SUBDIVISION REPORT - CONCEPT

▶ **FILE #:**	**7-SB-21-C**	**AGENDA ITEM #:**	**26**
POSTPONEMENT(S):	7/8/2021 - 9/9/2021	**AGENDA DATE:**	**10/14/2021**
▶ **SUBDIVISION:**	**CAPITAL DRIVE**		
▶ **APPLICANT/DEVELOPER:**	**PATRICK SCHAAD TRUSTEE**		
OWNER(S):	Schaad Residential Real Estate		

TAX IDENTIFICATION:	131 122 & 122.24 (PART OF)	**View map on KGIS**
JURISDICTION:	County Commission District 3	
STREET ADDRESS:	9933 & 0 Kingston Pk.	
▶ **LOCATION:**	**North side of Kingston Pike at Capital Drive**	
SECTOR PLAN:	Southwest County	
GROWTH POLICY PLAN:	Urban Growth Area	
WATERSHED:	Sinking Creek	
▶ **APPROXIMATE ACREAGE:**	**2.153 acres**	

▶ **ZONING:**	**CB (Business and Manufacturing)**
▶ **EXISTING LAND USE:**	**Retail store, vacant land**
▶ **PROPOSED USE:**	**Commercial subdivision**
SURROUNDING LAND USE AND ZONING:	North: Vacant land -- CB (Business and Manufacturing) South: Kingston Pike -- OP (Office Park) and PC (Planned Commercial) East: Church -- C-H-1 (Highway Commercial) West: Retail and vacant land -- I-G (General Industrial) and C-H-2 (Highway Commercial)

▶ **NUMBER OF LOTS:**	**4**
SURVEYOR/ENGINEER:	David Harbin / Batson, Himes, Norvell & Poe
ACCESSIBILITY:	Access is via Kingston Pike, a major arterial street with 4 travel lanes and a continuous middle turn lane within 87-ft of right-of-way.
▶ **SUBDIVISION VARIANCES REQUIRED:**	**VARIANCES:** **1) Reduce the minimum right-of-way dedication from the centerline of Kingston Pike from 50-ft to 44-ft.** **ALTERNATIVE DESIGN STANDARDS REQUIRING APPROVAL BY KNOX COUNTY ENGINEERING AND PUBLIC WORKS:** **1) Reduce the minimum intersection curb and property line radius at Kingston Pike and Commercial Drive from 75-ft to 50-ft.**

STAFF RECOMMENDATION:

▶ **Approve the requested variance based on the recommendations from the City of Knoxville Department of Engineering, Knox County Engineering and Public Works, and Tennessee Department of Transportation.**

Approve the Concept Plan subject to 8 conditions:

1. Revising the sidewalk design to meet requirements of Knox County Engineering and Public Works, City of Knoxville Department of Engineering, and/or Tennessee Department of Transportation.
2. Implementation of the street and intersection improvement recommendations outlined in the Transportation Impact Study (TIS) prepared by CDM Smith as revised on September 28, 2021 and as required by the Knox County Department of Engineering and Public Works, City of Knoxville Department of Engineering, and Tennessee Department of Transportation (TDOT), with the design details and timing of the improvements to be worked out during the design plan stage for the subdivision. The recommended improvements outlined in the TIS are provided in Exhibit A.
3. Modifying the existing stormwater ponds on lots 1 & 4 to meet the Knox County Stormwater Management Ordinance.
4. Installing notification of future street connection at the north end of Commercial Drive as required by Section 3.04.C.2.d. of the Knoxville-Knox County Subdivision Regulations.
5. Meeting all applicable requirements of the Knox County Engineering and Public Works, City of Knoxville Department of Engineering, and Tennessee Department of Transportation.
6. Provision of street names that are consistent with the Uniform Street Naming and Addressing System within Knox County (Ord 91-1-102).
7. Placing a note on the final plat that all lots will have access only to the internal street system.
8. Submitting to Planning Commission staff prior to final plat review by the Planning Commission, the certification of design plan approval form as required by the Knoxville-Knox County Subdivision Regulations.

COMMENTS:

This proposal is for a 4-lot commercial subdivision and a new 3-lane public road, located on the north side of Kingston Pike at the Capital Drive intersection. The new road (Commercial Drive) is proposed to be approximately 400-ft long, however, the intention is for it to be extended to the north in the future and potentially connect to Parkside Drive. The subject property and the new road are located in Knox County (outside the City limits), the right-of-ways for Kingston Pike and Capital Drive are within the City of Knoxville, and Kingston Pike is a U.S. route maintained by the Tennessee Department of Transportation (TDOT). The new road must meet the standards for Knox County but the Kingston Pike and Capital Drive intersection improvements must meet the requirements of the City of Knoxville and TDOT.

The traffic signal at this Kingston Pike intersection must be modified to accommodate the new road and the Capital Drive intersection on the south side of this intersection needs to be reconfigured to function properly with the addition of the new road, and to provide pedestrian accommodations. The intersection improvements are outlined in Exhibit A. There is a landscape island with a directory sign for the office development in the middle of Capital Drive at the Kingston Pike intersection. It is unknown when this sign was installed but it and the landscape island are in the public right-of-way and may need to be removed as part of the intersection improvements to improve sight distance or to create a dedicated left-turn lane as part of this project or as a capital improvement in the future.

Since this proposal was last discussed at the August Planning Commission meeting, the applicant's engineer has analyzed the two intersections on either side of Capital Drive, Mabry Hood Road to the west and Sherway Road to the east, to study the coordination and progression of traffic among the signals to determine if the Capital Drive intersection can operate as a split-phase signal without significant negative impacts to traffic progression on Kingston Pike (see TIS Addendum #1 and #2 – Exhibit B). Split phasing is a signal design that gives a green phase for all vehicle movements of one direction followed by a phase for all movements of the opposite direction. The study concludes that a split-phase operation at Capital Drive would not disrupt traffic progression along Kingston Pike, as much of the impacts are derived from over-capacity conditions at Mabry Hood Road, and reduces queueing for westbound traffic in the PM peak hour at Mabry Hood Road by storing traffic at Capital Drive.

The City of Knoxville requires sidewalks to be installed along road frontages when a property is developed or redeveloped, so a sidewalk along the Kingston Pike frontage is required. The existing detention ponds on lots 1 and 4 will be modified with the installation of the new road, however, the concept plan does not show a preliminary design for these modifications. The primary concern is how the pond on Lot 4 will impact the parking lot design for the existing business and the applicant has indicated the detention pond will be moved underground.

ESTIMATED TRAFFIC IMPACT: A traffic impact study was prepared by the applicant. The findings of that study were used in formulating the recommendations of this staff report.

ESTIMATED STUDENT YIELD: Not applicable.

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

7-SB-21-C
CONCEPT PLAN

Subdivision: Capital Drive

Approval of Concept Plan

Map No: 131
Jurisdiction: County

0 500
Feet

N

Original Print Date: 9/20/2021 Revised:

*Knoxville - Knox County Planning Commission * City / County Building * Knoxville, TN 37902*

Request to Postpone • Table • Withdraw

Planning
KNOXVILLE | KNOX COUNTY

Name of Applicant: Capital Drive
AS IT APPEARS ON THE CURRENT PLANNING COMMISSION AGENDA

PAID

Original File Number(s): 7-SB-21-C

Date Scheduled for Planning Review: Sept 9, 2021

Date Request Filed: 9·1·21 Request Accepted by: M. Reynolds

REQUEST

☒ **Postpone**
Please postpone the above application(s) until:
Oct 14, 2021
DATE OF FUTURE PUBLIC MEETING

☐ **Table**
Please table the above application(s).

☐ **Withdraw**
Please withdraw the above application(s).

State reason for request:

Eligible for Fee Refund? ☐ Yes ☒ No
Amount:
Approved by:
Date:

APPLICATION AUTHORIZATION

I hereby certify that I am the property owner, applicant, or applicant's authorized representative.

Signature: David Harbin

PLEASE PRINT
Name: DAVID HARBIN BHNP
Address: 4334 Papermill Dr
City: Knoxville State: TN Zip: 37909
Telephone: 865-588-6472
Fax: 865-588-6473
E-mail: harbin@bhnp.com

PLEASE NOTE

Consistent with the guidelines set forth in Planning's *Administrative Rules and Procedures*:

POSTPONEMENTS

Any first time (new) Planning application is eligible for one automatic postponement. This request is for 30 days only and does not require Planning approval if received no later than 3:30 p.m. on the Friday prior to the Planning Commission meeting. All other postponement requests must be acted upon by Planning before they can be officially postponed to a future public meeting.

TABLINGS

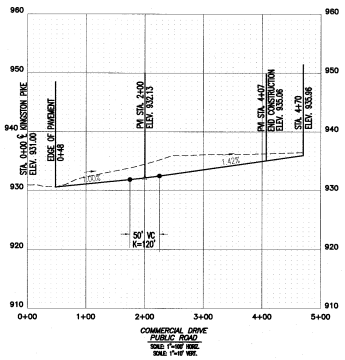
Any item requested for tabling must be acted upon by the Planning Commission before it can be officially tabled.

