



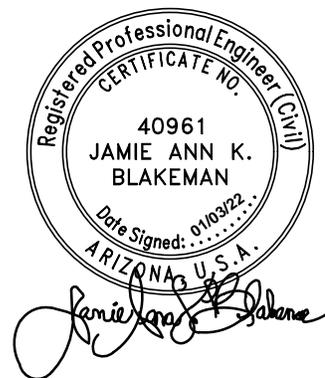
To: Doug Jorden
Jordan Law Firm, P.C.

From: Jamie Blakeman, PE, PTOE

Job Number: 20,5141.001

RE: Cottontail Run Road Vehicular Entry Gate
Traffic Study

Date: January 3, 2022



INTRODUCTION

Lōkahi, LLC (Lōkahi) has prepared a Traffic Study analyzing the traffic impacts of installing a vehicular gate on East Cottontail Run Road, approximately 220 feet east of Tatum Boulevard, just west of North Cottontail Run Road, in the Town of Paradise Valley, Arizona. See **Figure 1** for the vicinity map.

East Cottontail Run Road is a private roadway that is located immediately north of the Paradise Valley Country Club. The roadway is owned by the owner of the property located at 5000 E. Cottontail Run Road. East Cottontail Run Road provides access to ten (10) single family residential units.

The objective of this Traffic Study is to analyze the traffic impacts associated with the installation of the proposed vehicular gate, including the proposed geometrics, emergency vehicle accommodation, and queuing.



Figure 1 - Vicinity Map





BACKGROUND

East Cottontail Run Road, within the study area, terminates approximately one-quarter mile north-east of Tatum Boulevard, at an existing cul-de-sac. The proposed gate located just west of North Cottontail Run Road will serve nine (9) existing single family residential units along East Cottontail Run Road.

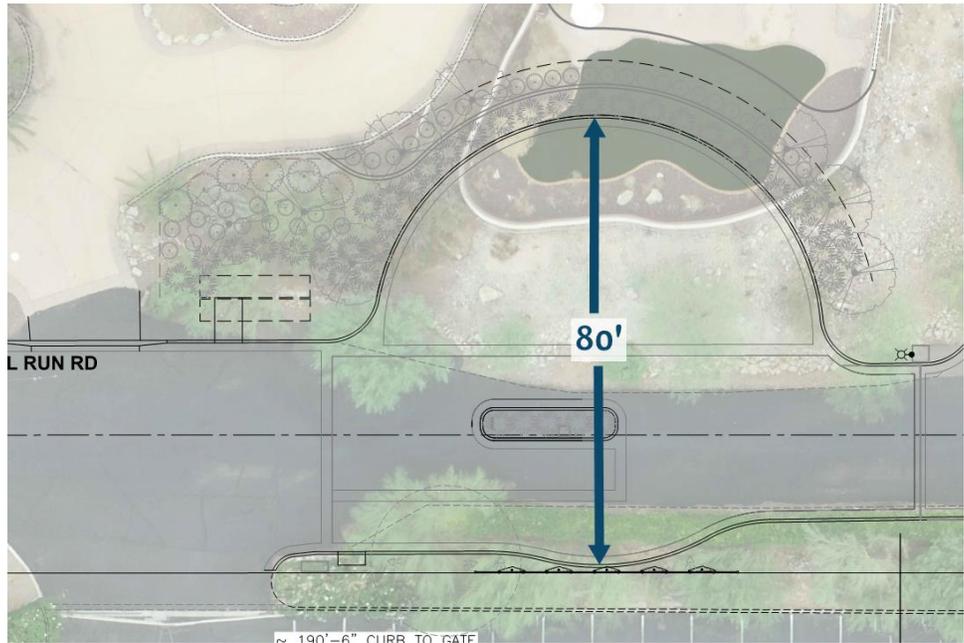


Figure 2 – Schematic Layout with a 40’ Turnaround

The gated entry will provide a median island where a transmitter and/or keypad will be installed to allow residents and guests access. Additionally, residents will have a wireless remote that will open the gate. Therefore, residents will be able to activate the opening of the gate as they approach and will not be using the keypad or queue at the gate. For emergency vehicle access, a knox box will be installed.

The Town of Paradise Valley suggests this turnaround be designed with a 40-foot radius, resulting in a maximum dimension of 80-feet. See **Attachment A** for the Town of Paradise Valley’s standards. In addition to the 40-foot radius cul-de-sac standard, the Town of Paradise Valley standards shown in **Attachment A** also provides standards for a “Hammer-Head Turn-Around” and an “Intermediate Turn-Around” driveway entrance for emergency vehicles.

See **Attachment B** and **Figure 2** for a schematic of a potential layout following these design guidelines using the 40-foot radius.

Gated driveway standards for agencies located within the Phoenix Metropolitan Area were researched, including: City of Scottsdale, Town of Gilbert, City of Chandler, City of Mesa, and the City of Phoenix. The proposed gate on Cottontail Run Road would be allowed in all of these municipalities. These standards are shown in **Attachment C**. The minimum approach width for all of these agencies, with the exception of the City of Mesa, is 20-feet, which meets the fire access standards.



EMERGENCY VEHICLE TURNAROUND

Maintaining fire access is critical, including the ability to turnaround. As mentioned previously, a knox box will be installed at the gated entrance for emergency vehicle access. Should a fire truck require an immediate turn around, the existing intersection of East Cottontail Run Road and North Cottontail Run Road should provide adequate space in order of an emergency vehicle to turnaround.

As previously mentioned, the Town of Paradise Valley’s standards shown in **Attachment A** also provide a

standard for an “Intermediate Turn-Around.” **Figure 3** shows this standard superimposed on the existing intersection of East Cottontail Run Road and North Cottontail Run Road. See **Figure 3**.

Additionally, a fire truck vehicular turning analysis was performed. A fire truck may perform a three-point turn within the turnaround area or may opt to enter the gate through the knox box, then perform a three-point turn at North Cottontail Run Road. See **Figure 4** and **Figure 5**, respectively.

