

SOLAEGUI  
ENGINEERS

June 14, 2018

Jon Ericson, PE, PTOE  
City of Sparks  
431 Prater Way  
Sparks, NV 89431

Re: Kiley Ranch North - Village 9

Dear Jon:

Per your request we are providing this traffic queuing analysis for the gated entries serving the above mentioned project. The project will contain 316 single family detached homes with access provided from Kiley Parkway via Dappled Way and Granary Park Avenue and Wingfield Hills Road via Hoot Owl Avenue. A fourth access is provided on Windmill Farms Parkway but it will be a gated emergency access only.

Trip generation for the project was calculated based on rates obtained from the Ninth Edition of *ITE Trip Generation* (2012). The project is anticipated to generate 199 entering trips during the critical PM peak hour. The trip generation printout is attached. Distribution of the entering PM peak hour trips was estimated based on existing and future peak hour traffic patterns and travel times associated with the internal street layout. It is estimated that 45% of the project trips will use Granary Park Avenue, 35% will use Dappled Way, and 20% will use Hoot Owl Way. Applying these percentages to the 199 entering trips results in 89 entering trips using Granary Park Avenue, 70 entering trips using Dappled Way, and 40 entering trips using Hoot Owl Way.

Per your request the entering trips were adjusted to account for the highest five-minute interval occurring within the peak hour. The highest five-minute period was established by performing manual counts at an existing nearby subdivision access. This access was the west approach of the Sparks Boulevard/Tioga Pass Drive intersection. A peak hour factor of 0.53 was calculated based on the five-minute count tabulations at the existing neighborhood access. The hourly trips at the accesses were subsequently adjusted to account for the highest five-minute interval occurring within the peak hour. Table 1 shows a summary of the distribution, unadjusted PM peak hour trip assignment, and adjusted PM peak hour trip assignment at the three accesses.

TABLE 1 HOURLY PM PEAK HOUR TRAFFIC VOLUMES			
GATED ACCESS	DISTRIBUTION	UNADJUSTED ENTERING TRIPS	ADJUSTED ENTERING TRIPS
Granary Park Avenue	45%	89	168
Dappled Way	35%	70	132
Hoot Owl Avenue	20%	40	75

Queuing was subsequently reviewed for the gated entries based on information obtained from the ITE Publication *Transportation and Land Development*. Figure 8-9 from this publication calculates average queue length based on a utilization factor that is calculated by dividing the peak hour demand by the anticipated service capacity. As shown in Table 1, the peak hour demand is the 168 vehicles per hour at Granary Park Avenue, 132 vehicles per hour at Dappled Way, and 75 vehicles per hour at Hoot Owl Avenue. A standard gate service time of 30 seconds per vehicle results in a maximum service capacity of 120 vehicles per hour. The peak hour demand divided by the service capacity yields utilization factors of 1.4 at Granary Park Avenue, 1.1 at Dappled Way, and 0.625 at Hoot Owl Avenue. Per the attached Figure 8-9, these utilization factors correspond to a maximum queue length of 14 vehicles (350 feet based on a 25 foot vehicle length) at Granary Park Avenue and Dappled Way and an average queue length of 5 vehicles (125 feet) at Hoot Owl Avenue. The site plan indicates that the distance between the on-site median nose and the visitor call box is  $\pm 55$  feet at Granary Park Avenue,  $\pm 35$  feet at Dappled Way, and  $\pm 50$  feet at Hoot Owl Avenue. These distances will not accommodate the calculated queue lengths. Queuing was subsequently reviewed for faster gate service times of 10 and 20 seconds per vehicle. Table 2 shows the average queue lengths for the various gate service times.

TABLE 2 AVERAGE QUEUE LENGTHS				
GATED ACCESS	AVAILABLE QUEUE LENGTH	AVERAGE GATE SERVICE TIME		
		30 SECONDS	20 SECONDS	10 SECONDS
Granary Park Avenue	$\pm 55'$	350'	350'	50'
Dappled Way	$\pm 35'$	350'	200'	25'
Hoot Owl Avenue	$\pm 50'$	125'	50'	25'

As shown in Table 2, average gate service times of 10 seconds per vehicle are required at Granary Park Avenue and Dappled Way and 20 seconds per vehicle is required at Hoot Owl Avenue. It should be noted that the queuing calculations are based on only one vehicle entering per gate opening. It is suggested that initially the entry gates be designed with sensing devices that keep them from closing if a successive vehicles are in the queue. The entry gates may ultimately need to remain open during the 4:00 to 6:00 PM period or other peak arrival times if queuing problems are observed after project buildout.