WITHDRAWALS

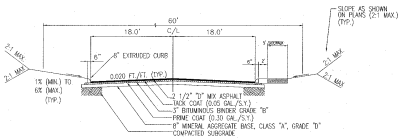
Any item is eligible for automatic withdrawal. A request for withdrawal must be received no later than 3:30p.m. on the Friday prior to the Planning Commission meeting. Withdrawal requests that do not meet these guidelines must be acted upon by Planning Commission before they can be officially withdrawn.

Any new item withdrawn may be eligible for a fee refund according to the following:

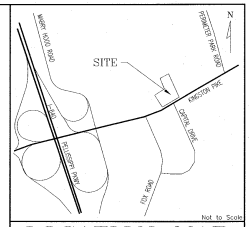
Application withdrawal with fee refund will be permitted only if a written request is received prior to public notice. This request must be approved by either the Executive Director, or the Planning Services Manager. Applications may be withdrawn after this time, but without fee refund.



COMMERCIAL DRIVE
PUBLIC ROAD
SCALE: 1"=40' HORZ.
SCALE: 1"=10' VERT.



TYPICAL ROAD SECTION
THRU 60' ROAD
"PUBLIC ROAD"



LOCATION MAP

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 SUBDIVISION CONTAINS 4 COMMERCIAL LOTS OF 2.153 ACRES.
5. THIS PROPERTY IS ZONED CB.
6. CONTOURS PROVIDED BY BHN&P FIELD SURVEY. ROAD PROFILES ARE BASED ON BHN&P FIELD SURVEY.
7. UTILITIES:
   WATER: FIRST UTILITY DISTRICT
   SEWER: FIRST UTILITY DISTRICT
   ELECTRIC: LENOIR CITY UTILITY BOARD
   GAS: KNOXVILLE UTILITIES BOARD
   TELEPHONE: BELLSOUTH
8. ALL ROADWAYS WILL BE PUBLIC.
9. WAIVERS APPROVED BY KNOXVILLE CITY ENGINEERING AND KNOX COUNTY ENGINEERING ARE AS FOLLOWS;
   a) REDUCE THE RIGHT-OF-WAY DEDICATION ALONG KINGSTON PIKE FROM 50' TO 44' FROM CENTERLINE.
   b) REDUCE THE RADIUS AT INTERSECTING PROPERTY LINES OF KINGSTON PIKE AND ROAD "A" FROM 75' TO 50'.
10. COMPACTION TESTING PURSUANT TO THE REQUIREMENTS OF THE KNOX COUNTY DEPT. OF ENGINEERING & PUBLIC WORKS WILL BE REQUIRED FOR ALL FILL AREAS.
11. BOUNDARY SURVEY BY BHN&P.
12. VEHICULAR ACCESS FOR ALL LOTS IS LIMITED TO INTERIOR ROAD SYSTEM ONLY.
13. THE TWO EXISTING DETENTION BASINS ARE IMPACTED BY CONSTRUCTION OF ROAD A. THE NEW PONDS WILL HAVE THE SAME VOLUME AS THE EXISTING PONDS. THE IMPERVIOUS AREA WILL BE LESS AFTER REDEVELOPMENT.

LOT 4 PARKING REQUIREMENTS:

TOTAL FLOOR AREA-2,139 S.F.

PARKING REQUIREMENTS-RETAIL STORE:

1 PARKING STALL PER 100 S.F. OF FLOOR AREA:
22 SPACES REQUIRED 25 SPACES PROVIDED
INCLUDING 3 ADA SPACES.

DAVID B. HARBIN
REGISTERED ENGINEER
No. 101265
STATE OF TENNESSEE
8/5/2021

CERTIFICATION OF CONCEPT PLAN BY REGISTERED ENGINEER:

I HEREBY CERTIFY THAT I AM A REGISTERED ENGINEER, LICENSED TO PRACTICE ENGINEERING UNDER THE LAWS OF THE STATE OF TENNESSEE. I FURTHER CERTIFY THAT THE PLAN AND ACCOMPANYING DRAWINGS, ENGINEERING DATA AND REPORTS, TO THE BEST OF MY KNOWLEDGE, TO ALL APPLICABLE PROVISIONS OF THE KNOXVILLE-KNOX COUNTY SUBDIVISION REGULATIONS EXCEPT AS HAS BEEN ITEMIZED AND DESCRIBED IN A REPORT FILED WITH THE METROPOLITAN PLANNING COMMISSION.

PROFESSIONAL ENGINEER

TENNESSEE LICENSE NO. 101265 DATE 8/5/2021

OWNER
PATRICK J. SCHAAD TRUSTEE
LOUIS E. SHAAD JR. TRUSTEE

150 MAJOR REYNOLDS PL
KNOXVILLE, TN 37919
PHONE: (865)

7-SB-21-C
Revised: 8/5/2021

7-SB-21-C

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 SEW
CHECKED DBH

NO.	DATE	REVISION	BY
3	8/4/21	KKCP COMMENTS	SEW
2	7/21/21	KKCP COMMENTS	SEW
1	6/16/21	KKCP COMMENTS	SEW

NO.	DATE	REVISION	BY

SCALE
HORIZONTAL: 1"= 40'
VERTICAL: 2' INTERVAL

DATE
05/21/21

DEED REFERENCES: INSTR.#201409050013870

0' 40' 80' 120'
1"=40'

CONCEPT PLAN FOR
ALL ELEVEN GENERAL PARTNERSHIP
KINGSTON PIKE & COMMERCIAL DRIVE
CLT MAP 131 PARCEL 122 & PART OF PARCEL 122.24
DISTRICT 6, KNOX COUNTY, TENNESSEE

22440-C-SP

SHEET 1
OF
1 SHEET

Q:\22440\CONCEPT\22440-C-SP.DWG

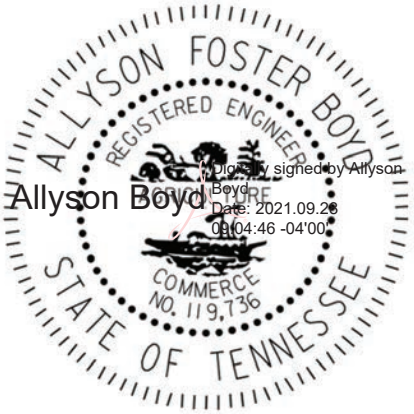
CAPITAL DRIVE-KINGSTON PIKE RETAIL DEVELOPMENT

KNOX COUNTY, TENNESSEE

TRANSPORTATION IMPACT ANALYSIS

Prepared for

All Eleven General Partnership
150 Major Reynolds Place
Knoxville, Tennessee 37919



Allyson Boyd

Digitally signed by Allyson Boyd
Date: 2021.09.28 08:04:46 -04'00'

May 2021
Revised September 2021

Prepared by

CDM Smith
1100 Marion Street, Suite 300
Knoxville, Tennessee 37921

7-SB-21-C
Revised: 9/28/2021

RECOMMENDATIONS

The analyses conducted identifies the following recommendations:

