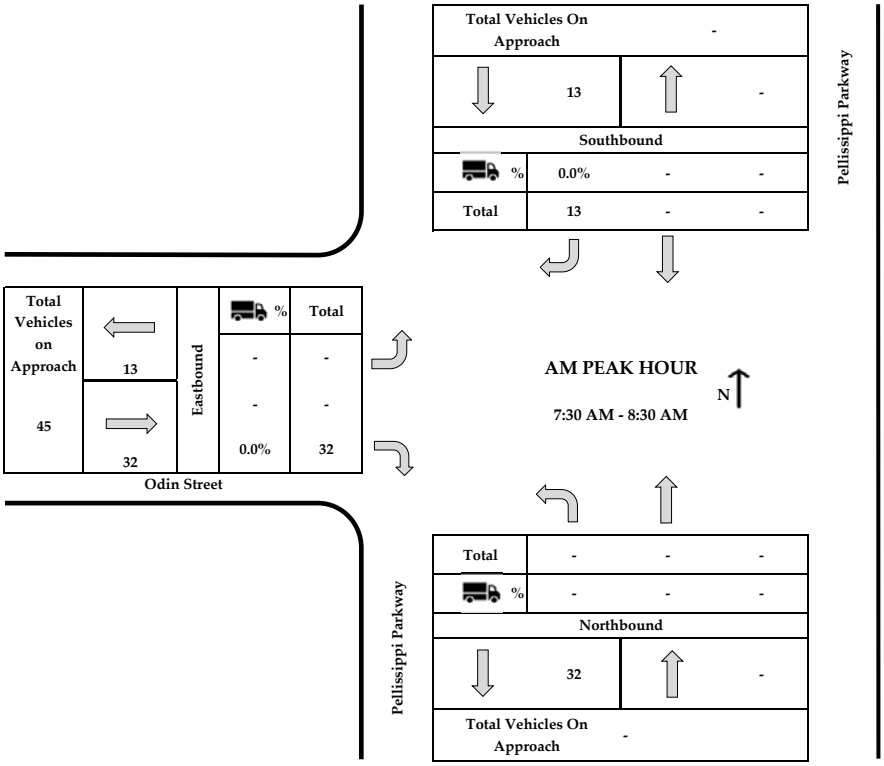
	Pellissippi Parkway		Pellissippi Parkway		Odin Street	
TIME	SOUTHBOUND		NORTHBOUND		EASTBOUND	
BEGIN	THRU	RT	LT	THRU	LT	RT
3:45 PM	-	9	-	-	-	7
4:00 PM	-	6	-	-	-	6
4:15 PM	-	5	-	-	-	3
4:30 PM	-	4	-	-	-	2
TOTAL	**-**	**24**	**-**	**-**	**-**	**18**
PHF	**-**	**0.67**	**-**	**-**	**-**	**0.64**
TRUCK %	**-**	**0.0%**	**-**	**-**	**-**	**0.0%**

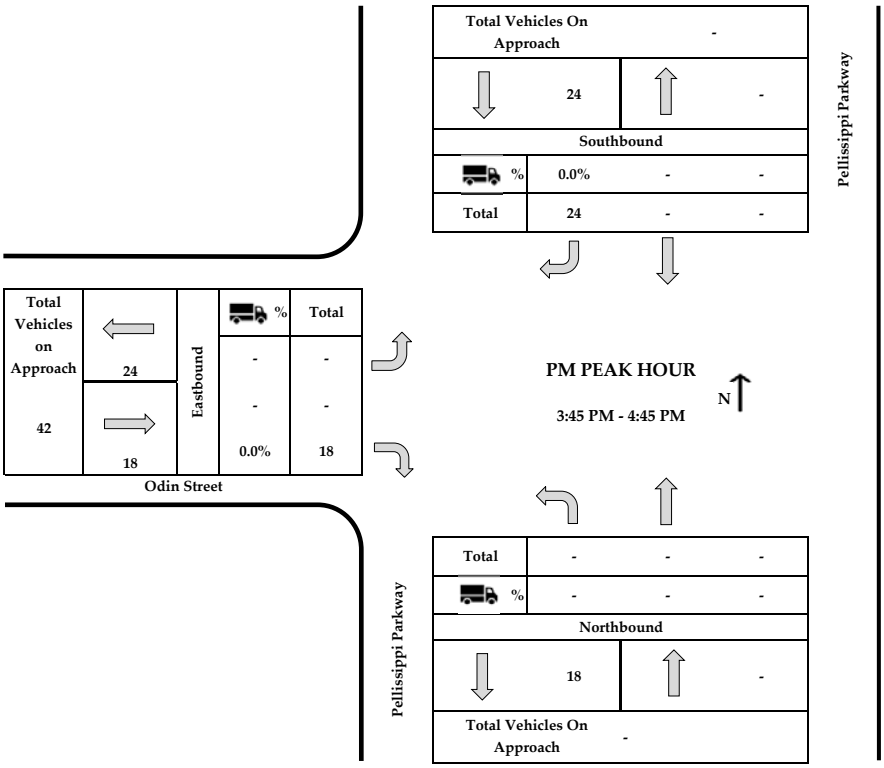

Pellissippi Parkway at Odin Street
Entering and Exiting Traffic Count Totals
3/28/2024
25
20
15
10
5
0
Vehicles
AM Peak Hour
PM Peak Hour
7:00 AM
7:15 AM
7:30 AM
7:45 AM
8:00 AM
8:15 AM
8:30 AM
8:45 AM
2:00 PM
2:15 PM
2:30 PM
2:45 PM
3:00 PM
3:15 PM
3:30 PM
3:45 PM
4:00 PM
4:15 PM
4:30 PM
4:45 PM
5:00 PM
5:15 PM
5:30 PM
5:45 PM
Time of Day

PEAK HOUR DATA

Major Street: Pellissippi Parkway (SB and NB)
Minor Street: Odin Street (EB)
Traffic Control: Stop Sign on Odin Street

3/28/2024 (Thursday)
Mostly Sunny and Mild
Conducted by: Ajax Engineering





APPENDIX G

CAPACITY ANALYSES – HCM WORKSHEETS (SYNCHRO 11)

EXISTING CONDITIONS

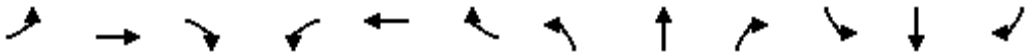
Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	232	5	2	276	27	2
Future Vol, veh/h	232	5	2	276	27	2
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, %	5	-	-	-5	-5	-
Peak Hour Factor	71	63	50	75	84	50
Heavy Vehicles, %	0	0	50	0	0	0
Mvmt Flow	327	8	4	368	32	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	335	0	707	331
Stage 1	-	-	-	-	331	-
Stage 2	-	-	-	-	376	-
Critical Hdwy	-	-	4.6	-	5.4	5.7
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	-	-	2.65	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	999	-	493	749
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	776	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	999	-	491	749
Mov Cap-2 Maneuver	-	-	-	-	491	-
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	772	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	12.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	510	-	-	999	-
HCM Lane V/C Ratio	0.071	-	-	0.004	-
HCM Control Delay (s)	12.6	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

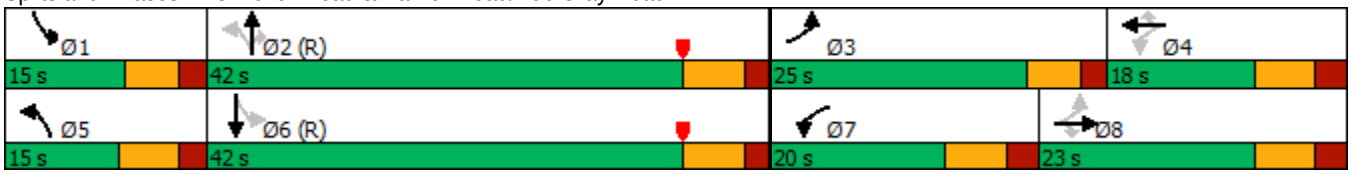


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	240	127	140	123	90	93	113	559	83	29	739	131
Future Volume (vph)	240	127	140	123	90	93	113	559	83	29	739	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3452	0
Flt Permitted	0.462			0.664			0.133			0.384		
Satd. Flow (perm)	847	1853	1559	1293	1947	1623	250	3540	1631	722	3452	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			185			185			191		22	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		583			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	276	146	161	141	103	107	130	643	95	33	849	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	276	146	161	141	103	107	130	643	95	33	1000	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	15.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	25.0	23.0	23.0	20.0	18.0	18.0	15.0	42.0	42.0	15.0	42.0	
Total Split (%)	25.0%	23.0%	23.0%	20.0%	18.0%	18.0%	15.0%	42.0%	42.0%	15.0%	42.0%	
Maximum Green (s)	19.0	16.0	16.0	13.0	11.0	11.0	8.5	35.5	35.5	9.0	35.5	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	33.0	15.3	15.3	20.9	10.3	10.3	51.0	45.7	45.7	45.9	38.9	
Actuated g/C Ratio	0.33	0.15	0.15	0.21	0.10	0.10	0.51	0.46	0.46	0.46	0.39	
v/c Ratio	0.64	0.51	0.41	0.43	0.52	0.32	0.52	0.40	0.11	0.08	0.74	
Control Delay	32.9	45.5	7.2	28.5	51.8	2.7	20.6	21.0	0.3	12.9	30.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	32.9	45.5	7.2	28.5	51.8	2.7	20.6	21.0	0.3	12.9	30.4	
LOS	C	D	A	C	D	A	C	C	A	B	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		29.0			27.5			18.6			29.9	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	132	85	0	63	62	0	41	157	0	10	292	
Queue Length 95th (ft)	194	143	36	103	112	0	72	207	0	24	356	
Internal Link Dist (ft)		503			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	455	303	409	373	216	344	260	1619	849	445	1356	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.61	0.48	0.39	0.38	0.48	0.31	0.50	0.40	0.11	0.07	0.74	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 26.0		Intersection LOS: C	
Intersection Capacity Utilization 72.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	494	21	16	310	18	2
Future Vol, veh/h	494	21	16	310	18	2
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, %	5	-	-	-5	-5	-
Peak Hour Factor	91	75	44	88	64	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	543	28	36	352	28	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	571	0	981	557
Stage 1	-	-	-	-	557	-
Stage 2	-	-	-	-	424	-
Critical Hdwy	-	-	4.1	-	5.4	5.7
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1012	-	366	577
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	748	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1012	-	350	577
Mov Cap-2 Maneuver	-	-	-	-	350	-
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	715	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	15.7
HCM LOS			C

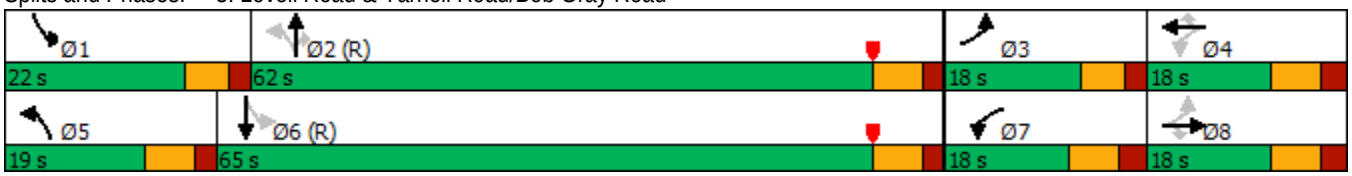
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	368	-	-	1012	-
HCM Lane V/C Ratio	0.087	-	-	0.036	-
HCM Control Delay (s)	15.7	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	196	207	88	147	126	45	124	923	215	92	971	161
Future Volume (vph)	196	207	88	147	126	45	124	923	215	92	971	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3459	0
Flt Permitted	0.564			0.360			0.144			0.230		
Satd. Flow (perm)	1034	1853	1559	701	1947	1623	271	3540	1631	433	3459	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			155			224		22	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		580			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	204	216	92	153	131	47	129	961	224	96	1011	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	216	92	153	131	47	129	961	224	96	1179	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	12.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	19.0	62.0	62.0	22.0	65.0	
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.8%	51.7%	51.7%	18.3%	54.2%	
Maximum Green (s)	12.0	11.0	11.0	11.0	11.0	11.0	12.5	55.5	55.5	16.0	58.5	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	24.3	11.4	11.4	21.7	11.1	11.1	72.5	63.6	63.6	70.5	62.2	
Actuated g/C Ratio	0.20	0.10	0.10	0.18	0.09	0.09	0.60	0.53	0.53	0.59	0.52	
v/c Ratio	0.73	1.23	0.32	0.67	0.73	0.16	0.47	0.51	0.23	0.28	0.65	
Control Delay	55.7	189.4	3.3	53.9	76.6	1.2	14.2	19.6	2.5	10.2	23.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	55.7	189.4	3.3	53.9	76.6	1.2	14.2	19.6	2.5	10.2	23.0	
LOS	E	F	A	D	E	A	B	B	A	B	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		102.7			55.4			16.1			22.1	
Approach LOS		F			E			B			C	
Queue Length 50th (ft)	135	~211	0	99	100	0	35	242	0	25	331	
Queue Length 95th (ft)	#233	#368	4	#165	#196	0	60	311	38	46	424	
Internal Link Dist (ft)		500			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	280	175	288	234	179	290	329	1877	970	460	1802	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.73	1.23	0.32	0.65	0.73	0.16	0.39	0.51	0.23	0.21	0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.23			
Intersection Signal Delay: 35.0		Intersection LOS: D	
Intersection Capacity Utilization 80.4%		ICU Level of Service D	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



PROJECTED CONDITIONS WITHOUT THE PROJECT

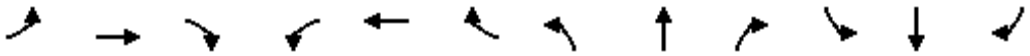
Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	249	5	2	297	27	2
Future Vol, veh/h	249	5	2	297	27	2
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, %	5	-	-	-5	-5	-
Peak Hour Factor	71	63	50	75	84	50
Heavy Vehicles, %	0	0	50	0	0	0
Mvmt Flow	351	8	4	396	32	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	359	0	759	355
Stage 1	-	-	-	-	355	-
Stage 2	-	-	-	-	404	-
Critical Hdwy	-	-	4.6	-	5.4	5.7
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	-	-	2.65	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	977	-	466	728
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	759	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	977	-	464	728
Mov Cap-2 Maneuver	-	-	-	-	464	-
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	755	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	13.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	483	-	-	977	-
HCM Lane V/C Ratio	0.075	-	-	0.004	-
HCM Control Delay (s)	13.1	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