We trust that this information will meet your requirements. Please contact us if you have any questions or comments.

Verified by you  
 SOLE ENGINEERS, LTD  
 PAUL W.  
 BOLAEGUI  
 CIVIL  
 Paul W. Bolaegui  
 6-14-18  
 EXP 6-30-20

Enclosures  
Word/Letters/Kiley Ranch North Village 9

### Trip Generation Summary - Alternative 1

Project: New Project  
 Alternative: Alternative 1

Open Date: 6/4/2018  
 Analysis Date: 6/4/2018

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
210	SFHOUSE 1	1504	1504	3008	59	178	237	199	117	316
	316 Dwelling Units									
Unadjusted Volume		0	0	0	0	0	0	0	0	0
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets		0	0	0	0	0	0	0	0	0

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

INSTITUTE  
OF  
TRANSPORTATION ENGINEERS

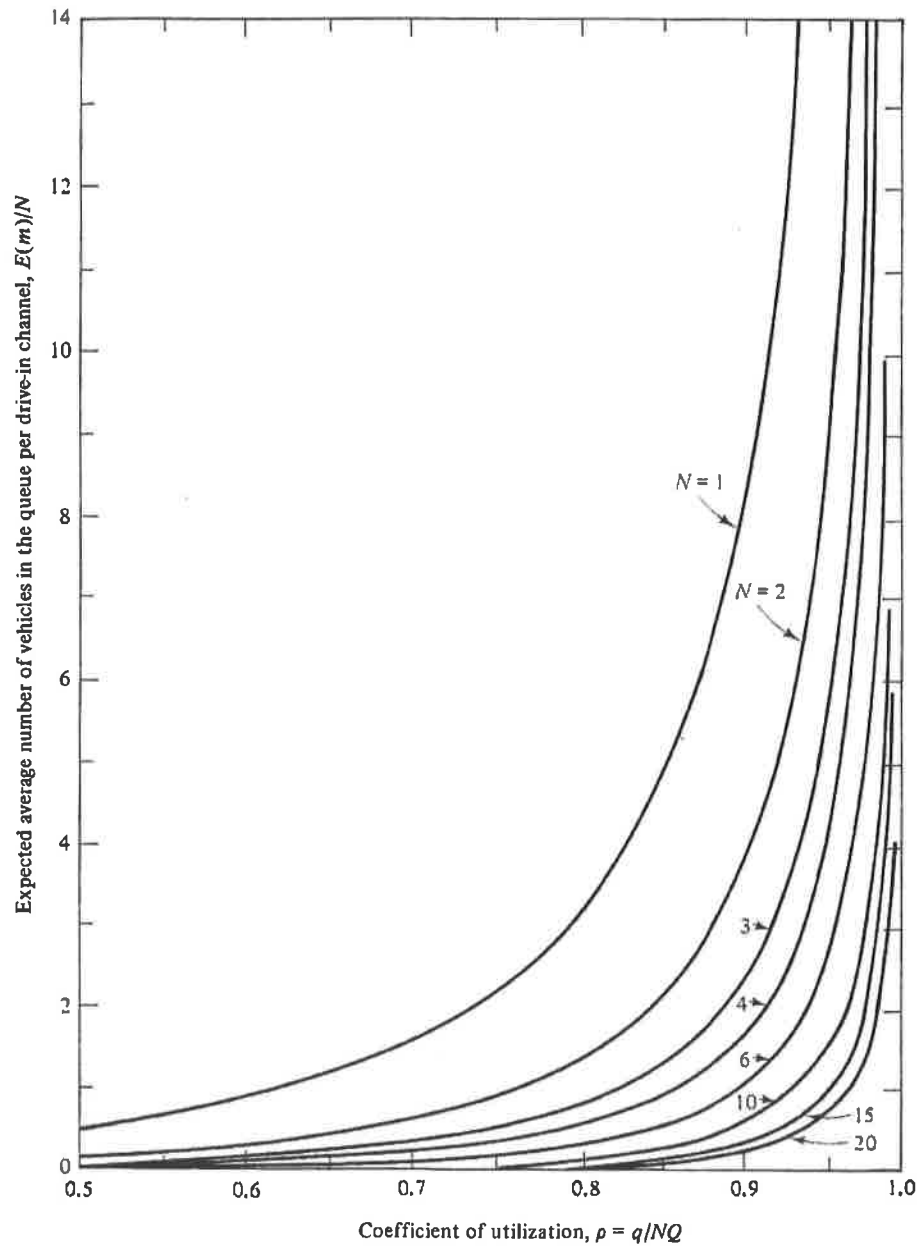
# Transportation and Land Development

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Prentice Hall, Englewood Cliffs, New Jersey 07632



