

# SUBDIVISION REPORT - CONCEPT/USE ON REVIEW

► **FILE #:** 9-SB-21-C **AGENDA ITEM #:** 21  
 9-C-21-UR **AGENDA DATE:** 9/9/2021

► **SUBDIVISION:** HOPPE SUBDIVISION  
 ► **APPLICANT/DEVELOPER:** HOMESTEAD LAND HOLDINGS, LLC  
 OWNER(S): C W Hoppe, Jr. & Julia G. Hoppe

TAX IDENTIFICATION: 116 06701 [View map on KGIS](#)

JURISDICTION: County Commission District 6

STREET ADDRESS: 12119 Hardin Valley Rd.

► **LOCATION:** North side of Hardin Valley Road, north of the intersection with Marietta Church Road

SECTOR PLAN: Northwest County

GROWTH POLICY PLAN: Rural Area

WATERSHED: Conner Creek

► **APPROXIMATE ACREAGE:** 36.77 acres

► **ZONING:** PR (Planned Residential) (pending)

► **EXISTING LAND USE:** Agricultural and vacant land

► **PROPOSED USE:** Detached and attached residential subdivision

SURROUNDING LAND USE AND ZONING: North: Residences -- PR (Planned Residential)  
 South: Hardin Valley Road, rural residential, vacant land -- A (Agricultural) and PR (Planned Residential)  
 East: Vacant land, Mission Hill Lane -- A (Agricultural), PR (Planned Residential) and CA (General Business)  
 West: Residences -- PR (Planned Residential)

► **NUMBER OF LOTS:** 80

SURVEYOR/ENGINEER: Russell N. Rackley, PE / Rackley Engineering

ACCESSIBILITY: Access is via Hardin Valley Road, a minor arterial with a pavement width of 20.5-ft within 60-ft of right-of-way; Deer Crossing Drive, a local street with a pavement width of 26-ft within 50-ft of right-of-way; and Mission Hill Lane, a local street with a pavement width of 26-ft within 100-ft of right-of-way.

► **SUBDIVISION VARIANCES REQUIRED:** VARIANCES:

1. REDUCE THE MINIMUM TANGENT BETWEEN BROKEN BACK CURVES FROM 150' TO 96.76' ON ROAD 1 FROM STA 6+00 TO STA 7+00.
2. REDUCE THE MINIMUM ANGLE OF INTERSECTION FROM 75 DEGREES TO 71 DEGREES AT THE ROAD 2 INTERSECTION WITH ROAD 1.
3. REDUCE THE MINIMUM ANGLE OF INTERSECTION FROM 75 DEGREES TO 74 DEGREES AT THE ROAD 3 INTERSECTION WITH

## ROAD 1.

### ALTERNATIVE DESIGN STANDARDS REQUIRING KNOX COUNTY ENGINEERING AND PUBLIC WORKS APPROVAL:

1. REDUCE THE MINIMUM HORIZONTAL RADIUS FROM 250' TO 100' ON ROAD 1 (TWO LOCATIONS).
2. REDUCE THE MINIMUM PAVEMENT WIDTH ON ROAD 4 FROM 26' TO 20'.

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#### STAFF RECOMMENDATION:

- **Approve variance 1-3 and alternative design standards 1-2 on the recommendations of the Knox County Department of Engineering and Public Works and because the site conditions restrict compliance with the Subdivision Regulations and the proposed variances and alternative design standards will not create a traffic hazard.**

#### **Approve the Concept Plan subject to 10 conditions.**

1. Connection to sanitary sewer and meeting any other relevant requirements of the utility provider.
2. Provision of street names that are consistent with the Uniform Street Naming and Addressing System within Knox County (County Ord. 91-1-102).
3. Implementation of the recommended street and intersection improvements outlined in the Hoppe Property Subdivision Transportation Impact Study prepared by Ajax Engineering, as last revised on August 23, 2021, and approved by the Knox County Department of Engineering and Public Works and Planning Commission staff. The design details and timing of the installation of the improvements shall be worked out with the Knox County Department of Engineering and Public Works during the design plan stage for the subdivision.
4. Obtaining approval from Knox County Commission to rezone the property to PR (Planned Residential) with a density that allows the development as proposed, or the number of lots must be reduced to be consistent with the approved density.
5. Providing a greenway easement on the final plat on south side of Connor Creek per the requirements of the Knox County Parks and Recreation department.
6. Meeting all applicable requirements of the Knox County Zoning Ordinance.
7. Meeting all applicable requirements of the Knox County Department of Engineering and Public Works.
8. Placing a note on the final plat that all lots will have access only to the internal street system.
9. Submitting to Planning staff prior to final plat review by the Planning Commission or Planning staff, the certification of design plan approval form as required by the Knoxville-Knox County Subdivision Regulations.
10. Prior to certification of the final plat for the subdivision, establishing a property owners association that will be responsible for the maintenance of the common areas and drainage system.

- **Approve the development plan for up to 47 detached and 33 attached residential dwellings on individual lots and the peripheral setback reduction from 35-ft to 25-ft, subject to 1 condition.**

Applicant is requesting a 15-ft peripheral setback for the eastern boundary lines of Lots 34-39.

- 1) Meeting all applicable requirements of the Knox County Zoning Ordinance.

With the conditions noted, this plan meets the requirements for approval in the PR district and the criteria for approval of a use on review.

#### COMMENTS:

This proposal is for an 80-lot residential subdivision on approximately 36.7 acres at a density of 2.2 du/ac. The application to rezone the property from A (Agricultural) and CA (General Business) to PR (Planned Residential) up to 3 du/ac is still pending Knox County Commission approval (5-F-21-RZ). The application was postponed until their September 27, 2021, meeting. The Planning Commission recommended approval of the PR zoning up to 3 du/ac.

The main accesses to the site are from Hardin Valley Road at the Marietta Church Road intersection and Mission Hill Lane, which is the access road for the Massey Creek subdivision to the north. Access will also be provided to Deer Crossing Drive in the Hunters Way subdivision. A greenway easement will be provided along the south side of Connor Creek, with the final location and width of the easement to be determined during the design plan phase. Approximately 11 acres of the 36.77-acre site is within the Hillside Protection (HP) area

(see the attached slope analysis). The recommended maximum land disturbance within the HP area is 7.2 acres and according to the applicant, 6.8 acres of the HP area will be disturbed (sheet C104).

The applicant is requesting a reduction of the peripheral setback from 35-ft to 25-ft for the boundary of the entire development with the exception of lots 34-39 where the request is for a 15-ft peripheral setback. Staff is recommending approval of the 25-ft peripheral setback for the entire development, excluding the 15-ft request, for the following reasons:

- 1) Along the Hardin Valley Road frontage, a 25-ft common area is being provided which creates a rear lot property line for the lots that adjoin it. From the rear lot line, the houses will have an additional 15-ft setback for a total setback of 40-ft from the Hardin Valley Road right-of-way, which is greater than the standard 35-ft peripheral setback. By reducing the peripheral setback to match the common area width, the adjoining lots will not have two different setbacks in the rear yard; 10-ft of the 35-ft peripheral setback and the 15-ft rear setback.
- 2) The Planning Commission approved a peripheral setback reduction to 25-ft for the adjacent subdivisions to the west and north and this request will be consistent with the surrounding development.
- 3) The requested 15-ft peripheral setback for lots 34-39 is not consistent with the proposed 35-ft peripheral setback on the adjacent Mission Hills subdivision, which is also being considered for concept plan and use-on-review approval on this agenda (7-SA-21-C / 7-C-21-UR). A 25-ft peripheral setback is consistent with the rest of the subdivision and other surrounding subdivisions.

#### DEVELOPMENT STANDARDS FOR USES PERMITTED ON REVIEW (ARTICLE 4.10 – SECTION 2)

The planning commission, in the exercise of its administrative judgment, shall be guided by adopted plans and policies, including the general plan and the following general standards:

##### 1) THE PROPOSED USE IS CONSISTENT WITH THE ADOPTED PLANS AND POLICIES, INCLUDING THE GENERAL PLAN AND SECTOR PLAN.

A. The Northwest County Sector Plan recommends RR (Rural Residential) uses for this site with a maximum of 3 du/ac if a transportation impact letter is submitted along with the rezoning application to demonstrate the adequacy of the road system back to the Planned Growth area on the Growth Policy Plan map. The proposed subdivision has a density of 2.2 du/ac. A transportation impact study was submitted along with this application which outlines the impact of this development on the overall transportation system in this area in comparison to the existing and projected traffic.

B. A greenway easement will be provided on the south side of Conner Creek to accommodate the proposed greenway in the Knox County Greenway Corridor Study (adopted January 2020).

C. Approximately 11 acres of the 36.77-acre site is within the Hillside Protection (HP) area and the recommended maximum disturbance according to the slope analysis is 7.2 acres. The proposed disturbance within the HP area is 6.8 acres.

##### 2) THE USE IS IN HARMONY WITH THE GENERAL PURPOSE AND INTENT OF THE ZONING ORDINANCE.

A. The PR (Planned Residential) zone is intended to provide optional methods of land development which encourage more imaginative solutions to environmental design problems. Residential areas thus established would be characterized by a unified building and site development program, open space for recreation and provision for commercial, religious, educational, and cultural facilities which are integrated with the total project by unified architectural and open space treatment. Each planned unit development shall be compatible with the surrounding or adjacent zones. Such compatibility shall be determined by the planning commission by review of the development plans.

