Drainage Reports

Abbreveated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application

# PRELIMINARY DRAINAGE REPORT

# Wolff Legacy Scottsdale

## Assisted Living Facility

## 8890 Legacy Blvd.

## Scottsdale, AZ 85255

CITY COPY

Stormwater Review By:
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Review Cycle 3 Date 5-7-18

**Prepared For:**

THE WOLFF COMPANY
Since 1949

- refer to Final Drainage Report 14-DR-2018

**Prepared by:**

SEG

Registered Professional Engineer (Civil)
CERTIFICATE NO.
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Date Signed 04-19-18
ARIZONA, U.S.A.
EXPIRES 12-31-18

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**Project Number: 170726**

**Revision Date: April 2018**
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**Submittal Date: November 20, 2017**
**Resubmittal Date: February 20, 2018**

**Case No.: 23-ZN-2017; 7-GP-2017** **Plan Check No.: TBD**

23-ZN & 7-GP-2017
04/20/18


EXPIRES 12-31-18

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## APPENDIX:

# 1. INTRODUCTION

This report represents the storm water analysis for a proposed assisted living project with 151 apartment type units within the north and south larger buildings, a communal area with a theater, salon, and 6,000 sf restaurant in the central building, and 22 cottage units. The purpose of this report is to provide the hydrologic and hydraulic analyses, required by the City of Scottsdale, to support the proposed site plan for said development. This report includes discussions and calculations defining the storm water management concepts for collection, conveyance, and detention systems necessary to comply with the drainage requirements of the City of Scottsdale and Maricopa County. Preparation of this report has been done in accordance with the requirements of the City of Scottsdale Design Standards & Policies Manual (DS&PM) 2010 [1], and the Drainage Design Manuals for Maricopa County, Arizona, Volumes I[2] and Volume II[3].

# 2. LOCATION AND PROJECT DESCRIPTION

## 2.1 LOCATION:

The project property consists of a parcel of land located in a portion of the SW ¼ of Section 30 and the NW ¼ of Section 31, Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The parcel ID number is 215-07-238 and the parcel area is 531,822.9 SF, (12.21 net acres). Refer to **FIGURE 1 - Vicinity Map** for the project's location with respect to major cross streets.

## 2.2 EXISTING AND PROPOSED DEVELOPMENTS SURROUNDING THE SITE:

Existing site context related to surrounding developments is as follows:

- North: To the north is the La Curvata development zoned I-1 ESL (HD)
- West: The west side is bound by 88th St and a City of Scottsdale property zoned OS.
- South: The south is Legacy Boulevard and directly across is an undeveloped parcel zoned I-1 PCD ESL (HD)
- East: Pima Road runs along the east side of the property and directly across the Ironwood Village parcel 4 residential development zoned R1-5 ESL (HD)
- Southeast: Directly adjacent to the subject project at the NWC of Legacy Blvd. and Pima Road is a parcel zoned C-2 ESL HD proposed to be a Chase Bank site (not part of this subject project).

## 2.3 EXISTING SITE DESCRIPTION:

Land ownership, as defined by ALTA/NSPS Land Title Survey by AW Land Surveying, LLC dated 11/13/2017 includes 531,822.9 square feet, 12.209 +/- acres (net) of commercially zoned land. City of Scottsdale zoning map designates this parcel as I-1 ESL HD and C-2 ESL HD. The C.O.S. conceptual land use map designates this parcel for commercial use. Rezoning to CO ESL HD is proposed.

This site is an undeveloped parcel lot. The topography generally slopes from the north east (elevation 1660+/-) to the southwest (elevation 1638 +/-) at approximately 2% with a change in elevation of approximately thirty-eight (38) feet. The site consists of grass, brush, rock, and typical desert landscape.

Refer to **FIGURE 2** for an aerial of the overall project existing conditions.

### 2.4 PROPOSED SITE DEVELOPMENT:

The property is proposed to be developed into an assisted living project with 151 apartment type units in the north and south larger buildings, a communal area with a theater, salon, and 6,000 sf restaurant in a centrally located building, and 22 cottage units.
Refer to **APPENDIX III** for Grading and Drainage Plans.

### 2.5 FLOOD HAZARD ZONE:

As defined by the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona, and incorporated areas, Community number 045012, Panel number 1320 of 4425, as shown on Map Number 04013C1320L dated October 16, 2013, this site is designated as **Special Flood Hazard Area (SFHA) Zone AO** and is typically defined as flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined. This site is in an area noted as having a flood depth of 1' at a velocity of 4 to 5 fps.
Refer to FIGURE 3 – FIRM.

## 3. EXISTING DRAINGE CONDITIONS

### 3.1 OFF-SITE DRAINAGE:

This site is bound as follows:

- By Pima Road to the east. This road has curb and gutter conveying runoff south where it is collected in a curb opening catch basin near the Pima Road and Legacy Blvd intersection.
- By Legacy Boulevard to the south. This road has curb and gutter conveying runoff west to Historical Outlet 1 where it joins with the wash runoff and flows downstream over land.
- By a wash to the north and west that passes under Pima Road through a bridge. This wash has a flow of 817 CFS per the Pinnacle Peak West ADMS- 100year 24-hour worse case results. Please see Appendix II for printout of Pinnacle Peak West FLO2D flows. The Pinnacle Peak West ADMS was conducted by Flood Control District of Maricopa County and City of Scottsdale. SEG acknowledged the FLO2D Data as the best available data, understand it, and accept the FLO-2D Results.

### 3.2 ON-SITE DRAINAGE:

Each existing drainage area has been calculated using the Rational Equations for time of concentration as follows:

**Drainage Area 1 (P-DA1) to Historical Outlet 1 (HO-1):**

The westerly edge of the site (P-DA1) is mainly the existing wash section to the top of its easterly bank. **$Q_{100}$ Exist. = 6.5 cfs**

**Drainage Area 2 (P-DA2) to Historical Outlet 2 (HO-2):**

Historical Outlet 2 is an existing 18" culvert crossing under Legacy Blvd. located approximately 720 feet west of the intersection of Pima Road. **$Q_{100}$ Exist. = 15.1 cfs**

**Drainage Area 3 (P-DA3) to Historical Outlet 3 (HO-3):**

Historical Outlet 3 is an existing 18" culvert crossing under Legacy Blvd. located approximately 390 feet west of the intersection of Pima Road. **$Q_{100}$ Exist. = 14.6 cfs**

**Drainage Area 4 (P-DA4) to Historical Outlet 4 (HO-4):**

Historical Outlet 4 is an existing 18" culvert crossing under Legacy Blvd. located approximately 180 feet west of the intersection of Pima Road. **$Q_{100}$ Exist. = 11.5 cfs**

Please see **Appendix II** for Summary of Rational Method calculations.

# 4. PROPOSED STORM WATER MANAGEMENT

## 4.1 Offsite Drainage

HECRAS Analysis was conducted on the wash to the north and the west of the site to determine the 100-year Water Surface Elevations. The buildings are elevated to be at least 1 foot above the 100-year water surface elevations. The channel cross-sections are confined except for cross sections 20 and 100 where the westerly bank allows the flow to disperse to the west. The calculation is run assuming a vertical confinement to provide a conservative high-water elevation for the site design.

SEG completed erosion setback and scour calculations summarized as follows:

- Erosion setback from top of bank for straight channel: 29'
- Erosion setback from top of bank for Curved Channel: 71'
- Scour depth: 3.2'

Because the proposed improvements encroach into the wash erosion setback, scour walls are provided that extend below the scour depth.
See **Appendix II** for existing and proposed HECRAS result printouts, n value selection, set back and scour calculations.

## 4.2 On-site DESIGN INTENT:

On-site drainage will be handled within paved areas through curb openings, underground storm systems, or onsite channels where necessary. This parcel is in ESL; Pre vs. Post analysis is used to keep the discharge at the historical outlets less than or equal to existing condition outflows.

On-site detention will be provided in an underground detention system on the low end of the site. Total discharge of the storm water detention will be within thirty-six hours with historical outlets HO-2 and HO-3 being used. The ultimate outfall for the project is at the southwest corner of the site along Legacy Boulevard at an elevation of 1238.24.

The area onsite that falls within the drainage area of the wash (P-DA1) will be largely untouched and developed runoff rate will be ensured to be less than or equal to the predevelopment discharge.

Refer to Section 5 below for a discussion on proposed finished floor elevations. Refer to **Appendix III** for the Preliminary Grading & Drainage Plan.

### 4.3 DESIGN STORM REQUIREMENTS:

In accordance with City of Scottsdale requirements for land within an ESL area, storm water storage is required based on existing conditions versus proposed conditions for a 100-yr; 2-hr event with the maximum developed outflow not to exceed existing condition rates. Design detention volume will be based on historical outflow rates per Section 3.2 and as calculated in Section 4.5 below.

### 4.4 CHARACTERISTICS OF BASINS:

The proposed basins are a combination of undisturbed NAOS areas or new commercial development. Based on Table 6.4 of the DS&PM, runoff coefficients for the 100-year storm event used are as follows:

- $C_{10}$=0.45 for undisturbed natural desert and desert landscaping
- $C_{10}$=0.95 for asphalt pavement, concrete, and roof areas.

HYDROLOGIC ANALYSIS: Hydrologic analysis is determined using the procedures in the City of Scottsdale Design Standards & Policies Manual and the Drainage Design Manual for Maricopa County, Arizona, Volume I. The Rational Method was utilized to compute the on-site peak discharges. The following is the established Rational Method equation and the basic input data required:

$Q=C_wiA$

Where: $C_{wt}$ = The runoff coefficient relating runoff to rainfall
i = Average rainfall intensity in inches/hour, lasting for Tc
Tc = The time of concentration (minutes)
$Tc = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$ (Equation 3.2, Papadakis and kazan equation, 1987)
A = The contributing drainage area in acres

Tc and i are calculated by iteration using the equation above and NOAA atlas 14 data as described in the *Drainage Design Manual for Maricopa County, hydrology (ref. 2).*

### 4.5 STORMWATER DETENTION:

#### 4.5.1 REQUIRED STORAGE:

The capacity of the existing historical outlets will be studied and storage will be provided as required to maintain outflows at or below existing flow rates and drainage-way capacities. Historic outfalls will be utilized, and detention provided as follows:

Post-Development DA-1 (wash) contributes only to the wash and will not be developed. Therefore, it will not be included in the detention requirements. This outlets to HO-1. (1.60 Ac). In addition, DA-12 outlets directly to Legacy Blvd. the proposed flow (DA1+DA12 = 5.8 cfs) is less than the pre-development flow of (P-DA1 = 6.5 cfs). Refer to Drainage Area Calculations, **Appendix II**.

Post-Development OSDA is the corner commercial site and is a stand-alone parcel that will have its own future detention and outlet to HO-4 culvert. (1.69 Ac). The post development flow of 6 cfs is less than the pre-development flow of 11.5 cfs.

Historical Outlets 2 and 3 have the small drainage areas DA-11 and DA-13 draining directly to the culvert, therefore the runoff from these areas will be accounted for in the release calculations.

The anticipated outlet for the developed assisted living site will be the existing 18" culverts at DA-11 and DA-13 with allowable release rates as determined in Section 3.2 above. Please refer to Appendix II for calculations of the combined hydrograph.

For this iteration, total allowable outflows based on pre-development runoff rates for DA-11 and DA-13 calculated in Section 3.2 above are as follows:

- 100-yr event: 15.1 cfs + 14.6 cfs = 29.7 cfs
  - Deduction for the direct runoff from DA-11 and DA-13
    - DA-11- $Q_{100}$ = 1.2 cfs
    - DA-12- $Q_{100}$ = 0.90 cfs
  - 29.7 cfs – 1.2 cfs – 0.90 cfs = **27.6 cfs**
  - 13.65 CFS to HO-2
  - 13.95 CFS to HO-3

Detention calculations were based on the combined hydrograph as inflow to the underground detention basin with outflow limited to a maximum of 27.6 cfs. Please refer to **Appendix II** for detention design.

#### 4.5.2 DETENTION BASIN SUMMARY:

- Required storage is 9,770 cf. (See Appendix II)
- Proposed storage volume = 222 lf; 8' Dia pipe @ 50.27 cf/ft = 11,158 cf

During Final Design restricted inlet plate(s) and emergency overflow structure will be designed for the underground detention basin, and detention basin design will be provided based on the final improvements elevations. The underground detention basin will be designed to bleed off in less than 36 hours through the restrictor plates during final design.

During final design, Stormceptor will be designed and provided on the final construction plans to provide storm water quality treatment.

# 5. FLOOD SAFETY FOR DWELLINGS

## 5.1 FINISHED FLOOR ELEVATIONS

This site is in an "AO" zone and per COS requirements Finished floor elevations are a minimum of 2' higher than the highest existing adjacent grade (HAG)under the building pad.

# 6. CONCLUSIONS

## 6.1 OVERALL PROJECT:

1. Off-site storm water will be conveyed to match existing conditions.
2. The finish floor elevations will be designed a minimum of 2' above existing adjacent ground elevations.