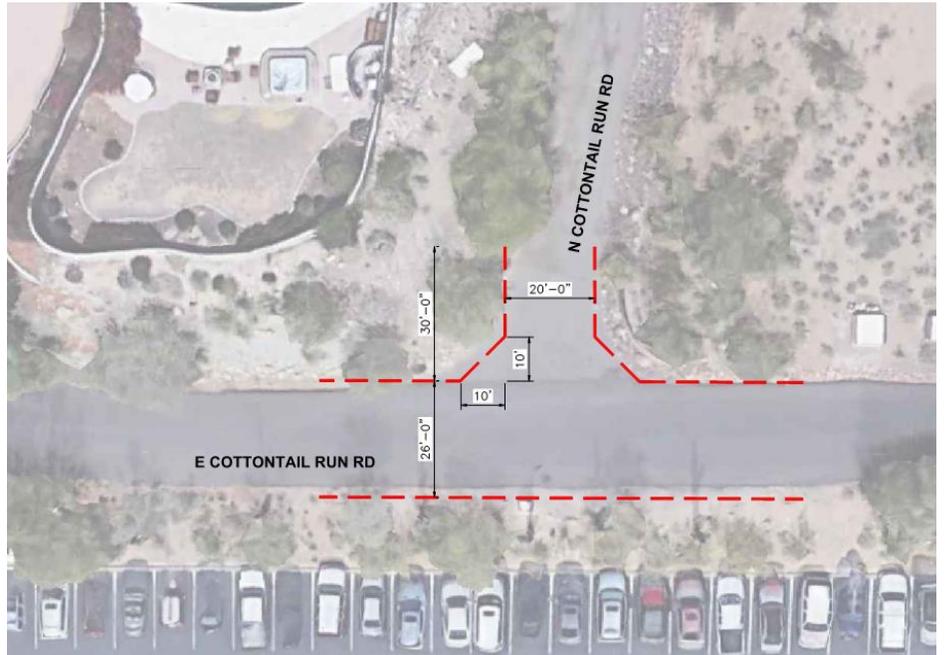


Figure 3 – Intermediate Turnaround

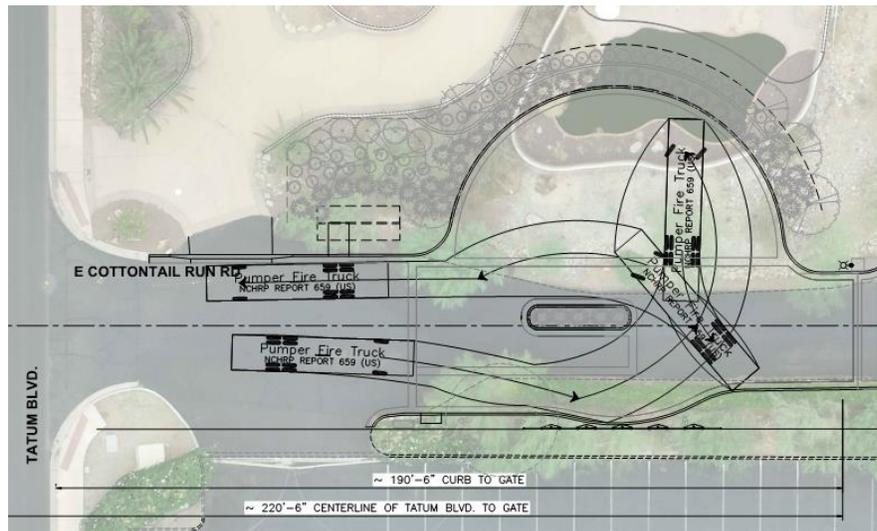


Figure 4 – Emergency Vehicle Turnaround – Template 1

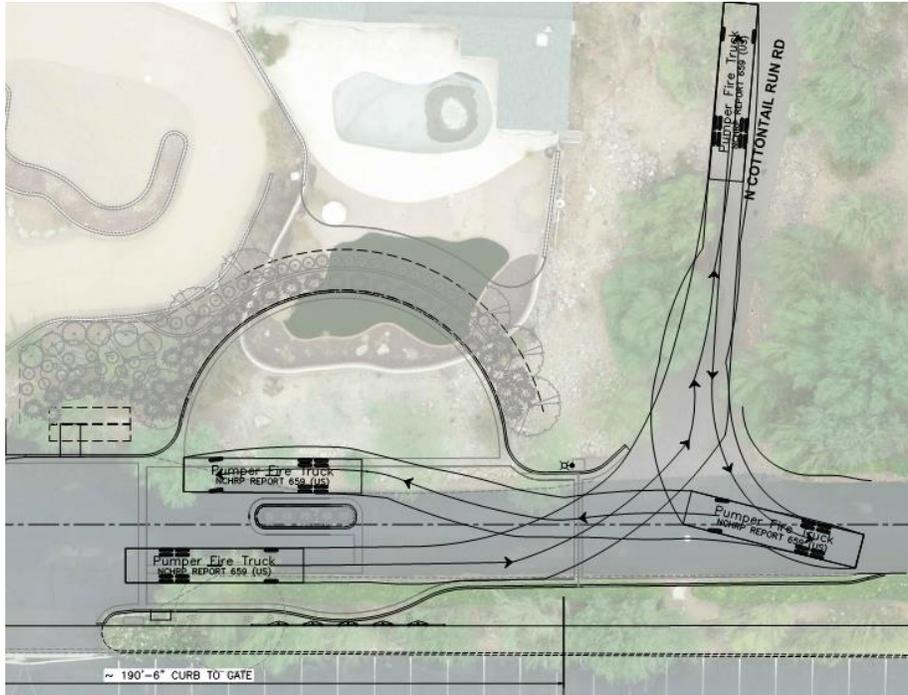


Figure 5 – Emergency Vehicle Turnaround – Template 2

TRUCK WITH TRAILER VEHICLE TURNAROUND

An analysis of the turnaround for a truck with a trailer (landscape vehicle) was also completed. Using the Town of Paradise Valley's 40-foot radial turnaround, a truck with a trailer is able to successfully perform a u-turn. See [Figure 6](#).

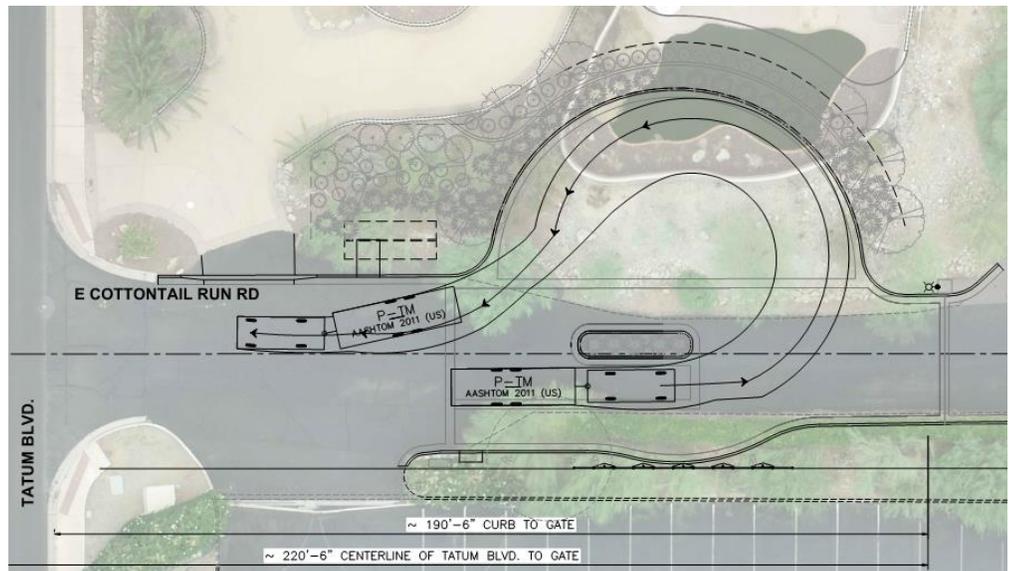


Figure 6 – Truck with Trailer Turnaround



VEHICLE QUEUING

Nine (9) existing single family homes would be located behind the proposed gate. However, as a conservative approach, the trips generated by the 12 single-family residential units was calculated utilizing the Institute of Transportation Engineers (ITE) publication entitled *Trip Generation*, 10th Edition. The ITE rates are based on studies that measure the trip generation characteristics for various types of land uses. The rates are expressed in terms of trips per unit of land use type. This publication is the standard for estimating trips in the transportation engineering profession.

The trip generation for 12 single-family homes, located behind the gate, was calculated utilizing the ITE Land Use 210 – Single-Family Detached Housing. The total trip generation is shown in **Table 1**. See **Attachment D** for the detailed trip generation calculations.

Table 1 – Trip Generation

Land Use	ITE Code	Qty	Unit	Weekday	AM Peak Hour			PM Peak Hour		
				Total	Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	12	Dwelling Units	148	13	3	10	13	8	5

On a typical weekday, 12 single-family residential units are anticipated to generate 148 weekday trips, with 13 trips occurring during the AM and PM peak hours. Of the peak hour trips, three (3) and eight (8) inbound trips are anticipated to occur during the AM and PM peak hours, respectively. The eight (8) inbound trips during the typical PM peak hour represents an average arrival rate of one (1) vehicle every seven to eight minutes.

Normally, there will be one (1) vehicle in queue.



As previously mentioned, residents will have a remote that will open the gate upon approach. Therefore, guests will be the primary user of the keypad. Residents can opt to pass-by to the right of vehicles in queue and enter the gate. Residents should not be contributing to the queue at the keypad, further reducing vehicle queue.

Figure 7 shows two (2) passenger vehicles queued in black.

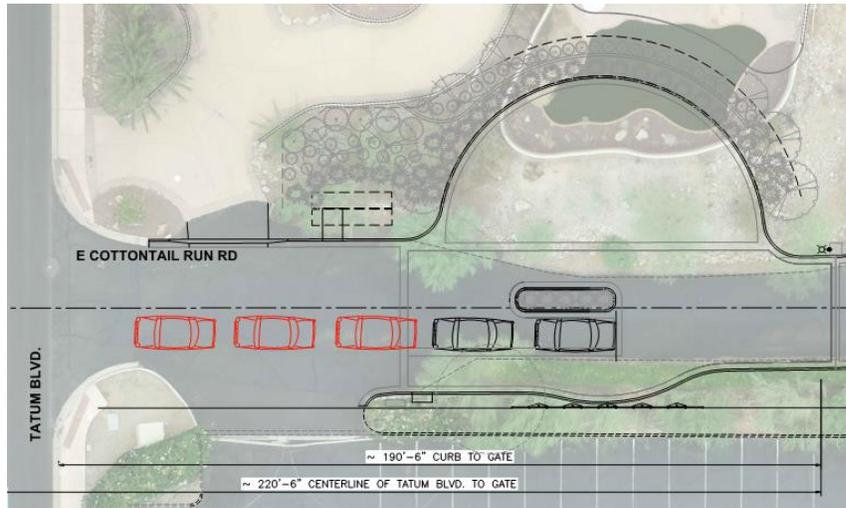


Figure 7 – Passenger Vehicle Queuing

Assuming 20 feet for a vehicle and 5 feet for a gap, which is a considered typical spacing for queuing, there is adequate storage for five (5) passenger vehicles. These additional vehicles are shown in red.

In the event that two (2) landscape vehicles arrive, the queuing of these vehicles is shown in **Figure 8**. Assuming a vehicle and trailer length of 50 feet, and 5 feet for the gap, two (2) landscape vehicles can sufficiently queue.

Additionally, this area provides space for an additional passenger vehicle.

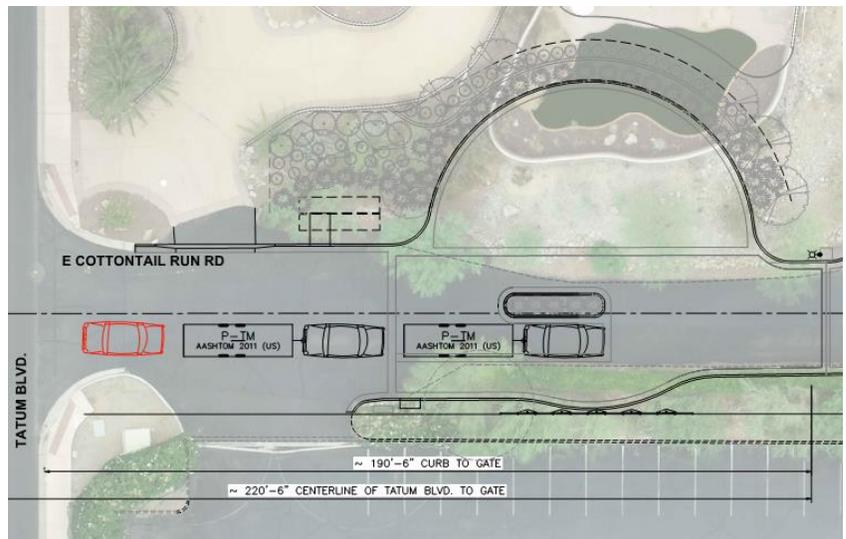


Figure 8 – Vehicle Queuing



SUMMARY

The objective of this Traffic Study is to analyze the traffic impacts associated with the installation of a proposed vehicular gate along East Cottontail Run Road, approximately 220 feet east of Tatum Boulevard, just west of North Cottontail Run Road in the Town of Paradise Valley, Arizona.

Emergency vehicle access is a key item to consider with any gated access. A Knox box will be installed for emergency vehicle access at the gated entrance. Town of Paradise Valley standard “Intermediate Turn-Around” driveway entrance for emergency vehicles was superimposed on the existing intersection of East Cottontail Run Road and North Cottontail Run Road, indicating that the existing intersection resembles the Town’s standard driveway entrance for emergency vehicles. In addition, a truck with a trailer is able to successfully perform a u-turn in the turnaround area.