B. The proposed subdivision will have detached residential lot sizes that are comparable to those in existing and recently developed subdivisions in the area.

C. Attached residential lots are not common in the Harding Valley area but are not inappropriate. The location of the attached lots is between the Massey Creek subdivision and Connor Creek. The attached houses will be at a lower elevation than the detached houses in the adjacent subdivision and there is common area between the two, which will help buffer and reduce the visual impact.

C. The rezoning of the property to PR up to 3 du/ac is pending approval by Knox County Commission and the proposed subdivision has a density of 2.2 du/ac.

##### 3) THE USE IS COMPATIBLE WITH THE CHARACTER OF THE NEIGHBORHOOD WHERE IT IS PROPOSED, AND WITH THE SIZE AND LOCATION OF BUILDINGS IN THE VICINITY.

A. The proposed detached and attached residential development is compatible with the surrounding residential uses and of similar character as the neighborhood where it is proposed.

4) THE USE WILL NOT SIGNIFICANTLY INJURE THE VALUE OF ADJACENT PROPERTY.

A. The use of the property for detached and attached residential should not significantly injure the value of the adjacent properties.

5) THE USE WILL NOT DRAW ADDITIONAL TRAFFIC THROUGH RESIDENTIAL AREAS.

A. The development will have direct access to Hardin Valley Road which is a minor arterial street.

6) THE NATURE OF DEVELOPMENT IN THE SURROUNDING AREA IS NOT SUCH AS TO POSE A POTENTIAL HAZARD TO THE PROPOSED USE OR TO CREATE AN UNDESIRABLE ENVIRONMENT FOR THE PROPOSED USE.

A. There are no known uses in the area that could be a potential hazard or create an undesirable environment for the proposed residential use.

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.

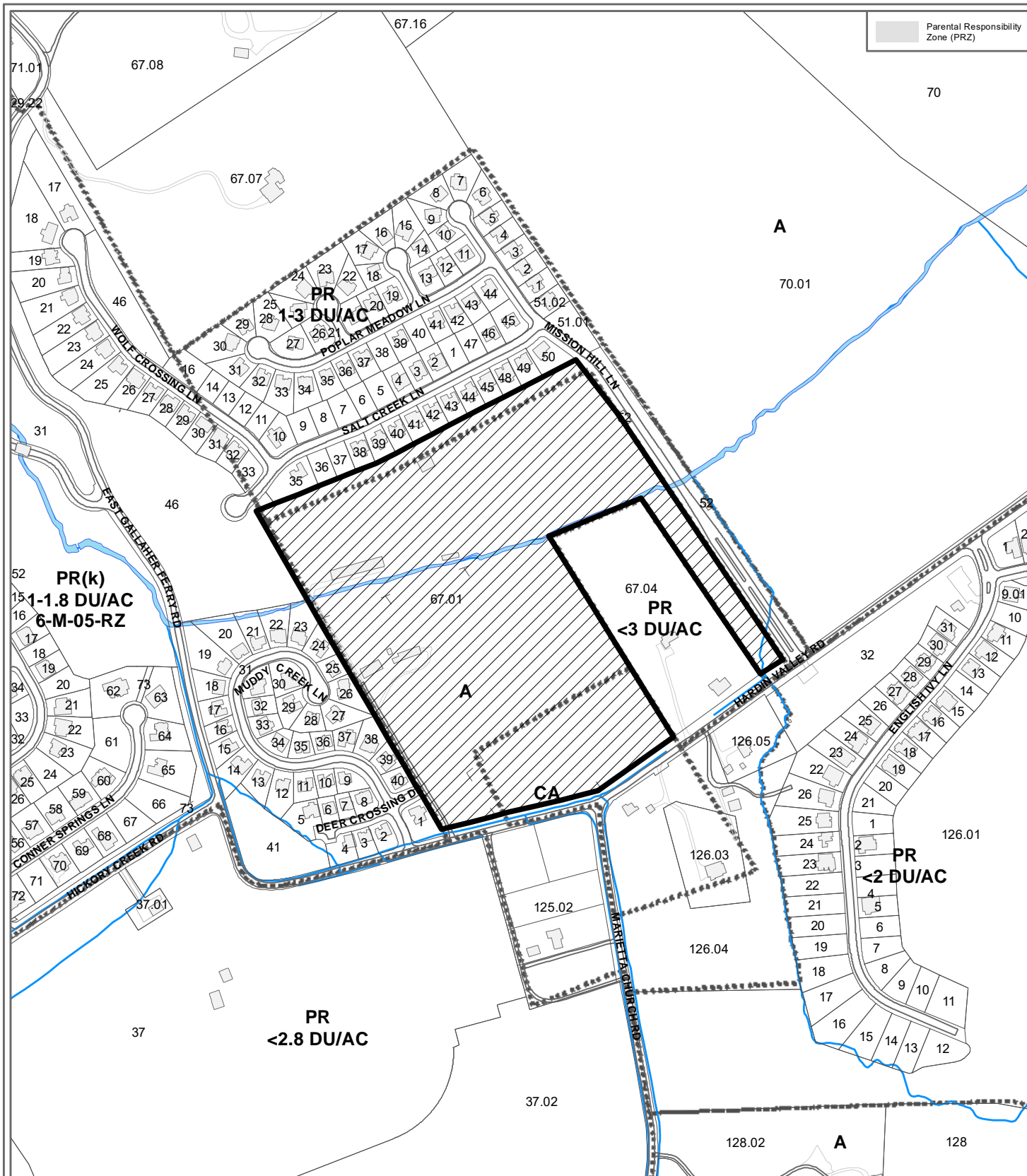
ESTIMATED STUDENT YIELD: 22 (public school children, grades K-12)

Schools affected by this proposal: Hardin Valley Elementary, 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.

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



**9-SB-21-C / 9-C-21-UR  
CONCEPT PLAN/USE ON REVIEW**



Detached and attached residential subdivision in PR (Planned Residential) (pending)

Original Print Date: 8/4/2021  
Revised:  
Knoxville - Knox County Planning Commission \* City / County Building \* Knoxville, TN 37902

Petitioner: Homestead Land Holdings, LLC  
Hoppe Subdivision

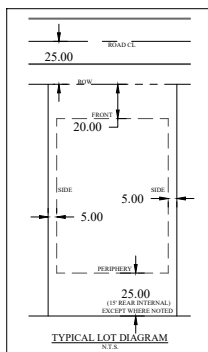
Map No: 116  
Jurisdiction: County







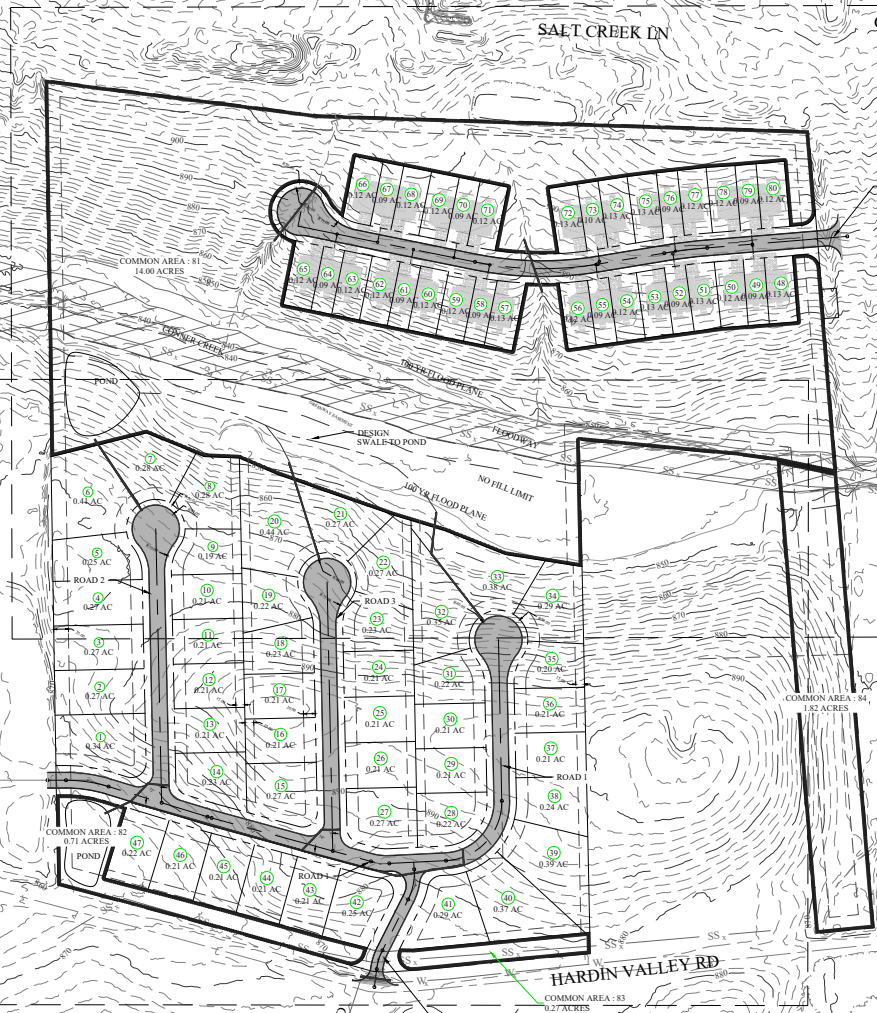




LEGEND	
---	PROPERTY LINE
---	EXISTING MNR CONTOUR
---	EXISTING MNR CONTOUR
---	EXISTING SANITARY SEWER
---	EXISTING WATER MAIN
---	EXISTING DITCH LINE
---	EXISTING GAS LINE
---	PROPOSED LOT LINE
---	BUILDING SET BACK LINE
---	PROPOSED ROAD CENTERLINE
---	PROPOSED ROAD CURB
---	PROPOSED STORM SYSTEM