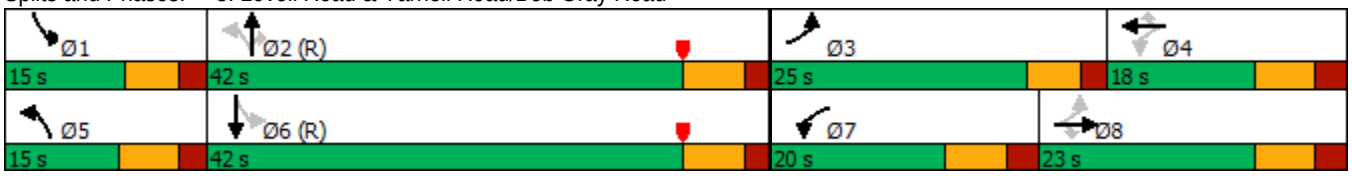


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	258	137	151	132	97	100	122	602	89	31	796	141
Future Volume (vph)	258	137	151	132	97	100	122	602	89	31	796	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3452	0
Flt Permitted	0.457			0.657			0.103			0.351		
Satd. Flow (perm)	838	1853	1559	1280	1947	1623	194	3540	1631	660	3452	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			185			185			191		22	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		583			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	297	157	174	152	111	115	140	692	102	36	915	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	297	157	174	152	111	115	140	692	102	36	1077	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	15.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	25.0	23.0	23.0	20.0	18.0	18.0	15.0	42.0	42.0	15.0	42.0	
Total Split (%)	25.0%	23.0%	23.0%	20.0%	18.0%	18.0%	15.0%	42.0%	42.0%	15.0%	42.0%	
Maximum Green (s)	19.0	16.0	16.0	13.0	11.0	11.0	8.5	35.5	35.5	9.0	35.5	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	33.7	15.6	15.6	21.3	10.4	10.4	50.2	45.1	45.1	45.4	38.4	
Actuated g/C Ratio	0.34	0.16	0.16	0.21	0.10	0.10	0.50	0.45	0.45	0.45	0.38	
v/c Ratio	0.68	0.54	0.44	0.46	0.55	0.34	0.62	0.43	0.12	0.10	0.80	
Control Delay	33.9	46.3	8.6	28.8	53.2	3.6	28.9	21.8	0.3	13.1	33.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	33.9	46.3	8.6	28.8	53.2	3.6	28.9	21.8	0.3	13.1	33.5	
LOS	C	D	A	C	D	A	C	C	A	B	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		30.0			28.3			20.5			32.8	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	142	91	0	67	67	0	46	176	0	11	327	
Queue Length 95th (ft)	210	152	45	110	119	4	#96	226	0	26	395	
Internal Link Dist (ft)		503			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	458	303	410	373	216	345	232	1597	840	417	1339	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.65	0.52	0.42	0.41	0.51	0.33	0.60	0.43	0.12	0.09	0.80	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 27.9		Intersection LOS: C	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	531	21	16	333	18	2
Future Vol, veh/h	531	21	16	333	18	2
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, %	5	-	-	-5	-5	-
Peak Hour Factor	91	75	44	88	64	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	584	28	36	378	28	4

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	612	0	1048	598
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	450	-
Critical Hdwy	-	-	4.1	-	5.4	5.7
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	977	-	341	550
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	733	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	977	-	325	550
Mov Cap-2 Maneuver	-	-	-	-	325	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.8	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	342	-	-	977	-
HCM Lane V/C Ratio	0.094	-	-	0.037	-
HCM Control Delay (s)	16.6	-	-	8.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

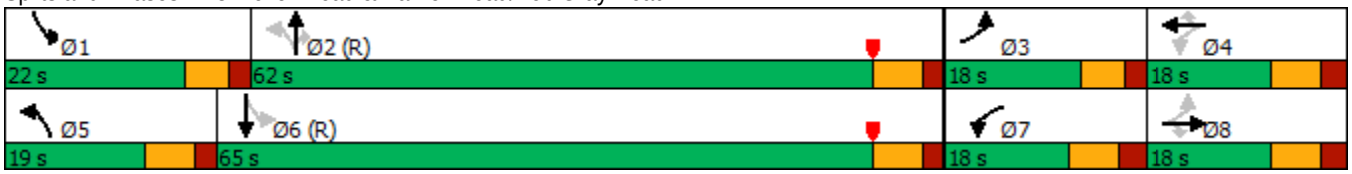
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	223	95	158	136	48	134	994	232	99	1046	173
Future Volume (vph)	211	223	95	158	136	48	134	994	232	99	1046	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3459	0
Flt Permitted	0.511			0.364			0.117			0.203		
Satd. Flow (perm)	937	1853	1559	709	1947	1623	220	3540	1631	382	3459	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			155			242		22	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		580			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	220	232	99	165	142	50	140	1035	242	103	1090	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	220	232	99	165	142	50	140	1035	242	103	1270	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.03	1.03	1.03	0.97	0.97	0.97	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	12.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	19.0	62.0	62.0	22.0	65.0	
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.8%	51.7%	51.7%	18.3%	54.2%	
Maximum Green (s)	12.0	11.0	11.0	11.0	11.0	11.0	12.5	55.5	55.5	16.0	58.5	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	24.3	11.3	11.3	21.7	11.0	11.0	72.8	63.4	63.4	70.2	61.7	
Actuated g/C Ratio	0.20	0.09	0.09	0.18	0.09	0.09	0.61	0.53	0.53	0.58	0.51	
v/c Ratio	0.82	1.34	0.35	0.72	0.80	0.17	0.55	0.55	0.25	0.32	0.71	
Control Delay	64.4	228.7	4.7	57.0	84.0	1.3	18.0	20.4	2.5	11.0	25.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	64.4	228.7	4.7	57.0	84.0	1.3	18.0	20.4	2.5	11.0	25.0	
LOS	E	F	A	E	F	A	B	C	A	B	C	
Approach Delay		122.9			60.0			17.1			23.9	
Approach LOS		F			E			B			C	
Queue Length 50th (ft)	147	~237	0	107	110	0	39	270	0	27	374	
Queue Length 95th (ft)	#221	#398	11	#190	#217	0	72	345	40	49	487	
Internal Link Dist (ft)		500			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	269	173	286	234	178	289	302	1871	976	433	1788	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.82	1.34	0.35	0.71	0.80	0.17	0.46	0.55	0.25	0.24	0.71	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.34
Intersection Signal Delay: 39.6 Intersection LOS: D
Intersection Capacity Utilization 84.8% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



PROJECTED CONDITIONS WITH THE PROJECT
BOB GRAY ROAD SUBDIVISION ONLY + LOVELL CROSSING DEVELOPMENT

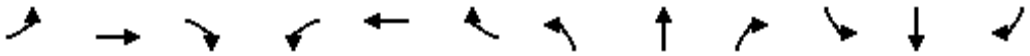
Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	251	11	6	300	57	8
Future Vol, veh/h	251	11	6	300	57	8
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, %	5	-	-	-5	-5	-
Peak Hour Factor	71	63	50	75	84	50
Heavy Vehicles, %	0	0	2	0	0	0
Mvmt Flow	354	17	12	400	68	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	371	0	787	363
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	424	-
Critical Hdwy	-	-	4.12	-	5.4	5.7
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1188	-	452	722
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	748	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1188	-	446	722
Mov Cap-2 Maneuver	-	-	-	-	446	-
Stage 1	-	-	-	-	783	-
Stage 2	-	-	-	-	738	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	481	-	-	1188	-
HCM Lane V/C Ratio	0.174	-	-	0.01	-
HCM Control Delay (s)	14.1	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0	-

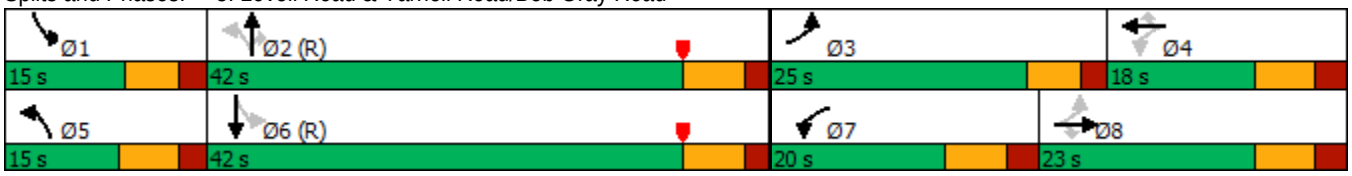


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	143	151	145	107	110	126	610	90	32	810	141
Future Volume (vph)	259	143	151	145	107	110	126	610	90	32	810	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3456	0
Flt Permitted	0.462			0.653			0.095			0.345		
Satd. Flow (perm)	847	1853	1559	1272	1947	1623	179	3540	1631	649	3456	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			185			185			191		22	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		583			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	298	164	174	167	123	126	145	701	103	37	931	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	298	164	174	167	123	126	145	701	103	37	1093	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	15.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	25.0	23.0	23.0	20.0	18.0	18.0	15.0	42.0	42.0	15.0	42.0	
Total Split (%)	25.0%	23.0%	23.0%	20.0%	18.0%	18.0%	15.0%	42.0%	42.0%	15.0%	42.0%	
Maximum Green (s)	19.0	16.0	16.0	13.0	11.0	11.0	8.5	35.5	35.5	9.0	35.5	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	33.6	15.4	15.4	21.8	10.5	10.5	50.0	44.9	44.9	45.2	38.1	
Actuated g/C Ratio	0.34	0.15	0.15	0.22	0.10	0.10	0.50	0.45	0.45	0.45	0.38	
v/c Ratio	0.68	0.57	0.44	0.49	0.60	0.38	0.66	0.44	0.12	0.10	0.82	
Control Delay	33.9	47.6	8.7	29.5	55.5	4.9	33.0	21.9	0.3	13.2	34.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	33.9	47.6	8.7	29.5	55.5	4.9	33.0	21.9	0.3	13.2	34.4	
LOS	C	D	A	C	E	A	C	C	A	B	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		30.5			29.7			21.3			33.7	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	142	96	0	74	75	0	48	178	0	11	334	
Queue Length 95th (ft)	210	158	45	120	130	12	#117	230	0	26	403	
Internal Link Dist (ft)		503			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	460	300	407	374	216	344	226	1590	838	411	1331	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.65	0.55	0.43	0.45	0.57	0.37	0.64	0.44	0.12	0.09	0.82	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 28.8		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



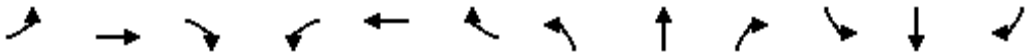
Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	538	43	30	340	43	7
Future Vol, veh/h	538	43	30	340	43	7
Conflicting Peds, #/hr	0	0	0	0	7	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, %	5	-	-	-5	-5	-
Peak Hour Factor	90	75	44	88	64	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	598	57	68	386	67	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	655	0	1156	627
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	529	-
Critical Hdwy	-	-	4.1	-	5.4	5.7
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	942	-	302	531
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	689	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	942	-	273	531
Mov Cap-2 Maneuver	-	-	-	-	273	-
Stage 1	-	-	-	-	638	-
Stage 2	-	-	-	-	621	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	21.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	298	-	-	942	-
HCM Lane V/C Ratio	0.272	-	-	0.072	-
HCM Control Delay (s)	21.5	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.2	-

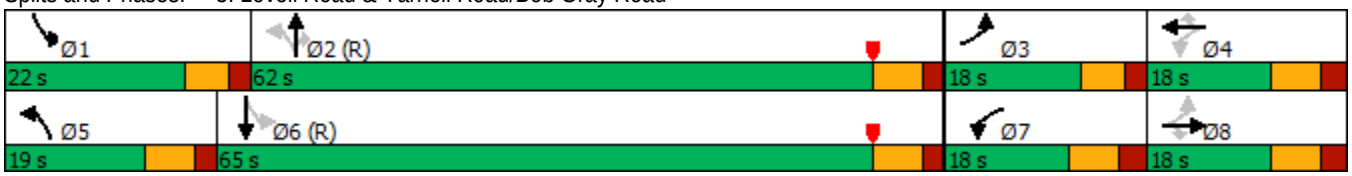


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	240	95	175	147	52	147	1018	238	105	1072	173
Future Volume (vph)	214	240	95	175	147	52	147	1018	238	105	1072	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3459	0
Flt Permitted	0.468			0.364			0.108			0.195		
Satd. Flow (perm)	858	1853	1559	709	1947	1623	203	3540	1631	367	3459	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			155			248		21	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		580			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	223	250	99	182	153	54	153	1060	248	109	1117	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	250	99	182	153	54	153	1060	248	109	1297	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	12.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	19.0	62.0	62.0	22.0	65.0	
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.8%	51.7%	51.7%	18.3%	54.2%	
Maximum Green (s)	12.0	11.0	11.0	11.0	11.0	11.0	12.5	55.5	55.5	16.0	58.5	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	24.1	11.1	11.1	21.9	11.0	11.0	72.9	63.3	63.3	70.1	61.4	
Actuated g/C Ratio	0.20	0.09	0.09	0.18	0.09	0.09	0.61	0.53	0.53	0.58	0.51	
v/c Ratio	0.86	1.47	0.35	0.78	0.86	0.19	0.61	0.57	0.25	0.35	0.73	
Control Delay	70.0	279.1	4.8	62.9	92.7	1.4	22.5	20.8	2.5	11.5	25.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	70.0	279.1	4.8	62.9	92.7	1.4	22.5	20.8	2.5	11.5	25.8	
LOS	E	F	A	E	F	A	C	C	A	B	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		150.1			66.1			17.9			24.7	
Approach LOS		F			E			B			C	
Queue Length 50th (ft)	149	~266	0	119	119	0	42	280	0	29	390	
Queue Length 95th (ft)	#239	#432	11	#199	#240	0	94	357	40	51	504	
Internal Link Dist (ft)		500			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	260	170	284	234	178	289	293	1866	977	424	1778	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.86	1.47	0.35	0.78	0.86	0.19	0.52	0.57	0.25	0.26	0.73	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.47			
Intersection Signal Delay: 45.0		Intersection LOS: D	
Intersection Capacity Utilization 88.1%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