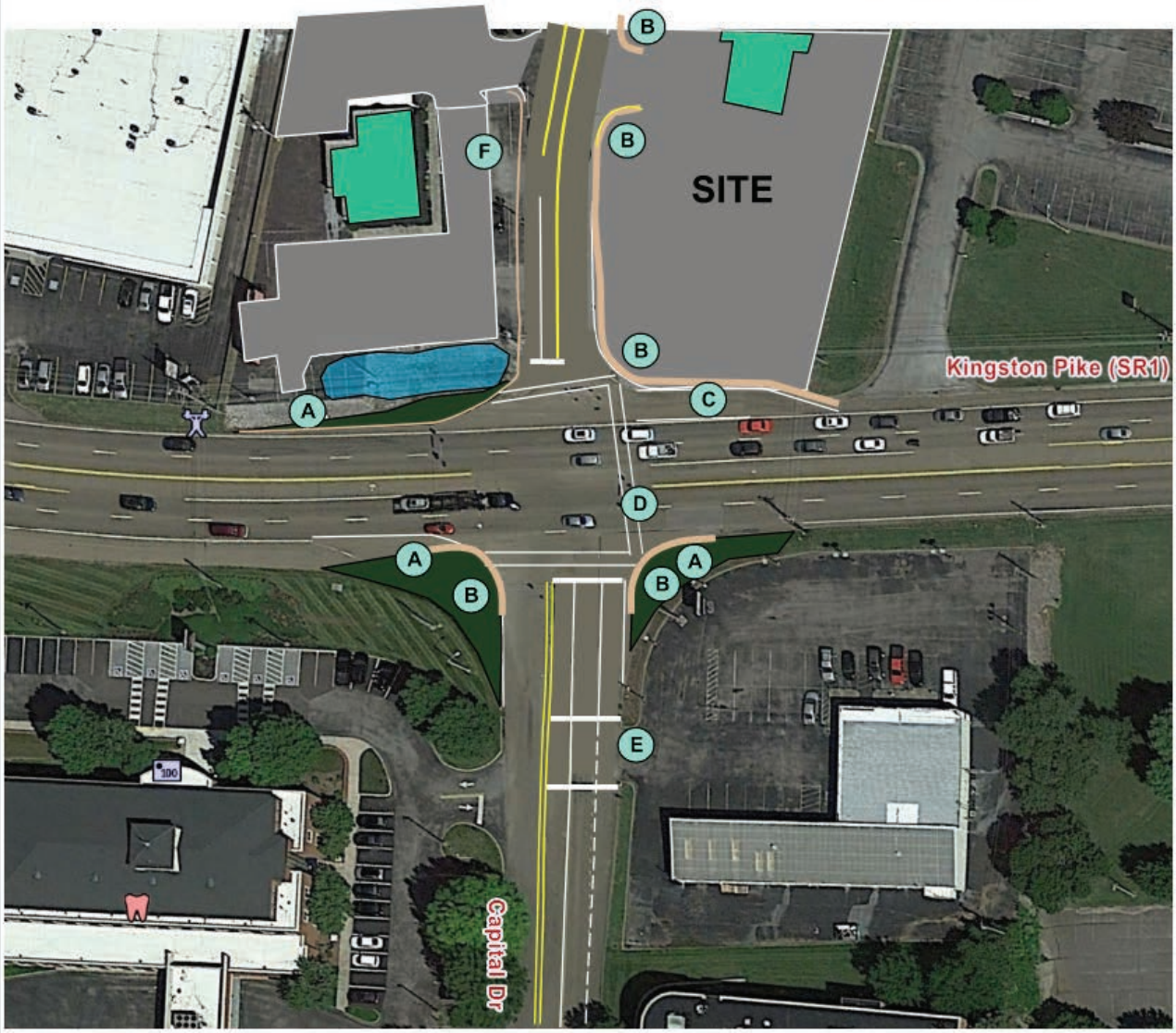
- Construct approximately 400 feet of a three-lane roadway north of Kingston Pike (S.R. 1) to provide access to the existing GemStore jewelry store, proposed coffee/donut shop, and two proposed retail developments.
- Provide 100-foot storage for a left-turn lane on the new connector stub road at the southbound approach to Kingston Pike as shown in **Figure 9**.
    - Ensure there are no driveway openings to the GemStore and proposed retail developments within this storage length.
- Reconfigure the northbound approach on Capital Drive to provide a 300-foot storage left-turn lane, a separate through lane, and a separate right-turn lane as shown in **Figure 9**.
    - This will require the removal of the landscaped median and relocation of the monument sign in the median. If the removal and relocation are unfeasible, the northbound approach can maintain its existing configuration and provide a split-phased operation for the northbound and southbound approaches.
    - The northbound and southbound approaches can also operate with split-phased operation with a three-lane configuration (NBL, NBL-T, NBR). Though there is slight improvement to delays and v/c ratios, this configuration worsens queueing conditions for the northbound approach. Also, if lane distributions vary more evenly than our assumptions, additional queueing may occur.
    - Maintain existing Do Not Block Driveway sign (R10-7 mod) at the existing access to the Broadway Carpets business on Capital Drive. Provide STOP bar striping across all northbound lanes to support sign.
    - Provide adequate distance between the turning path of the proposed northbound left-turn lane and the STOP bar locations of the eastbound travel lanes.
- Provide a 50-foot storage westbound right-turn lane on Kingston Pike via appropriate striping as shown in **Figure 9**.
- City of Knoxville staff have indicated that sidewalks will likely be required both internally along the new connector stub of Capital Drive and along the Kingston Pike road frontage. This will require the construction of sidewalk and ADA-compliant curb ramps along the proposed Kingston Pike westbound right-turn lane to Capital Drive, around the radii of the new connector stub road, and any connecting corners of the study intersection.
- Provide crosswalk striping from the northwest to northeast to southeast corners of the study intersection as shown in **Figure 9**.
- Post STOP signs (R1-1) for exiting traffic from the GemStore, proposed coffee/donut shop, and proposed retail strip development driveways located along the new connector road north of Kingston Pike.
- Modify signal operations of existing span-wire system to include appropriate signal parameters to facilitate the proposed connector stub road, recommended turn lanes, and pedestrian accommodations, which include:
    - Provide protected-permissive phasing for eastbound left-turn with additional signal heads and phasing and timing updates.

- Provide protected-permissive phasing for northbound left-turn with additional signal heads and phasing and timing updates.
- Should the northbound and southbound approaches utilize split-phased operation, provide the appropriate signal heads and phasing and timing updates.
- Provide countdown pedestrian signal heads with audible ADA-compliant pushbuttons, and pedestrian signs. Signal phasing and timing updates should be provided for this pedestrian crossing maneuver.

- Minimize landscaping, using low growing vegetation, and signing at the proposed street access to insure that safe sight distance is maintained.
- Intersection and roadway design should conform to the recommended standards and practices of TDOT, AASHTO, ITE, the City of Knoxville Traffic Engineering Department, and Knox County EPW.

RECOMMENDED INTERSECTION GEOMETRY FOR PROPOSED DEVELOPMENT

Capital Drive Retail Development
Knoxville, TN



NOTES:

A. Tightening intersection layout requires additional striping and landscaping and some striping removal. Likely to include utility and drainage impacts.

B. ADA-compliant curb ramps required, including detectable warning surface and turning space behind ramp. Likely to include utility and drainage impacts.

C. Striping of turn lane assumes shoulder is full depth.

D. Crosswalk preferred along eastside to avoid high volume northbound left turns.

E. Maintain business access by providing STOP bars across proposed lanes.

F. Stub road construction will require modification of access and parking at GemStore jewelry store.

N

Figure 9

CONCLUSION

The study addressed the transportation impact analysis and access requirements of an existing GemStore jewelry store and a proposed coffee/donut shop and two retail store developments within a Capital Drive retail development via an approximately 400-foot long proposed Capital Drive stub road constructed to Knox County standards from centerline of Kingston Pike (S.R. 1). Traffic signal system parameters were maintained throughout the study except when phasing modification and split optimization are required. Peak hour factors were consistent between all PM peak hour analysis periods to provide a conservative queue length and operational analysis. Adjustments were made to peak hour factors at the proposed stub road during the AM peak hour with the proposed development to account for new trips. Existing traffic for the signalized intersection was found to be operating at LOS A and LOS F for the AM and PM peak hours. Background traffic was determined using a 1.0-percent compounded growth rate until the horizon year 2026. The analysis does not include development of the undeveloped 25-acre tract north of the proposed site as there are no known development plans. Without the proposed development, the study intersection will maintain its LOS A in the AM peak hour and LOS F during the PM peak hour. Traffic associated with the proposed development was generated for a 2,500 SF coffee/donut shop with drive-through window and two 10,000 SF retail stores. The site will generate 4,060 daily trips, and after consideration of pass-by traffic, approximately 2,840 primary trips will be generated. Trips were assigned to the study intersection projected conditions and analyzed for capacity and level of service. Analyses found that acceptable levels of service can be achieved for the study intersection with improvements of added turn lanes, phasing modifications, and split optimizations. Driveways should be located to the most extreme property limits to minimize the number of events where queues block access during the peak hours. Acceptable sight distances for the site driveways should be provided. With the recommendations of this report, the impact of this proposed site can be minimized and manageable.

EXHIBIT B

Capital Drive at Kingston Pike Northbound Approach Configuration

EXHIBIT B

CDM Smith
1100 Marion St., Suite 300
Knoxville, Tennessee 37921
tel: 865. 963.4300
fax: 865. 524-5311

July 23, 2021

Mr. Rodney Phillips
All Eleven General Partnership
150 Major Reynolds Place
Knoxville, Tennessee 37919

RE: Capital Drive at Kingston Pike Northbound Approach Configuration

Dear Mr. Phillips:

CDM Smith is pleased provide this letter report regarding the recommendations of the June 2021 traffic impact study for the proposed Capital Drive Retail Development that would be at the intersection of Capital Drive and Kingston Pike. Specifically, the purpose of this letter report is to review alternatives for the northbound approach geometry due to the unfeasibility of moving a monument that is currently placed in the median of the northbound approach.

The traffic impact study report recommended that the northbound approach on Capital Drive be reconfigured to provide a 300-foot storage left-turn lane, a separate through lane, and a right-turn lane. As this would require the removal of a 50-foot landscaped median and relocation of a monument sign in the median at this approach, it was noted that the northbound approach can maintain its operation with its existing configuration by providing a shared left-through lane and a separate right-turn lane with split phased operation for the northbound and southbound approaches. It is important to note that an exclusive left-turn lane and shared through-right configuration is not recommended for the northbound approach as the through-right lane will be offset from the opposing receiving lane.

The remaining buildout analysis and final recommendations of the traffic impact study report continued forward assuming the northbound approach could operate with three exclusive lanes; however, it is our understanding that this is an unfeasible configuration for the northbound approach because of the cost to remove and relocate the monument sign. The analysis results in this letter retain the remaining intersection improvements as stated in the traffic impact study report (an exclusive westbound right turn lane and eastbound left-turn phasing modification).