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- NOTES:
- EXISTING PROPERTY AND TOPOGRAPHIC INFORMATION OBTAINED FROM KGIS.
  - CONTOURS ARE 4' INTERVAL WITH 20' INDEX.
  - A 10' DRAINAGE AND UTILITY EASEMENT EXISTS ALONG A STREET RIGHT OF WAY, 10' ALONG EXTERIOR BOUNDARY AND 5' ALONG ALL INTERIOR LOT LINES.
  - ALL DIMENSIONS ARE SUBJECT TO CHANGE ON FINAL PLAN.
  - ALL LOTS SHALL HAVE INTERNAL STREET ACCESS ONLY.
  - ALL ROADS TO BE IN 50' PUBLIC RIGHT OF WAY.
  - CONSTRUCTION PLANS MUST BE APPROVED BY APPROPRIATE AGENCIES AND PERMITS OBTAINED PRIOR TO ANY CONSTRUCTION ACTIVITY.
  - ALL STRUCTURES WILL HAVE TO BE LOCATED AT LEAST 50' FROM THE TOP OF SINKHOLES/CLOSED CONTOUR AREAS IDENTIFIED ON THE PLAN. CONSTRUCTION WITHIN THE 50' SETBACK MAY BE PERMITTED IF A GEOTECHNICAL STUDY PREPARED BY A REGISTERED ENGINEER STATES THAT BUILDING WITHIN THE 50' SINKHOLE BUFFER IS ACCEPTABLE AND THE STUDY IS APPROVED BY THE KNOX COUNTY DEPARTMENT OF ENGINEERING AND PUBLIC WORKS. ENGINEERED FOOTINGS MAY BE REQUIRED FOR ANY STRUCTURES WITHIN THE 50' SINKHOLE BUFFER.
  - GRADING PLAN APPROVAL REQUIRED TO MAINTAIN 5' SIDE SETBACKS FOR LOTS 3-17.
  - A SIGHT DISTANCE EASEMENT WILL BE REQUIRED ON LOT 18 ON FINAL PLAN.
  - DETENTION PONDS WILL REQUIRE 20' TRAVERSABLE ACCESS EASEMENTS ON FINAL PLAN.
  - ALL INTERSECTION GRADES UP TO 3% HAVE BEEN APPROVED BY KNOX COUNTY ENGINEERING.
  - ROAD CENTERLINE HORIZONTAL GEOMETRY DATA PROVIDED ON PLAN AND PROFILE SHEETS INCLUDED WITH THE CONCEPT PLAN.

- VARIANCE REQUESTS:
- REDUCE MIN TANGENT BETWEEN BROKEN BACK CURVE FROM 150' TO 98.76' ROAD 1 STA 6+00 TO STA 7+00.
  - REDUCE MIN ANGLE OF INTERSECTION FROM 75 DEG TO 71 DEG. ROAD 2 INTERSECTION.
  - REDUCE MIN ANGLE OF INTERSECTION FROM 75 DEG TO 74 DEG. ROAD 3 INTERSECTION.

- ALTERNATE DESIGN STANDARDS TO BE APPROVED BY KNOX COUNTY ENGINEERING AND PUBLIC WORKS:
- 100' ROAD CENTERLINE RADIUS ON ROAD 1 (TWO LOCATIONS)
  - ROAD WIDTH REDUCED ON ROAD 4 FROM 26' TO 20' TO DISCOURAGE ON-STREET PARKING.

PROPERTY DATA:  
12119 HARDIN VALLEY RD  
MAP 16 PARCEL 4701  
AREA: 36.77 ACRES +/-  
ZONE: PR 3 (PENDING)  
TOTAL LOTS: 40  
DENSITY: 2.2 DU/AC  
COMMON AREA: 16.8 AC (45.7%)  
SETBACKS:  
FRONT- 20 FT  
SIDE- 5 FT, REAR- 15 FT  
PERIPHERAL- 25 FT  
15 FT LOTS 34-39  
UTILITIES:  
WCLD (WATER AND SEWER)  
LCUR (ELECTRIC)  
ATT (COMMUNICATION)  
COMCAST (COMMUNICATION)

CERTIFICATION OF CONCEPT PLAN  
I, THE UNDERSIGNED, A REGISTERED ENGINEER, LICENSED TO PRACTICE ENGINEERING UNDER THE LAWS OF THE STATE OF TENNESSEE, I FURTHER CERTIFY THAT THE PLAN AND ACCOMPANYING DRAWINGS, DOCUMENTS AND STATEMENTS CONFORM TO ALL APPLICABLE PROVISIONS OF THE KNOX COUNTY SUBDIVISION REGULATIONS EXCEPT AS HAS BEEN IDENTIFIED AND DESCRIBED IN A REPORT FILED WITH THE METROPOLITAN PLANNING COMMISSION.

REGISTERED ENGINEER: *David M. Carley*  
TENNESSEE CERTIFICATE NO.: 109503

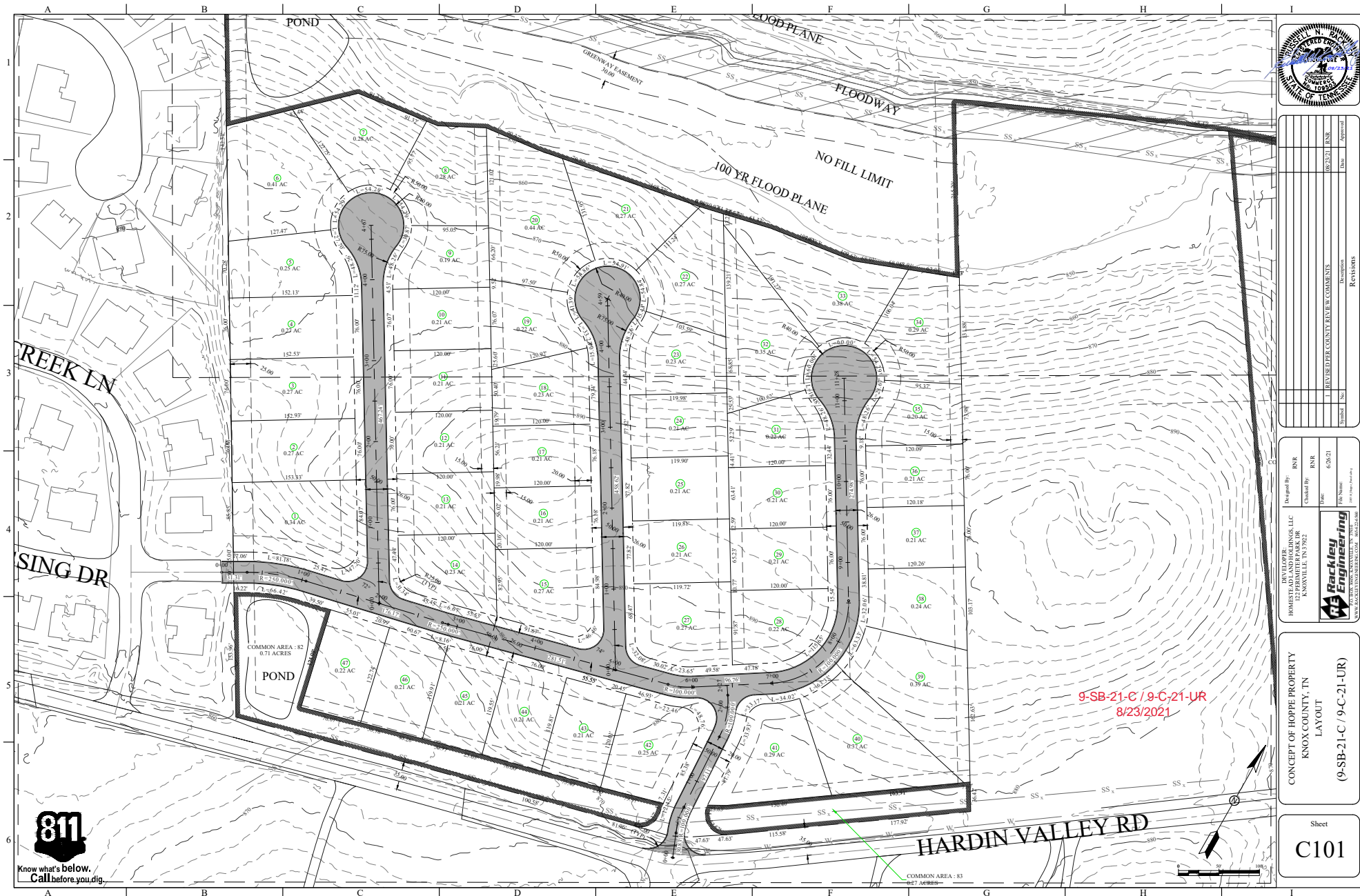


Revisions	Revised By	Date	Approved By
1	DAVID M. CARLEY	08/23/2021	RNR

DESIGNED BY: RNR  
CHECKED BY: RNR  
DATE: 6/26/21  
FILE NAME: 9-SB-21-C / 9-C-21-UR  
PROJECT: 9-SB-21-C / 9-C-21-UR  
Rackley Engineering  
122 PERMIT PARK DR  
KNOXVILLE, TN 37922  
WWW.RACKLEYENGINEERING.COM