## 6.2 PROJECT PHASING:

This development is anticipated to be constructed in a single phase.

# 7. WARNING AND DISCLAIMER OF LIABILITY

Re: following page.

# 8. REFERENCES

1. *Design Standards & Policies Manual, City of Scottsdale – January 2010*
2. *Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology, Flood Control District of Maricopa County, Fourth Edition, November 18, 2009 amended through February 10, 2011*
3. *Drainage Design Manual for Maricopa County, Arizona, Volume II, Hydraulics, Flood Control District of Maricopa County, January 28, 1996*

Appendix 4-1C

# WARNING & DISCLAIMER OF LIABILITY

The Drainage and Floodplain Regulations and Ordinances of the City of Scottsdale are intended to "minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding caused by the surface runoff of rainfall" (Scottsdale Revised Code §37-16).

As defined in S.R.C. §37-17, a flood plain or "*Special flood hazard* area means an area having flood and/or flood related erosion hazards as shown on a FHBM or FIRM as zone A, AO, A1-30, AE, A99, AH, or E, and those areas identified as such by the floodplain administrator, delineated in accordance with subsection 37-18(b) and adopted by the floodplain board." It is possible that a property could be inundated by greater frequency flood events or by a flood greater in magnitude than a 100-year flood. Additionally, much of the Scottsdale area is a dynamic flood area; that is, the floodplains may shift from one location to another, over time, due to natural processes.

**WARNING AND DISCLAIMER OF LIABILITY PURSUANT TO S.R.C §37-22**
"The degree of flood protection provided by the requirements in this article is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by man-made or natural causes. This article (Chapter 37, Article II) shall not create liability on the part of the city, any officer or employee thereof, or the federal government for any flood damages that result from reliance on this article or any administrative decision lawfully made thereunder."

Compliance with Drainage and Floodplain Regulations and Ordinances does not insure complete protection from flooding. The Floodplain Regulations and Ordinances meet established local and federal standards for floodplain management, but neither this review nor the Regulations and Ordinances take into account such flood related problems as natural erosion, streambed meander or man-made obstructions and diversions, all of which may have an adverse affect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

I have read and understand the above. If I am an agent for an owner I have made the owner aware of and explained this disclaimer.

| _____ | _____ | _____ |
|---|---|---|
| Plan Check No. | Owner or Agent | Date |


E-Havasupai-Dr
E-Diamond-Rim-Dr
E-Rimrock-Dr
E-Hualapai-Dr
N-84th-St
N-84th-Pl
N-Grayhawk-Dr
N-88th-Pl
N-89th-Pl
E-Maple-Dr
N-90th-St
N-91st-Ln
N-91st-Pl
N-91st-Way
N-92nd-Way
N-92nd-Pl
E-Palm-Tree-Dr
E-Topeka-Dr
N-95th-Pl
N-97th-St
N-98th-Pl
E-Kemper-Way
E-Legacy-Ln
N-98th-St
N-95th-Way
88th-St
PROJECT LOCATION
Legacy-Blvd
E-Princess-Dr
E-Desert-View
E-Desert-Park-Dr
E-Trailside-View
E-Canyon-View
E-Via-De-Vaquero
N-Pima-Rd
N-91st-St
N-93rd-Pl
N-94th-Pl
N-94th-Way
N-96th-Way
E-Piedra-Dr
E-Puerta-Del-Viento
N-98th-Way
N-99th-St
101
Pima-Fwy
E-Union-Hills-Dr
E-Mayo-Blvd
E-Theresa-Dr
N-85th-St
N-Hayden-Rd

FIGURE 1


E-Downing-Olson-Dr
N-90th-St
E-Rosemonte-Dr
PROJECT
LOCATION
N-Hayden-Rd
N-90th-Way
E-Rockwood-Dr
N-91st-St
E-Nittany-Dr
88th-St
E-Union-Hills-Dr
E-Princess-Dr
Legacy-Blvd

FIGURE 2

## NOTES TO USERS

This map is for use in administering the Nation Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

**Coastal Base Flood Elevations** shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

**Boundaries of the floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Arizona State Plane Central zone (FIPSZONE 0202). The **horizontal datum** was NAD 83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. Map users wishing to obtain flood elevations referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29) may use the following Maricopa County website application: http://www.fcd.maricopa.gov/Maps/gismaps/apps/gdacs/application/index.cfm

This web tool allows users to obtain point-specific datum conversion values by zooming in and hovering over a VERTCON checkbox on the layers menu on the left side of the screen. The VERTCON grid referenced in this web application was also used to convert existing flood elevations from NGVD 29 to NAVD 88.

To obtain current elevation, description, and/or location information for National Geodetic Survey bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at http://www.ngs.noaa.gov. To obtain information about Geodetic Densification and Cadastral Survey bench marks produced by the Maricopa County Department of Transportation, please visit the Flood Control District of Maricopa County website at: http://www.fcd.maricopa.gov/Maps/gismaps/apps/gdacs/application/index.cfm.

**Base map** information shown on this FIRM was derived from multiple sources. Aerial imagery was provided in digital format by the Maricopa County Department of Public Works, Flood Control District. The imagery is dated October 2009 to November 2009. Additional National Agricultural Imagery Program (NAIP) imagery was provided by the Arizona State Land Department (ALRIS) and is dated 2007. The coordinate system used for the production of the digital FIRM is State Plane Arizona Central NAD83 HARN, International Feet.

The **profile base line** depicted on this map represents the hydraulic modeling baselines that match flood profiles in the FIS report. As a result of improved topographic data, the profile base line, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

**Corporate limits** shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community, as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM, visit the **FEMA Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have questions about this map, how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.


## LEGEND

**SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

**FLOODWAY AREAS IN ZONE AE**

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

**OTHER FLOOD AREAS**

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

**OTHER AREAS**

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

**COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**

**OTHERWISE PROTECTED AREAS (OPAs)**

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 12
- 6000000 M — 5000-foot grid ticks: Arizona State Plane coordinate system, central zone (FIPSZONE 0202), Transverse Mercator
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
April 15, 1998

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
December 3, 1993 · September 30, 1998 · July 19, 2001 · September 30, 2005
October 16, 2013 – to add base flood elevation, to add special flood hazard areas, to incorporate previously issued letters of map revision, to add roads and road names, to update corporate limits, to change floodway, to advance suffix, to change base flood elevations, and to add floodway.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

**PANEL 1320L**

# FIRM
## FLOOD INSURANCE RATE MAP
## MARICOPA COUNTY, ARIZONA
## AND INCORPORATED AREAS

**PANEL 1320 OF 4425**
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| MARICOPA COUNTY | 040037 | 1320 | L |
| PHOENIX, CITY OF | 040051 | 1320 | L |
| SCOTTSDALE, CITY OF | 045012 | 1320 | L |

FIGURE 3

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER**
**04013C1320L**
**MAP REVISED**
**OCTOBER 16, 2013**

Federal Emergency Management Agency

# *APPENDIX I*

# *Rainfall Data*

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.6579°, Longitude: -111.8901°
Elevation: 1661.07 ft**
* source: ESRI Maps
** source: USGS

## POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **2.40** (1.99-2.95) | **3.14** (2.62-3.85) | **4.24** (3.50-5.18) | **5.08** (4.18-6.19) | **6.20** (5.02-7.54) | **7.06** (5.65-8.52) | **7.94** (6.24-9.56) | **8.82** (6.83-10.6) | **10.0** (7.54-12.0) | **10.9** (8.05-13.2) |
| 10-min | **1.83** (1.52-2.25) | **2.39** (2.00-2.93) | **3.22** (2.66-3.94) | **3.86** (3.17-4.71) | **4.72** (3.82-5.73) | **5.38** (4.30-6.48) | **6.04** (4.75-7.27) | **6.71** (5.19-8.07) | **7.61** (5.74-9.16) | **8.30** (6.13-10.0) |
| 15-min | **1.51** (1.26-1.86) | **1.98** (1.65-2.42) | **2.66** (2.20-3.26) | **3.19** (2.62-3.89) | **3.90** (3.16-4.74) | **4.44** (3.55-5.36) | **5.00** (3.92-6.01) | **5.55** (4.29-6.67) | **6.29** (4.74-7.57) | **6.86** (5.06-8.27) |
| 30-min | **1.02** (0.846-1.25) | **1.33** (1.11-1.63) | **1.79** (1.48-2.19) | **2.15** (1.77-2.62) | **2.63** (2.13-3.19) | **2.99** (2.39-3.61) | **3.36** (2.64-4.05) | **3.73** (2.89-4.49) | **4.24** (3.19-5.10) | **4.62** (3.41-5.57) |
| 60-min | **0.630** (0.523-0.773) | **0.823** (0.687-1.01) | **1.11** (0.918-1.36) | **1.33** (1.09-1.62) | **1.63** (1.31-1.97) | **1.85** (1.48-2.23) | **2.08** (1.64-2.50) | **2.31** (1.79-2.78) | **2.62** (1.98-3.15) | **2.86** (2.11-3.45) |
| 2-hr | **0.368** (0.310-0.442) | **0.476** (0.402-0.574) | **0.634** (0.531-0.759) | **0.754** (0.626-0.902) | **0.918** (0.754-1.09) | **1.04** (0.844-1.24) | **1.17** (0.931-1.38) | **1.30** (1.02-1.53) | **1.47** (1.13-1.74) | **1.60** (1.20-1.91) |
| 3-hr | **0.269** (0.226-0.330) | **0.345** (0.291-0.424) | **0.451** (0.378-0.551) | **0.534** (0.444-0.650) | **0.651** (0.532-0.787) | **0.744** (0.600-0.894) | **0.840** (0.666-1.01) | **0.941** (0.733-1.13) | **1.08** (0.816-1.29) | **1.19** (0.878-1.43) |
| 6-hr | **0.162** (0.139-0.193) | **0.205** (0.176-0.244) | **0.261** (0.223-0.309) | **0.306** (0.259-0.361) | **0.368** (0.307-0.432) | **0.415** (0.342-0.486) | **0.465** (0.377-0.543) | **0.516** (0.411-0.603) | **0.584** (0.453-0.683) | **0.638** (0.484-0.746) |
| 12-hr | **0.092** (0.080-0.108) | **0.116** (0.100-0.136) | **0.146** (0.126-0.171) | **0.170** (0.145-0.199) | **0.203** (0.171-0.236) | **0.227** (0.189-0.264) | **0.253** (0.208-0.293) | **0.278** (0.226-0.323) | **0.313** (0.247-0.364) | **0.339** (0.263-0.397) |
| 24-hr | **0.054** (0.048-0.063) | **0.069** (0.061-0.080) | **0.089** (0.078-0.103) | **0.106** (0.092-0.122) | **0.128** (0.111-0.148) | **0.146** (0.125-0.168) | **0.165** (0.140-0.190) | **0.185** (0.155-0.213) | **0.212** (0.175-0.245) | **0.234** (0.190-0.272) |
| 2-day | **0.030** (0.026-0.034) | **0.038** (0.033-0.044) | **0.050** (0.043-0.057) | **0.059** (0.051-0.068) | **0.073** (0.062-0.083) | **0.083** (0.071-0.095) | **0.094** (0.080-0.109) | **0.106** (0.089-0.123) | **0.123** (0.101-0.142) | **0.136** (0.110-0.158) |
| 3-day | **0.021** (0.019-0.024) | **0.027** (0.024-0.031) | **0.036** (0.032-0.041) | **0.043** (0.038-0.049) | **0.053** (0.046-0.061) | **0.061** (0.053-0.070) | **0.070** (0.059-0.080) | **0.079** (0.067-0.091) | **0.092** (0.076-0.106) | **0.103** (0.084-0.119) |
| 4-day | **0.017** (0.015-0.020) | **0.022** (0.019-0.025) | **0.029** (0.026-0.033) | **0.035** (0.031-0.040) | **0.043** (0.038-0.049) | **0.050** (0.044-0.057) | **0.058** (0.049-0.066) | **0.066** (0.056-0.075) | **0.077** (0.064-0.088) | **0.086** (0.071-0.099) |
| 7-day | **0.011** (0.010-0.013) | **0.014** (0.012-0.016) | **0.019** (0.017-0.022) | **0.023** (0.020-0.026) | **0.028** (0.025-0.032) | **0.033** (0.028-0.037) | **0.038** (0.032-0.043) | **0.043** (0.036-0.049) | **0.050** (0.042-0.058) | **0.056** (0.046-0.065) |
| 10-day | **0.008** (0.007-0.010) | **0.011** (0.010-0.012) | **0.014** (0.013-0.016) | **0.017** (0.015-0.020) | **0.021** (0.019-0.024) | **0.025** (0.021-0.028) | **0.028** (0.024-0.032) | **0.032** (0.027-0.037) | **0.038** (0.031-0.043) | **0.042** (0.035-0.049) |
| 20-day | **0.005** (0.005-0.006) | **0.007** (0.006-0.008) | **0.009** (0.008-0.010) | **0.011** (0.009-0.012) | **0.013** (0.011-0.015) | **0.015** (0.013-0.017) | **0.017** (0.014-0.019) | **0.019** (0.016-0.021) | **0.021** (0.018-0.024) | **0.023** (0.019-0.027) |
| 30-day | **0.004** (0.004-0.005) | **0.005** (0.005-0.006) | **0.007** (0.006-0.008) | **0.008** (0.007-0.009) | **0.010** (0.009-0.012) | **0.012** (0.010-0.013) | **0.013** (0.011-0.015) | **0.014** (0.012-0.016) | **0.016** (0.014-0.019) | **0.018** (0.015-0.021) |
| 45-day | **0.003** (0.003-0.004) | **0.004** (0.004-0.005) | **0.006** (0.005-0.006) | **0.007** (0.006-0.007) | **0.008** (0.007-0.009) | **0.009** (0.008-0.010) | **0.010** (0.009-0.011) | **0.011** (0.010-0.013) | **0.013** (0.011-0.014) | **0.014** (0.012-0.016) |
| 60-day | **0.003** (0.002-0.003) | **0.004** (0.003-0.004) | **0.005** (0.004-0.005) | **0.005** (0.005-0.006) | **0.007** (0.006-0.007) | **0.007** (0.006-0.008) | **0.008** (0.007-0.009) | **0.009** (0.008-0.010) | **0.010** (0.009-0.012) | **0.011** (0.009-0.013) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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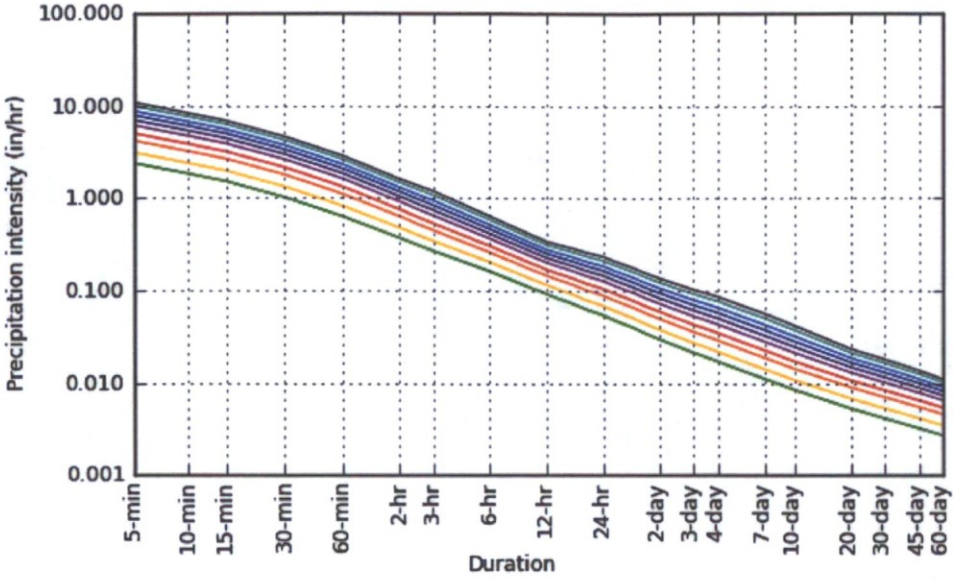
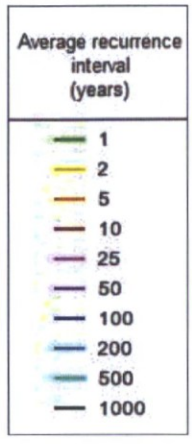
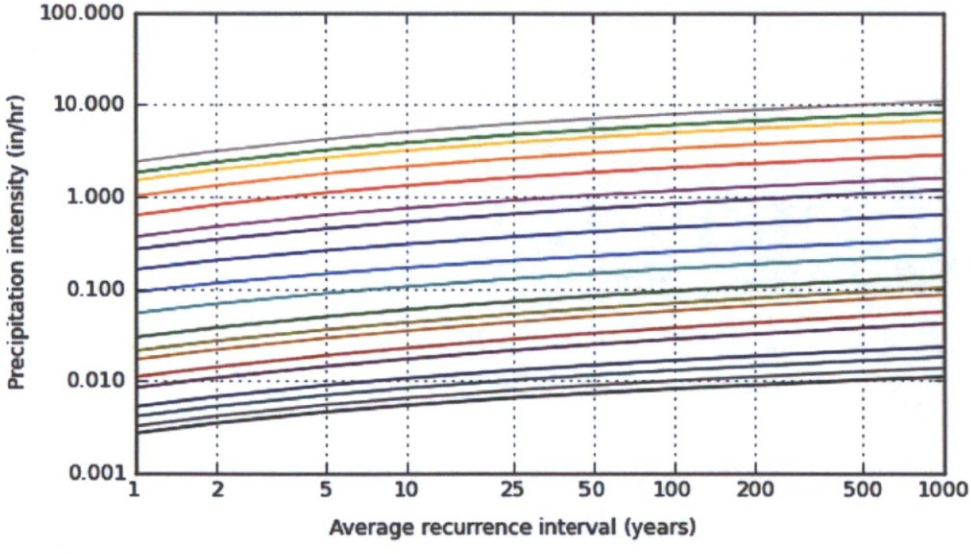
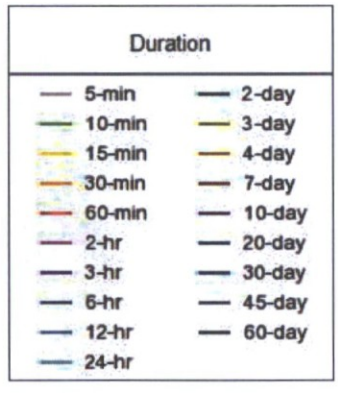
## PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 33.6579°, Longitude: -111.8901°