Analysis of the buildout conditions were conducted using Synchro, version 10, with HCM 6th edition methodologies and found that with a north- and southbound split phased operation, the intersection of Capital Drive and Kingston Pike will operate at an overall level-of-service (LOS) C and D during the AM and PM peak hours, respectively. It should be noted that the signal cycle lengths were optimized during this analysis. The AM peak hour cycle length optimized to 80 seconds, and the PM peak hour

EXHIBIT B

cycle length optimized to 150 seconds. Worst-case movement volume-to-capacity (v/c) ratios are 0.75 during the AM peak hour and 0.99 during the PM peak hour. During the PM peak hour, the northbound through-left and the southbound through-right lanes are near capacity. Queues for the northbound approach will lessen with the split phased operation compared to the existing operations; although, during the PM peak hour, the northbound left-through lane queues may potentially extend past the full lane development of the right turn lane.

With northbound/southbound split phase operation and the additional improvements at the Capital Drive and Kingston Pike intersection (an exclusive westbound right turn lane and eastbound left-turn phasing modification), conditions for the AM and PM peak hours negligibly worsen as overall intersection delays for both peak periods will increase by approximately 2 seconds. Again, these results are with cycle length optimization, and the cycle lengths optimized to 80 seconds in the AM peak hour and 110 seconds in the PM peak hour. During the PM peak hour, the northbound left-through lane is expected to operate near capacity with a v/c ratio of 0.99, yet the v/c ratio of the southbound through-right lane is expected to decrease to 0.54. Northbound queues during the PM peak hour will reduce slightly but the left-through lane queues are expected to extend past the full lane development of the right turn lane.

The capacity and LOS analyses results comparison is presented in Table 1, and the 95th percentile queues for the northbound approach are shown in Table 2.

Table 1: Summary of 2026 Projected Capacity and Level-of-Service

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	V/C	DELAY	LOS
Capital Drive at Kingston Pike	**SIGNAL**	**AM**	**3.20**	**81.9**	**F**
		PM	**3.36**	**119.6**	**F**
NB/SB Split-Phased Operation & Cycle Length Optimization	*SIGNAL Mitigation*	*AM*	*0.75*	*20.8*	*C*
		PM	*0.99*	*41.2*	*D*
NB/SB Split-Phased Operation, Cycle Length Optimization, Exclusive WBR Turn Lane & EB Phasing Modification	*SIGNAL Mitigation*	*AM*	*0.75*	*22.5*	*C*
		PM	*0.99*	*43.9*	*D*

Note: Average vehicle delay estimated in seconds. V/C ratios reported from worst-case movement.

EXHIBIT B

Table 2: 2026 Projected 95th Percentile Queues

Approach & Direction		Peak Hour	Available Storage (ft)	95th Percentile Queue (ft)		
				2026 No Build	2026 Build with Partial Mitigation[1]	2026 Build with Full Mitigation[1]
Capital Drive	NBL-T	AM	---	200	135	135
		PM	---	406	365	278 [2]
Capital Drive	NBR	AM	145	45	0	0
		PM	145	71	74	36

1. Partial Mitigation includes exclusive NB/SB split-phased operation and cycle length optimization.
   Full Mitigation includes the partial mitigation improvements, WBR turn lane, and EBL protected-permissive phasing.
2. 95th percentile volume exceeds capacity.

In comparison to the analyses results of the recommended approach geometry from the traffic impact study (separate left, through, and right lanes) there are minimal differences in v/c ratios, delay, and northbound queues as with the three exclusive lane configuration. Table 3 shows the comparison of analyses results.

Table 3: Results Comparison to June 2021 Traffic Impact Study Recommended Geometry

Peak Hour	Criteria	Shared Left-Through & Right	Exclusive Left, Through, & Right
AM	V/C Ratio	0.75	0.65
	Delay (sec)	22.5	14.1
	LOS	C	B
	NBL Queue	135	164
PM	V/C Ratio	0.99	0.99
	Delay (sec)	43.9	38.1
	LOS	D	D
	NBL Queue	278	280

It should be noted that the analyses results of this letter report optimized the cycle length of the study intersection only; however, it is understood that the Capital Drive signal operates in a system with adjacent signals along Kingston Pike. It is possible, as mentioned in the traffic impact study report, that a split-phased operation will worsen queueing conditions for the northbound approach and have slight changes to overall intersection delays and v/c ratios. However, the northbound queues will depend on the actual cycle length employed in the field and is a function of how the City of Knoxville wants to allocate the signal timing to each phase.

Through the analyses documented in this letter report, with the buildout of the proposed Capital Drive Retail Development, the northbound approach of Capital Drive at Kingston Pike can operate as a shared left-through lane and exclusive right turn lane, which can be provided through the existing

EXHIBIT B

layout. Additional analysis may be needed to ensure v/c ratios, delays, and queues with the split-phased operation of the signal within the signal system is within manageable measures. The recommendations of the June 2021 traffic impact study regarding the other intersection approaches are still valid and must be provided as well.

Sincerely,

Allyson F. Boyd, PE
Transportation Engineer
CDM Smith Inc.

cc: Mr. Hollis Loveday, PE, CDM Smith Inc.

Capital Drive at Kingston Pike Corridor Progression

EXHIBIT B

CDM Smith
1100 Marion St., Suite 300
Knoxville, Tennessee 37921
tel: 865. 963.4300
fax: 865. 524-5311

September 13, 2021

Mr. Rodney Phillips
All Eleven General Partnership
150 Major Reynolds Place
Knoxville, Tennessee 37919

RE: Capital Drive at Kingston Pike Corridor Progression

Dear Mr. Phillips:

CDM Smith is pleased to provide this letter report regarding the recommendations of the June 2021 traffic impact study for the proposed Capital Drive Retail Development that would be at the intersection of Capital Drive and Kingston Pike. Specifically, the purpose of this letter report is to expand on the assumptions that the intersection of Capital Drive and Kingston Pike can sufficiently operate as a split-phased signal without significant negative impacts to traffic progressions on Kingston Pike.

In our letter report dated July 23, 2021, the analysis concluded that during the buildout conditions of the Capital Drive Retail Development and with a north- and southbound split-phased operation, the intersection of Capital Drive and Kingston Pike will operate at an overall level-of-service (LOS) C and D during the AM and PM peak hours, respectively. This analysis, however, solely analyzed the study intersection, and did not consider the impacts of adjacent signalized intersections on Kingston Pike. It is understood that the Capital Drive signal operates in a coordinated system with the adjacent signals on Kingston Pike. This letter report will present the analysis results of the two intersections on either side of Capital Drive, Mabry Hood Road/ I-140 Ramps and Sherway Road, and the coordination and progression of traffic among the signals with the proposed split-phased operation.

Peak hour traffic volumes were collected at Kingston Pike at Sherway Road and Mabry Hood Road in early September 2021, and the observed volumes were adjusted by the recommended 20-percent growth factor to synchronize with the adjusted values previously analyzed at Capital Drive. Signal timing data provided by the City of Knoxville shows that the Mabry Hood Road and Sherway Road signals both operate using split-phased timings, and all signals use different cycle lengths during the day. During the AM peak hour, the cycle length at Sherway Road is 100 seconds, while the cycle lengths at Capital Drive and Mabry Hood Road are 130 seconds. During the PM peak hour, the cycle length for all three signals is 140 seconds.

Analysis of the existing conditions were conducted using Synchro, Version 10 with HCM 6th edition methodologies, to establish baseline conditions of the study intersections within the signal system.

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The analysis determined that all intersections currently perform at LOS A or C during the AM peak hour and LOS C, D or F during the PM peak hour. As previously reported, the northbound approach at Capital Drive is over-capacity during the PM peak hour; likewise, the north- and southbound approaches at Mabry Hood/ I-140 ramps are near-capacity during the AM peak hour and over-capacity during the PM peak hour.

Observations of existing progression through the study area intersections shows that traffic does not always successfully travel through all three intersections in both directions during peak hours. During both peak hours, both directions of travel are impacted by the high volume of traffic exiting from I-140. Traveling eastbound, it is very common for the leading platoon of traffic to be stopped at Sherway Road from Mabry Hood Road, and those behind the leading platoon are likely to be stopped at Capital Drive. Westbound travel commonly progresses through Sherway Road and Capital Drive before being stopped at Mabry Hood Road. These observations are supported by the time-space diagrams illustrated in Synchro (see Figures 1 and 2) and visualizations in SimTraffic simulations.

With northbound/southbound split phase operation and the additional improvements at the Capital Drive and Kingston Pike intersection (an exclusive westbound right turn lane and eastbound left-turn phasing modification), conditions for the AM peak hour operate at LOS B or C and operate at LOS C or a D for the PM peak hour. These analysis results maintain the existing cycle lengths as currently observed and optimize the cycle offsets within the signal system. Proposed conditions for Capital Drive at Kingston Pike with the existing cycle lengths show better LOSs than shown in previous reports with shorter cycle lengths, likely due to the longer green times of Kingston Pike and the critical northbound phase. The capacity and LOS analyses results comparison is presented in Table 1.