CONCEPT OF HOPPE PROPERTY  
KNOX COUNTY, TN  
OVERALL LAYOUT  
(9-SB-21-C / 9-C-21-UR)

Sheet  
C100



Revisions		
Revised	By	Date
1	REVISED COUNTY HAWK COMMUNITY	08/23/21 RSR

DESIGNED BY: RSR	6/26/21
CHECKED BY: RSR	
DATE: 6/26/21	
FILE NAME: 9-SB-21-C / 9-C-21-UR	
PROJECT: 9-SB-21-C / 9-C-21-UR	

CONCEPT OF HOPPE PROPERTY  
KNOX COUNTY, TN  
LAYOUT  
(9-SB-21-C / 9-C-21-UR)

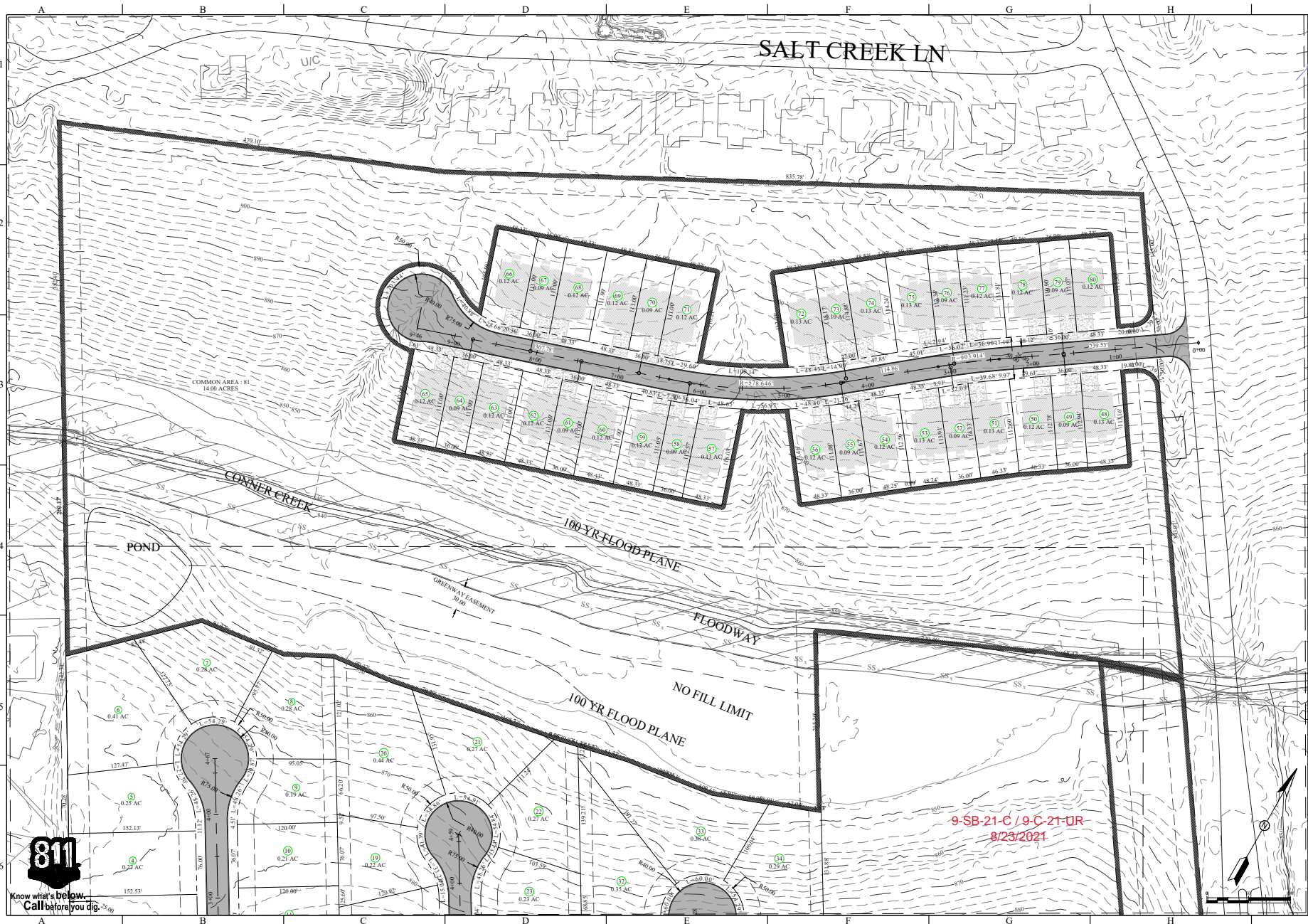
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**C101**

**811**

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9-SB-21-C / 9-C-21-UR  
8/23/2021



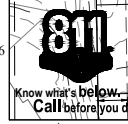


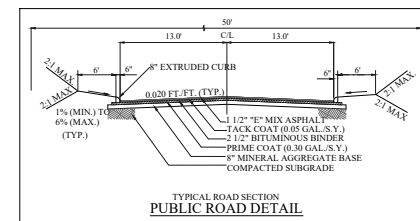
Revisions			
Revised	By	Date	Description
1	REVISOR	08/23/21	RNR

Designed By:	RNR
Checked By:	RNR
Date:	6/26/21
File Name:	9-SB-21-C / 9-C-21-UR
Project Name:	CONCEPT OF HOPPE PROPERTY LAYOUT
Project Address:	122 PERIMETER PARK DR KNOXVILLE, TN 37922

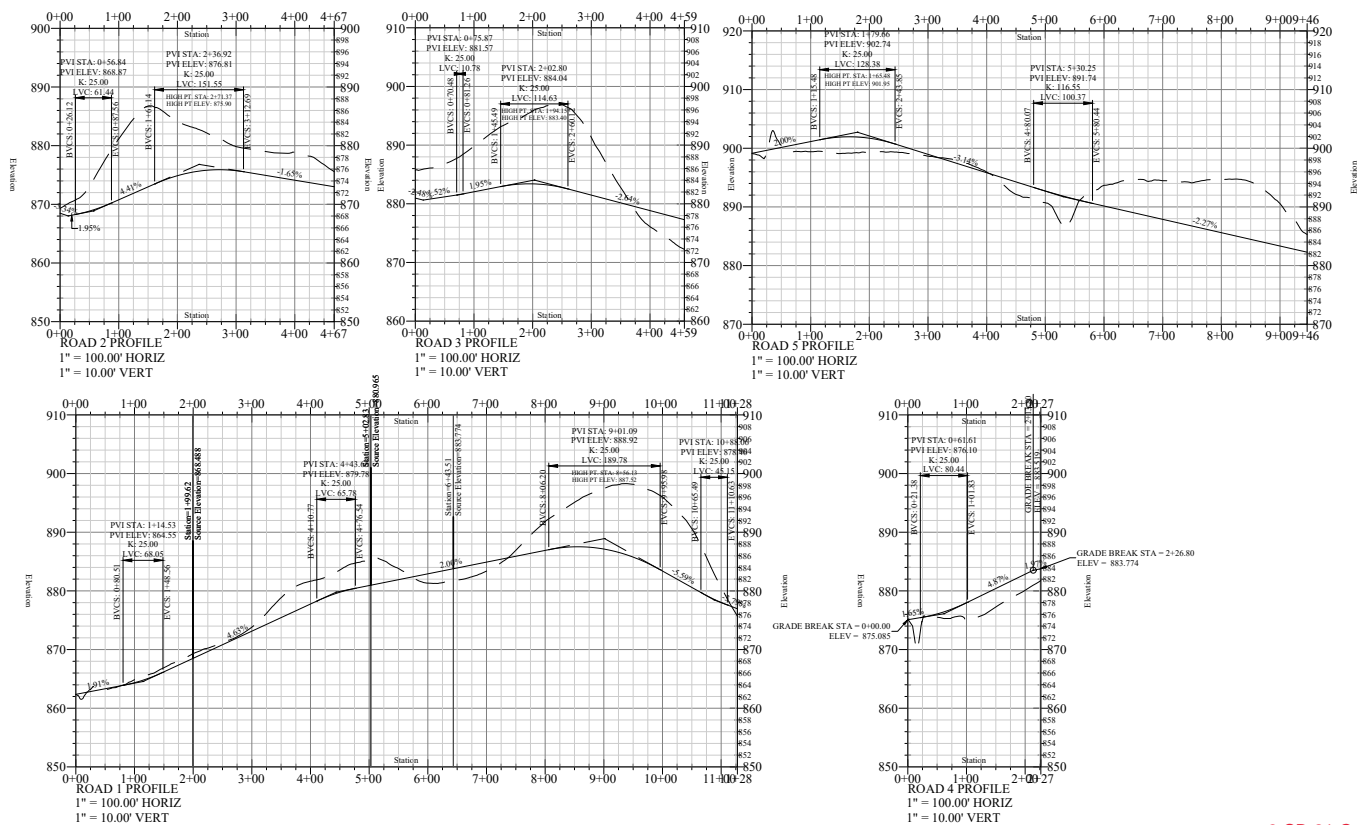
CONCEPT OF HOPPE PROPERTY  
KNOX COUNTY, TN  
LAYOUT  
(9-SB-21-C / 9-C-21-UR)

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NOTE: ROAD 4 TO BE 20' WIDE. ALTERNATE DESIGN STANDARD TO BE APPROVED BY KCEPW