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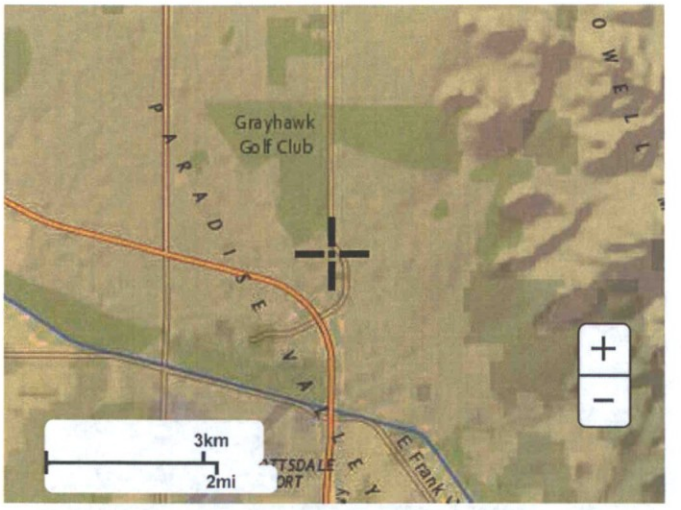
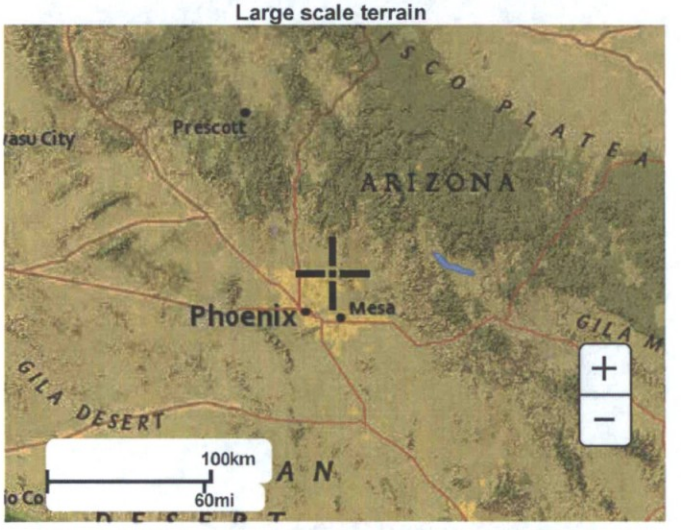
## Maps & aerials

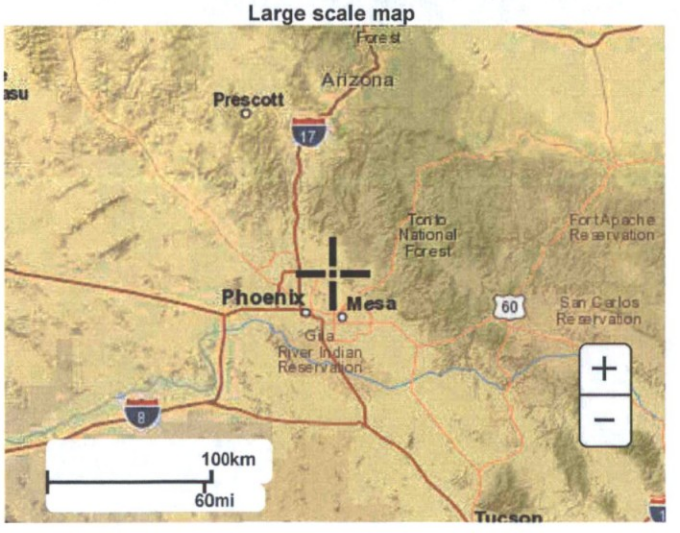
Small scale terrain




Large scale terrain




Large scale map




Large scale aerial

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.6579°, Longitude: -111.8901°
Elevation: 1661.07 ft**
* source: ESRI Maps
** source: USGS

## POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

# PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | **0.200** (0.166-0.246) | **0.262** (0.218-0.321) | **0.353** (0.292-0.432) | **0.423** (0.348-0.516) | **0.517** (0.418-0.628) | **0.588** (0.471-0.710) | **0.662** (0.520-0.797) | **0.735** (0.569-0.884) | **0.833** (0.628-1.00) | **0.909** (0.671-1.10) |
| 10-min | **0.305** (0.253-0.375) | **0.398** (0.333-0.489) | **0.537** (0.444-0.657) | **0.644** (0.529-0.785) | **0.787** (0.636-0.955) | **0.896** (0.716-1.08) | **1.01** (0.791-1.21) | **1.12** (0.865-1.34) | **1.27** (0.956-1.53) | **1.38** (1.02-1.67) |
| 15-min | **0.378** (0.314-0.464) | **0.494** (0.412-0.606) | **0.666** (0.551-0.815) | **0.798** (0.656-0.973) | **0.975** (0.789-1.18) | **1.11** (0.888-1.34) | **1.25** (0.981-1.50) | **1.39** (1.07-1.67) | **1.57** (1.19-1.89) | **1.71** (1.27-2.07) |
| 30-min | **0.509** (0.423-0.625) | **0.665** (0.555-0.816) | **0.897** (0.741-1.10) | **1.07** (0.884-1.31) | **1.31** (1.06-1.59) | **1.50** (1.20-1.80) | **1.68** (1.32-2.02) | **1.87** (1.44-2.25) | **2.12** (1.60-2.55) | **2.31** (1.71-2.78) |
| 60-min | **0.630** (0.523-0.773) | **0.823** (0.687-1.01) | **1.11** (0.918-1.36) | **1.33** (1.09-1.62) | **1.63** (1.31-1.97) | **1.85** (1.48-2.23) | **2.08** (1.64-2.50) | **2.31** (1.79-2.78) | **2.62** (1.98-3.15) | **2.86** (2.11-3.45) |
| 2-hr | **0.736** (0.619-0.884) | **0.952** (0.803-1.15) | **1.27** (1.06-1.52) | **1.51** (1.25-1.80) | **1.84** (1.51-2.19) | **2.08** (1.69-2.47) | **2.34** (1.86-2.77) | **2.59** (2.03-3.07) | **2.94** (2.25-3.48) | **3.20** (2.40-3.81) |
| 3-hr | **0.808** (0.680-0.990) | **1.04** (0.874-1.27) | **1.35** (1.14-1.66) | **1.60** (1.33-1.95) | **1.96** (1.60-2.36) | **2.23** (1.80-2.69) | **2.52** (2.00-3.03) | **2.83** (2.20-3.39) | **3.24** (2.45-3.88) | **3.57** (2.64-4.29) |
| 6-hr | **0.972** (0.835-1.16) | **1.23** (1.05-1.46) | **1.56** (1.34-1.85) | **1.83** (1.55-2.16) | **2.20** (1.84-2.58) | **2.49** (2.05-2.91) | **2.79** (2.26-3.25) | **3.09** (2.46-3.61) | **3.50** (2.71-4.09) | **3.82** (2.90-4.47) |
| 12-hr | **1.11** (0.958-1.30) | **1.40** (1.21-1.64) | **1.76** (1.51-2.06) | **2.05** (1.75-2.39) | **2.44** (2.06-2.84) | **2.74** (2.28-3.18) | **3.05** (2.50-3.53) | **3.35** (2.72-3.89) | **3.77** (2.98-4.39) | **4.08** (3.17-4.79) |
| 24-hr | **1.31** (1.14-1.51) | **1.66** (1.46-1.92) | **2.15** (1.88-2.48) | **2.54** (2.21-2.92) | **3.08** (2.66-3.54) | **3.51** (3.00-4.03) | **3.97** (3.36-4.56) | **4.44** (3.71-5.11) | **5.09** (4.19-5.88) | **5.62** (4.56-6.52) |
| 2-day | **1.43** (1.25-1.65) | **1.82** (1.59-2.10) | **2.39** (2.08-2.75) | **2.85** (2.47-3.27) | **3.49** (3.00-4.00) | **4.00** (3.40-4.58) | **4.53** (3.82-5.22) | **5.10** (4.26-5.88) | **5.88** (4.83-6.82) | **6.51** (5.27-7.59) |
| 3-day | **1.54** (1.35-1.76) | **1.97** (1.73-2.25) | **2.60** (2.27-2.97) | **3.11** (2.71-3.55) | **3.83** (3.31-4.37) | **4.41** (3.79-5.04) | **5.04** (4.28-5.76) | **5.69** (4.79-6.54) | **6.63** (5.49-7.64) | **7.38** (6.03-8.56) |
| 4-day | **1.64** (1.45-1.88) | **2.11** (1.86-2.40) | **2.80** (2.46-3.19) | **3.37** (2.95-3.82) | **4.17** (3.63-4.74) | **4.83** (4.18-5.49) | **5.54** (4.74-6.31) | **6.29** (5.33-7.20) | **7.37** (6.15-8.46) | **8.25** (6.79-9.53) |
| 7-day | **1.86** (1.64-2.14) | **2.39** (2.10-2.73) | **3.18** (2.79-3.64) | **3.83** (3.34-4.37) | **4.75** (4.12-5.42) | **5.51** (4.74-6.29) | **6.32** (5.39-7.23) | **7.19** (6.07-8.27) | **8.44** (7.00-9.74) | **9.46** (7.75-11.0) |
| 10-day | **2.03** (1.79-2.32) | **2.61** (2.29-2.98) | **3.46** (3.04-3.95) | **4.16** (3.63-4.73) | **5.14** (4.47-5.84) | **5.95** (5.13-6.76) | **6.81** (5.81-7.75) | **7.72** (6.53-8.83) | **9.02** (7.51-10.4) | **10.1** (8.28-11.6) |
| 20-day | **2.53** (2.23-2.88) | **3.26** (2.88-3.71) | **4.32** (3.80-4.90) | **5.14** (4.50-5.82) | **6.25** (5.45-7.08) | **7.11** (6.17-8.06) | **8.01** (6.90-9.11) | **8.92** (7.63-10.2) | **10.2** (8.61-11.7) | **11.2** (9.34-12.9) |
| 30-day | **2.98** (2.62-3.38) | **3.84** (3.38-4.36) | **5.08** (4.47-5.75) | **6.03** (5.30-6.82) | **7.33** (6.39-8.29) | **8.33** (7.23-9.43) | **9.37** (8.09-10.6) | **10.4** (8.94-11.8) | **11.9** (10.1-13.6) | **13.0** (10.9-14.9) |
| 45-day | **3.50** (3.10-3.96) | **4.52** (4.00-5.12) | **5.98** (5.28-6.76) | **7.08** (6.23-8.00) | **8.55** (7.49-9.67) | **9.67** (8.43-11.0) | **10.8** (9.37-12.3) | **12.0** (10.3-13.7) | **13.6** (11.6-15.6) | **14.8** (12.5-17.1) |
| 60-day | **3.90** (3.46-4.41) | **5.05** (4.48-5.70) | **6.67** (5.90-7.52) | **7.87** (6.94-8.87) | **9.44** (8.29-10.7) | **10.6** (9.28-12.0) | **11.8** (10.3-13.4) | **13.0** (11.3-14.8) | **14.6** (12.5-16.7) | **15.9** (13.5-18.3) |

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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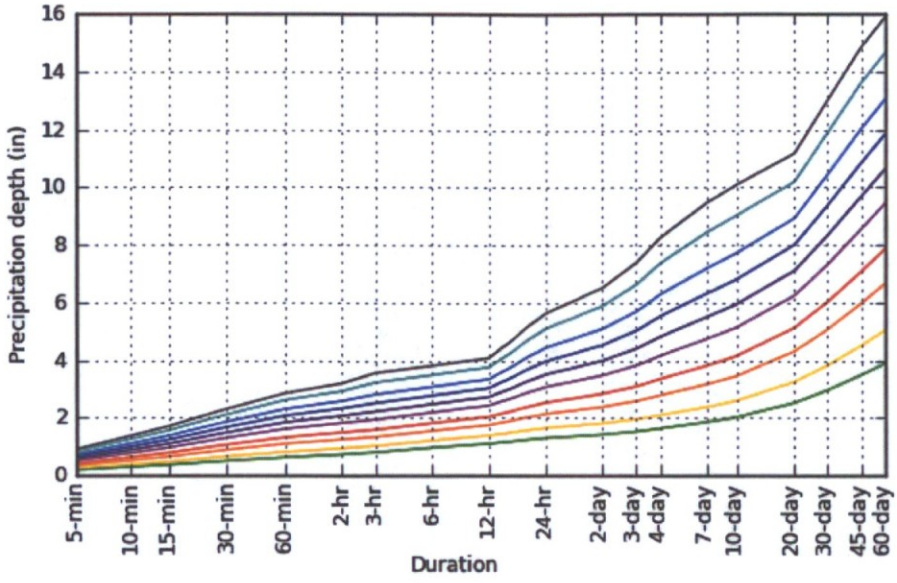
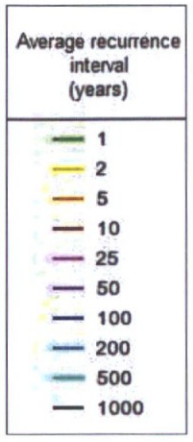
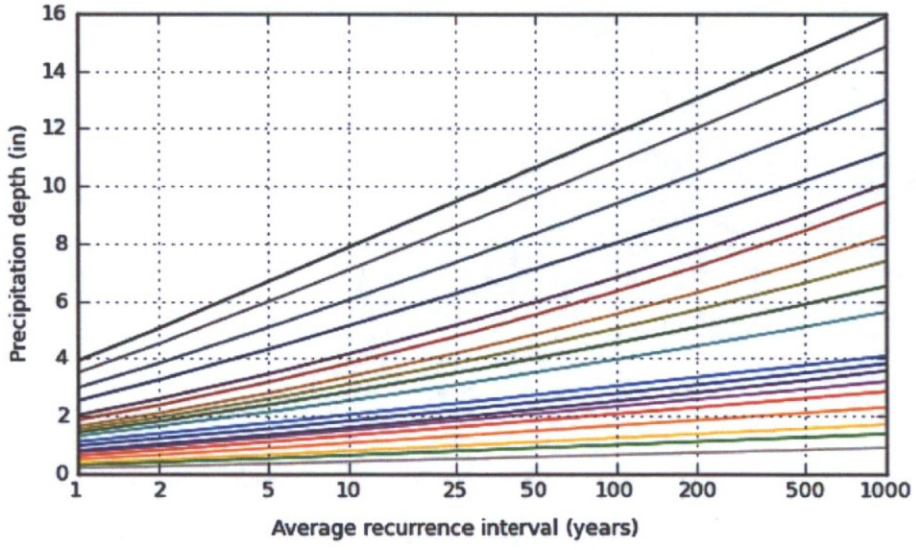
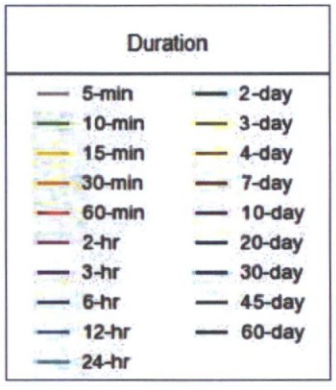
## PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.6579°, Longitude: -111.8901°




NOAA Atlas 14, Volume 1, Version 5

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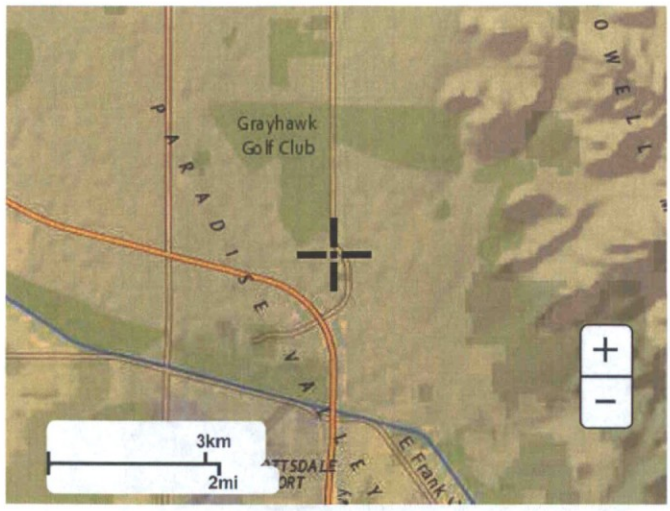
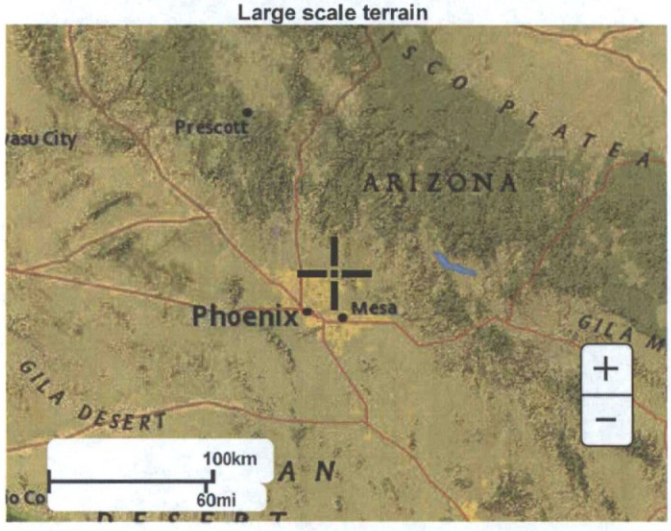
## Maps & aerials

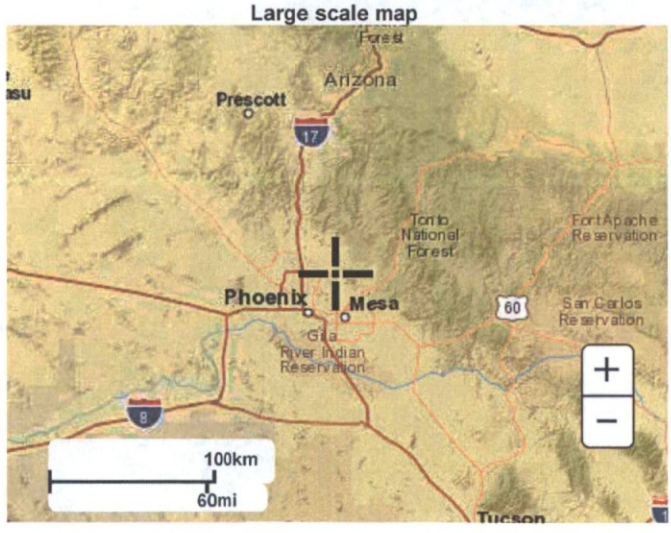
Small scale terrain




Large scale terrain




Large scale map




Large scale aerial

# *APPENDIX II*

## *Calculations*

### 2. Time of Concentration

Time of concentration "**Tc**" is the total time of travel from the most hydraulically remote part of the watershed to the concentration point of interest. The calculation of "Tc" must follow FCDMC Hydrology Manual procedures.

***Note:** **Do not add a standard set amount of time to the estimated "Tc" for lot runoff delay (such as 5 or 10 minutes).** Natural land slopes are too variable in Scottsdale to add a set amount of time for lot runoff.