PROJECTED CONDITIONS WITH THE PROJECT
COMBINED RESIDENTIAL SUBDIVISIONS + LOVELL CROSSING DEVELOPMENT

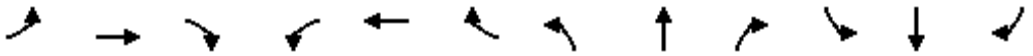
Intersection	
Int Delay, s/veh	2.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	251	19	11	300	95	16
Future Vol, veh/h	251	19	11	300	95	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, %	5	-	-	-5	-5	-
Peak Hour Factor	71	63	50	75	84	50
Heavy Vehicles, %	0	0	2	0	0	0
Mvmt Flow	354	30	22	400	113	32

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	384	0	813	369
Stage 1	-	-	-	-	369	-
Stage 2	-	-	-	-	444	-
Critical Hdwy	-	-	4.12	-	5.4	5.7
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	-	-	2.218	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1174	-	440	717
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	736	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1174	-	429	717
Mov Cap-2 Maneuver	-	-	-	-	429	-
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	718	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	16
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	1174	-
HCM Lane V/C Ratio	0.308	-	-	0.019	-
HCM Control Delay (s)	16	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0.1	-

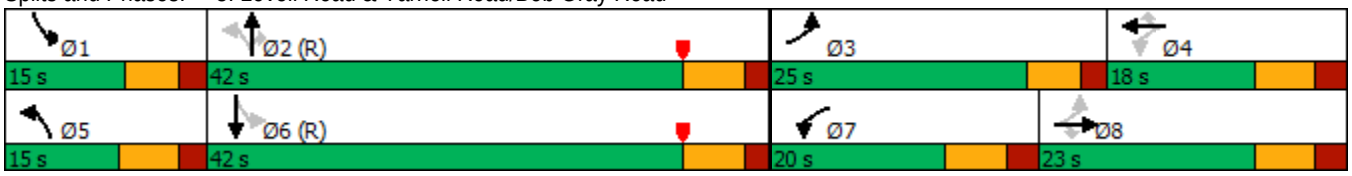


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	148	151	157	120	123	126	610	92	33	810	141
Future Volume (vph)	259	148	151	157	120	123	126	610	92	33	810	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3456	0
Flt Permitted	0.451			0.650			0.095			0.345		
Satd. Flow (perm)	827	1853	1559	1266	1947	1623	179	3540	1631	649	3456	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			185			185			191		22	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		583			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	298	170	174	180	138	141	145	701	106	38	931	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	298	170	174	180	138	141	145	701	106	38	1093	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	15.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	25.0	23.0	23.0	20.0	18.0	18.0	15.0	42.0	42.0	15.0	42.0	
Total Split (%)	25.0%	23.0%	23.0%	20.0%	18.0%	18.0%	15.0%	42.0%	42.0%	15.0%	42.0%	
Maximum Green (s)	19.0	16.0	16.0	13.0	11.0	11.0	8.5	35.5	35.5	9.0	35.5	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	33.6	15.4	15.4	22.4	10.8	10.8	49.7	44.6	44.6	44.9	37.8	
Actuated g/C Ratio	0.34	0.15	0.15	0.22	0.11	0.11	0.50	0.45	0.45	0.45	0.38	
v/c Ratio	0.69	0.60	0.44	0.51	0.66	0.41	0.66	0.44	0.13	0.10	0.83	
Control Delay	34.1	48.5	8.7	30.0	58.4	6.4	33.2	22.1	0.3	13.2	34.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	34.1	48.5	8.7	30.0	58.4	6.4	33.2	22.1	0.3	13.2	34.9	
LOS	C	D	A	C	E	A	C	C	A	B	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		31.0			31.3			21.4			34.1	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	142	101	0	80	85	0	48	178	0	12	334	
Queue Length 95th (ft)	210	164	45	128	#152	23	#117	230	0	27	403	
Internal Link Dist (ft)		503			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	459	299	406	377	218	346	225	1580	833	409	1321	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.65	0.57	0.43	0.48	0.63	0.41	0.64	0.44	0.13	0.09	0.83	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 29.3		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	538	71	48	340	75	13
Future Vol, veh/h	538	71	48	340	75	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, %	5	-	-	-5	-5	-
Peak Hour Factor	90	75	44	88	64	50
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	598	95	109	386	117	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	693	0	1250	646
Stage 1	-	-	-	-	646	-
Stage 2	-	-	-	-	604	-
Critical Hdwy	-	-	4.1	-	5.4	5.7
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	912	-	273	520
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	650	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	912	-	232	520
Mov Cap-2 Maneuver	-	-	-	-	232	-
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	551	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.1	35.1
HCM LOS			E

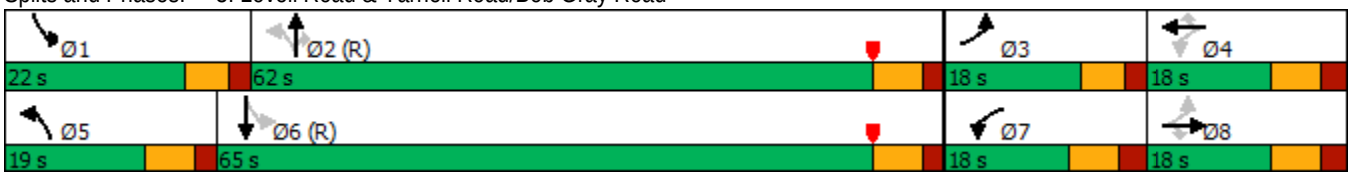
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	258	-	-	912	-
HCM Lane V/C Ratio	0.555	-	-	0.12	-
HCM Control Delay (s)	35.1	-	-	9.5	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	3.1	-	-	0.4	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	253	95	188	162	56	147	1018	246	112	1072	173
Future Volume (vph)	214	253	95	188	162	56	147	1018	246	112	1072	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3459	0
Flt Permitted	0.396			0.364			0.108			0.194		
Satd. Flow (perm)	726	1853	1559	709	1947	1623	203	3540	1631	365	3459	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			155			256		21	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		580			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	223	264	99	196	169	58	153	1060	256	117	1117	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	264	99	196	169	58	153	1060	256	117	1297	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	12.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	18.0	18.0	18.0	18.0	18.0	18.0	19.0	62.0	62.0	22.0	65.0	
Total Split (%)	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.8%	51.7%	51.7%	18.3%	54.2%	
Maximum Green (s)	12.0	11.0	11.0	11.0	11.0	11.0	12.5	55.5	55.5	16.0	58.5	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	24.0	11.0	11.0	22.0	11.0	11.0	72.7	63.1	63.1	70.3	61.4	
Actuated g/C Ratio	0.20	0.09	0.09	0.18	0.09	0.09	0.61	0.53	0.53	0.59	0.51	
v/c Ratio	0.91	1.56	0.35	0.84	0.95	0.20	0.61	0.57	0.26	0.37	0.73	
Control Delay	79.1	315.9	4.8	69.6	110.0	1.6	22.7	21.0	2.5	11.8	25.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	79.1	315.9	4.8	69.6	110.0	1.6	22.7	21.0	2.5	11.8	25.8	
LOS	E	F	A	E	F	A	C	C	A	B	C	

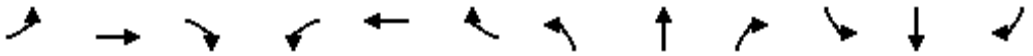
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		173.2			76.4			18.0			24.6	
Approach LOS		F			E			B			C	
Queue Length 50th (ft)	149	~289	0	129	132	0	42	282	0	31	390	
Queue Length 95th (ft)	#260	#458	11	#225	#270	0	94	360	41	54	504	
Internal Link Dist (ft)		500			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	246	169	283	234	178	289	292	1860	978	423	1778	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.91	1.56	0.35	0.84	0.95	0.20	0.52	0.57	0.26	0.28	0.73	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.56			
Intersection Signal Delay: 50.1		Intersection LOS: D	
Intersection Capacity Utilization 89.5%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



PROJECTED CONDITIONS WITH THE PROJECT
BOB GRAY ROAD SUBDIVISION ONLY + LOVELL CROSSING DEVELOPMENT
WITH MODIFIED SIGNAL TIMING

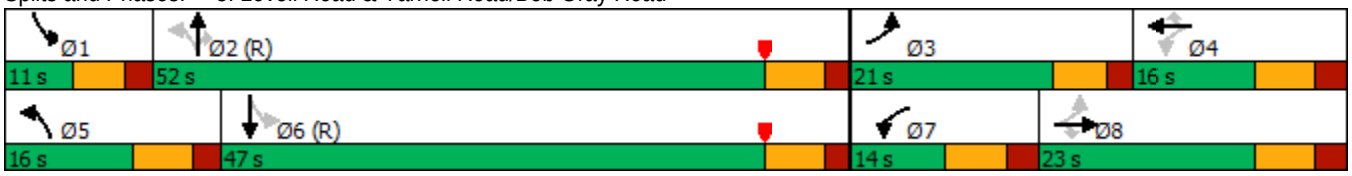


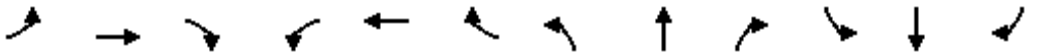
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	143	151	145	107	110	126	610	90	32	810	141
Future Volume (vph)	259	143	151	145	107	110	126	610	90	32	810	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3456	0
Flt Permitted	0.407			0.653			0.114			0.377		
Satd. Flow (perm)	747	1853	1559	1272	1947	1623	214	3540	1631	709	3456	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			180			245			251		24	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		583			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	298	164	174	167	123	126	145	701	103	37	931	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	298	164	174	167	123	126	145	701	103	37	1093	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	15.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	21.0	23.0	23.0	14.0	16.0	16.0	16.0	52.0	52.0	11.0	47.0	
Total Split (%)	21.0%	23.0%	23.0%	14.0%	16.0%	16.0%	16.0%	52.0%	52.0%	11.0%	47.0%	
Maximum Green (s)	15.0	16.0	16.0	7.0	9.0	9.0	9.5	45.5	45.5	5.0	40.5	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	30.6	15.7	15.7	15.9	8.9	8.9	55.9	50.2	50.2	47.3	41.7	
Actuated g/C Ratio	0.31	0.16	0.16	0.16	0.09	0.09	0.56	0.50	0.50	0.47	0.42	
v/c Ratio	0.79	0.57	0.44	0.69	0.71	0.34	0.57	0.39	0.11	0.09	0.75	
Control Delay	46.4	47.3	9.2	46.1	66.9	2.5	20.9	17.2	0.2	10.7	28.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.4	47.3	9.2	46.1	66.9	2.5	20.9	17.2	0.2	10.7	28.5	
LOS	D	D	A	D	E	A	C	B	A	B	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		36.4			39.1			16.0			27.9	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	157	97	0	82	78	0	41	154	0	10	304	
Queue Length 95th (ft)	#254	158	48	#142	#153	0	77	194	0	23	367	
Internal Link Dist (ft)		503			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	378	296	400	242	175	369	269	1777	943	390	1454	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.79	0.55	0.43	0.69	0.70	0.34	0.54	0.39	0.11	0.09	0.75	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 27.5		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



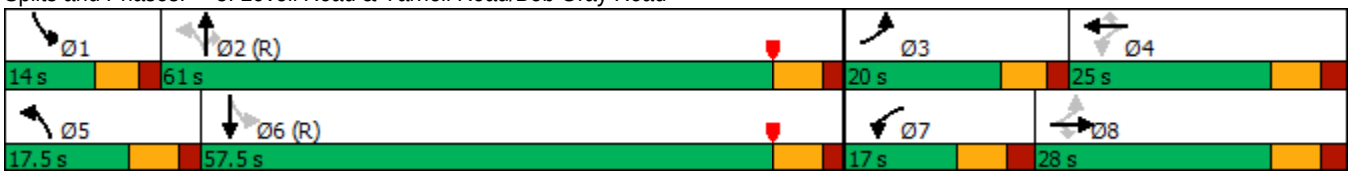


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	240	95	175	147	52	147	1018	238	105	1072	173
Future Volume (vph)	214	240	95	175	147	52	147	1018	238	105	1072	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3459	0
Flt Permitted	0.488			0.374			0.072			0.172		
Satd. Flow (perm)	895	1853	1559	728	1947	1623	135	3540	1631	324	3459	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			150			150			248		19	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		583			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	223	250	99	182	153	54	153	1060	248	109	1117	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	250	99	182	153	54	153	1060	248	109	1297	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	12.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	20.0	28.0	28.0	17.0	25.0	25.0	17.5	61.0	61.0	14.0	57.5	
Total Split (%)	16.7%	23.3%	23.3%	14.2%	20.8%	20.8%	14.6%	50.8%	50.8%	11.7%	47.9%	
Maximum Green (s)	14.0	21.0	21.0	10.0	18.0	18.0	11.0	54.5	54.5	8.0	51.0	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	34.3	19.7	19.7	27.2	17.2	17.2	66.1	56.1	56.1	61.5	53.3	
Actuated g/C Ratio	0.29	0.16	0.16	0.23	0.14	0.14	0.55	0.47	0.47	0.51	0.44	
v/c Ratio	0.64	0.82	0.26	0.71	0.55	0.15	0.73	0.64	0.28	0.42	0.84	
Control Delay	41.4	70.1	3.2	49.2	55.7	0.9	43.0	26.9	3.2	17.1	35.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	41.4	70.1	3.2	49.2	55.7	0.9	43.0	26.9	3.2	17.1	35.7	
LOS	D	E	A	D	E	A	D	C	A	B	D	

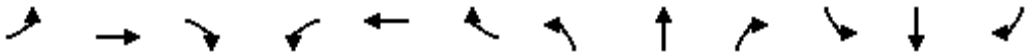
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		47.3			45.0			24.5			34.3	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	133	187	0	107	111	0	64	328	0	36	470	
Queue Length 95th (ft)	206	#308	13	#179	181	0	#151	404	45	64	573	
Internal Link Dist (ft)		503			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	358	324	396	258	292	370	227	1655	895	264	1547	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.62	0.77	0.25	0.71	0.52	0.15	0.67	0.64	0.28	0.41	0.84	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 33.6		Intersection LOS: C	
Intersection Capacity Utilization 88.1%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