9-SB-21-C / 9-C-21-UR  
8/23/2021



Revisions	By	Date
1	REK	08/23/21
2	REK	08/23/21
3	REK	08/23/21
4	REK	08/23/21
5	REK	08/23/21
6	REK	08/23/21

Designed By:	REK
Checked By:	REK
Date:	6/25/21
File Name:	9-SB-21-C / 9-C-21-UR
Scale:	1" = 100'

CONCEPT OF HOPPE PROPERTY  
KNOX COUNTY, TN  
ROAD PROFILES  
(9-SB-21-C / 9-C-21-UR)

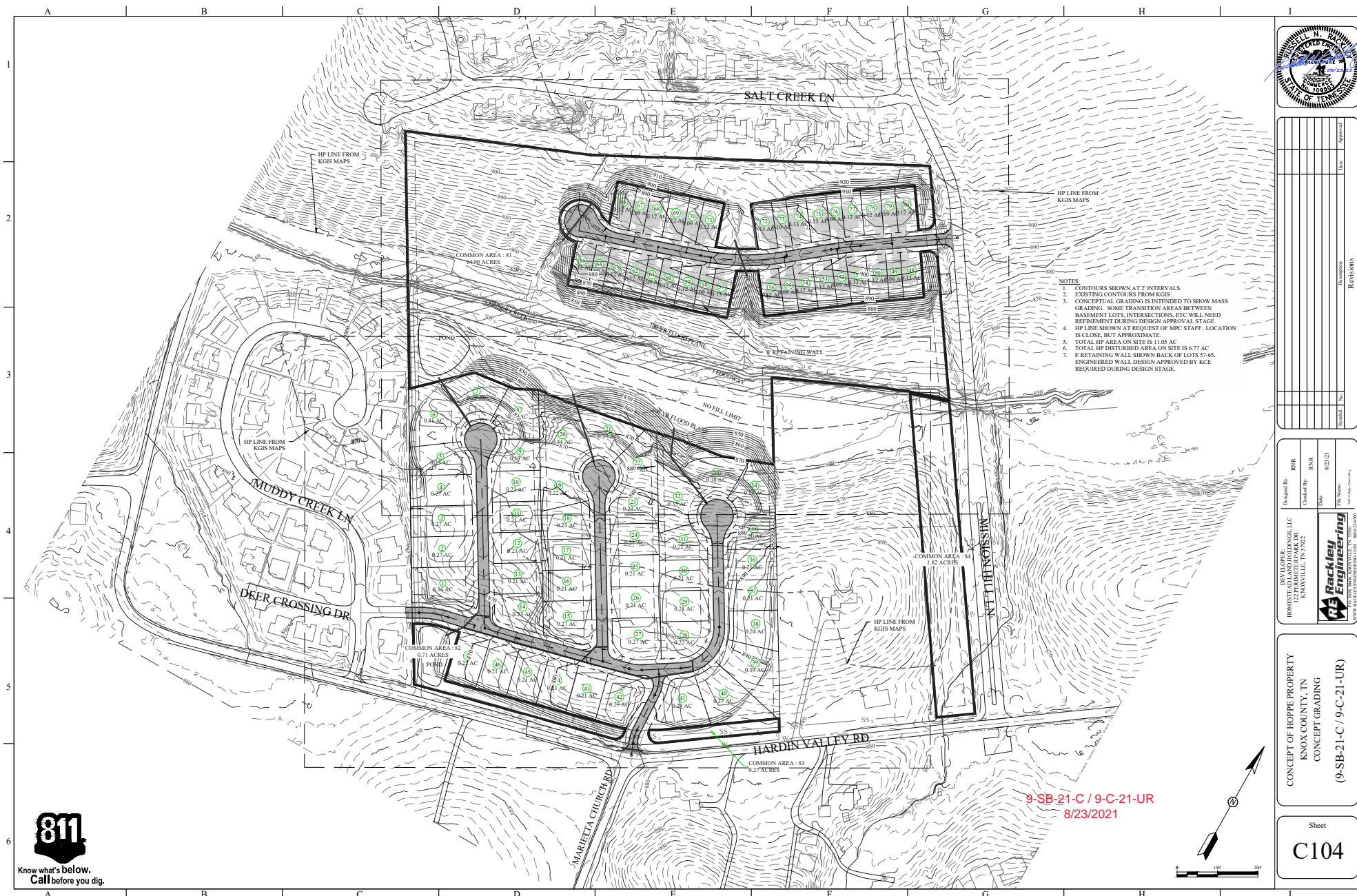
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DEVELOPER: HOMESTEAD LAND HOLDINGS, LLC 122 PRIMER PARK DR KNOXVILLE, TN 37922	Designed By:	RNR	8/23/21
	Checked By:	RNR	
	Date:		
	File Name:		
 RE Rackley Engineering P.O. BOX 3036, KNOXVILLE, TN 37903			

CONCEPT OF HOPPE PROPERTY  
KNOX COUNTY, TN  
CONCEPT GRADING  
(9-SB-21-C / 9-C-21-UR)

Sheet  
C104



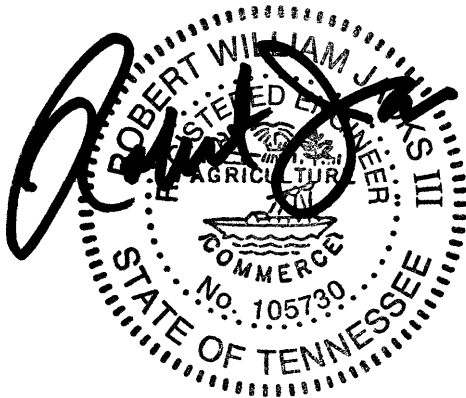


# Transportation Impact Study Hoppe Property Subdivision Knox County, Tennessee



Revised August 2021

Prepared for:  
Homestead Land Holdings, LLC  
122 Perimeter Park Drive  
Knoxville, TN 37922



8/23/2021

Case # 9-SB-21-C / 9-C-21-UR  
TIS Revision 1  
8/23/2021

## CONCLUSIONS & RECOMMENDATIONS

The area in which the Hoppe Property Subdivision is proposed is seeing extreme residential growth. In addition to the Hoppe Property Subdivision, several other large subdivisions are currently under construction or nearly beginning construction. As shown in this study results, the addition of the Hoppe Property Subdivision will not appreciably impact the surrounding road system; however, the adjacent intersections will experience increased vehicle delays in the future due to the residential developments in the area.

The transportation impact studies recently completed for the other residential developments indicated that road improvements would be necessary in the near future in the study area. These recommendations included reconstructing the Hardin Valley Road/East Gallaher Ferry Road/ Hickory Creek Road intersection into a roundabout. In addition to this roundabout, the study for the Briggs Station Subdivision recommended a 125-foot westbound left-turn lane on Hardin Valley Road at Marietta Church Road. Other study conclusions have shown that this section of Hardin Valley Road will need to be reconstructed with multiple lanes with a 3-lane road section at a minimum.

The following is an overview of recommendations to minimize the traffic impacts of the proposed development on the adjacent road system while attempting to achieve an acceptable traffic flow and safety level.



**Hardin Valley Road at Marietta Church Road:** The northbound approach of this intersection, Marietta Church Road, was calculated to operate poorly in the projected 2025 conditions even without the project. As shown in Table 6, the proposed Main Entrance comprising the southbound approach would also operate at LOS F. It is recommended that this intersection be modified to provide adequate future road capacity to combat the projected considerable vehicle delays in the future.

- 1a) A roundabout was evaluated as a potential modification and remediation for the projected peak hour volumes at the intersection of Hardin Valley Road at Marietta Church Road. Modifying this intersection with a roundabout would eliminate the need for separate turn lanes. A roundabout was analyzed with single-lane approaches, and the results are shown in Table 9.

**TABLE 9**  
**2025 INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**PROJECTED HORIZON YEAR (WITH THE PROJECT & IMPROVEMENTS)**  
**Hardin Valley Road at Marietta Church Road and Main Entrance**

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	v/c <sup>c</sup>	LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	v/c <sup>c</sup>
Hardin Valley Road at Marietta Church Road and Main Entrance	 Roundabout	Eastbound Left/Thru/Right	B	14.5	0.725	A	9.3	0.496
		Westbound Left/Thru/Right	A	6.1	0.357	C	15.6	0.773
		Northbound Left/Thru/Right	C	17.8	0.596	A	8.5	0.369
		Southbound Left/Thru/Right	A	4.7	0.039	A	8.0	0.042

Note: Results shown for Roundabout of Hardin Valley Road at Marietta Church Road are reported with HCM 2010 Methodology

<sup>a</sup> Level of Service

<sup>b</sup> Average Delay (sec/vehicle)

<sup>c</sup> Volume-to-Capacity Ratio

With a roundabout at the intersection, the vehicle delays for the northbound approach of Marietta Church Road are significantly reduced. In the projected 2025 conditions with the project, the northbound approach operating under existing two-way stop control conditions will experience LOS F in the AM and PM peak hours. In contrast, with a roundabout, the northbound approach of Marietta Church Road would operate at LOS C and A in the AM and PM peak hours, respectively. The Main Entrance's southbound approach would also operate at LOS A with a roundabout instead of LOS F while controlled with a two-way stop.

As part of evaluating the projected 2025 conditions with the Main Entrance at Hardin Valley Road at Marietta Church Road and a roundabout, vehicle queue lengths at the intersection were calculated based on the projected 2025 traffic volumes. The previously mentioned Synchro Traffic 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 (Version 8) software was utilized to estimate the queue lengths with the projected 2023 volumes.