### 3. Runoff Coefficients

Use Figure 4.1-4 or equivalent to obtain the runoff coefficients or "**C**" values. Composite "**C**" values for the appropriate zoning category or weighted average values calculated for the specific site are both acceptable approaches.

| RUNOFF COEFFICIENTS - "C" VALUE | | | |
|---|---|---|---|
| **Land Use** | Storm Frequency | | |
| Composite Area-wide Values | 2-25 Year | 50 Year | 100 Year |
| **Commercial & Industrial Areas** | 0.80 | 0.83 | 0.86 |
| **Residential Areas-Single Family (average lot size)** | | | |
| R1-1-1901 | 0.33 | 0.50 | 0.53 |
| R1-130 | 0.35 | 0.51 | 0.59 |
| R1-70 | 0.37 | 0.52 | 0.60 |
| R1-43 | 0.38 | 0.55 | 0.61 |
| R1-35 (35,000 square feet/lot) | 0.40 | 0.56 | 0.62 |
| R1-18 (18,000 square feet/lot) | 0.43 | 0.58 | 0.64 |
| R1-10 (10,000 square feet/lot) | 0.47 | 0.62 | 0.67 |
| R1-7 (7,000 square feet/lot) | 0.51 | 0.64 | 0.94 |
| **Townhouses (R-2, R-4)** | 0.63 | 0.74 | 0.94 |
| **Apartments & Condominiums (R-3, R-5)** | 0.76 | 0.83 | 0.94 |
| **Specific Surface Type Values** | | | |
| Paved streets, parking lots (concrete or asphalt), roofs, drive-ways, etc. | 0.90 | 0.93 | 0.95 |
| Lawns, golf courses, & parks (grassed areas) | 0.20 | 0.25 | 0.30 |
| Undisturbed natural desert or desert landscaping (no impervious weed barrier) | 0.37 | 0.42 | 045 |
| Desert landscaping (with impervious weed barrier) | 0.63 | 0.73 | 0.83 |
| Mountain terrain – slopes greater than 10% | 0.60 | 0.70 | 0.80 |
| Agricultural areas (flood-irrigated fields) | 0.16 | 0.18 | 0.20 |

**FIGURE 4.1-4 RUNOFF COEFFICIENTS FOR USE WITH RATIONAL METHOD**

# Worksheet for Pressure Pipe - HO 4 3.5' H

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Pressure 1 | 0.00 | psi |
| Pressure 2 | 0.00 | psi |
| Elevation 1 | 40.18 | ft |
| Elevation 2 | 36.22 | ft |
| Length | 130.00 | ft |
| Roughness Coefficient | 0.013 | |
| Diameter | 1.50 | ft |

## Results

| | | |
|---|---|---|
| Discharge | 18.33 | $ft^3/s$ |
| Headloss | 3.96 | ft |
| Energy Grade 1 | 41.85 | ft |
| Energy Grade 2 | 37.89 | ft |
| Hydraulic Grade 1 | 40.18 | ft |
| Hydraulic Grade 2 | 36.22 | ft |
| Flow Area | 1.77 | $ft^2$ |
| Wetted Perimeter | 4.71 | ft |
| Velocity | 10.37 | ft/s |
| Velocity Head | 1.67 | ft |
| Friction Slope | 0.03046 | ft/ft |

118
118
118
118
118

100-year 24 hour PPW base no wall flow at xsec 118

```
    MAXIMUM DISCHARGE FROM CROSS SECTION  118 IS:      360.51 CFS AT TIME:       12.49 HOURS

THE MAXIMUM DISCHARGE FROM NODE  673057 IS:       11.50 CFS AT TIME    12.10 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.28 FEET  AND A MAXIMUM VOLUME OF:        1.67 AF
 AXIMUM DISCHARGE FROM NODE  673684 IS:       41.16 CFS AT TIME    12.22 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.25 FEET  AND A MAXIMUM VOLUME OF:        6.47 AF
 AXIMUM DISCHARGE FROM NODE  674311 IS:      315.28 CFS AT TIME    12.50 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     2.31 FEET  AND A MAXIMUM VOLUME OF:       77.40 AF
THE MAXIMUM DISCHARGE FROM NODE  674939 IS:        0.04 CFS AT TIME    11.91 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.03 FEET  AND A MAXIMUM VOLUME OF:        0.00 AF
 AXIMUM DISCHARGE FROM NODE  675567 IS:        0.08 CFS AT TIME    11.91 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.02 FEET  AND A MAXIMUM VOLUME OF:        0.00 AF
```

100-year 24 hour PPW base with wall flow at cross section 118

```
     MAXIMUM DISCHARGE FROM CROSS SECTION  118 IS:      360.51 CFS AT TIME:      12.49 HOURS

THE MAXIMUM DISCHARGE FROM NODE  673057 IS:      11.50 CFS AT TIME    12.10 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.28 FEET  AND A MAXIMUM VOLUME OF:        1.67 AF
    AXIMUM DISCHARGE FROM NODE  673684 IS:      41.16 CFS AT TIME    12.22 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.25 FEET  AND A MAXIMUM VOLUME OF:        6.47 AF
    AXIMUM DISCHARGE FROM NODE  674311 IS:     315.28 CFS AT TIME    12.50 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     2.31 FEET  AND A MAXIMUM VOLUME OF:       77.40 AF
THE MAXIMUM DISCHARGE FROM NODE  674939 IS:       0.04 CFS AT TIME    11.91 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.03 FEET  AND A MAXIMUM VOLUME OF:        0.00 AF
    AXIMUM DISCHARGE FROM NODE  675567 IS:       0.08 CFS AT TIME    11.91 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.02 FEET  AND A MAXIMUM VOLUME OF:        0.00 AF
```

100-year 24 hour PPW south levee no wall flow at cross section 118

```
IE MAXIMUM DISCHARGE FROM CROSS SECTION  118 IS:      603.77 CFS AT TIME:       13.53 HOURS
THE MAXIMUM DISCHARGE FROM NODE  673057 IS:       11.70 CFS AT TIME    12.04 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:    0.28 FEET  AND A MAXIMUM VOLUME OF:        1.33 AF
 MAXIMUM DISCHARGE FROM NODE  673684 IS:       78.04 CFS AT TIME    13.53 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:    0.31 FEET  AND A MAXIMUM VOLUME OF:        8.29 AF
 MAXIMUM DISCHARGE FROM NODE  674311 IS:      520.27 CFS AT TIME    13.53 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:    2.95 FEET  AND A MAXIMUM VOLUME OF:       88.87 AF
THE MAXIMUM DISCHARGE FROM NODE  674939 IS:        3.91 CFS AT TIME    13.54 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:    0.25 FEET  AND A MAXIMUM VOLUME OF:        0.08 AF
   MAXIMUM DISCHARGE FROM NODE  675567 IS:        0.08 CFS AT TIME    11.91 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:    0.02 FEET  AND A MAXIMUM VOLUME OF:        0.00 AF
```

100-year 24 hour PPW south levee with wall flow at cross section 118

```
     MAXIMUM DISCHARGE FROM CROSS SECTION  118 IS:      817.52 CFS AT TIME:       13.45 HOURS

THE MAXIMUM DISCHARGE FROM NODE  673057 IS:       11.54 CFS AT TIME    12.10 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.28 FEET  AND A MAXIMUM VOLUME OF:        1.43 AF
    MAXIMUM DISCHARGE FROM NODE  673684 IS:      123.68 CFS AT TIME    13.45 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.71 FEET  AND A MAXIMUM VOLUME OF:       10.54 AF
    MAXIMUM DISCHARGE FROM NODE  674311 IS:      678.01 CFS AT TIME    13.45 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     3.43 FEET  AND A MAXIMUM VOLUME OF:       99.38 AF
THE MAXIMUM DISCHARGE FROM NODE  674939 IS:       14.00 CFS AT TIME    13.45 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.69 FEET  AND A MAXIMUM VOLUME OF:        0.35 AF
    MAXIMUM DISCHARGE FROM NODE  675567 IS:        0.08 CFS AT TIME    11.91 HOURS WITH A MAXIMUM FLOODPLAIN DEPTH OF:     0.02 FEET  AND A MAXIMUM VOLUME OF:        0.00 AF
```

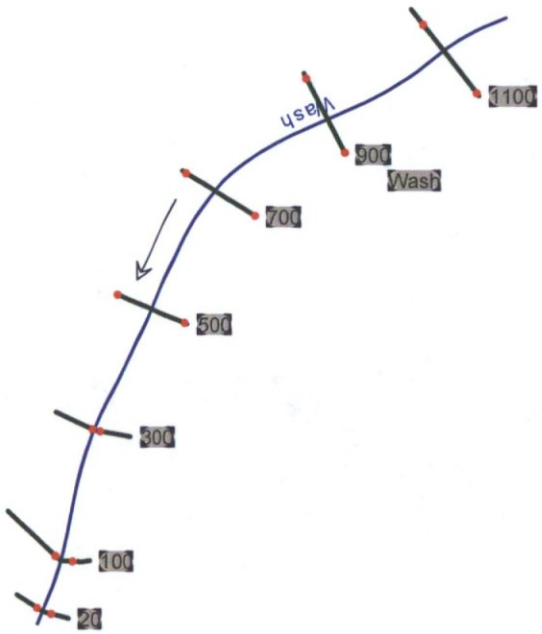
**SUMMARY OF RATIONAL METHOD PEAK FLOW HYDROLOGY**
**n value Selection**

**Channel n value:**

| | | |
|---|---|---|
| $n_0$ = | 0.03 | Ref. Table 7.3 - Firm Earth |
| $n_1$ = | 0.001 | Ref. Table 7.4 - Degree of irregularity - Minor |
| $n_2$ = | 0.002 | Ref. Table 7.4 - Variation in channel cross section - Alternating occasionally |
| $n_3$ = | 0 | Ref. Table 7.4 -Effects of obstructions - Negligible |
| $n_4$ = | 0.025 | Ref. Table 7.4 - Amount of vegetation - Medium |
| m = | 1 | Ref. Table 7.4 - Degree of meandering- Minor |

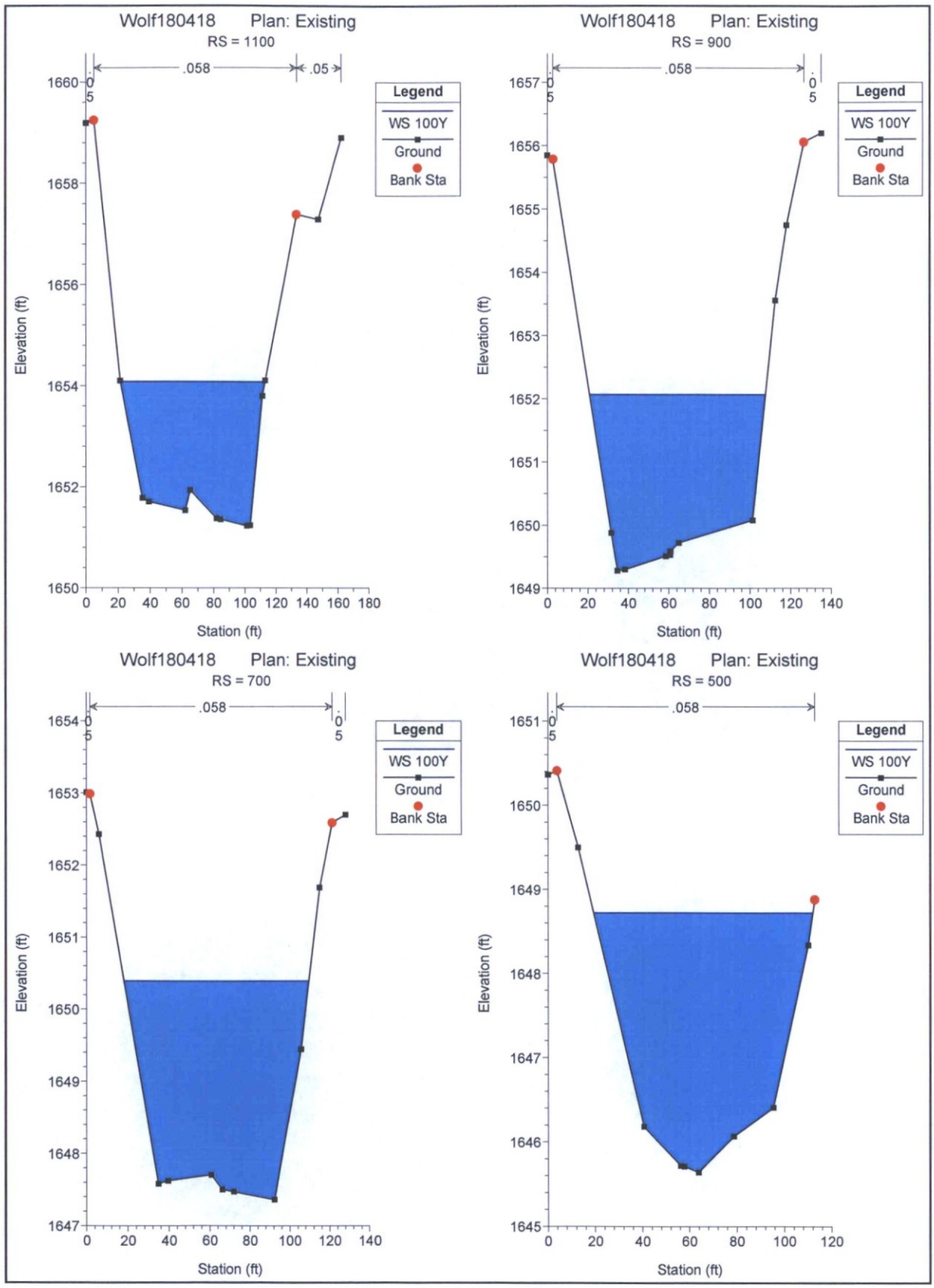
$n = (n_0+n_1+n_2+n_3+n_4)m$ Ref. Equation 7.5 of 2. Drainage Design Manual for Maricopa County, Arizona, Volume
$= 0.058$