Table 1: Summary of 2021 Existing and 2026 Projected Capacity and Level-of-Service

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2021 TRAFFIC V/C	2021 TRAFFIC DELAY	2021 TRAFFIC LOS	2026 PROJECTED V/C	2026 PROJECTED DELAY	2026 PROJECTED LOS
Sherway Road at Kingston Pike	SIGNAL	AM	0.60	10.0	A	0.62	10.8	B
		PM	0.77	20.4	C	0.73	27.6	C
Capital Drive at Kingston Pike	SIGNAL	AM	0.61	8.2	A	0.73	15.2	B
		PM	3.17	124.2	F	0.90	22.7	C
Mabry Hood Road at Kingston Pike	SIGNAL	AM	0.92	27.9	C	0.92	24.9	C
		PM	1.13	35.5	D	1.29	41.2	D

Note: Average vehicle delay estimated in seconds. V/C ratios reported from worst-case movement.
Capital Drive 2026 Projected configuration is with NBL-T/R split-phased operation, WBR turn lane, and EB phasing modification.

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Mr. Rodney Phillips
September 13, 2021
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Figure 1: Existing 2021 AM Peak Hour Time-Space Diagram

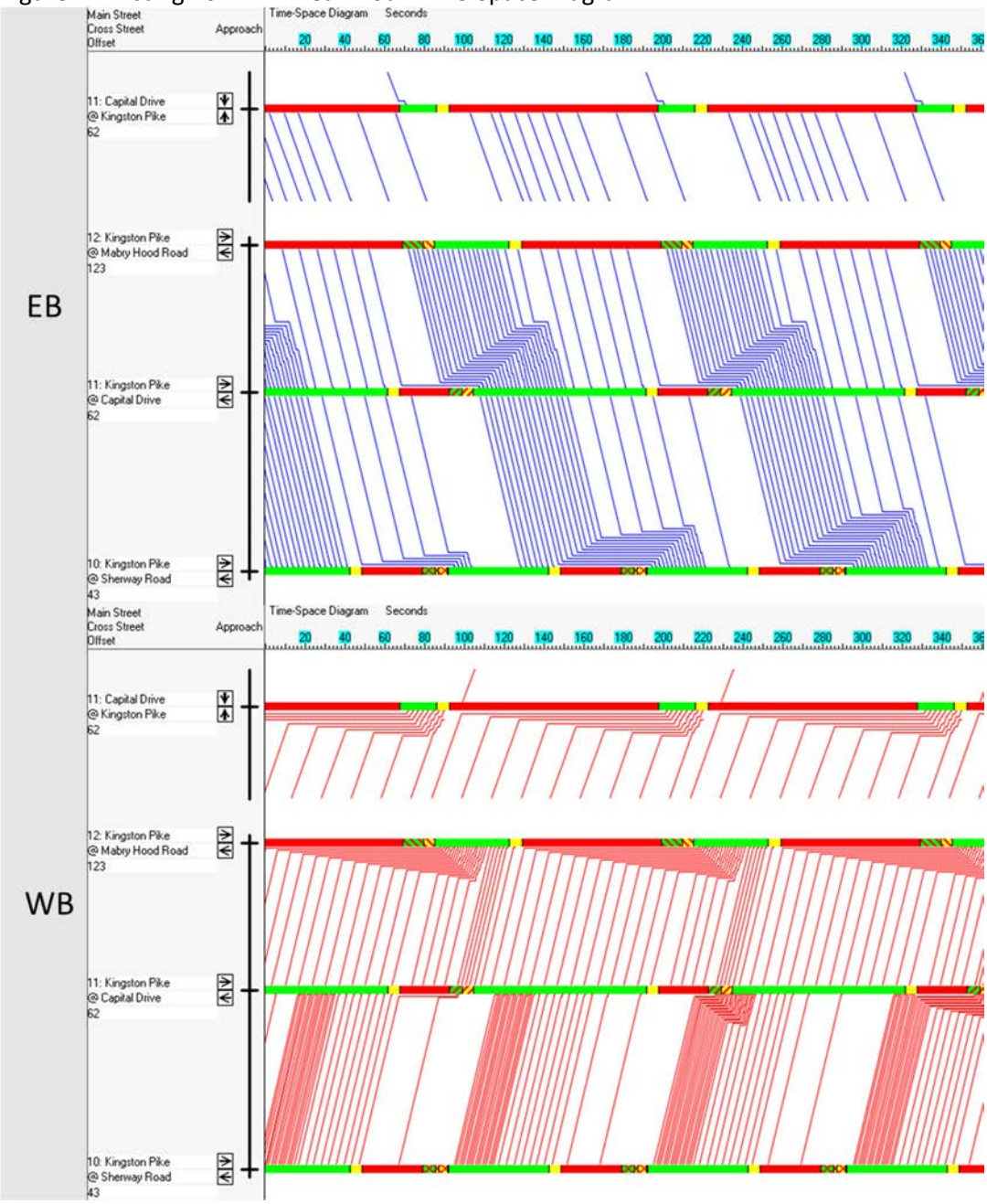

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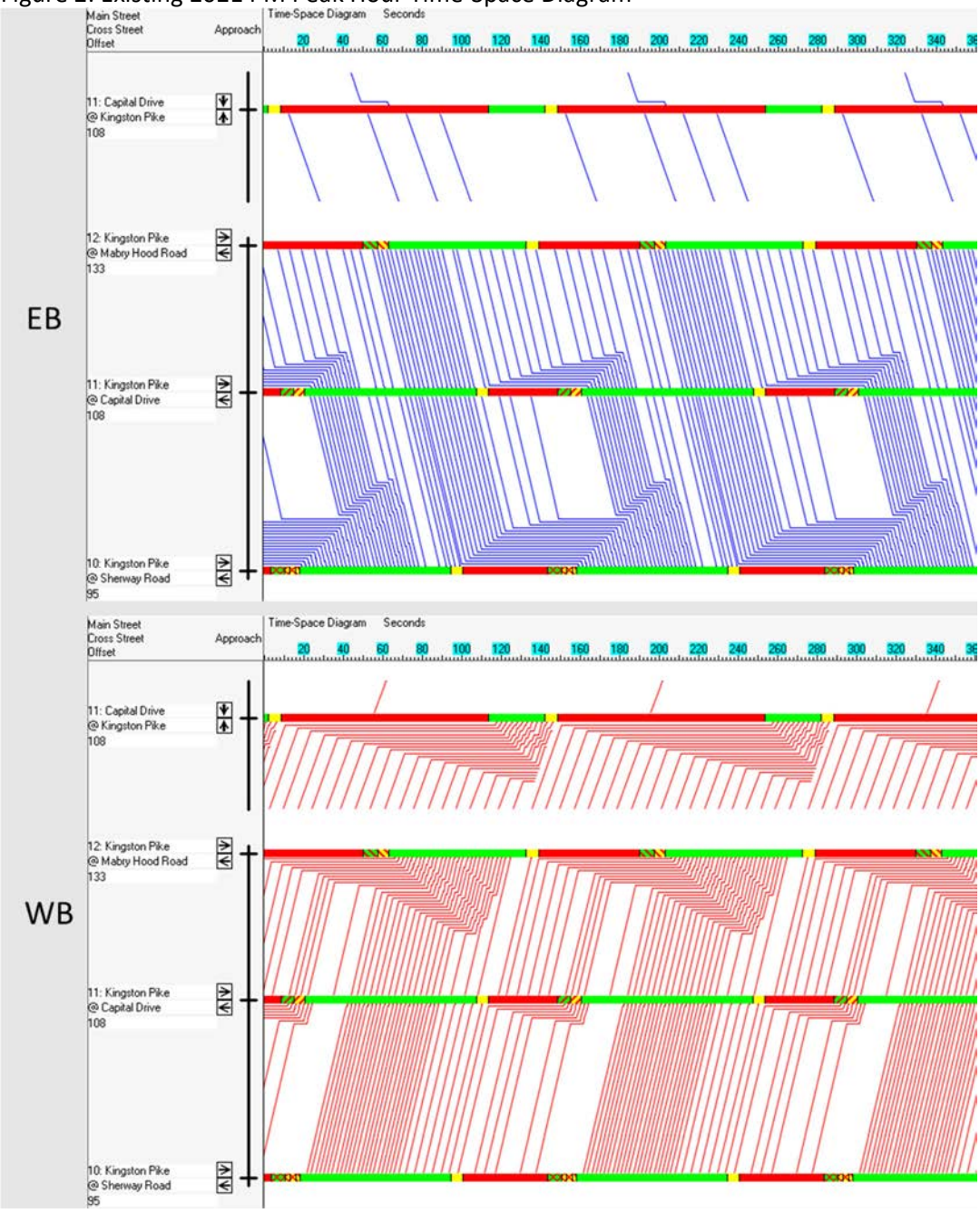
Figure 2: Existing 2021 PM Peak Hour Time-Space Diagram



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The split-phase operation of the signal at Capital Drive and additional traffic has both positive and negative impacts to the traffic progression along Kingston Pike as portrayed in SimTraffic visualizations and Synchro time-space diagrams, as shown in Figures 3 and 4. In the AM peak hour, with the offset optimization, eastbound progression improves, as traffic is more likely to proceed through Capital Drive during all eastbound green time at Mabry Hood Road. Some stops or queuing are expected at the approach to Sherway Road, which is not different than currently observed. Westbound AM peak hour traffic is more likely to encounter a stop or queue at Capital Drive, but experience stops and queueing at Mabry Hood as observed today. In the PM peak hour, eastbound traffic is more likely to be encounter a stop or queue at Capital Drive; yet is more likely to proceed through Sherway Road than currently observed. Similarly, traffic is more likely to encounter a queue or stop at Capital Drive from Sherway Road in the westbound direction; yet, progression is similar between Capital Drive and Mabry Hood Road as today.