PROJECTED CONDITIONS WITH THE PROJECT
COMBINED RESIDENTIAL SUBDIVISIONS + LOVELL CROSSING DEVELOPMENT
WITH MODIFIED SIGNAL TIMING

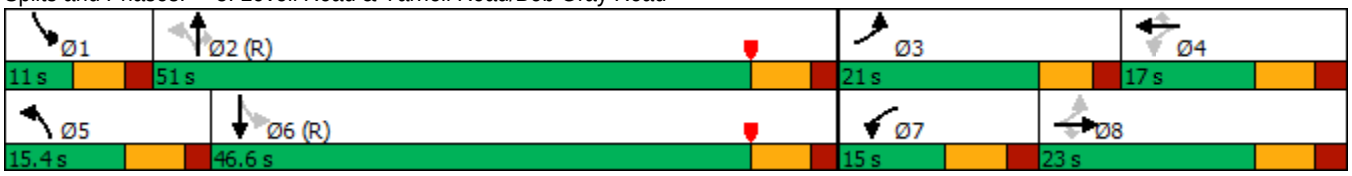


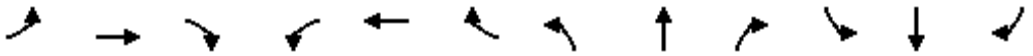
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	148	151	157	120	123	126	610	92	33	810	141
Future Volume (vph)	259	148	151	157	120	123	126	610	92	33	810	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3456	0
Flt Permitted	0.404			0.650			0.111			0.372		
Satd. Flow (perm)	741	1853	1559	1266	1947	1623	209	3540	1631	700	3456	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			180			180			185		24	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		583			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	298	170	174	180	138	141	145	701	106	38	931	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	298	170	174	180	138	141	145	701	106	38	1093	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	15.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	21.0	23.0	23.0	15.0	17.0	17.0	15.4	51.0	51.0	11.0	46.6	
Total Split (%)	21.0%	23.0%	23.0%	15.0%	17.0%	17.0%	15.4%	51.0%	51.0%	11.0%	46.6%	
Maximum Green (s)	15.0	16.0	16.0	8.0	10.0	10.0	8.9	44.5	44.5	5.0	40.1	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	31.3	15.6	15.6	17.9	9.9	9.9	54.7	49.3	49.3	46.7	41.1	
Actuated g/C Ratio	0.31	0.16	0.16	0.18	0.10	0.10	0.55	0.49	0.49	0.47	0.41	
v/c Ratio	0.79	0.59	0.44	0.66	0.72	0.44	0.59	0.40	0.12	0.10	0.76	
Control Delay	44.7	48.2	9.2	41.8	65.6	7.4	23.0	17.9	0.3	11.1	29.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.7	48.2	9.2	41.8	65.6	7.4	23.0	17.9	0.3	11.1	29.2	
LOS	D	D	A	D	E	A	C	B	A	B	C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		36.0			38.4			16.7			28.6	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	155	101	0	87	87	0	42	158	0	10	307	
Queue Length 95th (ft)	#245	164	48	139	#165	26	82	198	0	24	370	
Internal Link Dist (ft)		503			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	384	296	400	272	194	324	254	1746	898	382	1433	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.78	0.57	0.43	0.66	0.71	0.44	0.57	0.40	0.12	0.10	0.76	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 28.0		Intersection LOS: C	
Intersection Capacity Utilization 76.5%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



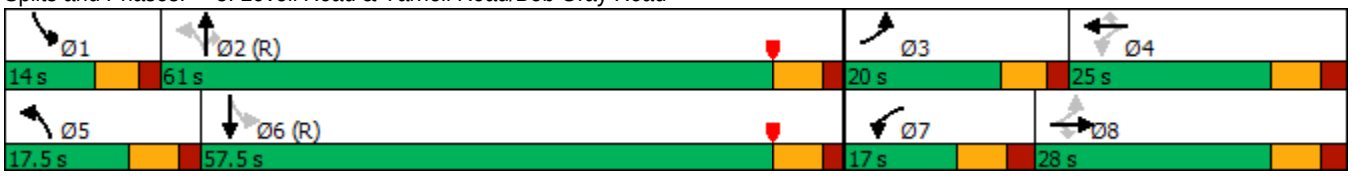


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	214	253	95	188	162	56	147	1018	246	112	1072	173
Future Volume (vph)	214	253	95	188	162	56	147	1018	246	112	1072	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			-5%			-2%			2%	
Storage Length (ft)	180		300	175		215	140		245	135		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	95			75			80			80		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt			0.850			0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	1853	1559	1850	1947	1623	1787	3540	1631	1787	3459	0
Flt Permitted	0.453			0.336			0.072			0.170		
Satd. Flow (perm)	831	1853	1559	654	1947	1623	135	3540	1631	320	3459	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			150			150			256		19	
Link Speed (mph)		40			40			45			45	
Link Distance (ft)		583			867			822			438	
Travel Time (s)		9.9			14.8			12.5			6.6	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	1%	0%	0%	2%	2%	3%	0%	0%	1%	2%
Adj. Flow (vph)	223	264	99	196	169	58	153	1060	256	117	1117	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	264	99	196	169	58	153	1060	256	117	1297	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	8.0	6.0	25.0	25.0	5.0	25.0	
Minimum Split (s)	12.0	15.0	15.0	13.0	15.0	15.0	12.5	35.5	35.5	11.0	35.5	
Total Split (s)	20.0	28.0	28.0	17.0	25.0	25.0	17.5	61.0	61.0	14.0	57.5	
Total Split (%)	16.7%	23.3%	23.3%	14.2%	20.8%	20.8%	14.6%	50.8%	50.8%	11.7%	47.9%	
Maximum Green (s)	14.0	21.0	21.0	10.0	18.0	18.0	11.0	54.5	54.5	8.0	51.0	
Yellow Time (s)	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.5	
All-Red Time (s)	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	7.0	7.0	7.0	7.0	7.0	6.5	6.5	6.5	6.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	34.7	20.1	20.1	27.6	17.6	17.6	65.6	55.7	55.7	61.1	52.9	
Actuated g/C Ratio	0.29	0.17	0.17	0.23	0.15	0.15	0.55	0.46	0.46	0.51	0.44	
v/c Ratio	0.65	0.85	0.26	0.78	0.59	0.16	0.73	0.65	0.29	0.46	0.84	
Control Delay	42.1	72.9	3.2	56.5	57.0	0.9	43.2	27.2	3.2	18.0	36.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.1	72.9	3.2	56.5	57.0	0.9	43.2	27.2	3.2	18.0	36.3	
LOS	D	E	A	E	E	A	D	C	A	B	D	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		49.4			49.1			24.7			34.8	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	133	199	0	116	123	0	64	328	0	39	470	
Queue Length 95th (ft)	206	#333	13	#183	197	0	#151	404	46	68	573	
Internal Link Dist (ft)		503			787			742			358	
Turn Bay Length (ft)	180		300	175		215	140		245	135		
Base Capacity (vph)	349	324	396	250	292	370	226	1641	893	261	1535	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.64	0.81	0.25	0.78	0.58	0.16	0.68	0.65	0.29	0.45	0.84	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 34.7		Intersection LOS: C	
Intersection Capacity Utilization 89.5%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Lovell Road & Yarnell Road/Bob Gray Road



LOCAL CONTROLLER PROGRAMMING

INTERSECTION NUMBER: **7** ZONE: **A**

INTERSECTION: Lovell Rd at Yarnell Rd / Bob Gray Rd

INSTALLATION DATE: _____

PROGRAMMED BY: _____

NOTES: _____

PEEK TRAFFIC
A Siemens Company

PEEK 3000 SERIES

MASTER TYPE: PEEK 3000

MASTER LOCATION: _____

TIME BY PHASE (SEC) & FUNCTIONS

PHASE	1	2	3	4	5	6	7	8
INITIAL	5	25	5	8	5	25	5	8
PASSAGE	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
YELLOW	4.0	4.5	4.0	4.5	4.5	4.5	4.5	4.5
RED CLEAR	2.0	2.0	2.0	2.5	2.0	2.0	2.5	2.5
WALK		7		7		7		7
PED CLEAR		22		26		22		31
MAX 1	10	43	10	20	10	43	10	20
MAX 2								
MAX 3 LIMIT								
MAX 3 ADJUST								
CNA 1								
CNA 2								
WALK REST MOD.								
FLASH WALK								
INHIBIT MAX								
PED RECYCLE								
MIN RECALL								
MAX RECALL								
PED RECALL								
SOFT RECALL								
NON-LOCK								
VEHICLE OMIT								
PED OMIT								
MAX OUTS TO ADJ MAX 3								
GAP OUTS TO ADJ MAX 3								

CONTROLLER OPTIONS

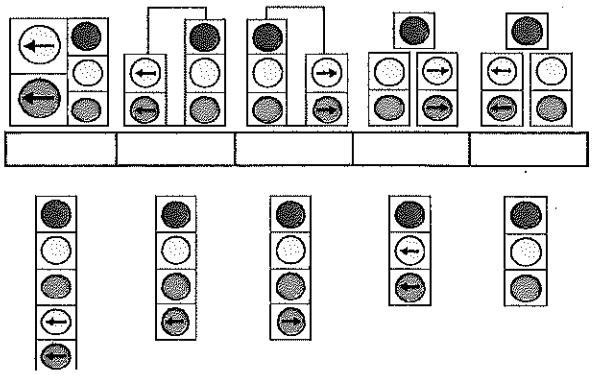
PHASE	1	2	3	4	5	6	7	8
START UP								
UCF LAST								
UCF EXIT								
SIM. GAP								

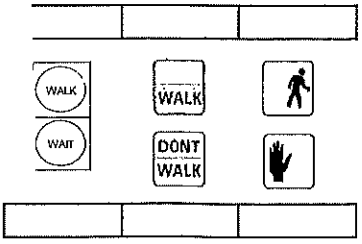
MIN RED REVERT		UCF OVERRIDE HOLD	
RED REVERT TIME		UCF TEST A OR B	
AUTO PED CLEAR		PASSAGE SEQUENTIAL	
START UP FLASH		ENABLE SIM. GAP	
START UP INTERVAL		ENHANCED PED OPERATION	
START UP ALL RED		EXT. START OVERRIDES	

PRE-EMPT OVERRIDES STOP TIME

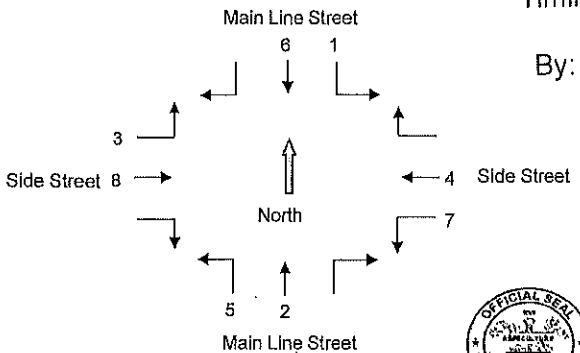
FLASH	
FREE	
SPECIAL	

SIGNAL DISPLAYS





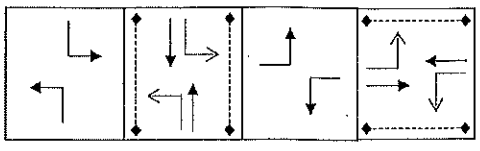
PHASING SCHEMATIC



Timing verified: 10/27/20

By: JWS

PHASING SEQUENCE



KNOX COUNTY
DEPARTMENT OF ENGINEERING AND PUBLIC WORKS

INTERSECTION NUMBER: 7 ZONE: A

INTERSECTION: Lovell Rd at Yarnell Rd / Bob Gray Rd

INSTALLATION DATE: _____

PROGRAMMED BY: _____

NOTES: _____

DETECTOR SETTINGS

PEEK TRAFFIC
A Q-Free Company

PEEK 3000 SERIES

DETECTION DATA

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LOOPS																
VIDEO																

DETECTOR ASSIGNMENTS

DETECTOR	1	2	3	4	5	6	7	8
DETECTOR 1	X							
DETECTOR 2		X						
DETECTOR 3			X					
DETECTOR 4				X				
DETECTOR 5					X			
DETECTOR 6						X		
DETECTOR 7							X	
DETECTOR 8								X

DETECTOR MODES & TIMING

DETECTOR	DETECTOR MODE	DELAY TIME	STRETCH/ STOP BAR
1			
2			
3			
4			
5			
6			
7			
8			

DELAY INHIBITS

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DETECTOR 1																
DETECTOR 2																
DETECTOR 3																
DETECTOR 4																
DETECTOR 5																
DETECTOR 6																
DETECTOR 7																
DETECTOR 8																

OFFICIAL SEAL KNOX COUNTY, TENN.