Finally, vehicle queuing at the gate was analyzed based on trip generation calculations. Normally, there will be one (1) vehicle in queue. The storage along East Cottontail Run Road provides up to five (5) passenger vehicles of queuing. Additionally, two landscape vehicles and one passenger vehicle could queue simultaneously. Therefore, there is more than sufficient length of vehicle queuing.

In conclusion, the vehicular gate along East Cottontail Run Road will have no major impacts to traffic operations.



ATTACHMENT A – TOWN OF PARADISE VALLEY STANDARDS

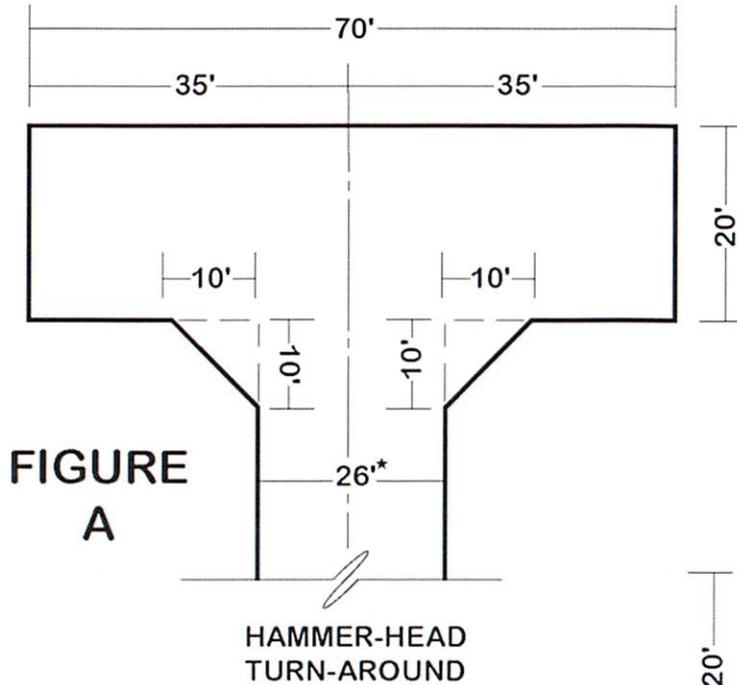


COUNTY OF LOS ANGELES FIRE DEPARTMENT FIRE PREVENTION DIVISION

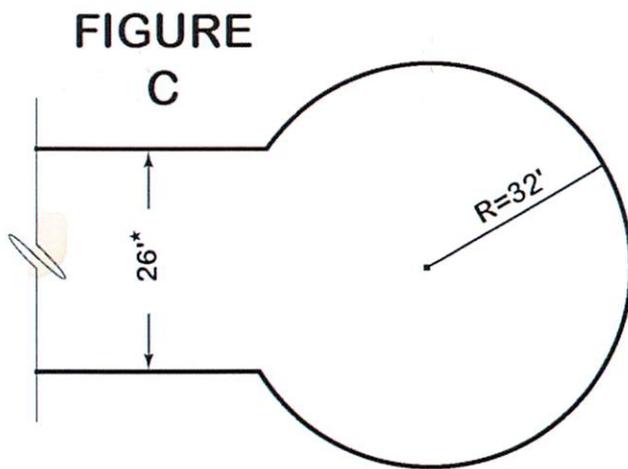
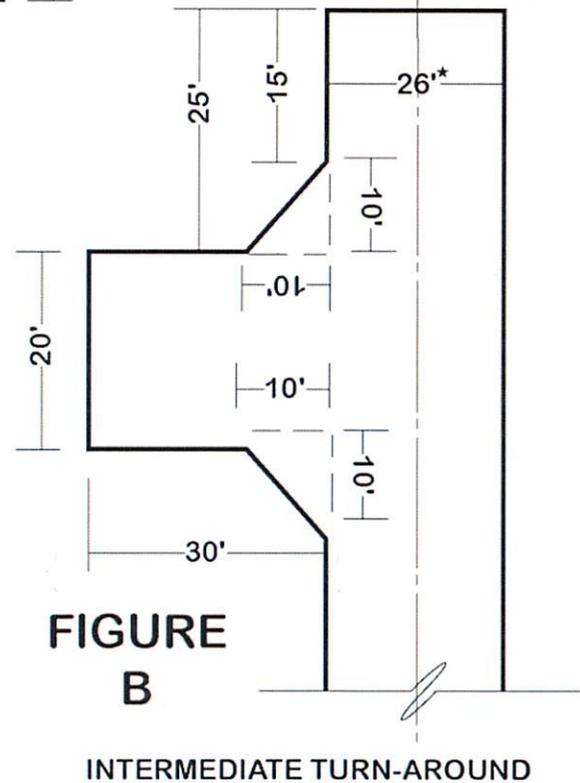
The dimensions of E91 & E92 - H 11' 2", W 8' 7" & L 34' 1"
T92 - H 10' 3", W 8' 4" & L 31' 9"

REV 04/03

FIRE APPARATUS TURNAROUND STANDARD PUMPER



Paradise Valley Town Code requires driveways to single family residences to be 12'



Paradise Valley Town Code Section 6-3-2 B requires cul-de-sac Right of Way radius of 45' and improvements of 40'.

★ MAY BE REDUCED TO 20' FOR SINGLE FAMILY RESIDENCES



ATTACHMENT B – GATED ENTRANCE DESIGN



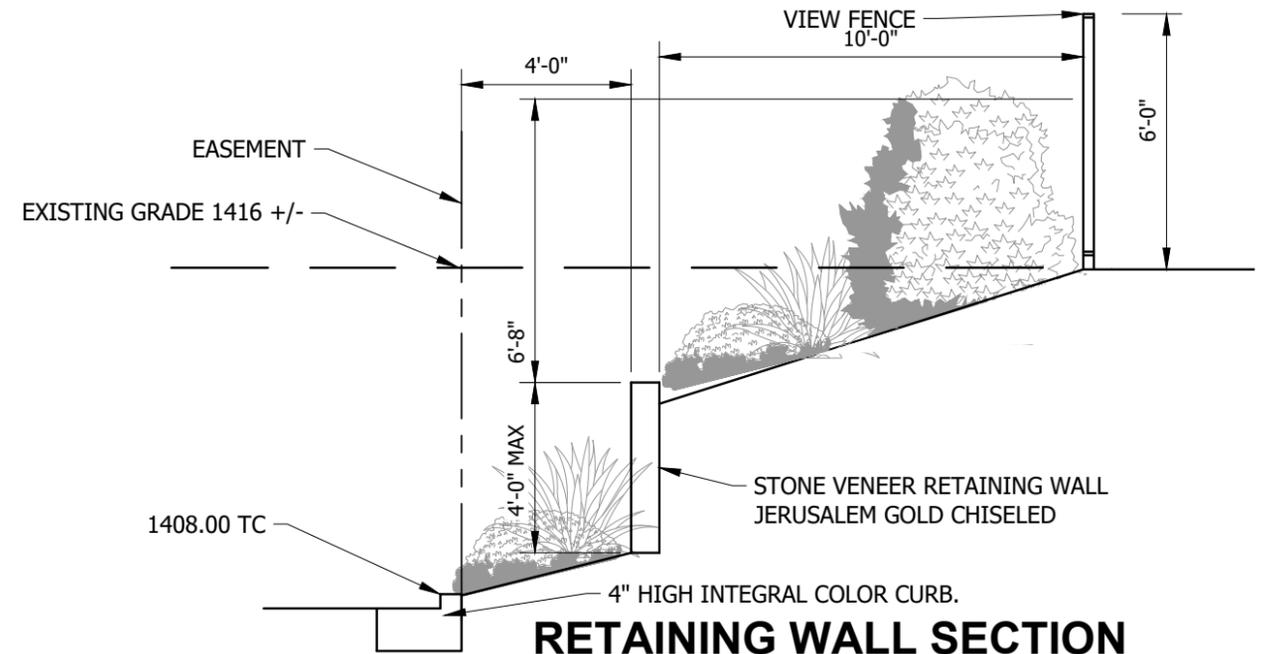
VINE TRELLIS
(6' TALL MAX)



LIGHTS AT GATE
LIGHT SOURCE
HIDDEN IN TOP



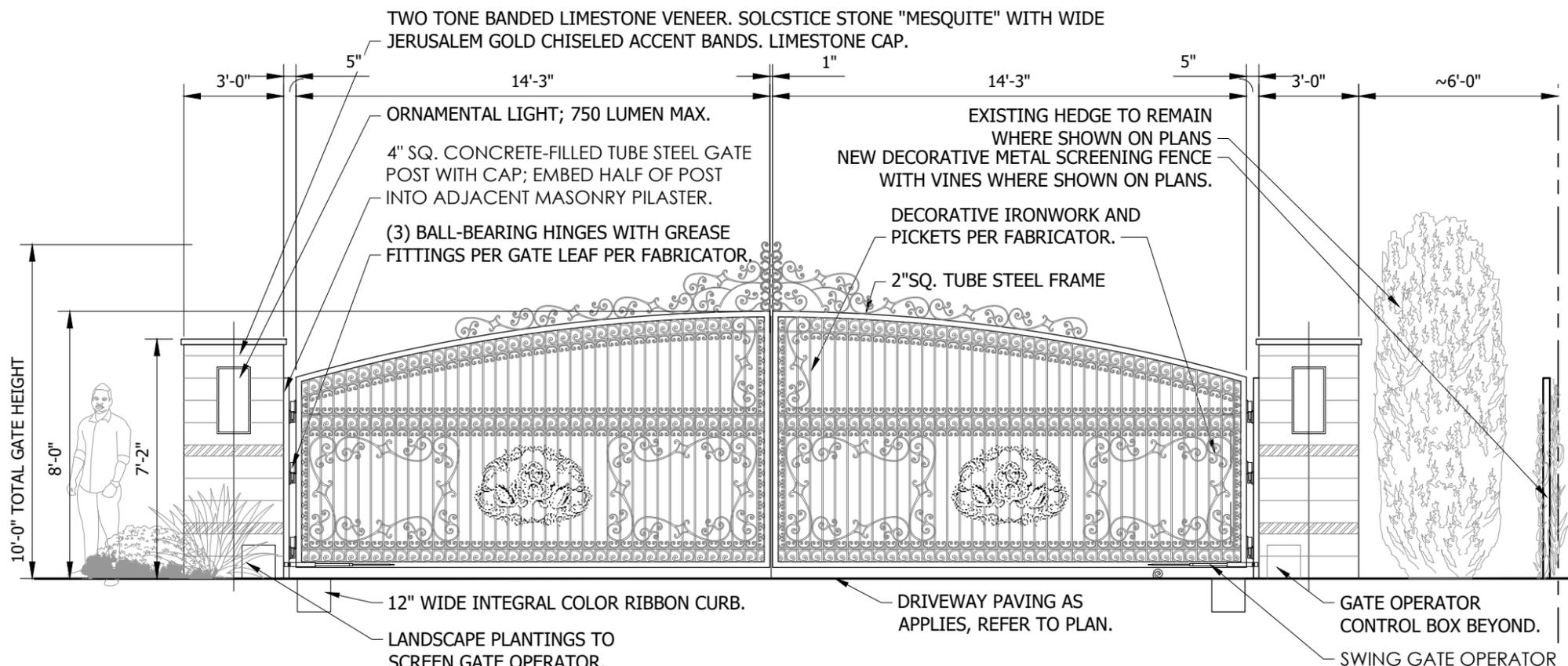
STONE VENEER ON COLUMNS AND CALL BOX PEDESTAL
SOLSTICE STONE (LIMESTONE), MESQUITE BRUSHED (LEFT)
AND JERUSALEM GOLD LINE CHISELED (CENTER). PAVERS:
BELGARD MEGA-BERGERAC (RIGHT), TOSCANA COLOR BLEND.
LRV VALUES LESS THAN 38%