Additional queue analyses can also determine the impact of the proposed operations and progression of traffic along Kingston Pike. Using the HCM 6th methodologies of Synchro, the 95th percentile of the east- and westbound traffic along Kingston Pike is shown in Table 2. A comparison to existing queues is also shown. In the eastbound direction, PM peak hour queues at Mabry Hood Road are expected to increase by 150' with the optimized offset timings. The Synchro software's optimization minimizes delays as shown in Table 1 but at the expense of longer queues on Kingston Pike. In the westbound direction, AM peak hour queues at Mabry Hood and Capital Drive are expected to increase by 150' or more, and PM peak hour queues at Capital Drive are expected to increase by nearly 200'. These values reported illustrate the queues of optimized offset timings set by Synchro. It is possible to reduce these queues depending on how the City of Knoxville chooses to allocate the signal timings and offsets to each signal. As previously mentioned, the optimized timings favor an eastbound progression which is likely not preferred, especially during the PM peak hour.

Table 2: Kingston Pike 95th Percentile Queues Comparison with Split-Phase Operation at Capital Drive

Approach & Direction		Scenario	Peak Hour	95th Percentile Queue (ft)		
				Mabry Hood Rd.	Capital Dr.	Sherway Rd.
Kingston Pike	EB	Existing 2021	AM	505	295	260
			PM	375	455	395
Kingston Pike	EB	Projected 2026	AM	580	170	285
			PM	**525**	365	180
Kingston Pike	WB	Existing 2021	AM	270	105	215
			PM	495	380	505
Kingston Pike	WB	Projected 2026	AM	**425**	**270**	245
			PM	445	**575**	565

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Figure 3: Projected 2026 AM Peak Hour Time-Space Diagram

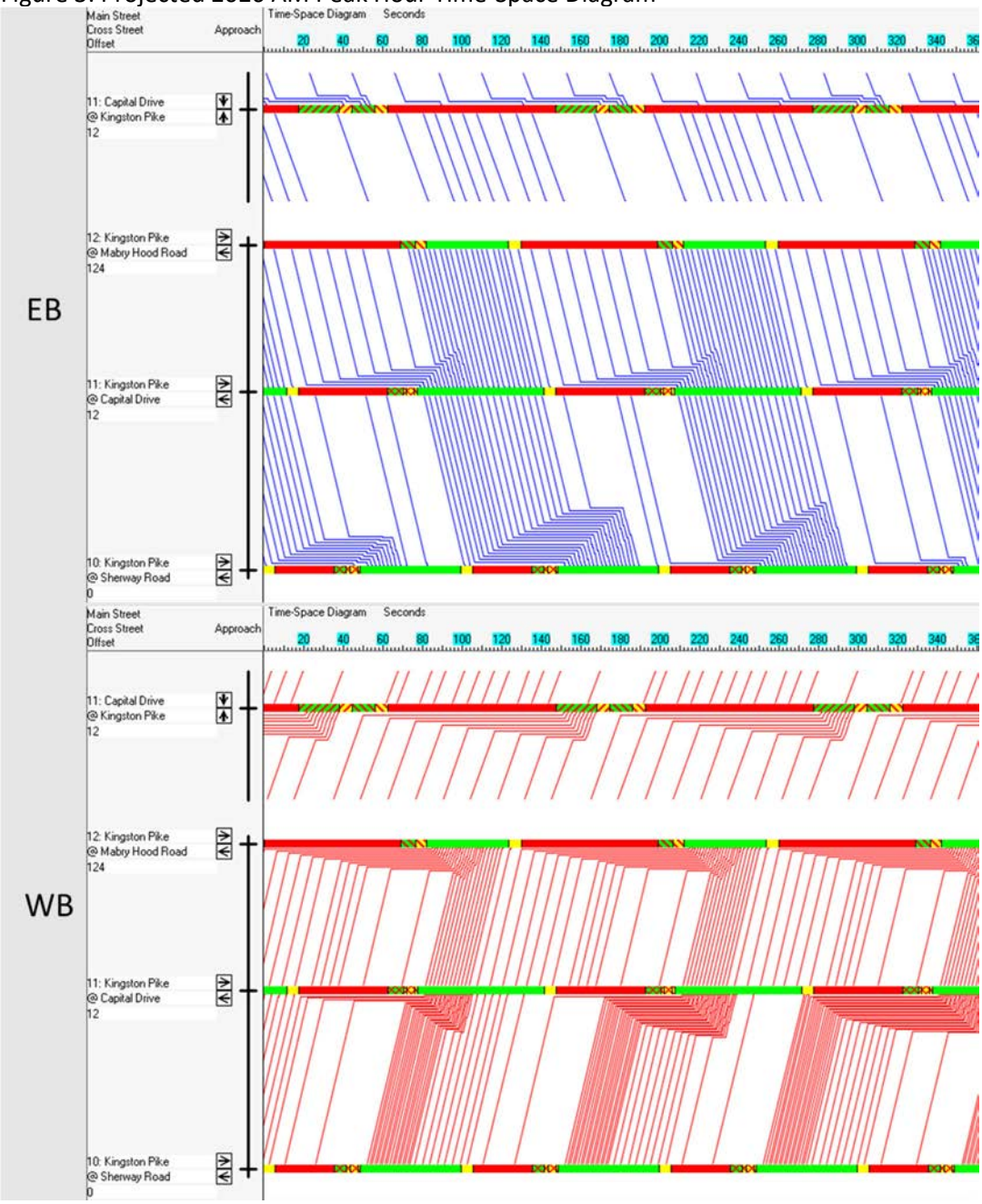

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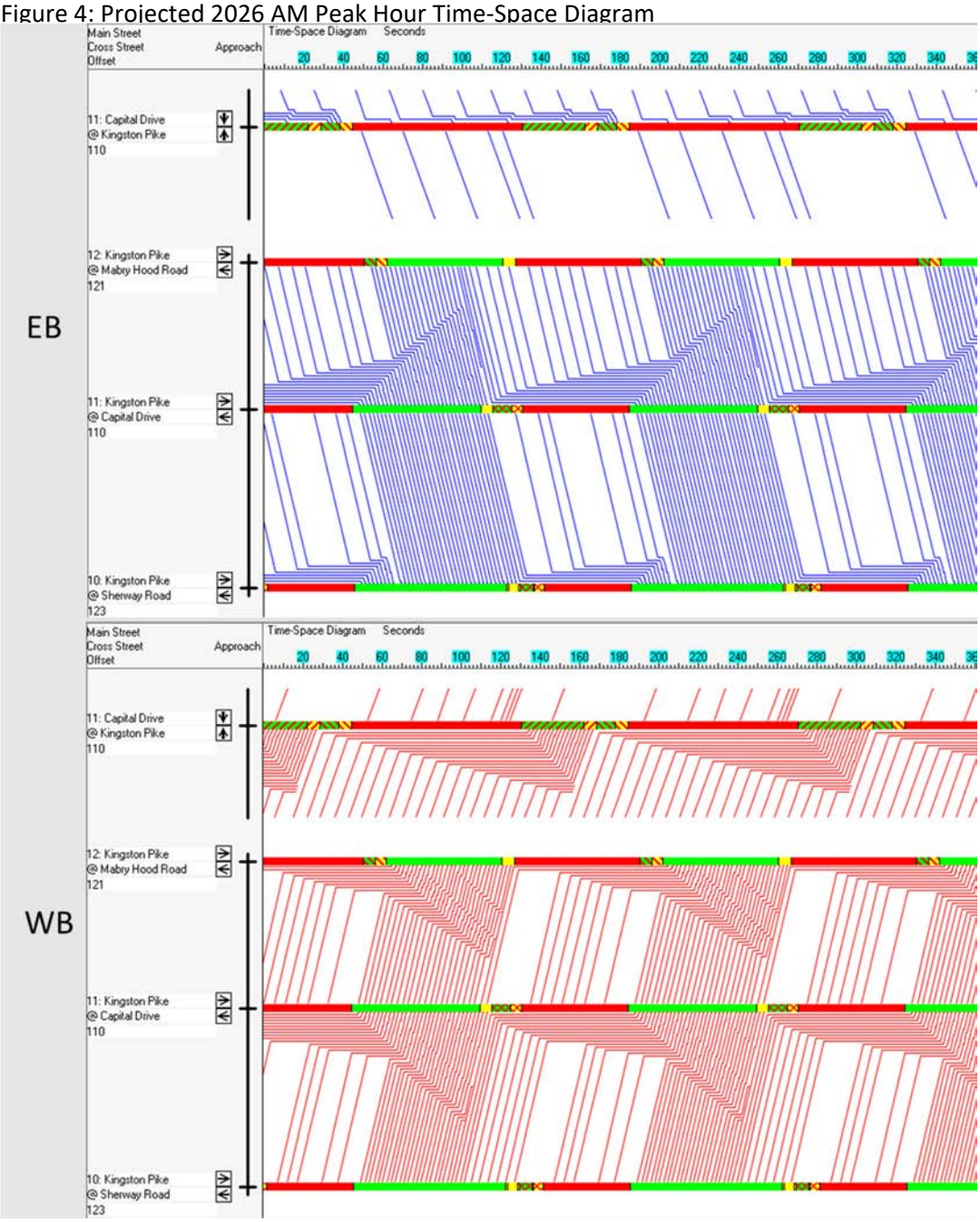
Figure 4: Projected 2026 AM Peak Hour Time-Space Diagram