The 95th percentile vehicle queue lengths were calculated based on the intersection operating as a roundabout. The 95th percentile vehicle queue is the recognized measurement in the traffic engineering profession as the design standard used when considering 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. The vehicle queue results from the SimTraffic software are in Appendix

**TABLE 10**  
**95<sup>TH</sup> PERCENTILE VEHICLE QUEUE LENGTHS**  
**2025 PROJECTED PEAK HOUR TRAFFIC VOLUMES**  
**Hardin Valley Road at Marietta Church Road and Main Entrance**

INTERSECTION	APPROACH/ MOVEMENT	SIMTRAFFIC 95 <sup>th</sup> PERCENTILE VEHICLE QUEUE LENGTH (ft)	
		AM PEAK HOUR	PM PEAK HOUR
Hardin Valley Road at Marietta Church Road and Main Entrance	Eastbound Left/Thru/Right	167	79
	Westbound Left/Thru/Right	28	289
	Northbound Left/Thru/Right	90	62
	Southbound Left/Thru/Right	26	27

Note: 95<sup>th</sup> percentile queues were calculated in SimTraffic 8 software

L. The 95th percentile queue lengths with a roundabout at the intersection are shown in Table 10.

These calculated queue lengths are reasonable for the northbound and southbound approaches. The projected queue lengths on Hardin Valley Road for eastbound and westbound traffic would not be unreasonable considering the number of projected volumes on these approaches.

Overall, the projected results indicate that the intersection would operate poorly for northbound and southbound motorists operating under the existing stop control conditions even when adding a warranted westbound left-turn and eastbound right-turn lanes. The large vehicle delays in 2025 are estimated to occur even without the Hoppe Property Subdivision being developed. The significant growth in traffic volumes in the area combined with the proposed adjacent residential subdivisions will create intolerable delays that will not be satisfied operating under stop control.

Even further growth in the area past 2025 may support a multi-lane roundabout as part of the overall projections that Hardin Valley Road will need to be reconstructed with multiple traffic lanes. However, it is unknown if this would be an acceptable approach since a multi-lane roundabout would require increased right-of-way and reduced pedestrian and bicyclist safety. It would also require public education since a

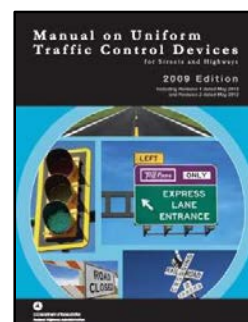
multi-lane roundabout requires more forethought and higher-level decision-making. However, some single-lane roundabouts can be given additional service life by including right-turn bypass (slip) lanes. This is particularly true when right-turning volumes are large, as projected for the northbound traffic movements on Marietta Church Road towards the east.

- 1b) As an investigation into potential remediation for this intersection, this intersection was also examined concerning traffic signal warrants.

Methodology:

The Manual on Uniform Traffic Control Devices – 2009 Edition

(MUTCD) presents nine different warrants that the traffic engineering profession has developed to determine whether a traffic signal is warranted. These warrants cover a broad range of minimum elements required to indicate whether a traffic signal is justified for any particular location. These elements consist of traffic volumes, pedestrian volumes, crash history, and other



factors. The MUTCD explicitly states that a traffic control signal should not be installed unless one or more of the manual's signal warrants are met. However, the satisfaction of a warrant does not entirely in itself justify the need for a traffic signal. Sometimes further engineering studies and judgments also need to be applied before justifying the need for a traffic signal installation. These additional studies are a significant step in ensuring that a traffic signal's installation will not degrade safety and efficiencies.

The MUTCD defines nine different warrants, two of which are potentially applicable for this intersection at this time and are explained below:



Warrant #1, Eight-Hour Vehicular Volume:

Warrant #1 is comprised of 2 conditions – A and B. The Minimum Vehicular Volume, Condition A, is intended for application where the volume of intersecting traffic is the principal reason for consideration of signal installation. The Interruption of Continuous Traffic, Condition B, is intended for use at locations where Condition A is

not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.



#### Warrant #2, Four-Hour Vehicular Volume:

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Even though nine warrants are offered to justify a traffic signal, according to the TDOT Traffic Signal Manual, the agency gives precedence to Warrant #1 (Eight Hour Vehicular Volume) and Warrant #7 (Crash Experience). Even though Warrant #2 is not a primary warrant used by TDOT, it is included in this study. Furthermore, TDOT does not allow installing a traffic signal on a state route based on speculative developments or unrealized traffic volumes.

The intersection was evaluated in the projected 2025 conditions to justify a traffic signal based on the MUTCD Warrants listed above. Marietta Church Road and the proposed Main Driveway were used as the minor side streets for the warrant analysis, and Hardin Valley Road was the major street. The original traffic count in 2016 at the intersection of Hardin Valley Road at Marietta Church Road only tabulated 6 hours of data. Thus, a complete 8-hour traffic signal warrant analysis was not achievable.

A spreadsheet was developed for the projected 2025 conditions to determine the traffic volumes generated by all the developments in the vicinity added to the intersection during the highest 6 hours of traffic based on the assumed traffic distribution in the projected conditions. This spreadsheet is shown in Appendix M. Based on this spreadsheet output, it is calculated that this intersection will not meet Warrant #1 or #2 in the year 2025 when right-turns are excluded from the analysis.

Even though TDOT does not typically accept justification for traffic signals except for Warrant #1 and #7, the intersection met Warrant #3 when right-turns were not included in the analysis. Warrant #3 is usually only used in rare instances such as



locations near office complexes, manufacturing plants, etc. According to the MUTCD, Warrant #3 “is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.” Appendix M shows the traffic signal warrant assessment for these evaluations.

When right-turns are included in the analysis, the intersection will likely meet Warrant #1 (it is not definitive due to the lack of a full 8 hours of traffic data) and will meet Warrants #2 and #3.

A cursory analysis of the intersection operating under a traffic signal in the projected conditions resulted in very favorable LOS conditions. However, separate left-turn lanes would be required on all approaches except for the southbound approach (the Main Entrance for the Hoppe Property Subdivision). In either instance, Knox County will need to provide resources and guidance on whether a roundabout or a traffic signal is the best course of action in the area.

Nonetheless, if desired, the justification for a traffic signal will likely be possible in 2025 if a roundabout is not chosen as potential intersection remediation. However, the strongest case could be made for a roundabout based on the traffic signal warrant evaluation that is tenuous at best.


- 1b) The Main Entrance for the Hoppe Property Subdivision should not be impacted by new signage or landscaping for the residential development and should provide the required sight distance.



**Hardin Valley Road at Muddy Creek Lane and Seal Property Entrance:** In the projected 2025 conditions with the Hoppe Property Subdivision, this intersection is calculated to operate adequately in the projected 2025 conditions.

2a) The 2025 intersection capacity results at this intersection are shown in Table 11.

**TABLE 11**  
**2025 INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**PROJECTED HORIZON YEAR (WITH THE PROJECT & IMPROVEMENTS)**  
**Hardin Valley Road at Muddy Creek Lane and Seal Property Entrance**

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	v/c <sup>c</sup>	LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	v/c <sup>c</sup>
Hardin Valley Road at Muddy Creek Lane and Seal Property Entrance		Northbound Left/Thru/Right	C	16.9	0.212	B	13.5	0.112
		Eastbound Left/Thru/Right	A	8.0	0.001	A	9.1	0.005
		Westbound Left/Thru/Right	A	9.1	0.012	A	8.3	0.032
		Southbound Left/Thru/Right	D	30.3	0.163	D	32.6	0.120

Note: Analysis of 2-way Stops calculated in Synchro 8 software and reported with HCM 2010 methodology

<sup>a</sup> Level of Service

<sup>b</sup> Average Delay (sec/vehicle)

<sup>c</sup> Volume-to-Capacity Ratio

As part of evaluating the projected 2025 conditions, vehicle queue lengths at the intersection were calculated based on the projected 2025 traffic volumes. The vehicle queue results from the SimTraffic software are in Appendix L. The 95th percentile queue lengths at the intersection are shown in Table 12.

**TABLE 12**  
**95<sup>TH</sup> PERCENTILE VEHICLE QUEUE LENGTHS**  
**2025 PROJECTED PEAK HOUR TRAFFIC VOLUMES**  
**Hardin Valley Road at Muddy Creek Lane and Seal Property Entrance**

INTERSECTION	APPROACH/ MOVEMENT	SIMTRAFFIC 95 <sup>th</sup> PERCENTILE VEHICLE QUEUE LENGTH (ft)	
		AM PEAK HOUR	PM PEAK HOUR
Hardin Valley Road at Muddy Creek Lane and Seal Property Entrance	Eastbound Left/Thru/Right	5	17
	Westbound Left/Thru/Right	30	39
	Northbound Left/Thru/Right	57	50
	Southbound Left/Thru/Right	42	37

Note: 95<sup>th</sup> percentile queues were calculated in SimTraffic 8 software

These calculated queue lengths are reasonable and would not impact upstream

intersections in the Hunters Way Subdivision, the Seal Property Subdivision, or Hardin Valley Road.

- 2b) It is recommended that the vegetation on the southbound approach of Muddy Creek Lane at Hardin Valley Road be trimmed and/or removed. This vegetation currently obscures the Stop Sign (R1-1).