RETAINING WALL SECTION

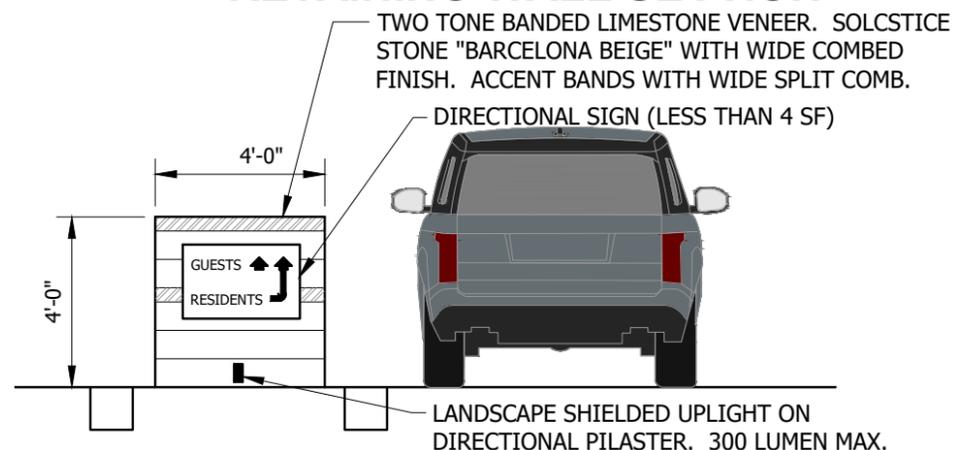
PROPOSED MATERIALS

FINAL MATERIALS, COLORS, AND SELECTION MAY VARY FROM IMAGES SHOWN BUT WILL BE OF SIMILAR QUALITY AND CHARACTER

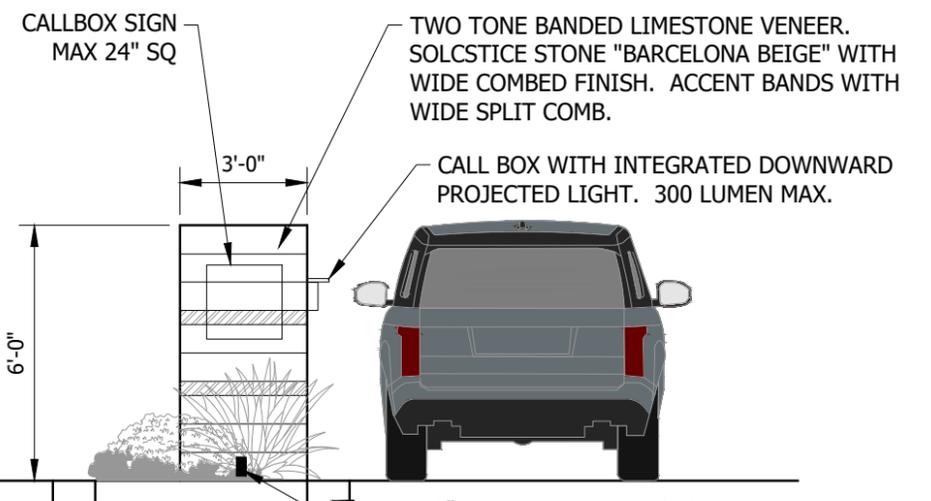


GATE ELEVATION LOOKING EAST

GATE COLOR: DARK BRONZE, LRV < 38%



DIRECTIONAL SIGN ELEVATION



CALL BOX ELEVATION LOOKING EAST



ATTACHMENT C – LOCAL AGENCY GATED ENTRANCE STANDARDS



RESIDENTIAL GATED ENTRANCE STANDARDS

Gated driveway standards for agencies located within the Phoenix Metropolitan Area were researched, including: City of Scottsdale, Town of Gilbert, City of Chandler, City of Mesa, and the City of Phoenix.

City of Scottsdale

The City of Scottsdale standards are shown in **Figure 1**. Two 20-foot approach lanes are provided with a varying median island and a 25-foot turn around area, which overlaps the egress lane by 5-feet. Assuming a 4-foot median island, this driveway configuration results in a maximum driveway width of 64 feet, occurring at the peak of the bulb-out. **This is 16-feet less than the Town of Paradise Valley's requirements.**

Town of Gilbert

The Town of Gilbert standards are shown in **Figure 2**. Two 20-foot approach lanes are provided with a 4-foot median island and a 25-foot turn around area, which overlaps the egress lane by 5-feet. This driveway configuration results in a maximum driveway width of 64 feet, occurring at the peak of the bulb-out. **This is 16-feet less than the Town of Paradise Valley's requirements.**

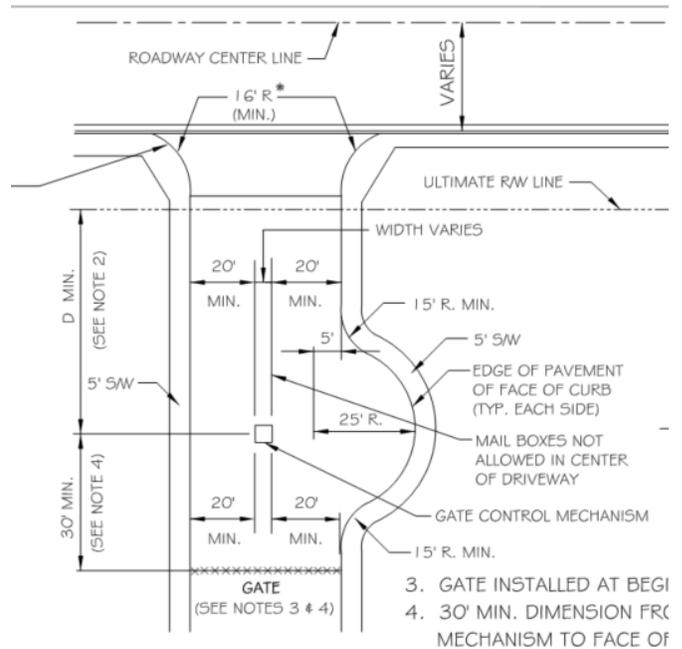


Figure 1 - City of Scottsdale

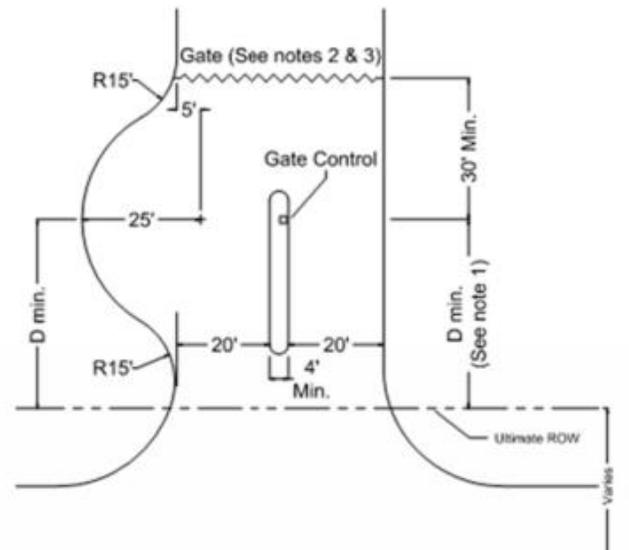


Figure 2 - Town of Gilbert Gated Entrance Standard Detail



City of Chandler

The City of Chandler standards are shown in **Figure 3**. Two 20-foot approach lanes are provided with a median island of varied width and a 25-foot turn around area, which overlaps the egress lane by 5-feet. Assuming a 4-foot median island, the driveway configuration results in a maximum driveway width of 64 feet, occurring at the peak of the bulb-out. **This also is 16-feet less than the Town of Paradise Valley's requirements.**

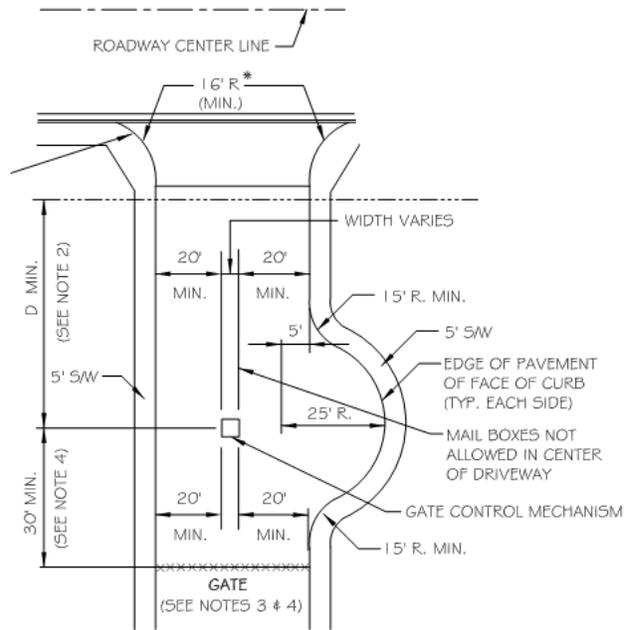


Figure 3 – City of Chandler Gated Entrance Standard Detail

City of Mesa

The City of Mesa standards are shown in **Figure 4**. Similar to the City of Chandler, two 20-foot approach lanes are provided with a median island of varied width and a 25-foot turn around area, which overlaps the egress lane by 5-feet. Assuming a 4-foot median island, the driveway configuration results in a maximum driveway width of 64 feet, occurring at the peak of the bulb-out. **This is also 16-feet less than the Town of Paradise Valley's requirements.**

See **Figure 4** for additional details.