**Overbank n value** = 0.05 - Scatter Shrubs - Ref. Drainage Design Manual for Maricopa County, Arizona, Volume I


1100
Wash
900
Wash
700
500
300
100
20

HEC-RAS Plan: EX River: Wash Reach: Wash Profile: 100Y

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Wash | 1100 | 100Y | 817.00 | 1651.23 | 1654.09 | | 1654.34 | 0.008771 | 4.05 | 201.93 | 91.56 | 0.48 |
| Wash | 900 | 100Y | 817.00 | 1649.28 | 1652.07 | | 1652.37 | 0.011025 | 4.43 | 184.55 | 86.81 | 0.54 |
| Wash | 700 | 100Y | 817.00 | 1647.36 | 1650.39 | | 1650.61 | 0.007031 | 3.79 | 215.54 | 91.45 | 0.44 |
| Wash | 500 | 100Y | 817.00 | 1645.64 | 1648.72 | | 1648.99 | 0.009588 | 4.14 | 197.35 | 92.77 | 0.50 |
| Wash | 300 | 100Y | 817.00 | 1640.34 | 1645.69 | 1645.69 | 1646.37 | 0.018167 | 8.15 | 144.91 | 99.92 | 0.71 |
| Wash | 100 | 100Y | 817.00 | 1638.12 | 1642.28 | 1642.28 | 1642.80 | 0.015376 | 6.63 | 169.62 | 147.59 | 0.66 |
| Wash | 20 | 100Y | 817.00 | 1636.71 | 1641.23 | 1640.70 | 1641.64 | 0.010004 | 5.82 | 168.57 | 79.48 | 0.55 |


Wolf180418 Plan: Existing
RS = 1100
.058
.05
.05
Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)
Wolf180418 Plan: Existing
RS = 900
.058
.05
.05
Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)
Wolf180418 Plan: Existing
RS = 700
.058
.05
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Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)
Wolf180418 Plan: Existing
RS = 500
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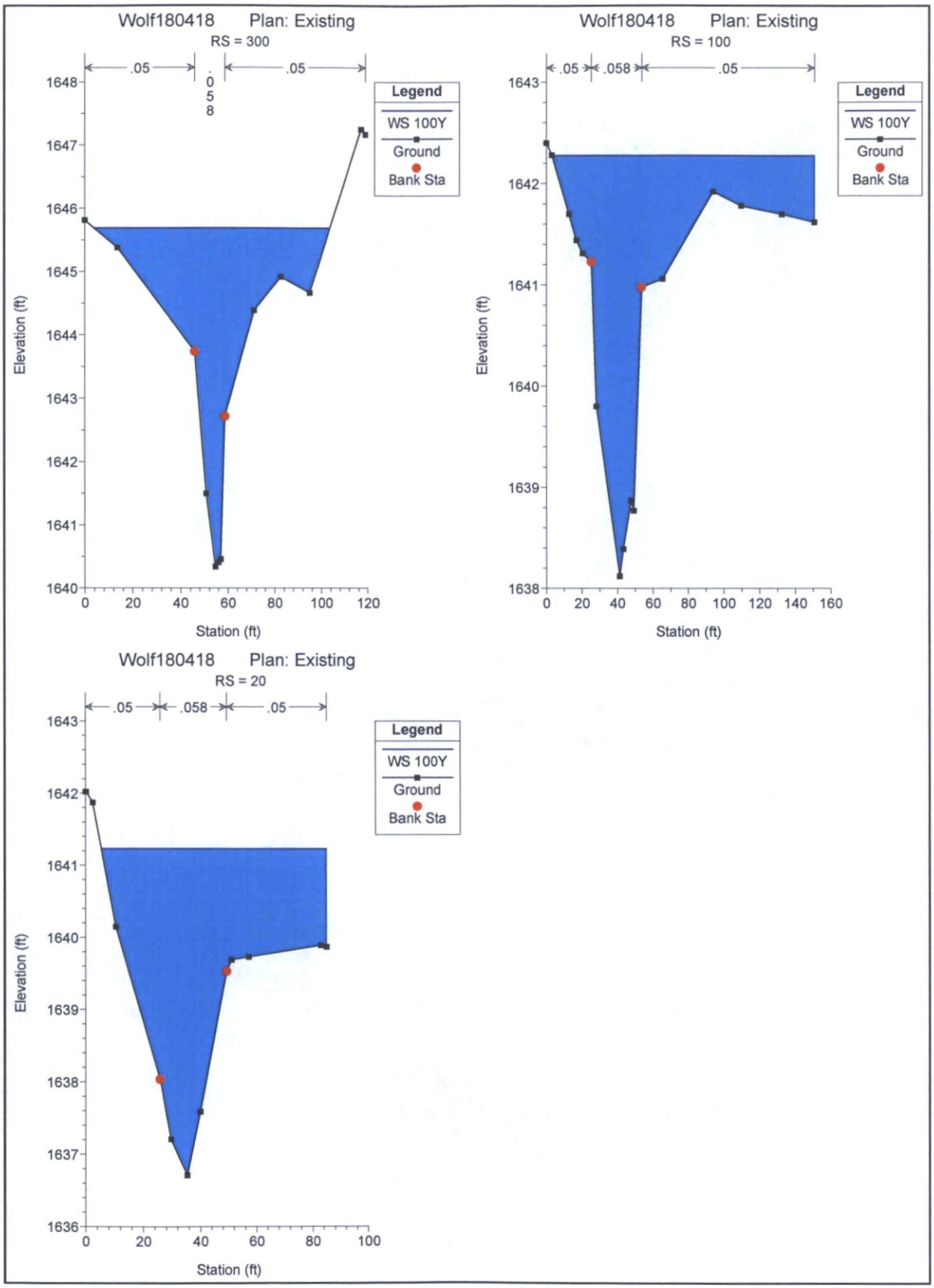
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)


Wolf180418 Plan: Existing
RS = 300
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WS 100Y
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Elevation (ft)
Station (ft)
Wolf180418 Plan: Existing
RS = 100
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Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)
Wolf180418 Plan: Existing
RS = 20
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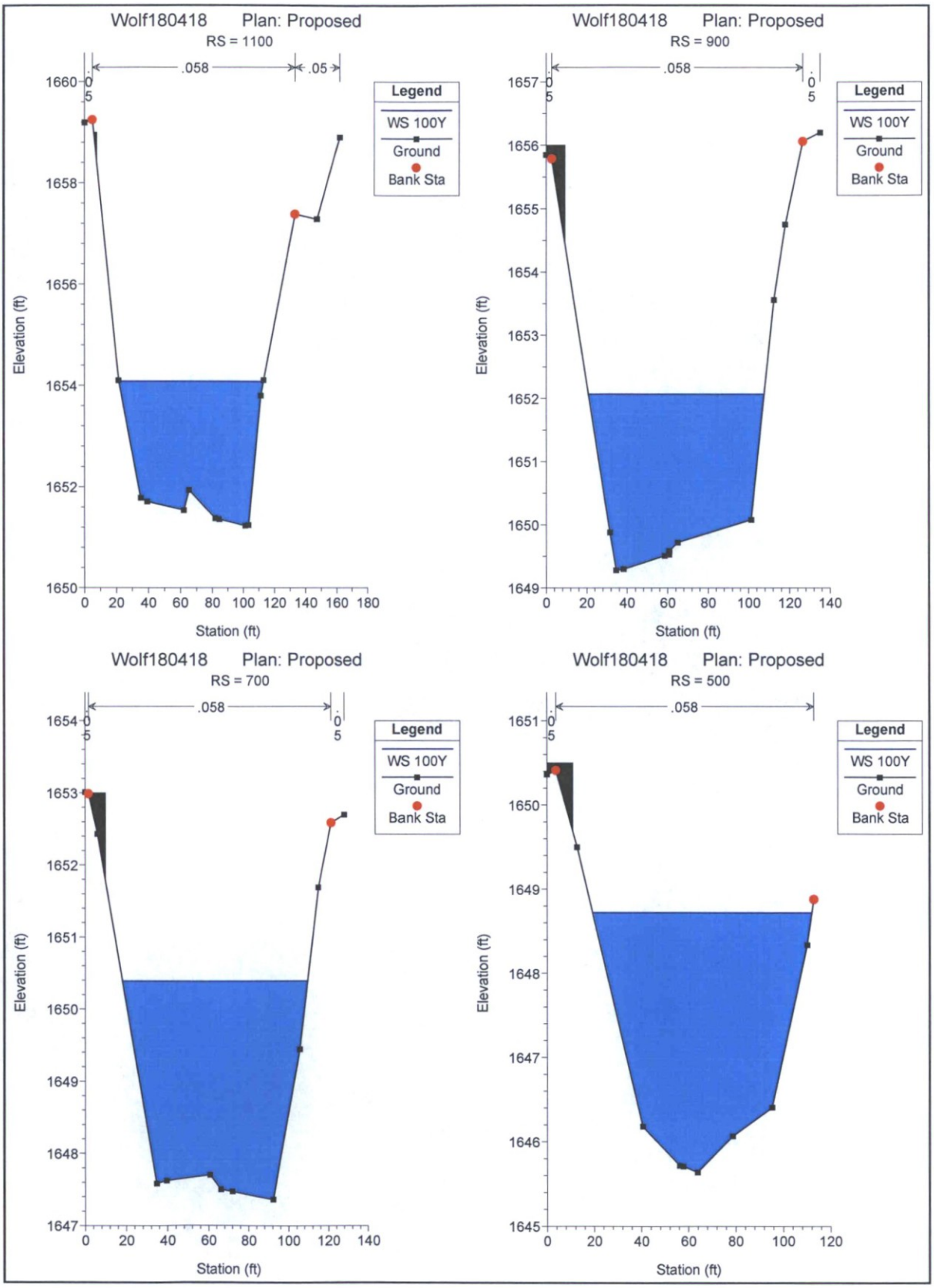
.058
.05
Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)

HEC-RAS Plan: Proposed River: Wash Reach: Wash Profile: 100Y

| Reach | River Sta | Profile | Q Total | Min Ch El | W.S. Elev | Crit W.S. | E.G. Elev | E.G. Slope | Vel Chnl | Flow Area | Top Width | Froude # Chl |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (cfs) | (ft) | (ft) | (ft) | (ft) | (ft/ft) | (ft/s) | (sq ft) | (ft) | |
| Wash | 1100 | 100Y | 817.00 | 1651.23 | 1654.09 | | 1654.34 | 0.008771 | 4.05 | 201.93 | 91.56 | 0.48 |
| Wash | 900 | 100Y | 817.00 | 1649.28 | 1652.07 | | 1652.37 | 0.011025 | 4.43 | 184.55 | 86.81 | 0.54 |
| Wash | 700 | 100Y | 817.00 | 1647.36 | 1650.39 | | 1650.61 | 0.007031 | 3.79 | 215.55 | 91.45 | 0.44 |
| Wash | 500 | 100Y | 817.00 | 1645.64 | 1648.72 | | 1648.99 | 0.009588 | 4.14 | 197.35 | 92.77 | 0.50 |
| Wash | 300 | 100Y | 817.00 | 1640.34 | 1645.69 | 1645.69 | 1646.37 | 0.018167 | 8.15 | 144.91 | 99.92 | 0.71 |
| Wash | 100 | 100Y | 817.00 | 1638.12 | 1642.29 | 1642.29 | 1642.80 | 0.014929 | 6.55 | 170.87 | 144.08 | 0.65 |
| Wash | 20 | 100Y | 817.00 | 1636.71 | 1641.23 | 1640.70 | 1641.64 | 0.010004 | 5.82 | 168.57 | 79.48 | 0.55 |