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The initial recommendations of the Capital Drive Retail Development traffic impact study proposes that the northbound approach at Capital Drive be reconfigured to provide separate left, through, and right turn lanes, provided that the landscaped median can be removed and monument sign relocated. With the three-lane approach, the signal would operate under conventional phasing with additional left-turn phases for all approaches. For comparison purposes, additional analysis was conducted to compare the signal operations and Kingston Pike progression should Capital Drive be modified to provide a three-lane northbound approach. Using existing signal cycle lengths and optimized offsets, there are minimal differences between v/c ratios, delays, and northbound queues between the two- or three-lane configurations as shown in Table 3; however, westbound traffic along Kingston Pike between Capital Drive and Mabry Hood Road are negatively impacted by the different signal operations, specifically during the PM peak hour. Simulations in SimTraffic and Synchro time-space diagrams illustrated in Figures 5 and 6 show that westbound queues at Mabry Hood Road are expected to increase to near the entire distance to Capital Drive due to the added traffic on Kingston Pike and the wait time for the split-phase at Mabry Hood. With Capital Drive operating as a split-phased signal, this additional traffic is held at Capital Drive before being released to Mabry Hood Road and is likely to progress through the signal. As shown in Table 2, the worst-case queues expected at Capital Drive in the westbound approach are approximately 575 feet, which can be stored with no impacts to Sherway Road.

Table 3: Capital Drive Analysis Results Comparison

Peak Hour	Criteria	Split-Phased Signal	Conventional Signal
		Shared Left-Through & Right	Exclusive Left, Through, & Right
AM	V/C Ratio	0.65	0.65
	Delay (sec)	15.2	13.6
	LOS	B	B
	NBL Queue	195	165
PM	V/C Ratio	0.99	0.95
	Delay (sec)	22.4	15.1
	LOS	C	B
	NBL Queue	330	275

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Figure 5: Projected 2026 AM Peak Hour Time-Space Diagram with Three-Lane Northbound Capital Drive