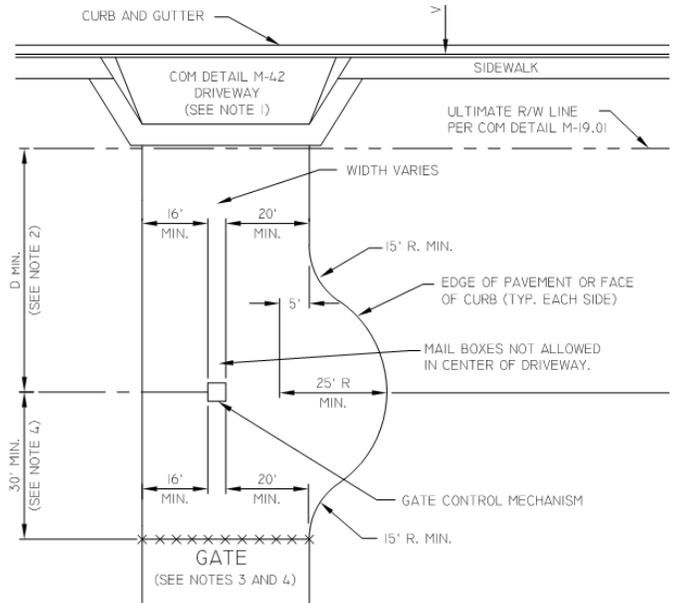


Figure 4 – City of Mesa Gated Entrance Standard Detail



City of Phoenix

The City of Phoenix takes a different approach than these other four municipalities. A standard detail is not provided, rather design guidance is provided. See below:

- Passenger vehicles denied access to the site for any reason shall be enabled to exit the Site with a single forward turning movement. This movement is not to conflict with other vehicles entering the site.
- Service vehicles denied access to the site for any reason shall be enabled to exit the site by

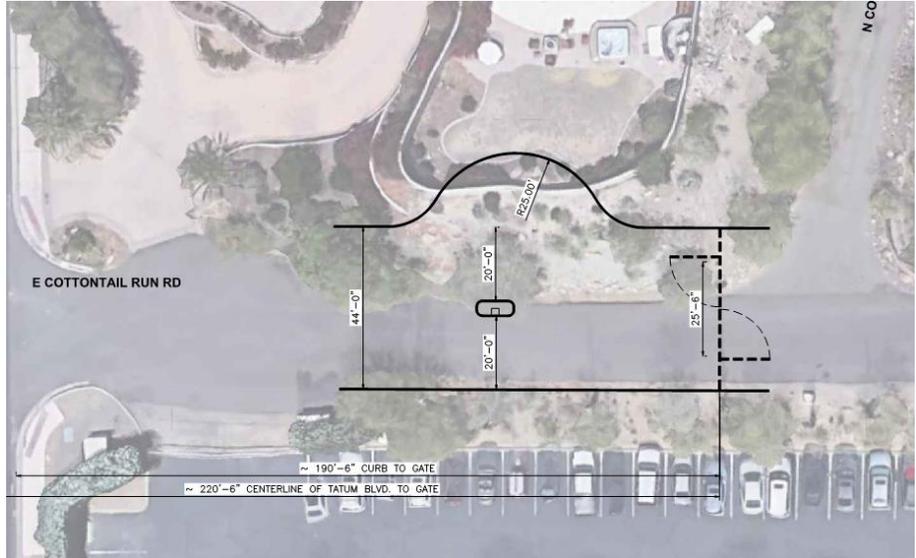
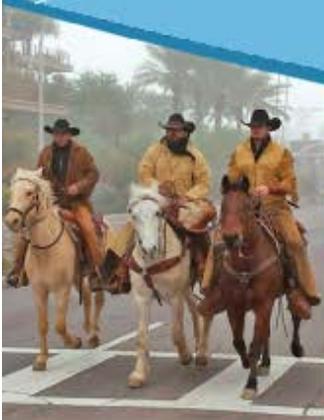
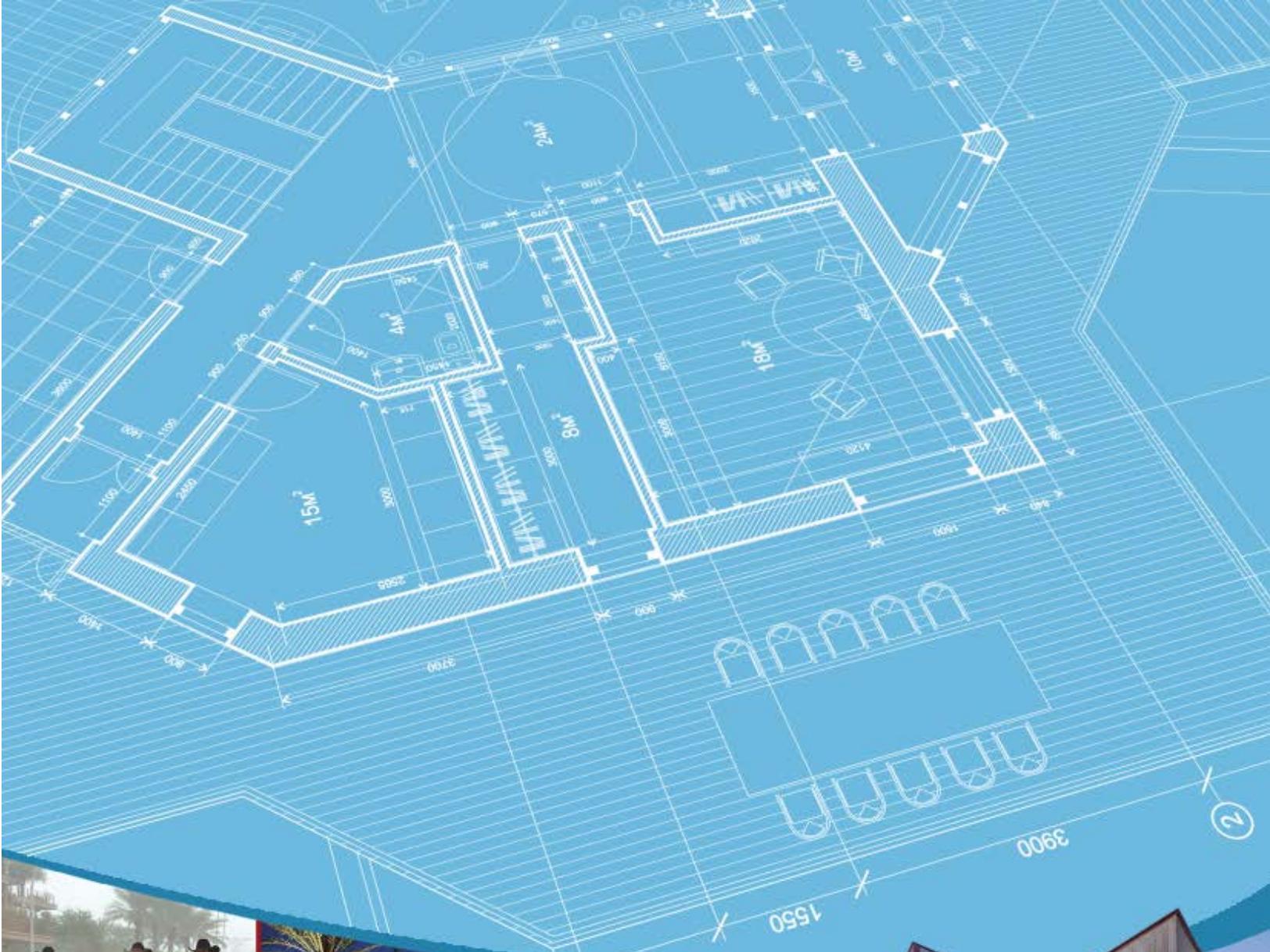


Figure 5 - City of Phoenix

means of a multiple forward and backward turning movement. The first forward motion is to move the vehicle out of the path of any vehicle that may have queued behind it and allow the vehicle to pass, unhindered, into the site.

According to the City of Phoenix Gate Controlled Access Requirements, the City allows site developers to suggest driveway designs that meet the City’s requirements.

See **Figure 6** using the guidance of the City of Phoenix, and applying a similar geometric layout as the City of Scottsdale, Town of Gilbert, City of Chandler and City of Mesa. There is significantly less impact to the adjacent properties.



CITY OF
SCOTTSDALE

DESIGN STANDARDS & POLICIES MANUAL

ON-SITE CIRCULATION & PARKING AREA DESIGN

2-1.300

In addition to the requirements of the Zoning Ordinance, the following guidelines focus on general and specific techniques to assure safe access, emergency access, and community benefits.

MAJOR DRIVEWAYS

2-1.301

Major driveways provide direct access from the street and into a parking lot with more than 50 spaces, and/or provide the driveway access across the front of a retail center.