Wolf180418 Plan: Proposed
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Elevation (ft)
Station (ft)
Wolf180418 Plan: Proposed
RS = 900
.058
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Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)
Wolf180418 Plan: Proposed
RS = 700
.058
.05
.05
Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)
Wolf180418 Plan: Proposed
RS = 500
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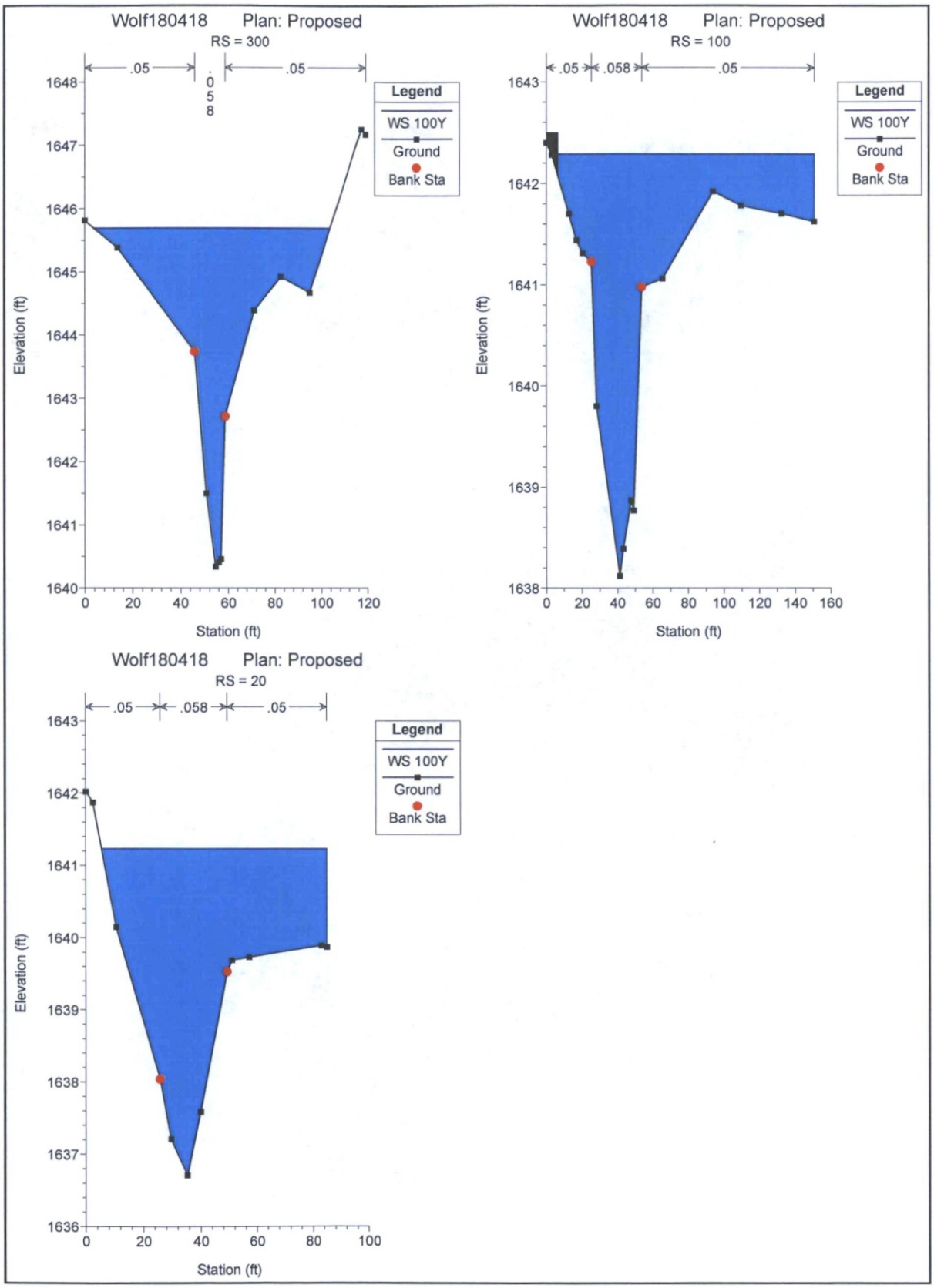
.05
.05
Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)


Wolf180418 Plan: Proposed
RS = 300
.05
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.05
Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)
Wolf180418 Plan: Proposed
RS = 100
.05
.058
.05
Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)
Wolf180418 Plan: Proposed
RS = 20
.05
.058
.05
Legend
WS 100Y
Ground
Bank Sta
Elevation (ft)
Station (ft)

## Wolff Legacy Scottsdale
## Erosion Setback

| Location | 100-year flow Q100 (ft3/s) | Calculated Erosion Setback for straight channels (ft) | Calculated Erosion Setback for Channels with Obvious Curvature (ft) |
|---|---|---|---|
| Wolf Property | 817 | 29 | 71 |

Reference: State Standard for Watercourse System Sediment Balance SSA 5-96

Setback = 1.0 $(Q_{100})^{0.5}$ for straight channels
Setback = 2.5 $(Q_{100})^{0.5}$ for channels with obvious curvature

## Wolff Legacy Scottsdale
### Scour Depth Calculations

| Location | 100-year flow Q100 (ft3/s) | General Degradation | | Degradation | Total Scour Depth | |
|---|---|---|---|---|---|---|
| | | Straight Channels dgs (ft) | Curved Channels dgs (ft) | dlts (ft) | Straight Channels ds (ft) | Curved Channels ds (ft) |
| Wolf Properties | 817 | 2.30 | 3.20 | 1.12 | 3.4 | 4.3 |

(Level I Scour depth per Arizona State Standard SSA 5-96)

$d_s = d_{gs} + d_{lts}$

$d_{gs} = 0.157 * (Q_{100})0.4$ for Straight Channels

$d_{gs} = 0.219 * (Q_{100})0.4$ for Curved Channels

$d_{lts} = 0.02 * (Q_{100})0.6$

For Level I, the minimum total scour depth, $d_s$ shall be 3 feet.

Where:

$d_s$ = Total scour depth, ft.
$d_{gs}$ = General degradation, ft
$d_{lts}$ = Long term degradation, ft
$Q_{100}$ = 100-year flow, cfs.

## SUMMARY OF RATIONAL METHOD PEAK FLOW HYDROLOGY
### Wolff Legacy Scottsdale

| CP Concentration Point | Sub- basin Area (ac) | Water Course Length ft | High Elevation ft | Low Elevation ft | Roughness, Kb | C Weighted Runoff Coefficient | | i Intensity (in/hr) | | Tc Time of Concentration (min) | | Q Peak Flow Rate (cfs) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Return Period | | Return Period | | Return Period | | Return Period | |
| | | | | | | 10-Year | 100-Year | 10-Year | 100-Year | 10-Year | 100-Year | 10-Year | 100-Year |
| P-DA1 | 2.10 | 1194 | 1652.79 | 1638.3 | 0.038 (A) | 0.37 | 0.45 | 3.9 | 6.9 | 9.7 | 7.9 | 3.1 | 6.5 |
| P-DA2 | 4.32 | 989 | 1659 | 1636.6 | 0.036 (A) | 0.37 | 0.45 | 4.7 | 7.8 | 6.6 | 5.5 | 7.5 | 15.1 |
| P-DA3 | 4.18 | 920 | 1659.4 | 1641.4 | 0.0361 (A) | 0.37 | 0.45 | 4.7 | 7.7 | 6.7 | 5.5 | 7.2 | 14.6 |
| P-DA4 | 3.30 | 891 | 1660.2 | 1642.9 | 0.0368 (A) | 0.37 | 0.45 | 4.7 | 7.8 | 6.7 | 5.5 | 5.7 | 11.5 |
| DA-1 | 1.60 | 1223 | 1652.9 | 1638.5 | 0.0387 (A) | 0.37 | 0.45 | 3.8 | 6.8 | 10.1 | 8.2 | 2.3 | 4.9 |
| DA-2 | 0.49 | 252 | 1659 | 1655 | 0.0419 (A) | 0.37 | 0.45 | 5.1 | 7.9 | 5 | 5 | 0.9 | 1.8 |
| DA-3 | 0.76 | 340 | 1654.31 | 1650 | 0.0407 (A) | 0.37 | 0.45 | 5.1 | 7.9 | 5 | 5 | 1.4 | 2.7 |
| DA-4 | 1.53 | 422 | 1659.63 | 1655.2 | 0.0388 (A) | 0.37 | 0.72 | 4.9 | 7.9 | 5.6 | 5 | 2.8 | 8.8 |
| DA-5 | 0.32 | 155 | 1659.2 | 1654.31 | 0.0431 (A) | 0.37 | 0.84 | 5.1 | 7.9 | 5 | 5 | 0.6 | 2.1 |
| DA-6 | 1.88 | 355 | 1655 | 1649 | 0.0383 (A) | 0.37 | 0.61 | 5.1 | 7.9 | 5 | 5 | 3.5 | 9.1 |
| DA-7 | 0.47 | 187 | 1649 | 1647 | 0.042 (A) | 0.37 | 0.45 | 5.1 | 7.9 | 5 | 5 | 0.9 | 1.7 |
| DA-8 | 0.74 | 284 | 1648.73 | 1642.8 | 0.0408 (A) | 0.37 | 0.83 | 5.1 | 7.9 | 5 | 5 | 1.4 | 4.9 |
| DA-9 | 1.14 | 311 | 1648.45 | 1645 | 0.0396 (A) | 0.37 | 0.75 | 5.1 | 7.9 | 5 | 5 | 2.1 | 6.8 |
| DA-10 | 1.07 | 172 | 1656.8 | 1648.3 | 0.0398 (A) | 0.37 | 0.83 | 5.1 | 7.9 | 5 | 5 | 2 | 7.1 |
| DA-11 | 0.34 | 125 | 1641.4 | 1639.4 | 0.0429 (A) | 0.37 | 0.45 | 5.1 | 7.9 | 5 | 5 | 0.6 | 1.2 |
| DA-12 | 0.12 | 121 | 1647.24 | 1639.3 | 0.0458 (A) | 0.37 | 0.95 | 5.1 | 7.9 | 5 | 5 | 0.2 | 0.9 |
| DA-13 | 0.24 | 176 | 1647.24 | 1641.2 | 0.0439 (A) | 0.37 | 0.45 | 5.1 | 7.9 | 5 | 5 | 0.5 | 0.9 |
| RD-1 | 0.52 | 10 | 10 | 0 | 0.0418 (A) | 0.37 | 0.95 | 5.1 | 7.9 | 5 | 5 | 1 | 3.9 |
| RD-2 | 0.42 | 10 | 10 | 0 | 0.0424 (A) | 0.37 | 0.95 | 5.1 | 7.9 | 5 | 5 | 0.8 | 3.2 |
| RD-3 | 0.56 | 10 | 10 | 0 | 0.0416 (A) | 0.37 | 0.95 | 5.1 | 7.9 | 5 | 5 | 1.1 | 4.2 |
| OSDA | 1.69 | 285 | 1650 | 1642.7 | 0.0386 (A) | 0.37 | 0.45 | 5.1 | 7.9 | 5 | 5 | 3.2 | 6 |

Reference: Drainage Design Manual for Maricopa County, Hydrology, August 15, 2013

Notes:

$T_c$ = Time of concentration = $11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$ (Equation 3.2, Papadakis and kazan equation, 1987)

L = Length of the longest flow path, miles.

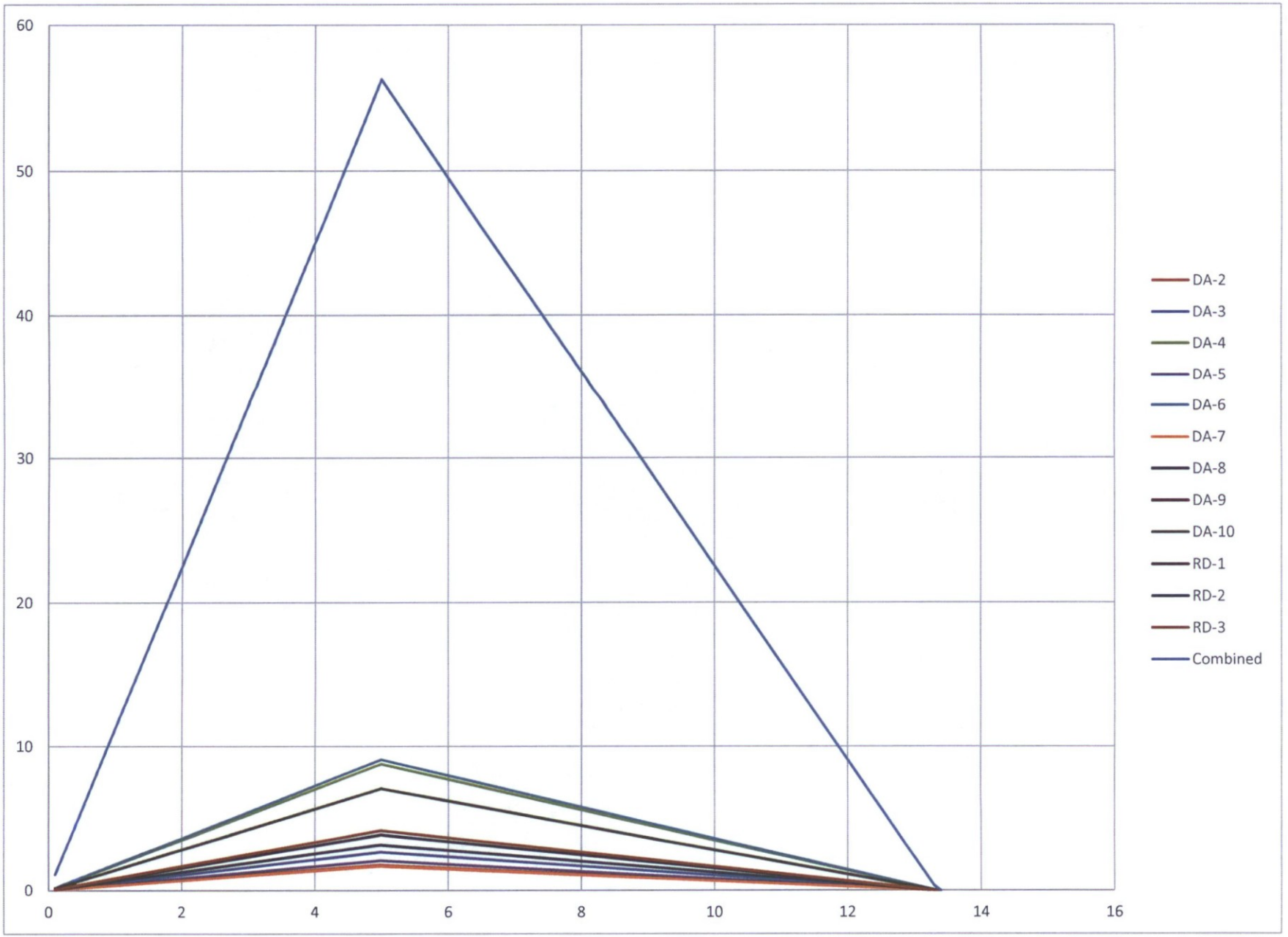
S = Watercourse slope, feet/mile.