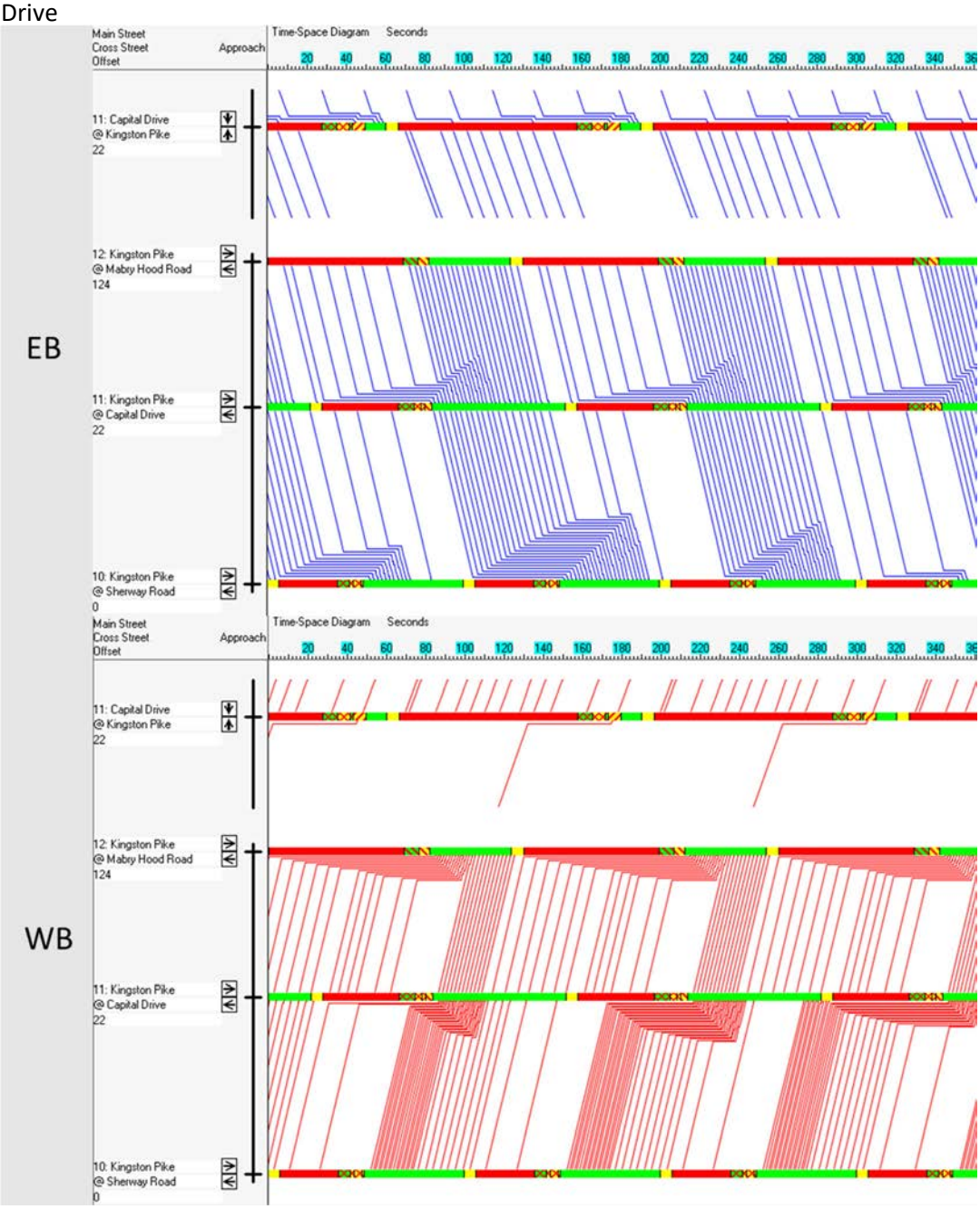

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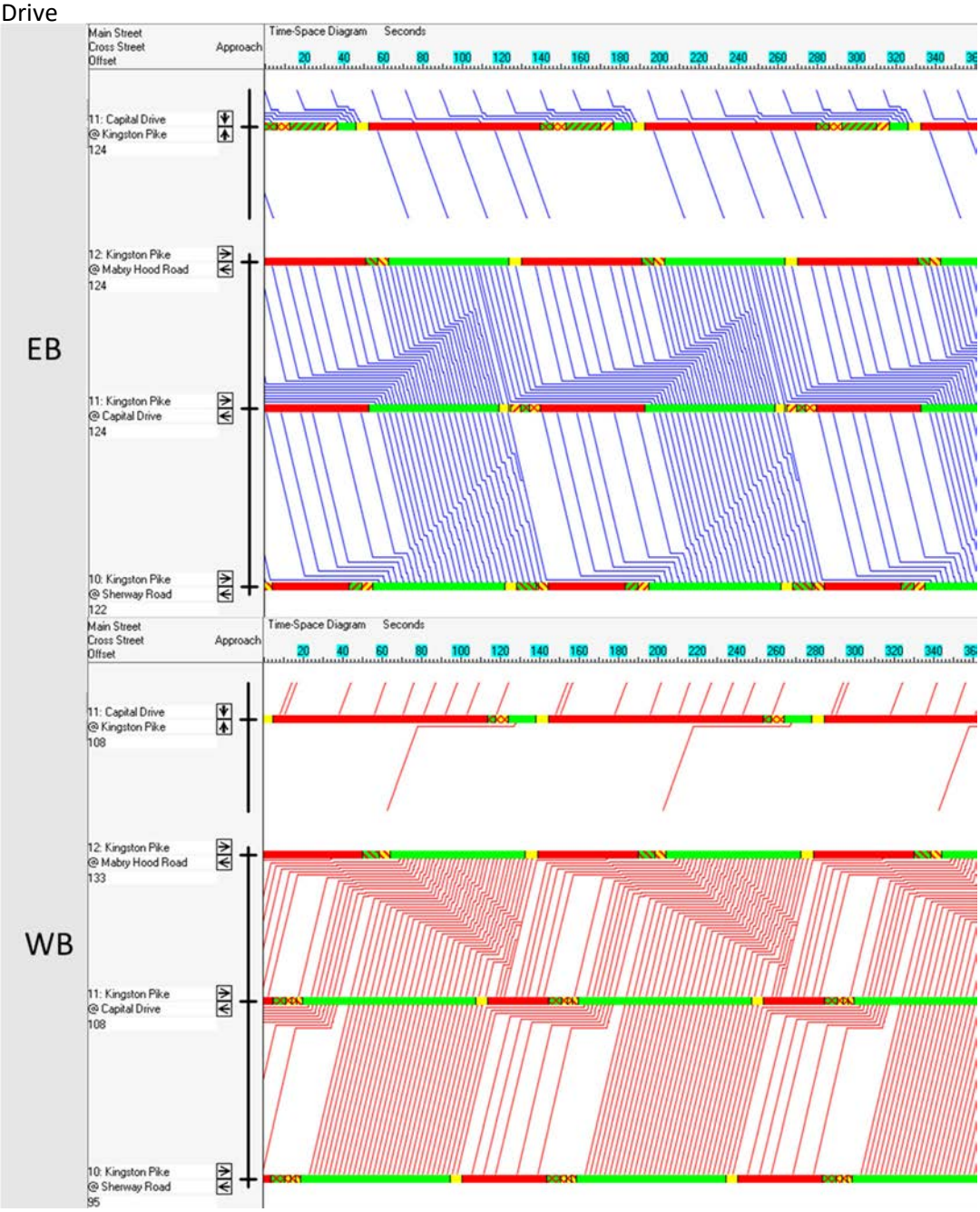
Figure 6: Projected 2026 PM Peak Hour Time-Space Diagram with Three-Lane Northbound Capital Drive



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The analysis documented in this letter report illustrates the operational impact of a split-phased signal and proposed development at Capital Drive and Kingston Pike and the traffic progression between the two adjacent signals at Mabry Hood Road and Sherway Road. By considering the adjacent traffic and signal operations, the intersection at Capital Drive functions more favorably as a split-phased signal, and the additional traffic and timing changes will have a manageable impact on traffic flow. The split-phased operation at Capital Drive does not disrupt traffic progression along Kingston Pike, as much of the impacts are derived from over-capacity conditions at Mabry Hood Road. In fact, a split-phased operation at Capital Drive reduces queueing for westbound traffic in the PM peak hour at Mabry Hood Road by storing traffic at Capital Drive. Adjustments can be made at the preference of the City to determine the best timing and offset parameters to optimize progression in both directions of Kingston Pike.

Sincerely,

Allyson F. Boyd, PE
Transportation Engineer
CDM Smith Inc.

cc: Mr. Hollis Loveday, PE, CDM Smith Inc.

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

PATRICK SCHAAD TRUSTEE
Applicant Name

Affiliation

5/24/21
Date Filed

7/8/21
Meeting Date (if applicable)

File Number(s)
7-SB-21-C

CORRESPONDENCE

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

☐ Applicant ☐ 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

Schaad Residential Real Estate
Owner Name (if different)

150 MAJOR REYNOLDS PL 37919
Owner Address

Owner Phone

9933 KINGSTON PIKE
Property Address

map 131 parcel 122 & part of parcel 122.24
Parcel ID

FUD
Sewer Provider

FUD
Water Provider

N
Septic (Y/N)

STAFF USE ONLY

North side of Kingston Pike @ Capital Dr
General Location

2.153 ac.
Tract Size

☐ City ☒ County
X

3rd
District

CB
Zoning District

CO, AgForVac
Existing Land Use

Southwest County
Planning Sector

MU-SD
Sector Plan Land Use Classification

Urban Growth
Growth Policy Plan Designation

DEVELOPMENT REQUEST

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

☐ Residential ☐ Non-Residential

Home Occupation (specify)

Other (specify)

Related City Permit Number(s)

SUBDIVISION REQUEST

Related Rezoning File Number

Proposed Subdivision Name

☐ Combine Parcels ☐ Divide Parcel

Unit / Phase Number

Total Number of Lots Created

☒ Other (specify) 4 COMMERCIAL LOTS OF 2.153 AC

☐ Attachments / Additional Requirements

ZONING REQUEST

Pending Plat File Number

☐ Zoning Change

Proposed Zoning

☐ 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)*

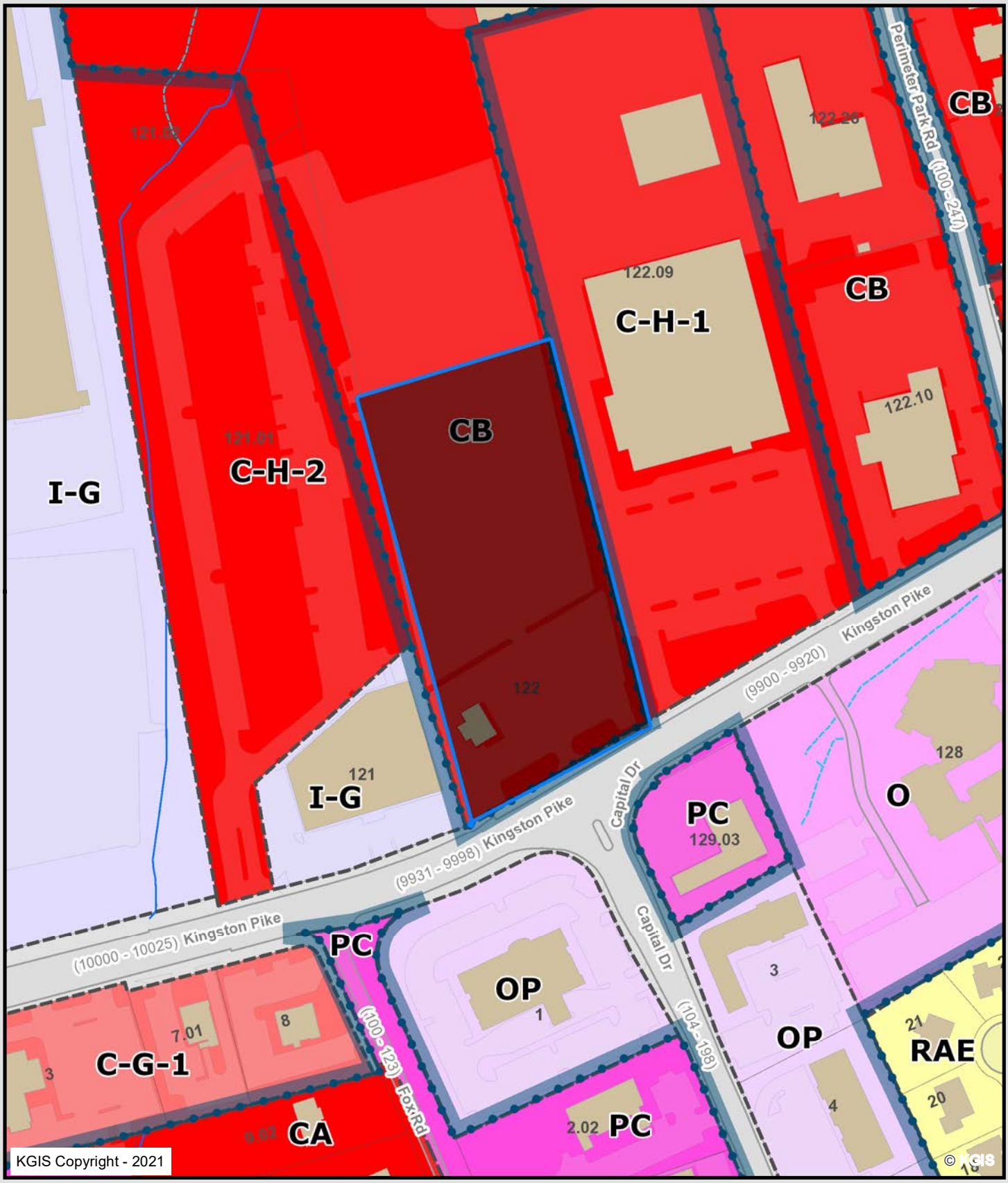
X Traffic Impact Study

☐ COA Checklist *(Hillside Protection)*

Fee 1		Total
0107	500.00	
Fee 2		
Fee 3		
		500.00

AUTHORIZATION *By signing below, I certify I am the property owner, applicant or the owners authorized representative.*

David Harbin	David Harbin	5/24/2021
Applicant Signature	Please Print	Date
865-[illegible]-6472	harbin@bhn-p.com	
Phone Number	Email	
[illegible]	Marc Payne	5/25/2021
Staff Signature	Please Print	Date



Letter Portrait

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