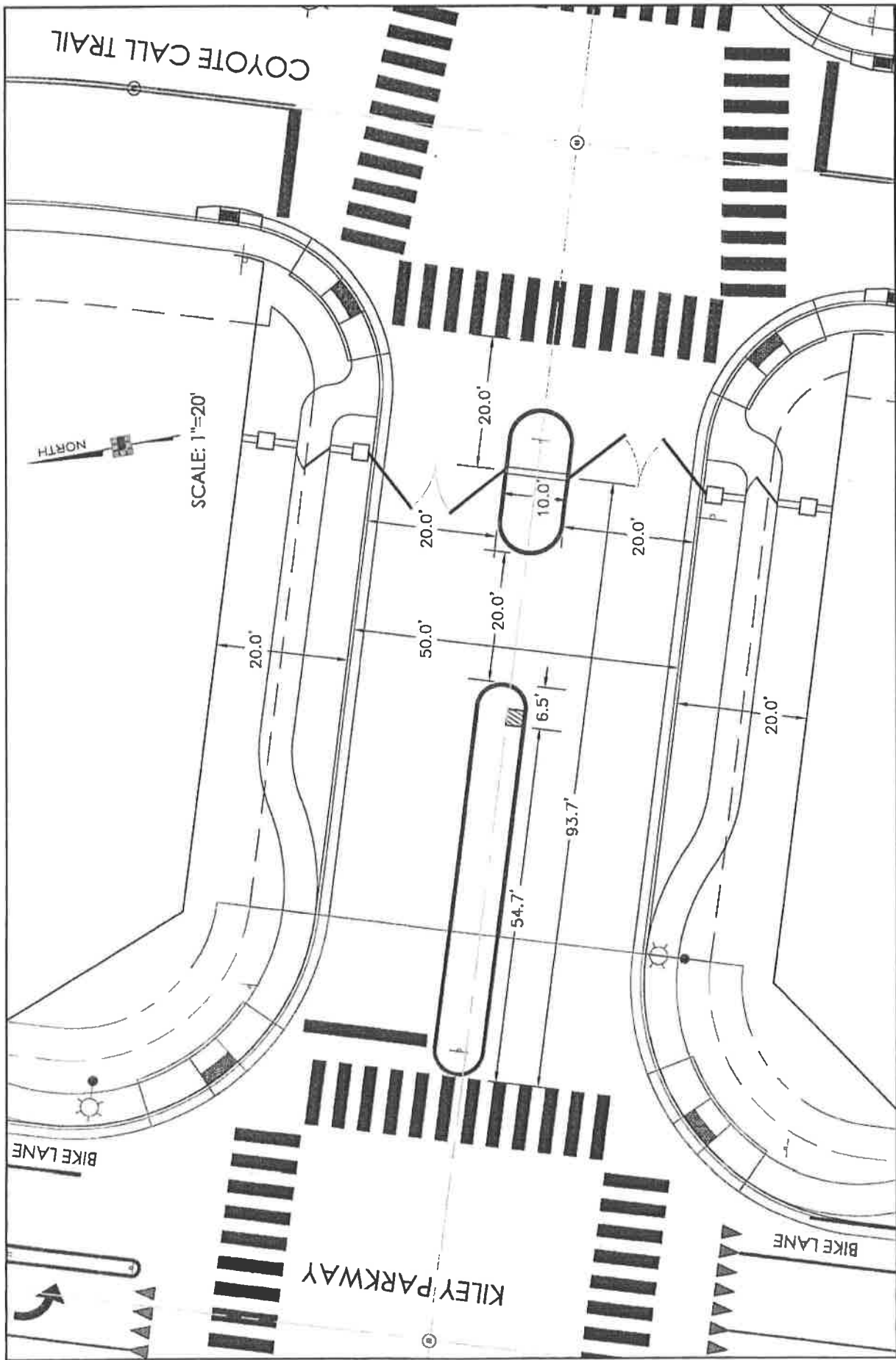
**Figure 8-9** Average queue length per service position [ $E(m)/N$  values]. SOURCE: Jones, Woods, and Thurgood [4].