**Stop Sign Obscured on Muddy  
Creek Lane at Hardin Valley Road  
(Looking South)**






**Hardin Valley Road at Mission Hill Lane:** In the projected 2025 conditions with the Hoppe Property Subdivision, this intersection is calculated to operate adequately in the projected 2025 conditions except for the southbound approach, as shown previously in Table 6. A westbound right-turn lane is warranted at this intersection in 2025, even without the Hoppe Property Subdivision being developed.

- 3a) The intersection capacity results with a westbound right-turn lane are shown in Table 13.

**TABLE 13**  
**2025 INTERSECTION CAPACITY ANALYSIS RESULTS -**  
**PROJECTED HORIZON YEAR (WITH THE PROJECT & IMPROVEMENTS)**  
**Hardin Valley Road at Mission Hill Lane**

INTERSECTION	TRAFFIC CONTROL	APPROACH/ MOVEMENT	AM PEAK			PM PEAK		
			LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	v/c <sup>c</sup>	LOS <sup>a</sup>	DELAY <sup>b</sup> (seconds)	v/c <sup>c</sup>
Hardin Valley Road at Mission Hill Lane	 Unsignalized	Eastbound Left/Thru	A	8.2	0.004	B	10.1	0.018
		Southbound Left/Right	F	77.1	0.639	F	75.0	0.539

Note: Analysis of 2-way Stops calculated in Synchro 8 software and reported with HCM 2010 methodology

Note 2: Results shown include a 75' WB Right-Turn Lane

<sup>a</sup> Level of Service

<sup>b</sup> Average Delay (sec/vehicle)

<sup>c</sup> Volume-to-Capacity Ratio

As part of evaluating the projected 2025 conditions with the Main Entrance at Hardin Valley Road at Marietta Church Road, vehicle queue lengths at the intersection were calculated based on the projected 2025 traffic volumes. The 95th percentile queue lengths at the intersection are shown in Table 14. The vehicle queue results from the SimTraffic software are in Appendix L.

**TABLE 14**  
**95<sup>TH</sup> PERCENTILE VEHICLE QUEUE LENGTHS**  
**2025 PROJECTED PEAK HOUR TRAFFIC VOLUMES**  
**Hardin Valley Road at Mission Hill Lane**

INTERSECTION	APPROACH/ MOVEMENT	SIMTRAFFIC 95 <sup>th</sup> PERCENTILE VEHICLE QUEUE LENGTH (ft)	
		AM PEAK HOUR	PM PEAK HOUR
Hardin Valley Road at Mission Hill Lane	Eastbound Left/Thru	14	66
	Westbound Right	0	2
	Southbound Left/Right	75	56

Note: 95<sup>th</sup> percentile queues were calculated in SimTraffic 8 software

Besides LOS calculations, another appropriate metric to determine whether mitigation should be pursued can be based on projected vehicle queue lengths. When considerable vehicle delays are calculated for minor side streets, as in this case for the southbound approach, it does not always necessitate mitigation. If only one vehicle experiences a significant delay in attempting to enter a high-volume major street, mitigation is not always realistic nor particularly cost-effective. Likewise, mitigation should be pursued if many vehicles on a minor side street are experiencing significant delays.

As shown in Table 14, the calculated queue lengths are reasonable for the southbound approach, with the lengths indicating only a few vehicles at their maximum.

- 3b) Separate southbound left and right-turn lanes would not appreciably improve the overall vehicle delays since most turns will be left-turns towards the east with minimal right-turning volumes to the west. When Hardin Valley Road is expanded to include a center turn lane in the future, it is expected that the southbound vehicle delays will be significantly reduced. A center turn lane on Hardin Valley Road would allow exiting motorists to complete the left-turn in two stages and not rely on finding a traffic gap in both directions simultaneously and reduce vehicle delays.
- 3c) A westbound right-turn lane will be warranted on Hardin Valley Road at the intersection with Mission Hill Lane in the year 2025, whether the Hoppe Property Subdivision is developed or not. It is recommended that a 50-foot westbound right

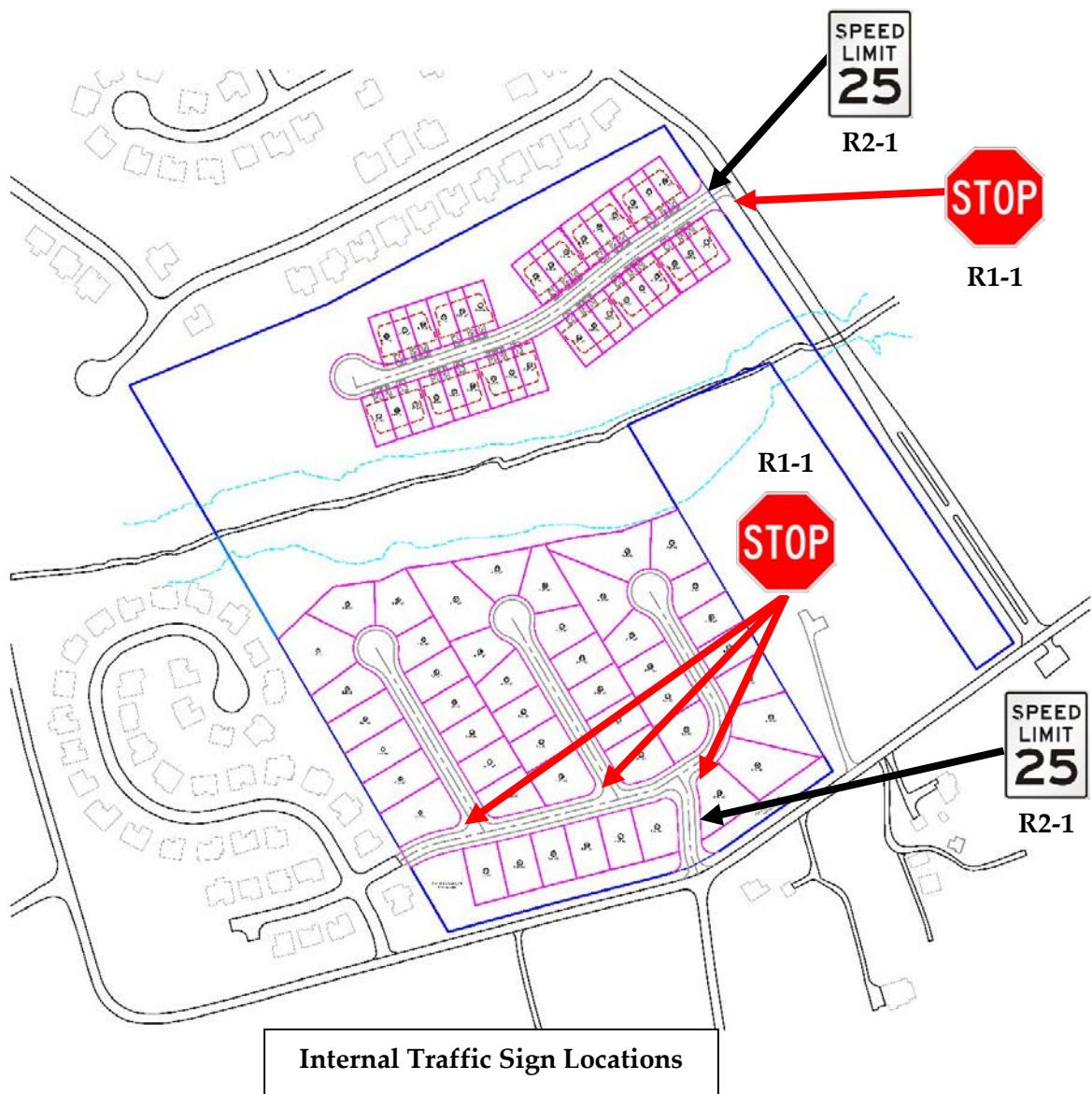
turn lane be constructed with a 100-foot taper. To accomplish this, the installation of a right-turn lane will need to be facilitated by Knox County since this length will infringe on the frontage of the adjacent property on Hardin Valley Road. Adding a westbound right-turn lane at this intersection could be beneficial to this adjacent property in the future if and when it is developed, and this benefit may provide a motivation to enable the construction.

- 3d) An eastbound left-turn lane will be below the threshold in the projected 2025 conditions with the project. The Hoppe Property Subdivision will add very few vehicles to this turning movement. It is not recommended that an eastbound left-turn lane specifically be built at this location for this development. Rather, this need would be fulfilled when Hardin Valley Road is eventually modified to a multi-lane facility. The few projected left-turn volumes would not justify constructing an exclusive left-turn lane.



**Hoppe Property Subdivision Internal Roads:** The current proposed plan layout shows five new roads constructed within the development, as shown in Figure 3.

- 4a) It is recommended that 25-mph Speed Limit Signs (R2-1) be posted near the beginning of each entrance within the development except for the entrance at Deer Crossing Drive due to the proximity of the existing signage on Muddy Creek Lane off Hardin Valley Road.
- 4b) Stop Signs (R1-1) and 24" white stop bars should be installed on the new internal streets, as shown below.





4c) Sight distance at the new internal intersections in the development must not be impacted by new signage or future landscaping. With a proposed internal speed limit of 25-mph, the intersection sight distance requirement is 280 feet. The stopping sight distance required is 155 feet for a level road grade. The site designer should ensure that these internal sight distance lengths are met internally.

4d) All drainage grates and covers for the residential development need to be pedestrian and bicycle-safe.