KNOX COUNTY
DEPARTMENT OF ENGINEERING AND PUBLIC WORKS

INTERSECTION NUMBER: 7 ZONE: A

INTERSECTION: Lovell Rd at Yarnell Rd / Bob Gray Rd

INSTALLATION DATE: _____

PROGRAMMED BY: _____

NOTES: Offset is referenced at beginning of yellow

COORDINATION AND OPERATION

PEEK TRAFFIC A Siemens Company

PEEK 3000 SERIES

PHASE ALLOCATIONS (SEC)

PHASE	1	2	3	4	5	6	7	8
CYCLE 1/SPLIT 1	15	42	25	18	15	42	20	23
CYCLE 1/SPLIT 2								
CYCLE 2/SPLIT 1	22	62	18	18	19	65	18	18
CYCLE 2/SPLIT 2								
CYCLE 3/SPLIT 1	16	37	16	21	16	37	16	21
CYCLE 3/SPLIT 2								
CYCLE 4/SPLIT 1								
CYCLE 4/SPLIT 2								

DYNAMIC OMITS

PHASE/OVL	1/A	2/B	3/C	4/D	5/E	6/F	7/G	8/H
OMIT PHASE								
IF PHASE OR OVL ON								
OMIT PHASE								
IF PHASE OR OVL ON								
OMIT PHASE								
IF PHASE OR OVL ON								
OMIT PHASE								
IF PHASE OR OVL ON								

OPERATING MODE

FUNCTION	
AUTO PERM	
END OF MAIN ST	
ENHANCED PERM	
FIXED FORCE OFF	
YELLOW OFFSET	
CENTRAL OVERIDE	
NO PCL OFFSET ADJ	
OFFSET ENTRY IN %	
PERM-PA ENTRY IN %	
INVERT FREE IN	
SPLIT MATRIX	
4 SPLITS / CYCLE	
NO EARLY COORD PED	
CYCLE SOURCE	
SPLIT SOURCE	
OFFSET SOURCE	
FREE SOURCE	
FLASH SOURCE	
INTER. TOD REVERT	
TYPE OF PERM	
OFFSET SEEKING	
PED PERMISSIVE	
YIELD PERCENT	

CYCLE LENGTH / DWELL / OFFSETS

CYCLE	1	2	3	4	5	6
CYCLE LENGTH	100	120	90			
MAX DWELL						
OFFSET 1	24	52	23			
OFFSET 2						
OFFSET 3						
OFFSET 4						
OFFSET 5						

PHASE REVERSAL

PATTERN	MODE	PHASES	
		LEAD	LAG

DUAL ENTRY

PHASE	1	2	3	4	5	6	7	8
PHASE 1								
PHASE 2								
PHASE 3								
PHASE 4								
PHASE 5								
PHASE 6								
PHASE 7								
PHASE 8								

COORD. PHASES

CYCLE	PHASES TO BE COORD	
1	2	6
2		
3		
4		
5		
6		

CYCLE / OFFSET / SPLIT / FREE TO TOD CIRCUITS

PLAN	C / O / S / FREE				CKT	CKT	CKT	CKT
1								
2								

OFFICIAL SEAL KNOX COUNTY, TENN.

KNOX COUNTY
DEPARTMENT OF ENGINEERING AND PUBLIC WORKS

INTERSECTION NUMBER: 7 ZONE: A

INTERSECTION: Lovell Rd at Yarnell Rd / Bob Gray Rd

INSTALLATION DATE: _____

PROGRAMMED BY: _____

NOTES: _____

TIME OF DAY PROGRAMMING

PEEK TRAFFIC
A Q Quarta Company

PEEK 3000 SERIES

WEEKLY PROGRAM PLAN

PLAN	SUN 1	MON 2	TUE 3	WED 4	THU 5	FRI 6	SAT 7
1	2	1	1	1	1	1	2
2							
3							
4							
5							

DAYLIGHT SAVINGS

	MONTH	W-O-M
SPRING	3	2
FALL	11	1

CIRCUIT OVERRIDES

CKT	SYM	ON/OFF/TOD

TIME DEPENDENT SYNC REF

CYCLE	HH:MM
1	
2	
3	
4	
5	
6	
SYNC REF	

DAY PLAN EVENTS

PLAN	HH:MM	CKT PLAN	C/O/S	CKT	ON/OFF
1	00:00	FREE			
1	06:30		1/1/1		
1	09:30		3/1/1		
1	13:30		2/1/1		
1	18:30		3/1/1		
1	21:00	FREE			
2	00:00	FREE			
2	09:00		3/1/1		
2	19:00	FREE			

TOD CIRCUIT PLANS

PLAN	CKT	ON/OFF	CKT	ON/OFF	CKT	ON/OFF	CKT	ON/OFF
1								
2								
3								

OFFICIAL SEAL KNOX COUNTY, TENN.

KNOX COUNTY
DEPARTMENT OF ENGINEERING AND PUBLIC WORKS

APPENDIX H

LOCAL TRIP GENERATION DATA

Local Apartment
Trip Generation Study

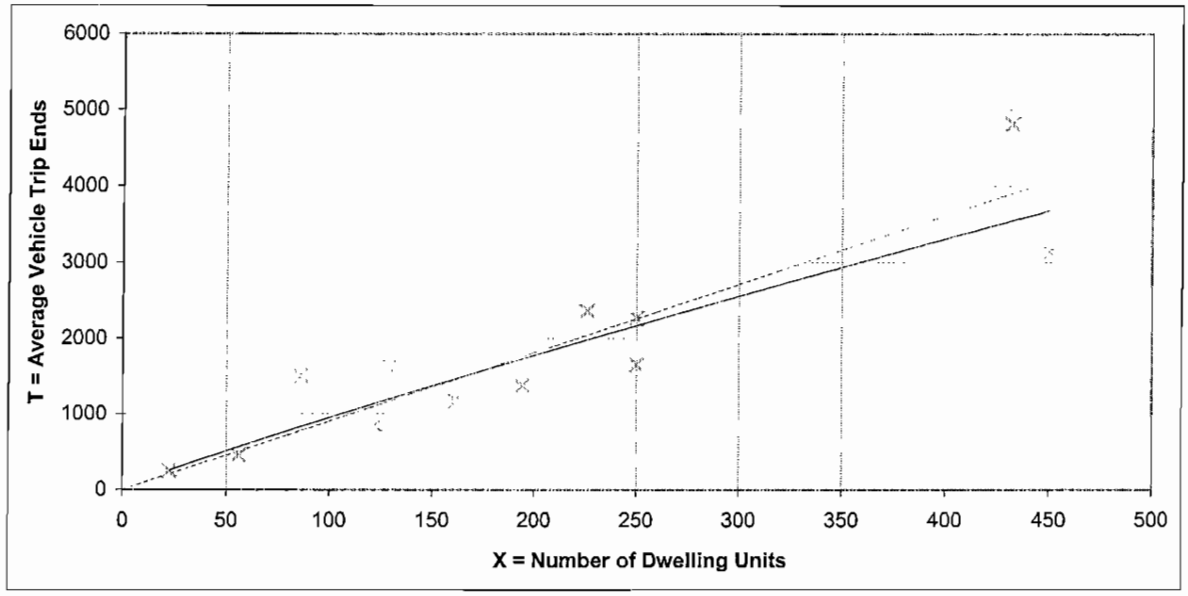
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Number of Studies: 13
Average Number of Dwelling Units: 193
Directional Distribution: 50% entering, 50% exiting

Trip Generation Per Dwelling Unit

Average Rate	Ranges of Rates	Standard Deviation
9.03	6.59 - 17.41	2.47

Data Plot and Equation



X Actual Data Points ——— Fitted Curve Average Rate

Fitted Curve Equation: $T = 15.193(X)^{0.899}$ $R^2 = 0.88$

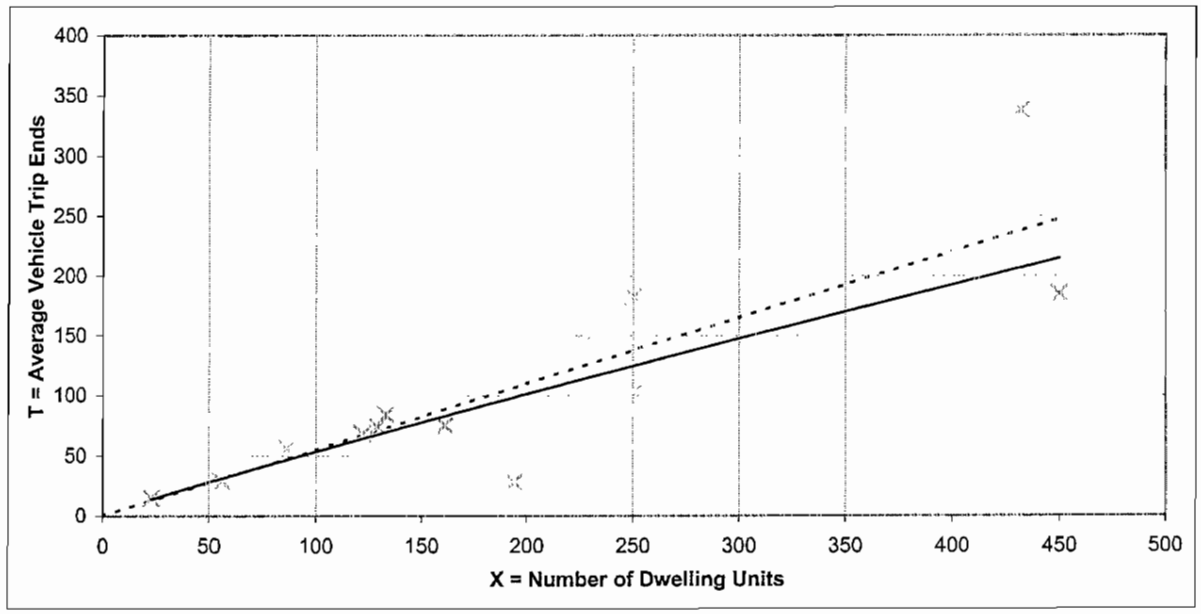
Local Apartment
Trip Generation Study

Average Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,** **Peak Hour of Adjacent Street Traffic,** **One Hour Between 7 and 9 a.m.**
Number of Studies:	13
Average Number of Dwelling Units:	193
Directional Distribution:	22% entering, 78% exiting

Trip Generation Per Dwelling Unit

Average Rate	Ranges of Rates	Standard Deviation
0.55	0.14 - 0.78	0.18

Data Plot and Equation



X Actual Data Points ——— Fitted Curve Average Rate

Fitted Curve Equation: $T = 0.758(X)^{0.924}$ $R^2 = 0.75$

Local Apartment
Trip Generation Study

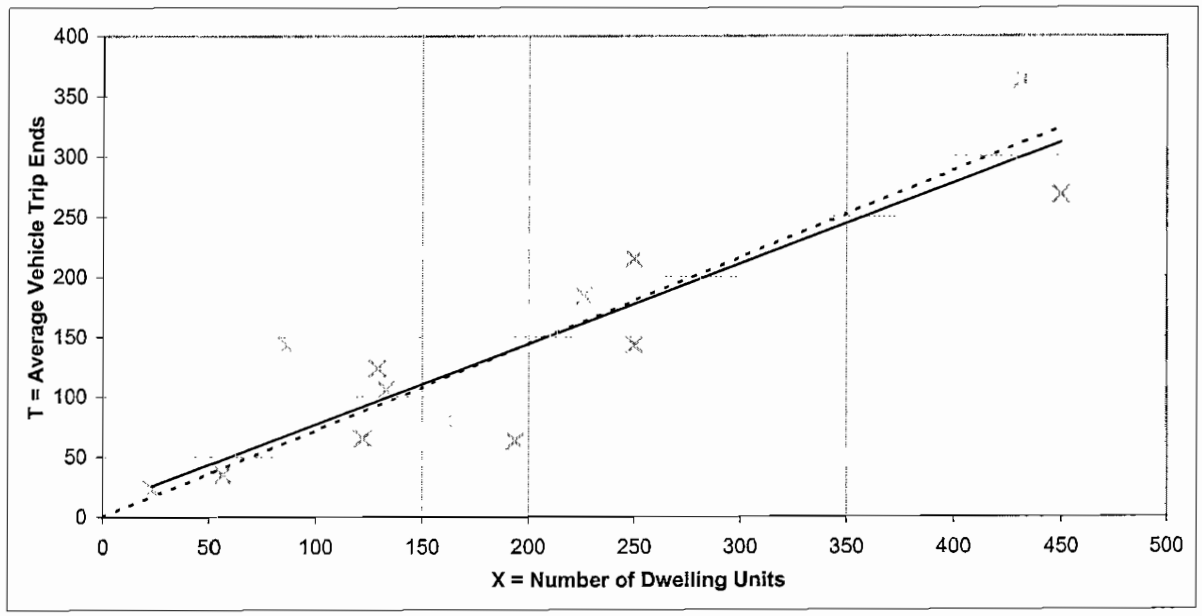
Average Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 13
Average Number of Dwelling Units: 193
Directional Distribution: 55% entering, 45% exiting

Trip Generation Per Dwelling Unit

Average Rate	Ranges of Rates	Standard Deviation
0.72	0.32 - 1.66	0.25

Data Plot and Equation



X Actual Data Points ——— Fitted Curve Average Rate

Fitted Curve Equation: **T = 0.669(X) + 10.069** **R^2 = 0.79**

TRIP GENERATION FOR BOB GRAY ROAD SUBDIVISION

94 Multi-Family Attached Townhouses

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Local Trip Rate	Townhouses	94 Townhouses	903	22%	78%		55%	45%	
				11	40	51	40	33	73
Total New Volume Site Trips			**903**	**11**	**40**	**51**	**40**	**33**	**73**

Data from Local Trip Rates and calculated by using Fitted Curve Equations

TRIP GENERATION FOR BOB GRAY ROAD SUBDIVISION

94 Townhouses

94 Units = X

Weekday:

Fitted Curve Equation: $T = 15.193(X)^{0.899}$

T = 15.193 * 59.41

T = 903 trips

Peak Hour of Adjacent Traffic between 7 and 9 am:

Fitted Curve Equation: $T = 0.758(X)^{0.924}$

T = 0.758 * 67

T = 51 trips

Peak Hour of Adjacent Traffic between 4 and 6 pm:

Fitted Curve Equation: T = 0.669(X)+10.069

T = 0.669 * 94 + 10.07

T = 73 trips

TRIP GENERATION FOR PARKWAY HEIGHTS TOWNHOUSES

123 Multi-Family Attached Townhouses

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Local Trip Rate	Townhouses	123 Townhouses	1,150	22%	78%		55%	45%	
				14	51	65	51	42	93
Total New Volume Site Trips			**1,150**	**14**	**51**	**65**	**51**	**42**	**93**

Data from Local Trip Rates and calculated by using Fitted Curve Equations

TRIP GENERATION FOR PARKWAY HEIGHTS TOWNHOUSES

123 Townhouses

123 Units = X

Weekday:

Fitted Curve Equation: $T = 15.193(X)^{0.899}$

T = 15.193 * 75.65

T = 1150 trips

Peak Hour of Adjacent Traffic between 7 and 9 am:

Fitted Curve Equation: $T = 0.758(X)^{0.924}$

T = 0.758 * 85

T = 65 trips

Peak Hour of Adjacent Traffic between 4 and 6 pm:

Fitted Curve Equation: $T = 0.669(X)+10.069$

T = 0.669 * 123 + 10.07

T = 93 trips

TRIP GENERATION FOR COMBINED DEVELOPMENTS

ITE LAND USE CODE	LAND USE DESCRIPTION	UNITS	GENERATED DAILY TRAFFIC	GENERATED TRAFFIC AM PEAK HOUR			GENERATED TRAFFIC PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
Local Trip Rate	Townhouses	217 Townhouses	2,053	22%	78%		55%	45%	
				25	91	116	91	75	166
Total New Volume Site Trips			**2,053**	**25**	**91**	**116**	**91**	**75**	**166**