*Comparison:*

Variable	Graphs	Equations
$P(0)$	0.05	0.0505
$E(m)$	3	2.97
$E(w)$	2.5	2.55

**Example and Case Studies of Required Storage at a Drive-In Bank**

Consider the following example of a drive-in bank facility as a demonstration of the use of queuing analysis. Review of a site plan for a proposed bank shows there are six drive-in window positions plus space to store 18 vehicles waiting to be served. In view of its

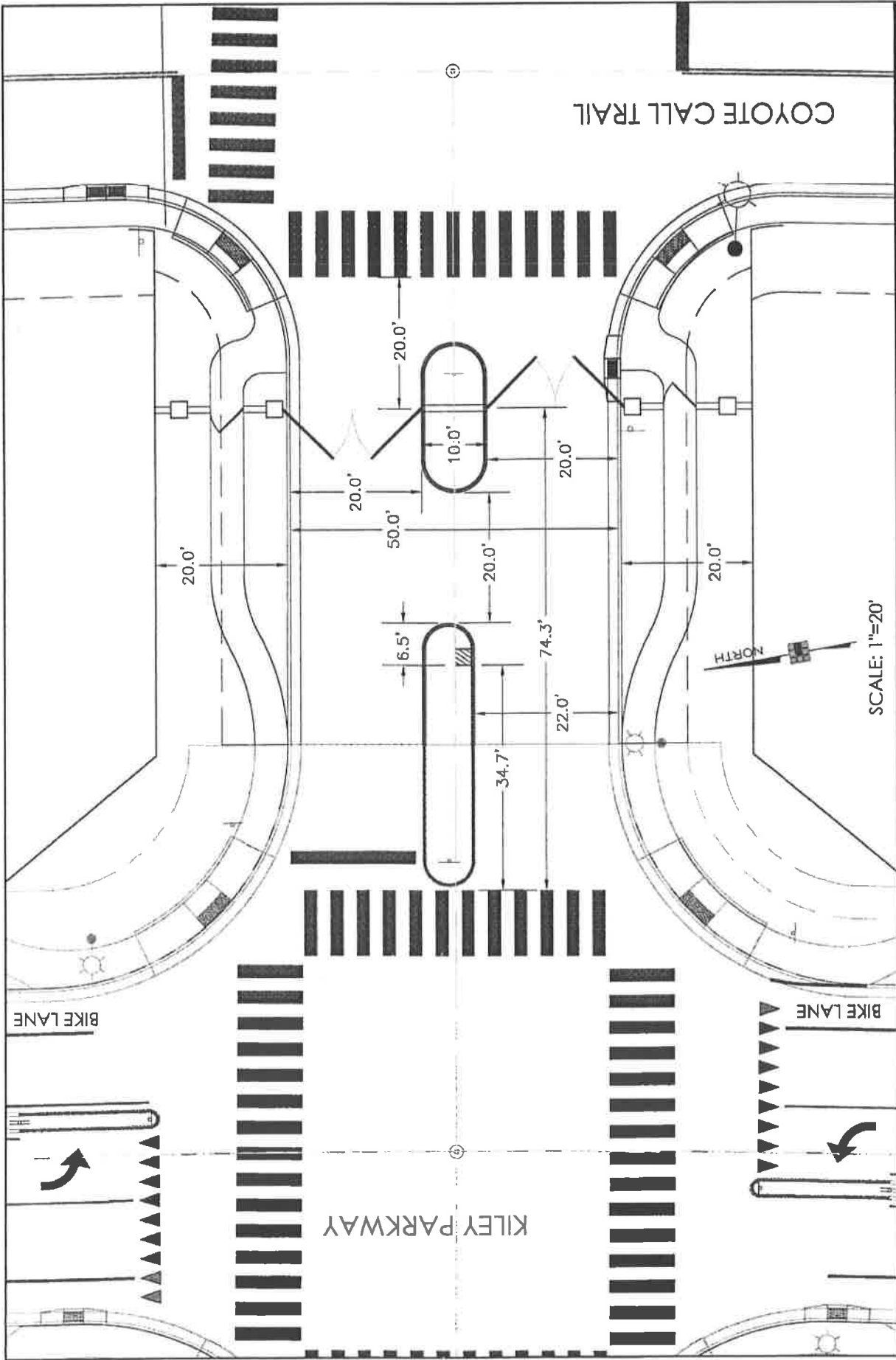


**CHRISTY CORPORATION**  
 1000 Kiley Pkwy | Sparks, Nevada 89436  
 775.502.8552 | christynv.com

KILEY RANCH NORTH - VILLAGE 9  
 GATED ENTRY CONCEPT  
 GRANARY PARK AVENUE ENTRY

D.R. HORTON, INC.  
 MAY 24, 2018

SPARKS NEVADA



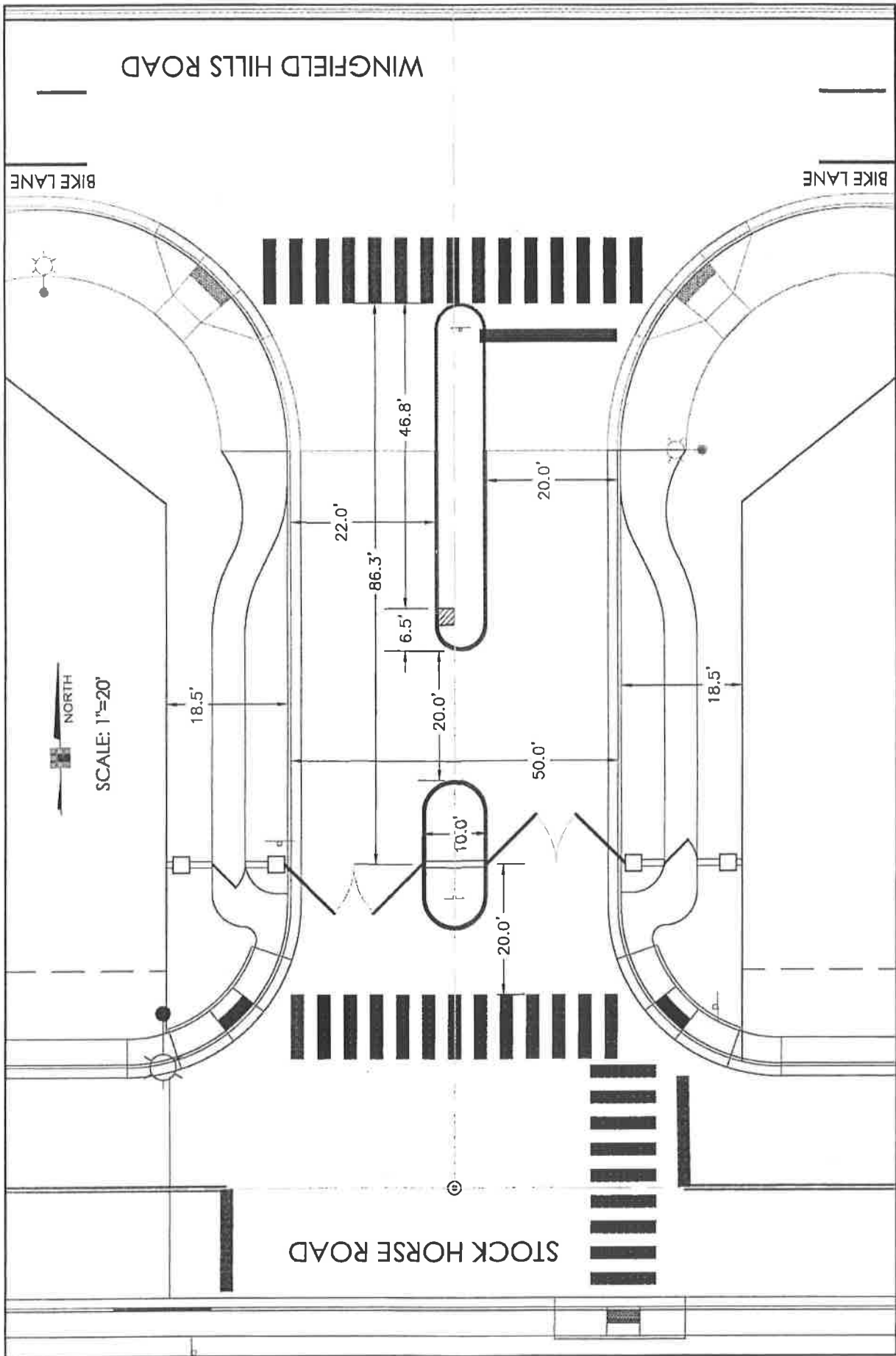
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KILEY RANCH NORTH - VILLAGE 9  
 GATED ENTRY CONCEPT  
 DAPPLED WAY ENTRY