Design major driveways:

- A. To have a minimum width of thirty (30) feet from face-of-curb to face-of-curb, and conform to the City of Scottsdale (COS) Maricopa Association of Governments (MAG) details;
- B. Without designated customer and business activity loading areas, and direct parking aisle access near the street intersection;
- C. With adequate vehicle stacking distances where they access public streets;
- D. With adequate site area that will allow fire equipment vehicles to turn-around.
Refer to Section 2-1.303 + 2-1.304;
- E. In coordination with adjacent bus stop locations.

GATED PRIVATE STREET AND DRIVEWAY ENTRANCES

2-1.302

Unless otherwise approved by the Transportation Director, or designee, and the Fire Chief, or designee, gated private streets and driveways shall comply with the following:

- A. Private streets and residential developments
Gated private streets and residential driveways entrances (excluding development in the Downtown Area) shall comply with Figure 2-1.2.

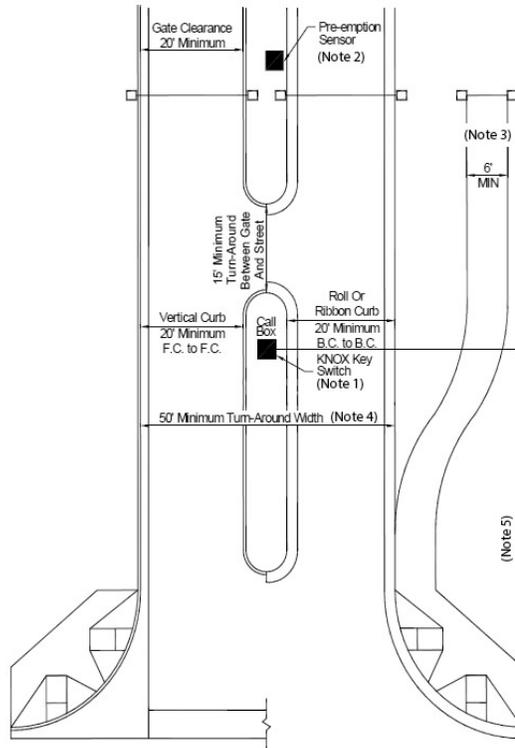
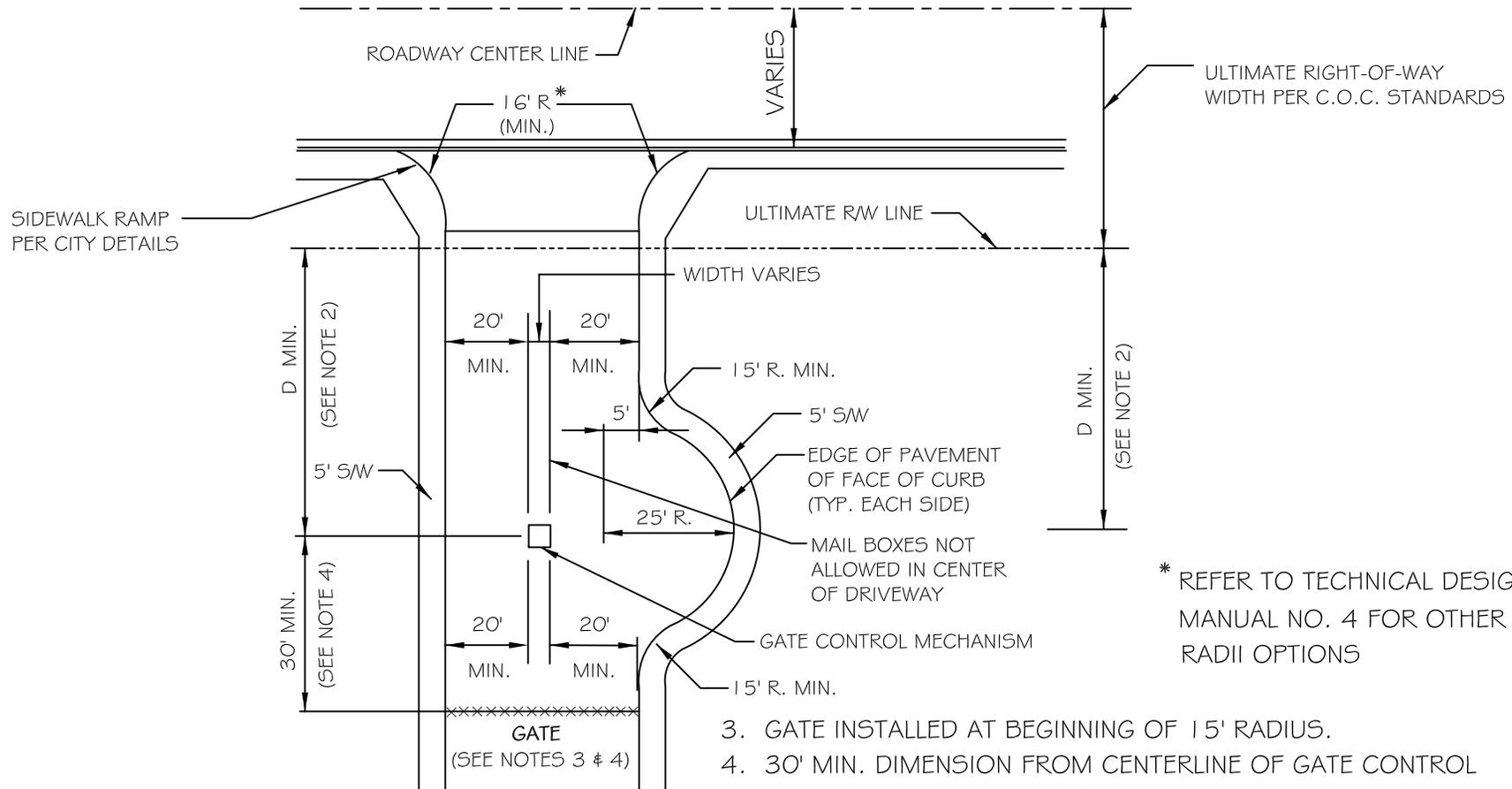


Figure Notes:

1. A KNOX key switch and pre-emption sensor shall be provided on all electric entry control gates. A KNOX key switch shall be installed in a location on the gate control panel (call box) that is readily visible and accessible.
2. The pre-emption sensor shall be at or behind the gate.
3. A separate pedestrian and bicycle access shall be provided on the side of gated vehicular entrance. This may be a gated entrance.
4. The Transportation Director, or designee, may require additional width to accommodate dual entry lanes when the gated entrance is accessed from street classified as an Arterial in the Transportation Master Plan, or a signalized intersection. See note 5.d below pertaining to single entry gated entrances accessed from street classified as an Arterial, or at signalized intersections.
5. The distance from center of the call box:
 - a. To the back of the curb of the street is be a minimum of fifty (50) feet, except as provided in d. and e. below, for:
 - i. Attached and detached residential developments that contain fifty (50) lots or less.
 - ii. Multi-family developments that contain fifty (50) dwelling units, or less.
 - b. To the back of the curb of the street is be a minimum of seventy-five (75) feet, except as provided in d. and e. below, for:
 - i. Attached and detached residential developments that contain fifty (50) lots or greater
 - ii. Multi-family developments that contain fifty (50) dwelling units, or greater.
 - c. Resident or tenant secondary gated private streets and driveways may be approved by the Transportation Director, or designee allowed at 50 feet from center of the call box to the back of the curb of the street, except as indicated in d. below.
 - d. Additional queuing distance from call box to the back of the curb of the street the will be required for gated entrances that are located at signalized intersections or accessing an arterial street.

STREETS
C-200 TO C-261



* REFER TO TECHNICAL DESIGN MANUAL NO. 4 FOR OTHER RADII OPTIONS

NOTES :

1. DRIVEWAY MAX. WIDTH = 45 FEET IN STREET RW.
2. SETBACK REQUIREMENT BY NUMBER OF RESIDENTIAL UNITS:

NUMBER OF UNITS	D MIN.
LESS THAN 100	40'
101 TO 150	60'
151 TO 200	80'
GREATER THAN 200	100'

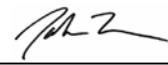
3. GATE INSTALLED AT BEGINNING OF 15' RADIUS.
4. 30' MIN. DIMENSION FROM CENTERLINE OF GATE CONTROL MECHANISM TO FACE OF GATE.
5. WHERE MORE THAN ONE ENTRY IS PROVIDED, D_{MIN.} MAY BE REDUCED WITH APPROVAL OF CITY ENGINEER.
6. ELECTRICAL CONTROLLED GATES SHALL BE EQUIPPED WITH AN AUTOMATIC OPENING PRE-EMPTION DEVICE, TIMED TO REMAIN OPEN FOR 30 MINUTES, AND A KNOX KEY SWITCH OVERRIDE LOCATED AT THE GATE CONTROL MECHANISM. ELECTRIC GATE OPERATORS SHALL BE LISTED IN ACCORDANCE WITH UL 325. GATES SHALL BE DESIGNED AND CONSTRUCTED TO COMPLY WITH THE REQUIREMENTS OF ASTM F 2200.