Data from Local Trip Rates and calculated by using Fitted Curve Equations

APPENDIX I

2021 CENSUS BUREAU DATA

United States Census Bureau OnTheMap

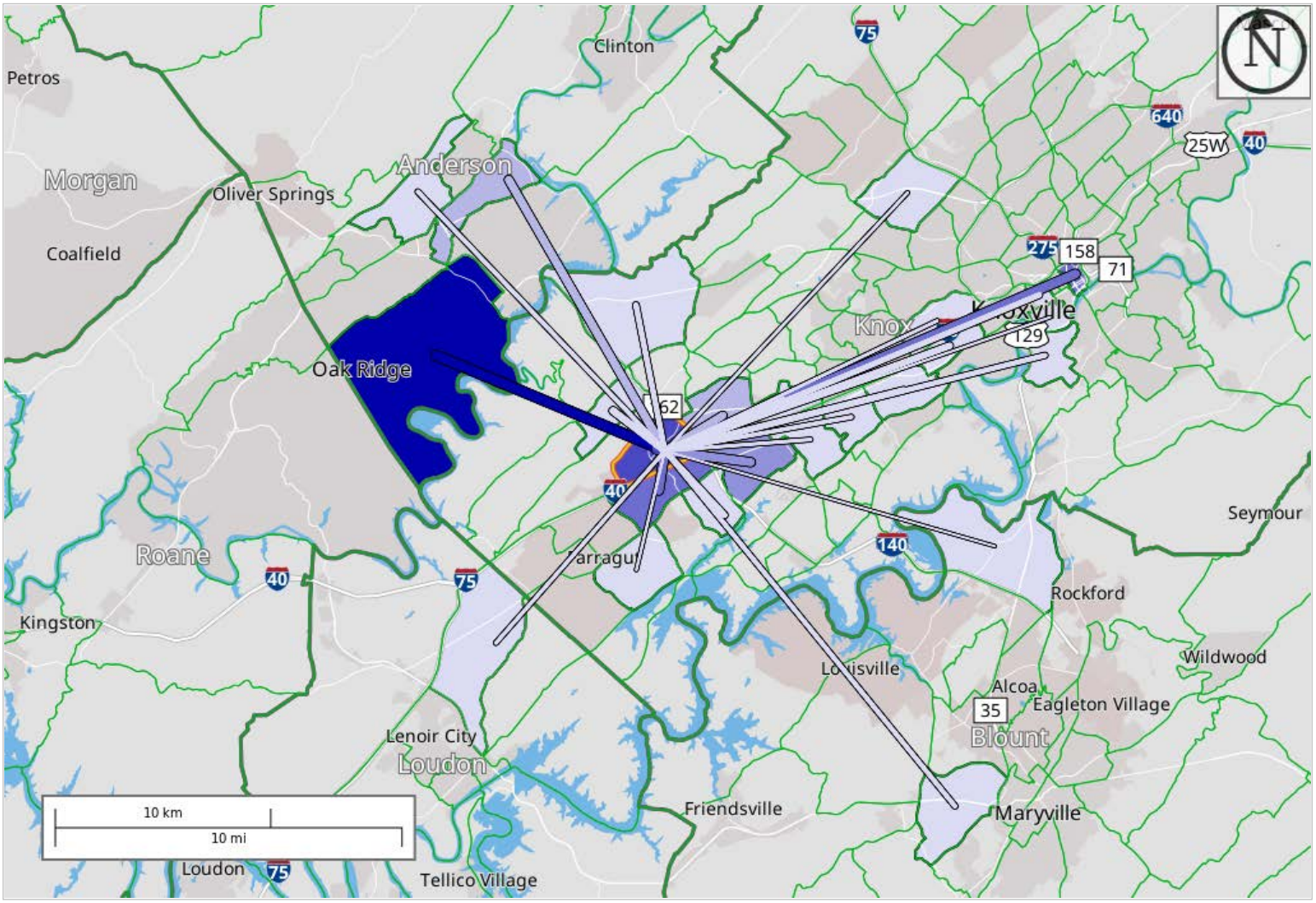
Destination Analysis

Workers: *Living in 59.11 (Knox, TN)*
Showing: *Employment locations grouped by Census Tracts*

Created by the U.S. Census Bureau's OnTheMap `https://onthemap.ces.census.gov` on 03/22/2024

Counts of All Jobs from Home Selection Area to Work Census Tracts in 2021

All Workers



Map Legend

Job Count
- 111 - 127
- 94 - 110
- 78 - 93
- 61 - 77
- 45 - 60
- 28 - 44
- 11 - 27

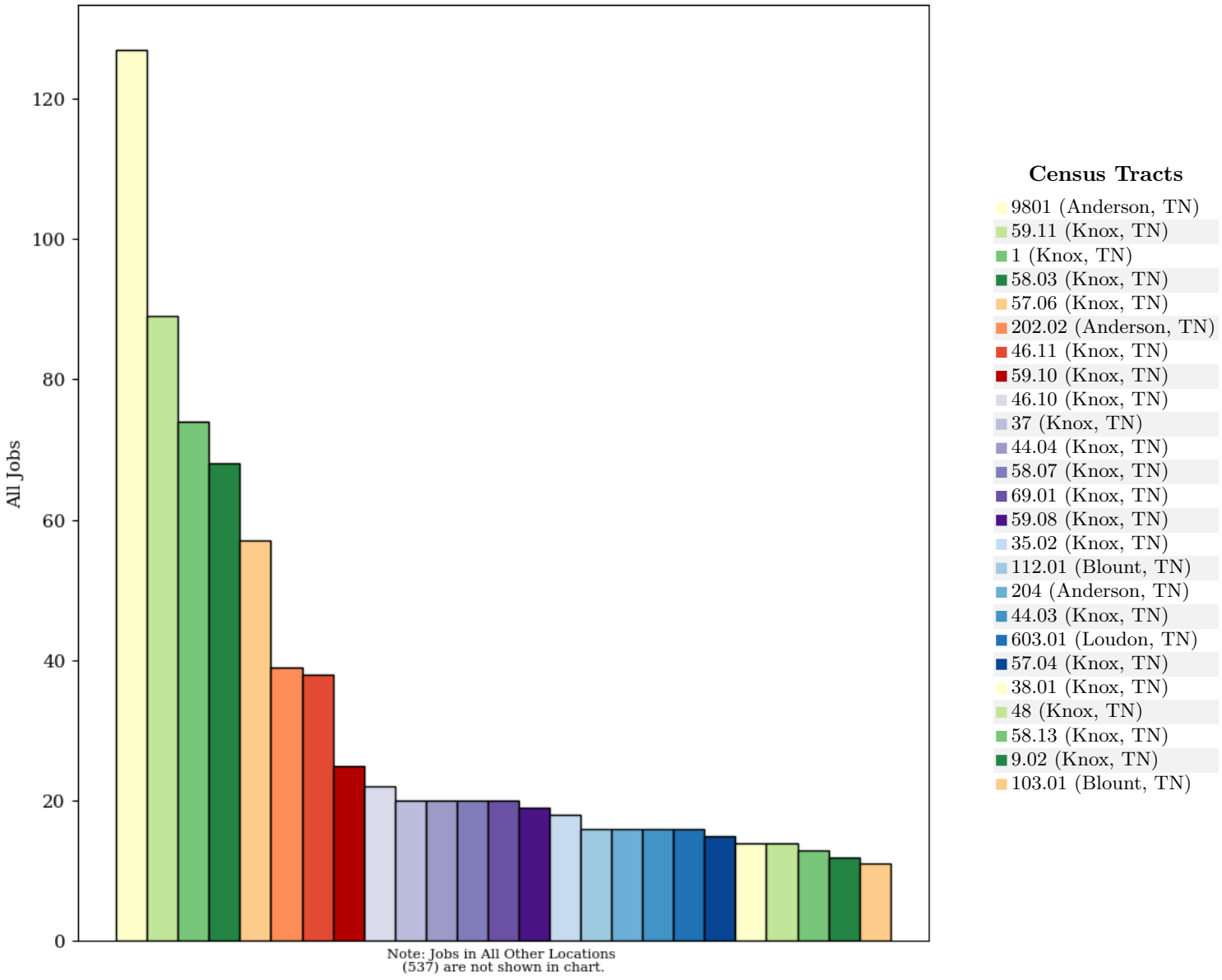
Selection Areas
- Home Area

Job Count
- 111 - 127
- 94 - 110
- 78 - 93
- 61 - 77
- 45 - 60
- 28 - 44
- 11 - 27

United States Census Bureau

All Jobs from Home Selection Area to Work Census Tracts in 2021

All Workers



All Jobs from Home Selection Area to Work Census Tracts in 2021

All Workers

Census Tracts as Work Destination Area	2021 Count	2021 Share
All Census Tracts	1,336	100.0%
9801 (Anderson, TN)	127	9.5%
59.11 (Knox, TN)	89	6.7%
1 (Knox, TN)	74	5.5%
58.03 (Knox, TN)	68	5.1%
57.06 (Knox, TN)	57	4.3%
202.02 (Anderson, TN)	39	2.9%
46.11 (Knox, TN)	38	2.8%
59.10 (Knox, TN)	25	1.9%
46.10 (Knox, TN)	22	1.6%
37 (Knox, TN)	20	1.5%

Census Tracts as Work Destination Area	2021 Count	2021 Share
44.04 (Knox, TN)	20	1.5%
58.07 (Knox, TN)	20	1.5%
69.01 (Knox, TN)	20	1.5%
59.08 (Knox, TN)	19	1.4%
35.02 (Knox, TN)	18	1.3%
112.01 (Blount, TN)	16	1.2%
204 (Anderson, TN)	16	1.2%
44.03 (Knox, TN)	16	1.2%
603.01 (Loudon, TN)	16	1.2%
57.04 (Knox, TN)	15	1.1%
38.01 (Knox, TN)	14	1.0%
48 (Knox, TN)	14	1.0%
58.13 (Knox, TN)	13	1.0%
9.02 (Knox, TN)	12	0.9%
103.01 (Blount, TN)	11	0.8%
All Other Locations	537	40.2%

Additional Information

Analysis Settings

Analysis Type	Destination
Destination Type	Census Tracts
Selection area as	Home
Year(s)	2021
Job Type	All Jobs
Selection Area	59.11 (Knox, TN) from Census Tracts
Selected Census Blocks	48
Analysis Generation Date	03/22/2024 16:56 - OnTheMap 6.23.5
Code Revision	61ba66adb1494f11636f474452a03e1039f6f3a0
LODES Data Vintage	20231016_1512

Data Sources

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2002-2021).

Notes

1. Race, Ethnicity, Educational Attainment, and Sex statistics are beta release results and are not available before 2009.
2. Educational Attainment is only produced for workers aged 30 and over.
3. Firm Age and Firm Size statistics are beta release results for All Private jobs and are not available before 2011.

APPENDIX J

KNOX COUNTY TURN LANE VOLUME THRESHOLD WORKSHEETS

TABLE 5A

LEFT-TURN LANE VOLUME THRESHOLDS FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

(If the left-turn volume exceeds the table value a left -turn lane is needed)

300

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149 150 - 199	250 200	180 140	140 105	110 90	80 70	70 60
200 - 249 250 - 299	160 130	115 100	85 75	75 65	60	55 50
300 - 349 350 - 399	110 100	90 80	70	60	55	45 40
400 - 449 450 - 499	90 80	70 65				35 30
500 - 549 550 - 599	70 65	60 55				25 25
600 - 649 650 - 699	60 55	45 35				25 20
700 - 749 750 or More	50 45	35 35				20 20

251+11 = 262

Bob Gray Road at Highvue Drive:
Bob Gray Road Subdivision Only +
Lovell Crossing Development

2027 Projected AM
WB Left Turns = 6

Left Turn Lane NOT Warranted

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	=/ > 600
100 - 149 150 - 199	70 60	60 55	50 45	45 40	40 35	35 30
200 - 249 250 - 299	55 50	50 45	40 35	35 30	30 30	30 30
300 - 349 350 - 399	45 40	40 35	35 30	30 25	25 25	25 20
400 - 449 450 - 499	35 30	30 25	30 25	25 20	20 20	20 20
500 - 549 550 - 599	25 25	25 20	20 20	20 20	20 20	15 15
600 - 649 650 - 699	25 20	20 20	20 20	20 20	20 20	15 15
700 - 749 750 or More	20 20	20 20	20 20	15 15	15 15	15 15

* Or through volume only if a right-turn lane exists

TABLE 5B

RIGHT-TURN LANE VOLUME THRESHOLDS FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

251

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
11 Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199						
200 - 249 250 - 299					Yes	Yes Yes
300 - 349 350 - 399					Yes Yes	Yes Yes
400 - 449 450 - 499			Yes	Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

Bob Gray Road at Highvue Drive:
Bob Gray Road Subdivision Only +
Lovell Crossing Development

2027 Projected AM
EB Right Turns = 11

Right Turn Lane NOT Warranted

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 50 - 99				Yes	Yes Yes	Yes Yes
100 - 149 150 - 199		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

* Or through volume only if a left-turn lane exists.