4e) The United States Postal Service (USPS) has implemented changes to its delivery guidelines in new residential subdivisions. If directed by the local post office, the site designer should include a parking area within the development for a centralized mail delivery center.



**Centralized USPS Delivery Center**

4f) Lots in the subdivision should not directly access Hardin Valley Road.

4g) As mentioned previously, Knox County has recently completed a greenway study and has shown that Conner Creek is a preferred route for a new greenway that would connect Hardin Valley to Powell. The developer should discuss with Knox County if this potential greenway path is desirable or feasible to implement on the development property.

4h) All internal and external road grade and intersection elements should be designed to AASHTO, TDOT, and the Knox County, TN specifications and guidelines to ensure proper operation.



## DEVELOPMENT REQUEST

### DEVELOPMENT

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

### SUBDIVISION

- ☒ Concept Plan  
☐ Final Plat

### ZONING

- ☐ Plan Amendment  
☐ Rezoning

Homestead Land Holdings, LLC

Developer

Applicant Name

July 26, 2021

September 9, 2021

Affiliation

~~March 29, 2021~~

~~May 13, 2021~~

9-SB-21-C / 9-C-21-UR

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.

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

Russell N. Rackley, PE

Rackley Engineering

Name

Company

PO Box 30456

Knoxville

TN

37930

Address

City

State

Zip

865-850-1535

Rnrackley@rackleyengineering.com

Phone

Email

## CURRENT PROPERTY INFO

C W Hoppe Jr & Julia G Hoppe

101 Amanda Place, Oak Ridge, TN 37830

Owner Name (if different)

Owner Address

Owner Phone

12119 Hardin Valley Rd

116 06701

Property Address

Parcel ID

Hardin Valley Rd North of intersection with Marietta Church Rd

36.77

General Location

Tract Size

6

A, C &

PR 3 (PENDING) (pipeline)

Jurisdiction (specify district above)

☒ City ☒ County

Zoning District

Northwest

RR, HP & SP

RURAL

Planning Sector

Sector Plan Land Use Classification

Growth Policy Plan Designation

~~Vacant~~ Ag For Vac

WKUD

WKUD

Existing Land Use

Septic (Y/N)

Sewer Provider

Water Provider

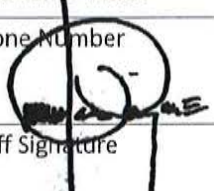
# REQUEST

DEVELOPMENT	<input type="checkbox"/> Development Plan <input type="checkbox"/> Use on Review / Special Use <input type="checkbox"/> Residential <input type="checkbox"/> Non-Residential	
	<input type="checkbox"/> Home Occupation (specify): _____ <input type="checkbox"/> Other (specify): _____	
SUBDIVISION	Hoppe Subdivision (name TBD) _____	
	<input checked="" type="checkbox"/> Proposed Subdivision Name	NA _____ Unit / Phase Number
	<input checked="" type="checkbox"/> Parcel Change <input type="checkbox"/> Combine Parcels <input checked="" type="checkbox"/> Divide Parcel    Total Number of Lots Created: <u>80</u>	
	<input type="checkbox"/> Other (specify): _____ <input checked="" type="checkbox"/> Attachments / Additional Requirements	
ZONING	<input type="checkbox"/> Zoning Change: _____ Proposed Zoning	
	<input type="checkbox"/> Plan Amendment Change: _____ Proposed Plan Designation(s)	
	Proposed Density (units/acre) _____ Previous Rezoning Requests _____	
	<input type="checkbox"/> Other (specify): _____	

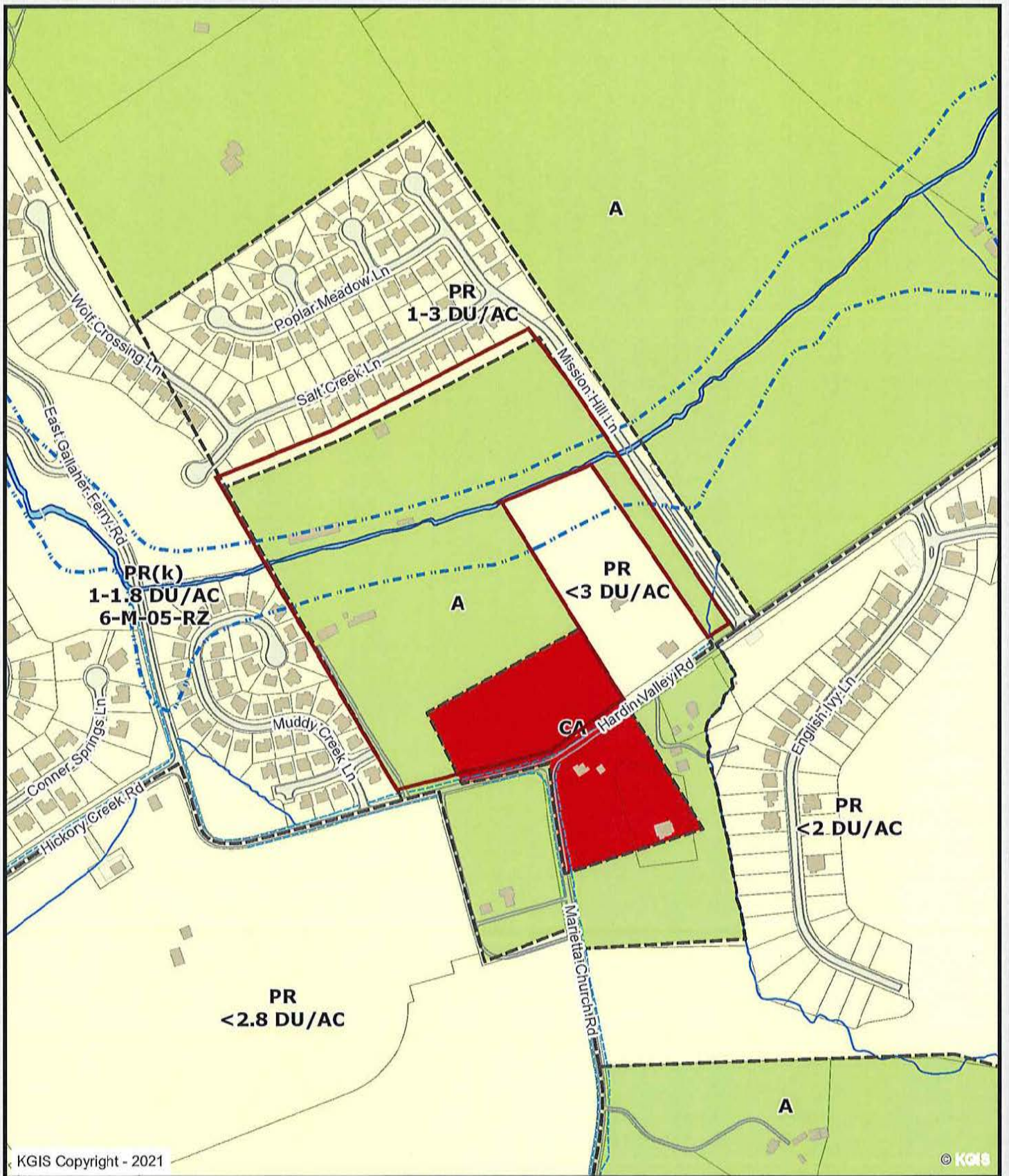
STAFF USE ONLY	<b>PLAT TYPE</b> <input type="checkbox"/> Staff Review <input checked="" type="checkbox"/> Planning Commission		<b>FEE 1:</b> 0406    4,977.00		<b>TOTAL:</b>  \$4,977.00
	<b>ATTACHMENTS</b> <input type="checkbox"/> Property Owners / Option Holders <input type="checkbox"/> Variance Request		<b>FEE 2:</b>		
	<b>ADDITIONAL REQUIREMENTS</b> <input type="checkbox"/> Design Plan Certification ( <i>Final Plat only</i> ) <input checked="" type="checkbox"/> Use on Review / Special Use ( <i>Concept Plan only</i> ) <input type="checkbox"/> Traffic Impact Study		<b>FEE 3:</b>		

## AUTHORIZATION

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

 Applicant Signature	Russell N. Rackley Please Print	06/28/21 Date
865-850-1535 Phone Number	Rnrackley@rackleyengineering.com Email	
 Staff Signature	Marc Payne Please Print	swm 7/26/2021 Date





## zoning map

### Knoxville - Knox County - KUB Geographic Information System

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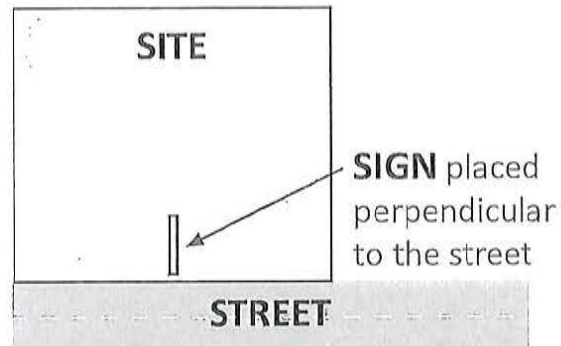


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ft



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:*

Aug 25 (Wed) and Sept 10 (Fri)  
 (applicant or staff to post sign) (applicant to remove sign)

Applicant Name: Russell Rackley  
Homestead Land Holdings  
 Date: 7/26/2021  
 File Number: 9SB-21-C / 9-C-21-WR

☒ Sign posted by Staff  
☐ Sign posted by Applicant