DETAIL NO.
C-228
NTS



CITY OF
CHANDLER
STANDARD
DETAIL

**TYPICAL DRIVEWAY ACCESS TO
PRIVATE GATED COMMUNITY**

APPROVED: 
CITY ENGINEER
DATE: 01-09-2020

DETAIL NO.
C-228
NTS

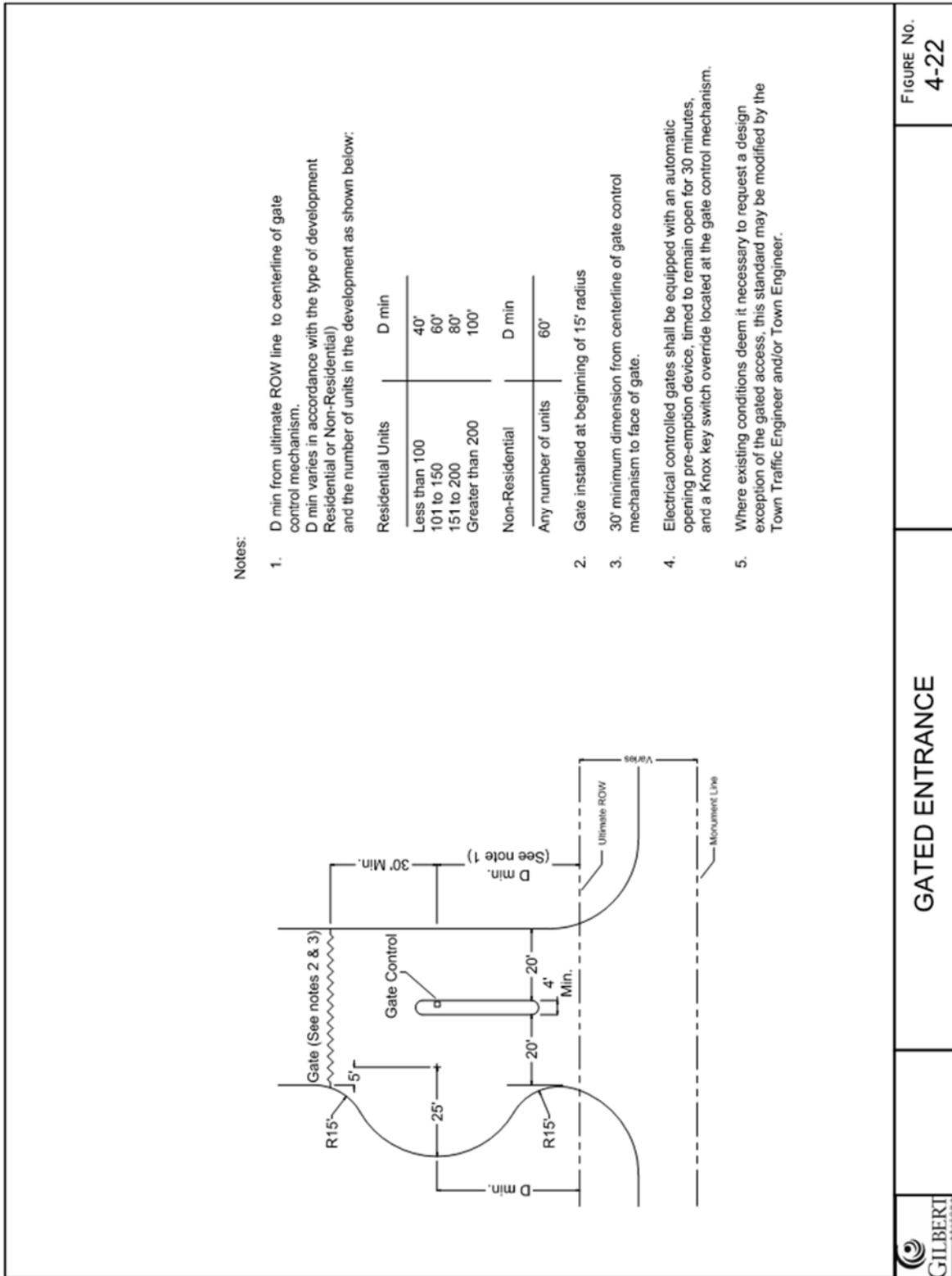
**PUBLIC WORKS
AND
ENGINEERING
STANDARDS**

2020



GILBERT
A R I Z O N A

September 10, 2020



Notes:

1. D min from ultimate ROW line to centerline of gate control mechanism.
D min varies in accordance with the type of development Residential or Non-Residential and the number of units in the development as shown below:

Residential Units	D min
Less than 100	40'
101 to 150	60'
151 to 200	80'
Greater than 200	100'
Non-Residential	D min
Any number of units	60'

2. Gate installed at beginning of 15' radius
3. 30' minimum dimension from centerline of gate control mechanism to face of gate.
4. Electrical controlled gates shall be equipped with an automatic opening pre-emption device, timed to remain open for 30 minutes, and a Knox key switch override located at the gate control mechanism.
5. Where existing conditions deem it necessary to request a design exception of the gated access, this standard may be modified by the Town Traffic Engineer and/or Town Engineer.

FIGURE NO.
4-22

GATED ENTRANCE



FIGURE 4-22 GATED ENTRANCE

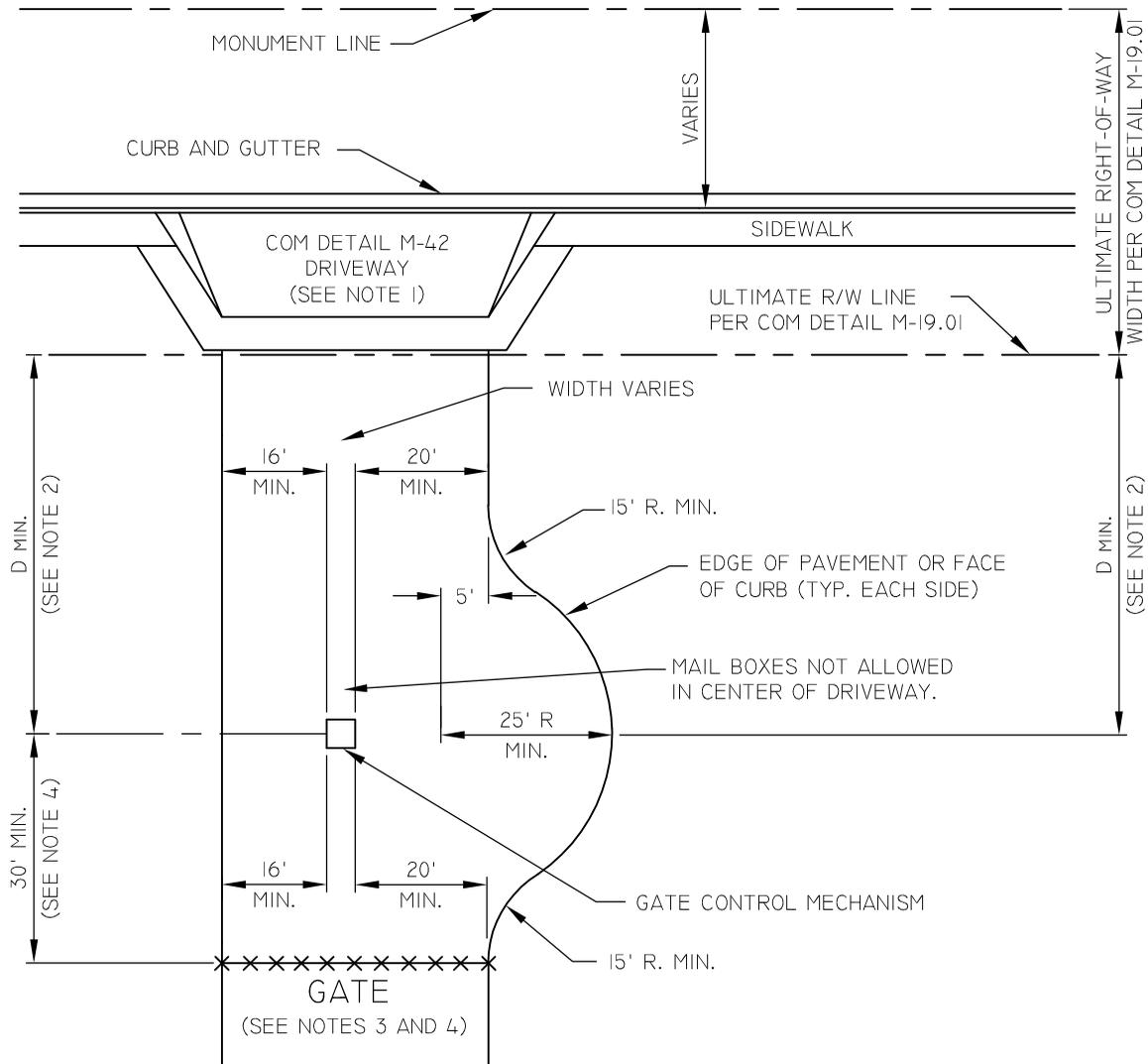
Mesa Standard Details & Specifications

Amendments to MAG Uniform Standard
Details & Specifications for
Public Works Construction