TABLE 5A

LEFT-TURN LANE VOLUME THRESHOLDS FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

(If the left-turn volume exceeds the table value a left -turn lane is needed)

340

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149 150 - 199	250 200			110 90	80 70	70 60
200 - 249 250 - 299	160 130			75 65	65 60	55 50
300 - 349 350 - 399	110 100			60 55	55 50	45 40
400 - 449 450 - 499	90 80			50 45	45 40	35 30
500 - 549 550 - 599	70 65	60 55	45 40	35 35	30 30	25 25
600 - 649 650 - 699	60 55	45 35	35 35	30 30	25 25	25 20
700 - 749 750 or More	50 45	35 35	30 25	25 25	20 20	20 20

Bob Gray Road at Highvue Drive:
Bob Gray Road Subdivision Only +
Lovell Crossing Development

2027 Projected PM
WB Left Turns = 30

Left Turn Lane
Warranted

538+43 = 581

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	=/ > 600
100 - 149 150 - 199	70 60	60 55	50 45	45 40	40 35	35 30
200 - 249 250 - 299	55 50	50 45	40 35	35 30	30 30	30 30
300 - 349 350 - 399	45 40	40 35	35 30	30 25	25 25	25 20
400 - 449 450 - 499	35 30	30 25	30 25	25 20	20 20	20 20
500 - 549 550 - 599	25 25	25 20	20 20	20 20	20 20	15 15
600 - 649 650 - 699	25 20	20 20	20 20	20 20	20 20	15 15
700 - 749 750 or More	20 20	20 20	20 20	15 15	15 15	15 15

* Or through volume only if a right-turn lane exists

TABLE 5B

RIGHT-TURN LANE VOLUME THRESHOLDS FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199						
200 - 249 250 - 299					Yes	Yes Yes
300 - 349 350 - 399			Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

538

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 50 - 99				Yes	Yes Yes	Yes Yes
100 - 149 150 - 199		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes Yes				Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes				Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes				Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes		Yes	Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

43

Bob Gray Road at Highvue Drive:
Bob Gray Road Subdivision Only +
Lovell Crossing Development

2027 Projected PM
EB Right Turns = 43

Right Turn Lane NOT Warranted

* Or through volume only if a left-turn lane exists.

TABLE 5A

LEFT-TURN LANE VOLUME THRESHOLDS FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

(If the left-turn volume exceeds the table value a left -turn lane is needed)

300

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149 150 - 199	250 200	180 140	140 105	110 90	80 70	70 60
200 - 249 250 - 299	160 130	115 100	85 75	75 65	60	55 50
300 - 349 350 - 399	110 100	90 80	70	60	55	45 40
400 - 449 450 - 499	90 80	70 65				35 30
500 - 549 550 - 599	70 65	60 55				25 25
600 - 649 650 - 699	60 55	45 35				25 20
700 - 749 750 or More	50 45	35 35				20 20

251+19 = 270

Bob Gray Road at Highvue Drive:
Combined Residential Subdivisions + Lovell Crossing Development

2027 Projected AM
WB Left Turns = 11

Left Turn Lane NOT Warranted

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	=/ > 600
100 - 149 150 - 199	70 60	60 55	50 45	45 40	40 35	35 30
200 - 249 250 - 299	55 50	50 45	40 35	35 30	30 30	30 30
300 - 349 350 - 399	45 40	40 35	35 30	30 25	25 25	25 20
400 - 449 450 - 499	35 30	30 25	30 25	25 20	20 20	20 20
500 - 549 550 - 599	25 25	25 20	20 20	20 20	20 20	15 15
600 - 649 650 - 699	25 20	20 20	20 20	20 20	20 20	15 15
700 - 749 750 or More	20 20	20 20	20 20	15 15	15 15	15 15

* Or through volume only if a right-turn lane exists

TABLE 5B

RIGHT-TURN LANE VOLUME THRESHOLDS FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

251

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
19 Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199						
200 - 249 250 - 299					Yes	Yes Yes
300 - 349 350 - 399					Yes Yes	Yes Yes
400 - 449 450 - 499			Yes	Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

Bob Gray Road at Highvue Drive:
Combined Residential Subdivisions + Lovell Crossing Development

2027 Projected AM
EB Right Turns = 19

Right Turn Lane NOT Warranted

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 50 - 99				Yes	Yes Yes	Yes Yes
100 - 149 150 - 199		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

* Or through volume only if a left-turn lane exists.

TABLE 5A

LEFT-TURN LANE VOLUME THRESHOLDS FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

(If the left-turn volume exceeds the table value a left -turn lane is needed)

340

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149 150 - 199	250 200			110 90	80 70	70 60
200 - 249 250 - 299	160 130			75 65	65 60	55 50
300 - 349 350 - 399	110 100			60 55	55 50	45 40
400 - 449 450 - 499	90 80			50 45	45 40	35 30
500 - 549 550 - 599	70 65	60 55	45 40	35 35	35 30	25 25
600 - 649 650 - 699	60 55	45 35	35 35	30 30	25 25	25 20
700 - 749 750 or More	50 45	35 35	30 25	25 25	20 20	20 20

Bob Gray Road at Highvue Drive:
Combined Residential Subdivisions + Lovell Crossing Development

2027 Projected PM
WB Left Turns = 48

Left Turn Lane Warranted

538+71 = 609

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	=/ >600
100 - 149 150 - 199	70 60	60 55	50 45	45 40	40 35	35 30
200 - 249 250 - 299	55 50	50 45	40 35	35 30	30 30	30 30
300 - 349 350 - 399	45 40	40 35	35 30	30 25	25 25	25 20
400 - 449 450 - 499	35 30	30 25	30 25	25 20	20 20	20 20
500 - 549 550 - 599	25 25	25 20	20 20	20 20	20 20	15 15
600 - 649 650 - 699	25 20	20 20	20 20	20 20	20 20	15 15
700 - 749 750 or More	20 20	20 20	20 20	15 15	15 15	15 15

* Or through volume only if a right-turn lane exists

TABLE 5B

RIGHT-TURN LANE VOLUME THRESHOLDS FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 36 TO 45 MPH

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99						
100 - 149 150 - 199						
200 - 249 250 - 299					Yes	Yes Yes
300 - 349 350 - 399			Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

538

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 71 50 - 99				Yes	Yes Yes	Yes Yes
100 - 149 150 - 199		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes Yes				Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes				Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes				Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes				Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

Bob Gray Road at Highvue Drive:
Combined Residential Subdivisions + Lovell Crossing Development

2027 Projected PM
EB Right Turns = 71

Right Turn Lane Warranted

* Or through volume only if a left-turn lane exists.

APPENDIX K

SIMTRAFFIC VEHICLE QUEUE WORKSHEETS

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	249	223	104	159	142	74	150	221	183	56	214	342
Average Queue (ft)	134	93	46	77	68	31	61	125	85	22	34	212
95th Queue (ft)	217	178	81	135	123	58	113	200	162	45	127	310
Link Distance (ft)		537			772			778	778			393
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	180		300	175		215	140			245	135	
Storage Blk Time (%)	3	0		0	0		0	5				25
Queuing Penalty (veh)	10	2		1	0		0	7				8

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	277
Average Queue (ft)	167
95th Queue (ft)	262
Link Distance (ft)	393
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Highvue Drive & Bob Gray Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	38	60
Average Queue (ft)	2	30
95th Queue (ft)	16	52
Link Distance (ft)	363	386
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 28

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	275	566	425	244	335	105	219	368	317	101	215	403
Average Queue (ft)	264	546	303	129	123	25	96	220	175	43	86	279
95th Queue (ft)	337	588	603	225	262	84	200	327	273	84	208	404
Link Distance (ft)		533			772			775	775			392
Upstream Blk Time (%)		83										1
Queuing Penalty (veh)		0										0
Storage Bay Dist (ft)	180		300	175		215	140			245	135	
Storage Blk Time (%)	18	93		5	10		2	18	1		0	24
Queuing Penalty (veh)	62	288		10	23		12	26	2		0	25

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	399
Average Queue (ft)	239
95th Queue (ft)	366
Link Distance (ft)	392
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Highvue Drive & Bob Gray Road

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	35	96	64
Average Queue (ft)	2	19	28
95th Queue (ft)	18	63	55
Link Distance (ft)	772	354	387
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 448

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	236	211	99	168	176	83	160	221	203	50	198	334
Average Queue (ft)	133	93	45	80	75	34	64	128	89	21	30	211
95th Queue (ft)	210	168	79	139	137	64	123	202	171	42	109	310
Link Distance (ft)		537			772			778	778			393
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	180		300	175		215	140			245	135	
Storage Blk Time (%)	3	0		0	0		0	6	0			25
Queuing Penalty (veh)	9	1		1	0		0	8	0			8

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	284
Average Queue (ft)	171
95th Queue (ft)	262
Link Distance (ft)	393
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Highvue Drive & Bob Gray Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	38	88
Average Queue (ft)	3	42
95th Queue (ft)	21	71
Link Distance (ft)	363	386
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 28

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	275	557	425	244	448	181	219	367	312	111	215	405
Average Queue (ft)	266	547	298	145	186	43	101	226	180	47	94	285
95th Queue (ft)	331	580	602	252	415	183	205	338	291	90	222	401
Link Distance (ft)		533			772			775	775			392
Upstream Blk Time (%)		85			1							1
Queuing Penalty (veh)		0			2							0
Storage Bay Dist (ft)	180		300	175		215	140			245	135	
Storage Blk Time (%)	17	94		11	15		2	18	1		0	24
Queuing Penalty (veh)	60	290		23	38		8	27	3		0	27

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	391
Average Queue (ft)	244
95th Queue (ft)	362
Link Distance (ft)	392
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Highvue Drive & Bob Gray Road

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	12	119	88
Average Queue (ft)	0	31	42
95th Queue (ft)	5	83	72
Link Distance (ft)	772	354	387
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 478

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	249	266	100	170	172	76	140	205	177	50	178	320
Average Queue (ft)	141	99	44	84	80	32	60	111	72	18	29	195
95th Queue (ft)	220	196	77	148	150	59	109	182	146	43	107	292
Link Distance (ft)		537			772			778	778			393
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	180		300	175		215	140			245	135	
Storage Blk Time (%)	4	0		0	1		0	3				20
Queuing Penalty (veh)	12	2		0	3		0	4				6

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	279
Average Queue (ft)	154
95th Queue (ft)	255
Link Distance (ft)	393
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Highvue Drive & Bob Gray Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	44	64
Average Queue (ft)	2	31
95th Queue (ft)	21	56
Link Distance (ft)	349	387
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 29

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	270	400	196	231	331	134	220	389	350	149	214	410
Average Queue (ft)	152	194	45	134	144	34	123	232	190	48	106	314
95th Queue (ft)	244	320	128	228	348	149	235	349	299	105	238	450
Link Distance (ft)		537			772			778	778			393
Upstream Blk Time (%)		0										5
Queuing Penalty (veh)		0										0
Storage Bay Dist (ft)	180		300	175		215	140			245	135	
Storage Blk Time (%)	4	16		12	2		2	24	2		1	35
Queuing Penalty (veh)	14	49		24	4		10	36	4		4	37

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	409
Average Queue (ft)	274
95th Queue (ft)	414
Link Distance (ft)	393
Upstream Blk Time (%)	2
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Highvue Drive & Bob Gray Road

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	18	132	76
Average Queue (ft)	1	24	28
95th Queue (ft)	9	84	60
Link Distance (ft)	772	354	386
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 181

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	247	252	102	165	187	73	153	204	166	54	158	334
Average Queue (ft)	137	99	45	83	85	33	60	115	74	20	27	200
95th Queue (ft)	216	181	80	142	150	59	113	184	144	44	105	304
Link Distance (ft)		537			772			778	778			393
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	180		300	175		215	140			245	135	
Storage Blk Time (%)	3	0		0	1		0	4				20
Queuing Penalty (veh)	10	2		1	2		1	5				7

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	284
Average Queue (ft)	161
95th Queue (ft)	261
Link Distance (ft)	393
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Highvue Drive & Bob Gray Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	69	89
Average Queue (ft)	5	41
95th Queue (ft)	32	67
Link Distance (ft)	349	387
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 26

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	274	428	239	235	412	211	220	414	371	131	215	411
Average Queue (ft)	162	210	49	146	160	32	120	243	200	52	112	312
95th Queue (ft)	266	353	141	241	356	141	226	365	317	100	240	444
Link Distance (ft)		537			772			778	778			393
Upstream Blk Time (%)		0			0							5
Queuing Penalty (veh)		0			0							0
Storage Bay Dist (ft)	180		300	175		215	140			245	135	
Storage Blk Time (%)	4	20		13	5		3	26	2		1	35
Queuing Penalty (veh)	14	63		28	13		17	38	5		6	39

Intersection: 3: Lovell Road & Yarnell Road/Bob Gray Road

Movement	SB
Directions Served	TR
Maximum Queue (ft)	408
Average Queue (ft)	278
95th Queue (ft)	415
Link Distance (ft)	393
Upstream Blk Time (%)	4
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Highvue Drive & Bob Gray Road

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	25	183	100
Average Queue (ft)	1	44	43
95th Queue (ft)	13	127	83
Link Distance (ft)	772	354	386
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 223

Ajax Engineering, LLC
11812 Black Road
Knoxville, TN 37932
ajaxengineering@gmail.com

Development Request

DEVELOPMENT
- ☑ Development Plan
- ☐ Planned Development
- ☐ Use on Review / Special Use
- ☐ Hillside Protection COA

SUBDIVISION
- ☑ Concept Plan
- ☐ Final Plat

ZONING
- ☐ Rezoning
- ☐ Plan Amendment
  - ☐ Sector Plan
  - ☐ City OYP / County Comp Plan

Arcip Horobet | Applicant Name | Affiliation

4/29/2024	**6/13/2024**	**6-SB-24-C / 6-E-24-DP**
Date Filed	Meeting Date (if applicable)	File Number(s)

CORRESPONDENCE

All correspondence related to this application should be directed to the approved contact listed below.