D.R. HORTON, INC.  
 MAY 22, 2018

NEVADA

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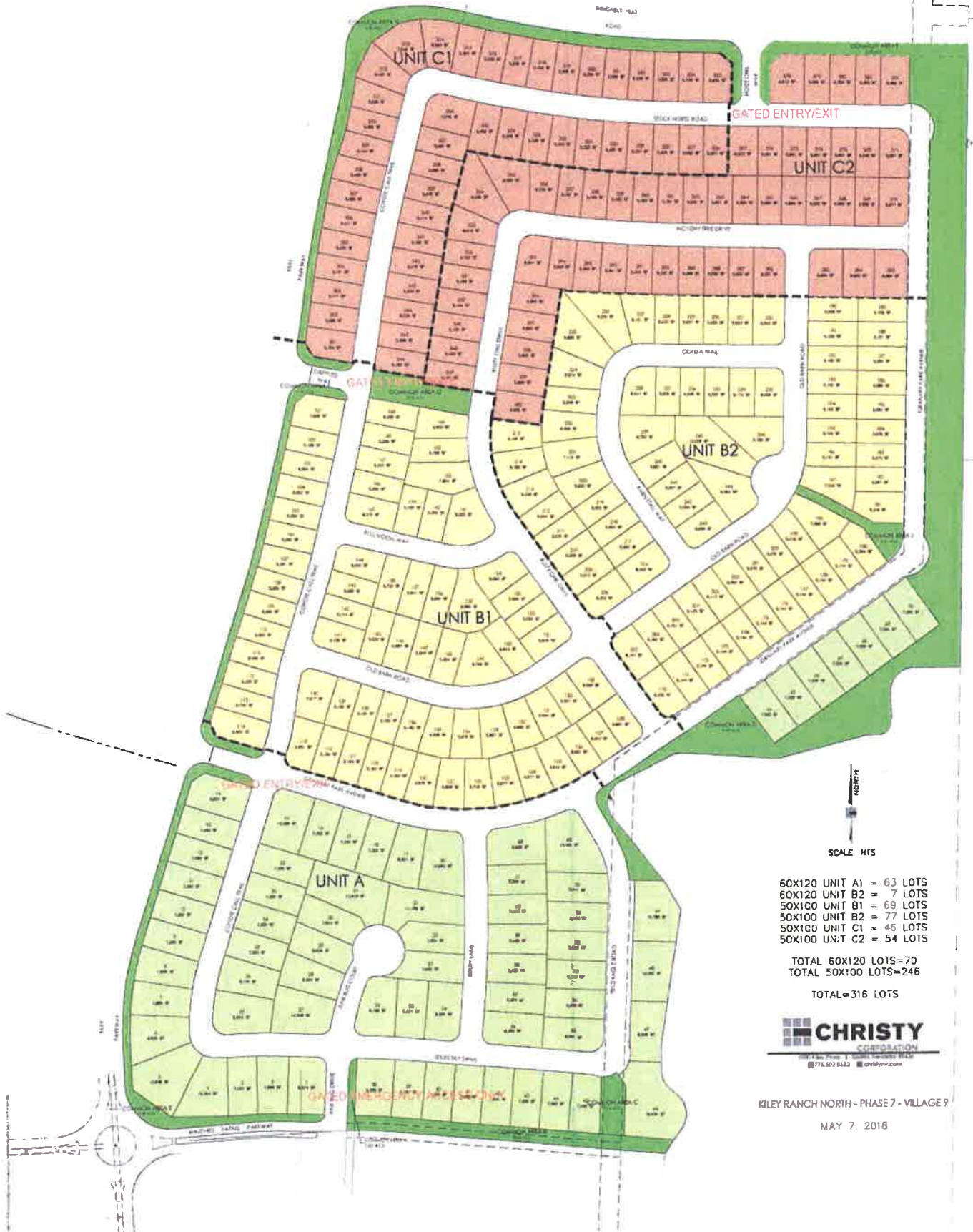
KILEY RANCH NORTH - VILLAGE 9  
 GATED ENTRY CONCEPT  
 HOOT OWL WAY ENTRY

SPARKS NEVADA

D.R. HORTON, INC.  
 MAY 24, 2018



# KILEY RANCH NORTH - VILLAGE 9 PHASING PLAN



- 60X120 UNIT A1 = 63 LOTS
- 60X120 UNIT B2 = 7 LOTS
- 50X100 UNIT B1 = 69 LOTS
- 50X100 UNIT B2 = 77 LOTS
- 50X100 UNIT C1 = 46 LOTS
- 50X100 UNIT C2 = 54 LOTS

TOTAL 60X120 LOTS=70  
 TOTAL 50X100 LOTS=246  
 TOTAL=316 LOTS