MESA STANDARD DETAILS
AVAILABLE ON-LINE
WWW.MESAAZ.GOV/ENGINEERING

EFFECTIVE DATE April 15, 2019



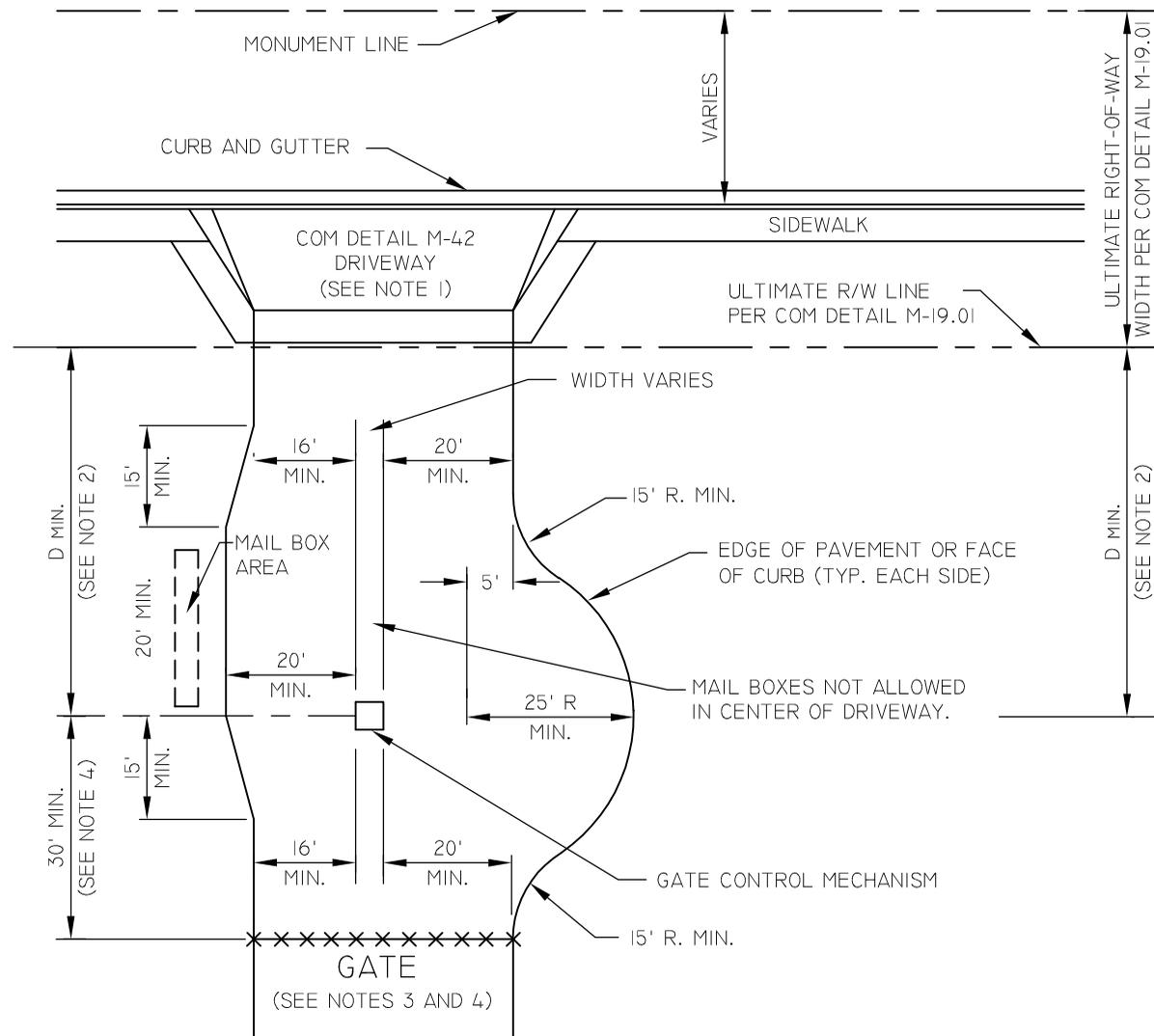
NOTES

1. DRIVEWAY PER COM DETAIL M-42. DOUBLE DRIVEWAY MAX. WIDTH = 60'.
2. D MIN. FROM ULTIMATE R/W LINE PER COM DETAIL M-19.01 TO CENTERLINE OF GATE CONTROL MECHANISM. D MIN. VARIES IN ACCORDANCE WITH THE TYPE OF DEVELOPMENT (RESIDENTIAL OR NON- RESIDENTIAL) AND THE NUMBER OF UNITS IN THE DEVELOPMENT AS SHOWN BELOW:

RESIDENTIAL UNITS	D MIN.
LESS THAN 25	20'
25 TO 100	40'
101 TO 150	60'
151 TO 200	80'
GREATER THAN 200	100'
NON-RESIDENTIAL UNITS	D MIN.
ANY NUMBER OF UNITS	60'

3. GATE INSTALLED AT BEGINNING OF 15' RADIUS.
4. 30' MIN. DIMENSION FROM CENTERLINE OF GATE CONTROL MECHANISM TO FACE OF GATE.
5. WHERE EXISTING CONDITIONS DEEM IT NECESSARY TO REQUEST A DESIGN EXCEPTION OF THE GATED ACCESS, THIS STANDARD MAY BE MODIFIED BY THE TRAFFIC ENGINEER AND/OR CITY ENGINEER.

NOT TO SCALE



NOTES

1. DRIVEWAY PER COM DETAIL M-42. DOUBLE DRIVEWAY MAX. WIDTH = 60'.
2. D MIN. FROM ULTIMATE R/W LINE PER COM DETAIL M-19.01 TO CENTERLINE OF GATE CONTROL MECHANISM. D MIN. VARIES IN ACCORDANCE WITH THE TYPE OF DEVELOPMENT (RESIDENTIAL OR NON- RESIDENTIAL) AND THE NUMBER OF UNITS IN THE DEVELOPMENT AS SHOWN BELOW:

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LESS THAN 25	20'
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GREATER THAN 200	100'
NON-RESIDENTIAL UNITS	D MIN.
ANY NUMBER OF UNITS	60'

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5. WHERE EXISTING CONDITIONS DEEM IT NECESSARY TO REQUEST A DESIGN EXCEPTION OF THE GATED ACCESS, THIS STANDARD MAY BE MODIFIED BY THE TRAFFIC ENGINEER AND/OR CITY ENGINEER.

NOT TO SCALE



Background

The popularity of gated entrances for subdivisions, multi-family projects and parking lots is growing due to the perceived need for security. When gate-controlled access is used, turnarounds must be provided to ensure safe and efficient travel on adjacent streets.

Definition

Gate-controlled access is defined as any entrance to a site that is designed to regulate vehicular access. Ingress and egress may be regulated by an operational guard station, with or without gates, or through a gate that is operated by an electronically controlled device activated by a card reader, keypad, home owner remote, a security service or any other means.

Requirements

1. The centerline of the controller device in the private street or driveway shall be 50' (minimum) from the extension of the face of curb of the public street. This will allow a two (2) car queue without obstructing adjacent street traffic.
2. Passenger vehicles denied access to the site for any reason shall be enabled to exit the Site with a single forward turning movement. This movement is not to conflict with other vehicles entering the site.
3. Service vehicles denied access to the site for any reason shall be enabled to exit the site by means of a multiple forward and backward turning movement. The first forward motion is to move the vehicle out of the path of any vehicle that may have queued behind it and allow the vehicle to pass, unhindered, into the site.
4. All turning movements shall be accomplished in front of the gate and beyond the keypad.
5. The mounting of 8 square feet of reflectors or reflective material shall be required on both faces of the vehicular gates. Lighting may be substituted for the reflective material if the lighting illuminates the entire gate area and is in full operation from dusk until dawn. It is important that the gate be visible from the adjacent public street at all times.
6. Gates may not be placed on public streets.
7. Fire Department approval will also be required for evaluation of emergency access.
8. While designing the entrance other issues to consider include:
 - a. Access required by vehicles and staff of the Solid Waste Division of Public Works
 - b. Mail delivery
 - c. Utility (meter reader) access
 - d. Effects on internal circulation
 - e. Effect on any existing Planning & Development Department stipulations
 - f. Impact on adjacent driveways
 - g. Other potentially detrimental effects in or around the site

Exceptions

1. If the entrance is a secondary access point or a primary access point located on a local street or a minor collector, the requirements for long wheelbase vehicles may be relaxed. However, the turnaround requirements for passenger vehicles will still apply. (See Figure 2).
2. If the entrance is a secondary access point and is designated as “residents only” or as exit only, the turnaround requirements may be waived. The “residents only” gates must be operated via remote access exclusively. If this entrance is located off of an arterial or collector, the gates shall be set back a minimum of 25’ from the extension of the curb face on the intersecting street. “Resident Only” or “Exit Only – Do Not Enter” signs shall be posted on the exterior face of the gate.
3. If the gates are to remain open from 6:00 am to 7:00 pm for residential projects, the turnaround requirements for entrances located on local streets and minor collectors only may be waived.
4. If the gates are to remain open during business hours for commercial projects, the turnaround requirements may be waived.
5. Access points with manned guard stations may have the turnaround requirements waived, if the guard allows unauthorized vehicles to enter the site in order to turn around.
6. If the keypad is located at least 200’ from the intersecting public street the requirements for long wheelbase vehicles may be waived provided there is some type of maneuvering area.
7. Secondary entrances to parking garages located on local streets may have the turnaround requirements waived.
8. Gates that are activated by any and all vehicles entering the site will not be required to provide turnarounds.
9. Other conditions or technology that allow smooth access operation and does not affect traffic flow may allow the turnaround requirements to be waived.

Exhibits

The following figures are examples of gate-controlled entrances that meet all of the previously described requirements. Figure 1 shows the standard arterial street access point. Figure 2 shows an entrance with the long wheelbase vehicle requirements relaxed. Applicants may suggest creative alternatives to these examples provided they meet all of the requirements outlined herein.



ATTACHMENT D – TRIP GENERATION



Trip Generation Calculations, 10th Edition

210 Single-Family Detached Housing																					
Land Use	ITE Code	Qty	Unit	Weekday			AM Peak Hour			PM Peak Hour			Weekday			AM Peak Hour			PM Peak Hour		
				Rate	% In	% Out	Rate	% In	% Out	Rate	% In	% Out	Total	In	Out	Total	In	Out	Total	In	Out
Single-Family Detached Housing	210	12	Dwelling Units	9.44	50%	50%	0.74	25%	75%	0.99	63%	37%	113	57	56	9	2	7	12	8	4
Single-Family Detached Housing	210	12	Dwelling Units	4.81	50%	50%	0.33	25%	75%	0.44	63%	37%	58	29	29	4	1	3	5	3	2
Single-Family Detached Housing	210	12	Dwelling Units	19.39	50%	50%	2.27	25%	75%	2.98	63%	37%	233	117	116	27	7	20	36	23	13
Land Use	ITE Code	Qty	Unit	Weekday			AM Peak Hour			PM Peak Hour			Weekday			AM Peak Hour			PM Peak Hour		
Single-Family Detached Housing	210	12	Dwelling Units	Equation			Equation			Equation			Total	In	Out	Total	In	Out	Total	In	Out
				$\ln(T)=0.92\ln(X)+2.71$	50%	50%	$T=0.71(X)+4.80$	25%	75%	$\ln(T)=0.96\ln(X)+0.20$	63%	37%	148	74	74	13	3	10	13	8	5
Single-Family Detached Housing				Standard Deviation	2.10			0.27	0.31												
Single-Family Detached Housing				Number of Studies	159			173	190												
Single-Family Detached Housing				Average Size	264			219	242												
Single-Family Detached Housing				R ²	0.95			0.89	0.92												

Average

Minimum

Maximum

Equation