David Harbin Batson, Himes, Norvell and Poe
Name / Company

4334 Papermill Dr. Dr. Knoxville TN 37909
Address

865-588-6472 / harbin@bhn-p.com
Phone / Email

CURRENT PROPERTY INFO

Arcip Horobet	**3105 W. Gallaher Ferry Rd Knoxville TN 37932**	**865-607-1167**
Owner Name (if different)	Owner Address	Owner Phone / Email

0 PELLISSIPPI PKWY
Property Address

118 071		**9.87 acres**
Parcel ID	Part of Parcel (Y/N)?	Tract Size

West Knox Utility District, First Knox Utilit	**West Knox Utility District**	
Sewer Provider	Water Provider	Septic (Y/N)

STAFF USE ONLY

South side of Bob Gray Rd, west side of Pellissippi Pkwy, northern terminus of Blinken St
General Location

☐ City	**Commission District 3**	**PR(k) (Planned Residential) up to 1 du/ac, TO (Technology Overlay)**	**Agriculture/Forestry/Vacant Land**
☑ County	District	Zoning District	Existing Land Use
			Planned Growth Area
Planning Sector	Land Use (City)/Place Type (County)		Growth Policy Plan Designation

DEVELOPMENT REQUEST

☑ Development Plan ☐ Planned Development ☐ Use on Review / Special Use

☐ Hillside Protection COA ☐ Residential ☐ Non-residential

Related City Permit Number(s)

Home Occupation (specify)

Other (specify) **Attached residential subdivision**

SUBDIVSION REQUEST

Horobet on Bob Gray Road

Proposed Subdivision Name

Related Rezoning File Number

Unit / Phase Number

☑ Split Parcels

94

Total Number of Lots Created

Additional Information

☐ Attachments / Additional Requirements

ZONING REQUEST

☐ Zoning Change

Proposed Zoning

Pending Plat File Number

☐ Plan Amendment

Proposed Plan Designation(s)

9.52 du/ac

Proposed Density (units/acre)

Previous Rezoning Requests

Additional Information

STAFF USE ONLY

PLAT TYPE

☐ Staff Review ☐ Planning Commission

ATTACHMENTS

☐ Property Owners / Option Holders ☐ Variance Request

☐ Amendment Request (Comprehensive Plan)

ADDITIONAL REQUIREMENTS

☐ Use on Review / Special Use (Concept Plan)

☐ Traffic Impact Study

☐ COA Checklist (Hillside Protection)

Fee 1	Total
$1,600.00	
Fee 2	
Fee 3	

AUTHORIZATION

☐ **I declare under penalty of perjury the foregoing is true and correct: 1) He/she/it is the owner of the property, AND 2) the application and all associated materials are being submitted with his/her/its consent.**

	Arcip Horobet	**4/29/2024**
Applicant Signature	Please Print	Date

Phone / Email

	Arcip Horobet	**4/29/2024**
Property Owner Signature	Please Print	Date

Development Request

Planning
KNOXVILLE | KNOX COUNTY

DEVELOPMENT
- ☑ Development Plan
- ☐ Planned Development
- ☐ Use on Review / Special Use
- ☐ Hillside Protection COA

SUBDIVISION
- ☒ Concept Plan
- ☐ Final Plat

ZONING
- ☐ Plan Amendment
  - ☐ SP ☐ OYP
- ☐ Rezoning

ARCIP HOROBET
Applicant Name

Affiliation

4/29/2024
Date Filed

6/13/2024
Meeting Date (if applicable)

File Number(s)

CORRESPONDENCE

All correspondence related to this application should be directed to the approved contact listed below.

☐ Applicant ☐ Property Owner ☐ Option Holder ☒ Project Surveyor ☒ Engineer ☐ Architect/Landscape Architect

DAVID HARBIN
Name

BATSON HIMES NORVELL + POE
Company

4334 PAPERMILL DR
Address

KNOXVILLE
City

TN
State

37909
ZIP

865-588-6472
Phone

harbin@bhn-p.com
Email

CURRENT PROPERTY INFO

3105 W. GALLAHER FERRY RD
KNOXVILLE, TN 37932
Property Owner Name (if different)

Property Owner Address

865-607-1167
Property Owner Phone

Bob Gray RD
Property Address

TAX MAP 118 PARCEL 71
Parcel ID

WKUD
Sewer Provider

WKUD
Water Provider

NO
Septic (Y/N)

STAFF USE ONLY

General Location

Tract Size

☐ City ☐ County
District

Zoning District

Existing Land Use

Planning Sector

Sector Plan Land Use Classification

Growth Policy Plan Designation

DEVELOPMENT REQUEST

☑ Development Plan ☐ Use on Review / Special Use ☐ Hillside Protection COA

☑ Residential ☐ Non-Residential

Home Occupation (specify)

Other (specify) Attached residential subdivision

Related City Permit Number(s)

SUBDIVISION REQUEST

Horobet on Bob Gray Road

Proposed Subdivision Name

Related Rezoning File Number

Unit / Phase Number

☐ Combine Parcels ☒ Divide Parcel

94 LOTS

Total Number of Lots Created

☐ Other (specify)

☐ Attachments / Additional Requirements

ZONING REQUEST

☐ Zoning Change

Proposed Zoning

Pending Plat File Number

☐ Plan Amendment Change

Proposed Plan Designation(s)

Proposed Density (units/acre)

Previous Rezoning Requests

☐ Other (specify)

STAFF USE ONLY

PLAT TYPE

☐ Staff Review ☐ Planning Commission

ATTACHMENTS

☐ Property Owners / Option Holders ☐ Variance Request

ADDITIONAL REQUIREMENTS

☐ Design Plan Certification *(Final Plat)*

☐ Use on Review / Special Use *(Concept Plan)*

☐ Traffic Impact Study

☐ COA Checklist *(Hillside Protection)*

Fee 1	Total
Fee 2	
Fee 3	

AUTHORIZATION

☐ ***I declare under penalty of perjury*** *the foregoing is true and correct:*
1) *He/she/it is the owner of the property AND* ***2)*** *The application and all associated materials are being submitted with his/her/its consent*

Applicant Signature

DAVID HARBIN

Please Print

Date

865-588-6472

Phone Number

harbin@bhn-p.com

Email

Property Owner Signature

ARCIP HOROBET

Please Print

Date Paid

Planning
KNOXVILLE | KNOX COUNTY

Alternative Design Standards

The minimum design and performance standards shall apply to all subdivisions unless an alternative design standard is permitted within Article 3 Section 3.01.D, Application of Alternative Design Standards, or Article 4.01.C, Street Standards (within Hillside and Ridgetop Areas).

There are some alternative design standards that require Planning Commission approval, and some that can be approved by the Engineering Departments of the City or County. However, the City or County Engineering Departments, as applicable, will provide review comments on any alternative design proposed. These comments will be provided during the review process.

Alternative Design Standards Requiring Planning Commission Approval

Section 3.03.B.2 - Street frontage in the PR (Planned Residential) zone, Knox County
Section 3.03.E.1.e – Maximum grade of private right-of-way
Section 3.03.E.3.a – Pavement width reduction, private rights-of-way serving 6 or more lots
Section 3.04.H.2 – Maximum grade, public streets
Section 3.04.I.1.b.1 – Horizontal curves, local streets in Knox County

Alternative Design Standards Approved by the Engineering Departments of the City of Knoxville or Knox County

Section 3.03.E.3.a – Right-of-way width reduction, private rights-of-way serving 6 or more lots
Section 3.04.A.3.c – Right-of-way dedication, new subdivisions
Section 3.04.F.1 – Right-of-way reduction, local streets
Section 3.04.G.1 – Pavement width reduction, local streets
Section 3.04.H.3 – Intersection grade, all streets
Section 3.04.J.2 – Corner radius reduction in agricultural, residential, and office zones
Section 3.04.J.3 – Corner radius reduction in commercial and industrial zones
Section 3.11.A.2 – Standard utility and drainage easement

By signing this form, I certify that the criteria for a variance have been met for each request, and that any and all requests needed to meet the Subdivision Regulations are requested above or are attached. I understand and agree that no additional variances can be acted upon by the legislative body upon appeal and none will be requested.

Signature | DAVID HARBIN Printed Name | Date

For each alternative design standard requested, identify how the proposed alternative design either meets the intent of the standard in the Subdivision Regulations or meets an alternative, nationally recognized engineering standard such as The American Association of State Highway and Transportation Officials (AASHTO) or Public Right-of-Way Accessibility Guidelines (PROWAG).

1. ALTERNATIVE DESIGN STANDARD REQUESTED:

ROADWAY GRADE FROM 12% TO 15% FROM STA 0+90 TO 4+94 ROAD "A"

Approval required by: Planning Commission ☒ Engineering ☐

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

2. ALTERNATIVE DESIGN STANDARD REQUESTED:

VERTICAL CURVE LENGTH FROM 200' TO 165', STA 0+90 ROAD "A" (K VALUE FROM 25 TO 15.5)

Approval required by: Planning Commission ☒ Engineering ☐

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

3. ALTERNATIVE DESIGN STANDARD REQUESTED:

Approval required by: Planning Commission ☐ Engineering ☐

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

4. ALTERNATIVE DESIGN STANDARD REQUESTED:

Approval required by: Planning Commission ☐ Engineering ☐

Engineering supports the alternative design standard requested (to be completed during review process): YES ☐ NO ☐

Engineering Comments:

5. ALTERNATIVE DESIGN STANDARD REQUESTED:

Approval required by: Planning Commission ☐ Engineering ☐

Engineering supports the alternative design standard requested (to be completed during review process): YES ☐ NO ☐

Engineering Comments:

Planning
KNOXVILLE | KNOX COUNTY

Alternative Design Standards

The minimum design and performance standards shall apply to all subdivisions unless an alternative design standard is permitted within Article 3 Section 3.01.D, Application of Alternative Design Standards, or Article 4.01.C, Street Standards (within Hillside and Ridgetop Areas).

There are some alternative design standards that require Planning Commission approval, and some that can be approved by the Engineering Departments of the City or County. However, the City or County Engineering Departments, as applicable, will provide review comments on any alternative design proposed. These comments will be provided during the review process.

Alternative Design Standards Requiring Planning Commission Approval

Section 3.03.B.2 - Street frontage in the PR (Planned Residential) zone, Knox County
Section 3.03.E.1.e – Maximum grade of private right-of-way
Section 3.03.E.3.a – Pavement width reduction, private rights-of-way serving 6 or more lots
Section 3.04.H.2 – Maximum grade, public streets
Section 3.04.I.1.b.1 – Horizontal curves, local streets in Knox County

Alternative Design Standards Approved by the Engineering Departments of the City of Knoxville or Knox County

Section 3.03.E.3.a – Right-of-way width reduction, private rights-of-way serving 6 or more lots
Section 3.04.A.3.c – Right-of-way dedication, new subdivisions
Section 3.04.F.1 – Right-of-way reduction, local streets
Section 3.04.G.1 – Pavement width reduction, local streets
Section 3.04.H.3 – Intersection grade, all streets
Section 3.04.J.2 – Corner radius reduction in agricultural, residential, and office zones
Section 3.04.J.3 – Corner radius reduction in commercial and industrial zones
Section 3.11.A.2 – Standard utility and drainage easement

By signing this form, I certify that the criteria for a variance have been met for each request, and that any and all requests needed to meet the Subdivision Regulations are requested above or are attached. I understand and agree that no additional variances can be acted upon by the legislative body upon appeal and none will be requested.

Signature | DAVID HARBIN (Printed Name) | Date

For each alternative design standard requested, identify how the proposed alternative design either meets the intent of the standard in the Subdivision Regulations or meets an alternative, nationally recognized engineering standard such as The American Association of State Highway and Transportation Officials (AASHTO) or Public Right-of-Way Accessibility Guidelines (PROWAG).

1. ALTERNATIVE DESIGN STANDARD REQUESTED:

INTERSECTION ROADWAY GRADE -
FROM 1.00% TO 4.32%, STA 0+10 TO STA 0+90 ROAD "A"

Approval required by: Planning Commission ☐ Engineering ☒

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

2. ALTERNATIVE DESIGN STANDARD REQUESTED:

INTERSECTION ROADWAY GRADE -
FROM 1.00% TO 3.00% STA, 0+13 TO STA 0+50 ROAD "B"

Approval required by: Planning Commission ☐ Engineering ☒

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

3. ALTERNATIVE DESIGN STANDARD REQUESTED:

INTERSECTION ROADWAY GRADE -
FROM 1.00% TO 3.00% STA 1+50 TO STA 2+12 ROAD "B"

Approval required by: Planning Commission ☐ Engineering ☒

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

4. ALTERNATIVE DESIGN STANDARD REQUESTED:

INTERSECTION ROADWAY GRADE -
FROM 1.00% TO 3.00% STA 0+13 TO STA 0+45 ROAD "D"

Approval required by: Planning Commission ☐ Engineering ☒

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

5. ALTERNATIVE DESIGN STANDARD REQUESTED:

INTERSECTION ROADWAY GRADE -
FROM 1.00% TO 2.00% STA 0+13 TO STA 2+99 ROAD "E"

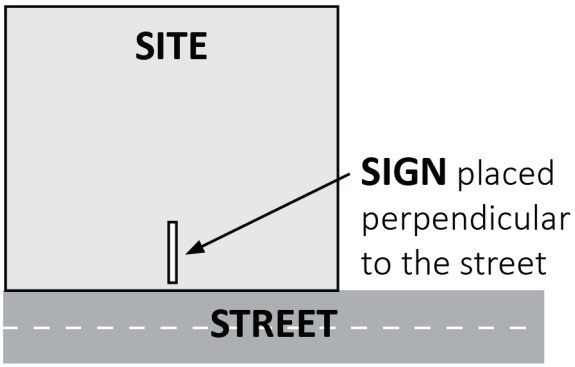
Approval required by: Planning Commission ☐ Engineering ☒

Engineering supports the alternative design standard requested
(to be completed during review process): YES ☐ NO ☐
Engineering Comments:

Sign Posting & Removal Requirement

Revised April 2021

The Administrative Rules and Procedures of the Knoxville-Knox County Planning Commission require a sign to be posted on the property for each application subject to consideration by the Planning Commission, including the following applications: rezoning, plan amendment, concept plan, use on review/special use, planned development, right-of-way closure, and name change.



The required public notice sign(s) will be provided by Planning to the applicant when an application is submitted. If an application is submitted electronically, Planning staff will post the required sign. If a replacement sign(s) is needed, the applicant is responsible for picking up the new sign(s) from Planning and will be charged $10 for each replacement.

LOCATION AND VISIBILITY

The sign must be posted on the nearest adjacent/frontage street and in a location clearly visible to vehicles traveling in either direction. If the property has more than one street frontage, the sign should be placed along the street that carries more traffic. Planning staff may recommend a preferred location for the sign to be posted at the time of application.

TIMING

The sign(s) must be posted **not less than 12 days prior to the scheduled Planning Commission public hearing** and must remain in place until the day after the meeting. In the case of a postponement, the sign can either remain in place or be removed and reposted not less than 12 days prior to the next Planning Commission meeting. The applicant is responsible for removing the sign after the application has been acted upon by the Planning Commission.

The individual below is responsible for posting and removing the sign(s) provided consistent with the above guidelines and between the dates of:

May 10, 2024 and June 14, 2024

(applicant or staff to post sign) **(applicant to remove sign)**

Applicant Name: Arcip Horobet

Date: 4/29/2024

File Number: 6-SB-24-C_6-E-24-DP

☒ Sign posted by Staff

☐ Sign posted by Applicant