$K_b$ = Watershed resistance coefficient = $m\log_{10}A + b$, where A= drainage area in acres, m and b values from (Table 3.1).

Q = Peak discharge = C*I*A, cfs. (Equation 3.1)

i = Average rainfall intensity, in in/hr, lasting for a $T_c$. Determined using the I-D-F curve from the NOAA Atlas 14 PRECIPITATION FREQUENCY ESTIMATES

C = Runoff coefficient per Land use category


60
50
40
30
20
10
0
0
2
4
6
8
10
12
14
16
DA-2
DA-3
DA-4
DA-5
DA-6
DA-7
DA-8
DA-9
DA-10
RD-1
RD-2
RD-3
Combined

Wolff Legacy Scottsdale
Detention Design

| DA-2 | | DA-3 | | DA-4 | | DA-5 | | DA-6 | | DA-7 | | DA-8 | | DA-9 | | DA-10 | | RD-1 | | RD-2 | | RD-3 | | Combined | Inflow | Outflow | Cumulative Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | Time (min) | Q (cfs) | [cf] | [cf] |
| 0.1 | 0.036 | 0.1 | 0.054 | 0.1 | 0.176 | 0.1 | 0.042 | 0.1 | 0.182 | 0.1 | 0.034 | 0.1 | 0.098 | 0.1 | 0.136 | 0.1 | 0.142 | 0.1 | 0.078 | 0.1 | 0.064 | 0.1 | 0.084 | 0.1 | 1.13 | 1.13 | 0.00 |
| 0.2 | 0.072 | 0.2 | 0.108 | 0.2 | 0.352 | 0.2 | 0.084 | 0.2 | 0.364 | 0.2 | 0.068 | 0.2 | 0.196 | 0.2 | 0.272 | 0.2 | 0.284 | 0.2 | 0.156 | 0.2 | 0.128 | 0.2 | 0.168 | 0.2 | 2.25 | 2.25 | 0.00 |
| 0.3 | 0.108 | 0.3 | 0.162 | 0.3 | 0.528 | 0.3 | 0.126 | 0.3 | 0.546 | 0.3 | 0.102 | 0.3 | 0.294 | 0.3 | 0.408 | 0.3 | 0.426 | 0.3 | 0.234 | 0.3 | 0.192 | 0.3 | 0.252 | 0.3 | 3.38 | 3.38 | 0.00 |
| 0.4 | 0.144 | 0.4 | 0.216 | 0.4 | 0.704 | 0.4 | 0.168 | 0.4 | 0.728 | 0.4 | 0.136 | 0.4 | 0.392 | 0.4 | 0.544 | 0.4 | 0.568 | 0.4 | 0.312 | 0.4 | 0.256 | 0.4 | 0.336 | 0.4 | 4.50 | 4.50 | 0.00 |
| 0.5 | 0.18 | 0.5 | 0.27 | 0.5 | 0.88 | 0.5 | 0.21 | 0.5 | 0.91 | 0.5 | 0.17 | 0.5 | 0.49 | 0.5 | 0.68 | 0.5 | 0.71 | 0.5 | 0.39 | 0.5 | 0.32 | 0.5 | 0.42 | 0.5 | 5.63 | 5.63 | 0.00 |
| 0.6 | 0.216 | 0.6 | 0.324 | 0.6 | 1.056 | 0.6 | 0.252 | 0.6 | 1.092 | 0.6 | 0.204 | 0.6 | 0.588 | 0.6 | 0.816 | 0.6 | 0.852 | 0.6 | 0.468 | 0.6 | 0.384 | 0.6 | 0.504 | 0.6 | 6.76 | 6.76 | 0.00 |
| 0.7 | 0.252 | 0.7 | 0.378 | 0.7 | 1.232 | 0.7 | 0.294 | 0.7 | 1.274 | 0.7 | 0.238 | 0.7 | 0.686 | 0.7 | 0.952 | 0.7 | 0.994 | 0.7 | 0.546 | 0.7 | 0.448 | 0.7 | 0.588 | 0.7 | 7.88 | 7.88 | 0.00 |
| 0.8 | 0.288 | 0.8 | 0.432 | 0.8 | 1.408 | 0.8 | 0.336 | 0.8 | 1.456 | 0.8 | 0.272 | 0.8 | 0.784 | 0.8 | 1.088 | 0.8 | 1.136 | 0.8 | 0.624 | 0.8 | 0.512 | 0.8 | 0.672 | 0.8 | 9.01 | 9.01 | 0.00 |
| 0.9 | 0.324 | 0.9 | 0.486 | 0.9 | 1.584 | 0.9 | 0.378 | 0.9 | 1.638 | 0.9 | 0.306 | 0.9 | 0.882 | 0.9 | 1.224 | 0.9 | 1.278 | 0.9 | 0.702 | 0.9 | 0.576 | 0.9 | 0.756 | 0.9 | 10.13 | 10.13 | 0.00 |
| 1 | 0.36 | 1 | 0.54 | 1 | 1.76 | 1 | 0.42 | 1 | 1.82 | 1 | 0.34 | 1 | 0.98 | 1 | 1.36 | 1 | 1.42 | 1 | 0.78 | 1 | 0.64 | 1 | 0.84 | 1 | 11.26 | 11.26 | 0.00 |
| 1.1 | 0.396 | 1.1 | 0.594 | 1.1 | 1.936 | 1.1 | 0.462 | 1.1 | 2.002 | 1.1 | 0.374 | 1.1 | 1.078 | 1.1 | 1.496 | 1.1 | 1.562 | 1.1 | 0.858 | 1.1 | 0.704 | 1.1 | 0.924 | 1.1 | 12.39 | 12.39 | 0.00 |
| 1.2 | 0.432 | 1.2 | 0.648 | 1.2 | 2.112 | 1.2 | 0.504 | 1.2 | 2.184 | 1.2 | 0.408 | 1.2 | 1.176 | 1.2 | 1.632 | 1.2 | 1.704 | 1.2 | 0.936 | 1.2 | 0.768 | 1.2 | 1.008 | 1.2 | 13.51 | 13.51 | 0.00 |
| 1.3 | 0.468 | 1.3 | 0.702 | 1.3 | 2.288 | 1.3 | 0.546 | 1.3 | 2.366 | 1.3 | 0.442 | 1.3 | 1.274 | 1.3 | 1.768 | 1.3 | 1.846 | 1.3 | 1.014 | 1.3 | 0.832 | 1.3 | 1.092 | 1.3 | 14.64 | 14.64 | 0.00 |
| 1.4 | 0.504 | 1.4 | 0.756 | 1.4 | 2.464 | 1.4 | 0.588 | 1.4 | 2.548 | 1.4 | 0.476 | 1.4 | 1.372 | 1.4 | 1.904 | 1.4 | 1.988 | 1.4 | 1.092 | 1.4 | 0.896 | 1.4 | 1.176 | 1.4 | 15.76 | 15.76 | 0.00 |
| 1.5 | 0.54 | 1.5 | 0.81 | 1.5 | 2.64 | 1.5 | 0.63 | 1.5 | 2.73 | 1.5 | 0.51 | 1.5 | 1.47 | 1.5 | 2.04 | 1.5 | 2.13 | 1.5 | 1.17 | 1.5 | 0.96 | 1.5 | 1.26 | 1.5 | 16.89 | 16.89 | 0.00 |
| 1.6 | 0.576 | 1.6 | 0.864 | 1.6 | 2.816 | 1.6 | 0.672 | 1.6 | 2.912 | 1.6 | 0.544 | 1.6 | 1.568 | 1.6 | 2.176 | 1.6 | 2.272 | 1.6 | 1.248 | 1.6 | 1.024 | 1.6 | 1.344 | 1.6 | 18.02 | 18.02 | 0.00 |
| 1.7 | 0.612 | 1.7 | 0.918 | 1.7 | 2.992 | 1.7 | 0.714 | 1.7 | 3.094 | 1.7 | 0.578 | 1.7 | 1.666 | 1.7 | 2.312 | 1.7 | 2.414 | 1.7 | 1.326 | 1.7 | 1.088 | 1.7 | 1.428 | 1.7 | 19.14 | 19.14 | 0.00 |
| 1.8 | 0.648 | 1.8 | 0.972 | 1.8 | 3.168 | 1.8 | 0.756 | 1.8 | 3.276 | 1.8 | 0.612 | 1.8 | 1.764 | 1.8 | 2.448 | 1.8 | 2.556 | 1.8 | 1.404 | 1.8 | 1.152 | 1.8 | 1.512 | 1.8 | 20.27 | 20.27 | 0.00 |
| 1.9 | 0.684 | 1.9 | 1.026 | 1.9 | 3.344 | 1.9 | 0.798 | 1.9 | 3.458 | 1.9 | 0.646 | 1.9 | 1.862 | 1.9 | 2.584 | 1.9 | 2.698 | 1.9 | 1.482 | 1.9 | 1.216 | 1.9 | 1.596 | 1.9 | 21.39 | 21.39 | 0.00 |
| 2 | 0.72 | 2 | 1.08 | 2 | 3.52 | 2 | 0.84 | 2 | 3.64 | 2 | 0.68 | 2 | 1.96 | 2 | 2.72 | 2 | 2.84 | 2 | 1.56 | 2 | 1.28 | 2 | 1.68 | 2 | 22.52 | 22.52 | 0.00 |
| 2.1 | 0.756 | 2.1 | 1.134 | 2.1 | 3.696 | 2.1 | 0.882 | 2.1 | 3.822 | 2.1 | 0.714 | 2.1 | 2.058 | 2.1 | 2.856 | 2.1 | 2.982 | 2.1 | 1.638 | 2.1 | 1.344 | 2.1 | 1.764 | 2.1 | 23.65 | 23.65 | 0.00 |
| 2.2 | 0.792 | 2.2 | 1.188 | 2.2 | 3.872 | 2.2 | 0.924 | 2.2 | 4.004 | 2.2 | 0.748 | 2.2 | 2.156 | 2.2 | 2.992 | 2.2 | 3.124 | 2.2 | 1.716 | 2.2 | 1.408 | 2.2 | 1.848 | 2.2 | 24.77 | 24.77 | 0.00 |
| 2.3 | 0.828 | 2.3 | 1.242 | 2.3 | 4.048 | 2.3 | 0.966 | 2.3 | 4.186 | 2.3 | 0.782 | 2.3 | 2.254 | 2.3 | 3.128 | 2.3 | 3.266 | 2.3 | 1.794 | 2.3 | 1.472 | 2.3 | 1.932 | 2.3 | 25.90 | 25.90 | 0.00 |
| 2.4 | 0.864 | 2.4 | 1.296 | 2.4 | 4.224 | 2.4 | 1.008 | 2.4 | 4.368 | 2.4 | 0.816 | 2.4 | 2.352 | 2.4 | 3.264 | 2.4 | 3.408 | 2.4 | 1.872 | 2.4 | 1.536 | 2.4 | 2.016 | 2.4 | 27.02 | 27.02 | 0.00 |
| 2.5 | 0.9 | 2.5 | 1.35 | 2.5 | 4.4 | 2.5 | 1.05 | 2.5 | 4.55 | 2.5 | 0.85 | 2.5 | 2.45 | 2.5 | 3.4 | 2.5 | 3.55 | 2.5 | 1.95 | 2.5 | 1.6 | 2.5 | 2.1 | 2.5 | 28.15 | 0.55 | 82.80 |
| 2.6 | 0.936 | 2.6 | 1.404 | 2.6 | 4.576 | 2.6 | 1.092 | 2.6 | 4.732 | 2.6 | 0.884 | 2.6 | 2.548 | 2.6 | 3.536 | 2.6 | 3.692 | 2.6 | 2.028 | 2.6 | 1.664 | 2.6 | 2.184 | 2.6 | 29.28 | 1.68 | 248.40 |
| 2.7 | 0.972 | 2.7 | 1.458 | 2.7 | 4.752 | 2.7 | 1.134 | 2.7 | 4.914 | 2.7 | 0.918 | 2.7 | 2.646 | 2.7 | 3.672 | 2.7 | 3.834 | 2.7 | 2.106 | 2.7 | 1.728 | 2.7 | 2.268 | 2.7 | 30.40 | 2.80 | 414.00 |
| 2.8 | 1.008 | 2.8 | 1.512 | 2.8 | 4.928 | 2.8 | 1.176 | 2.8 | 5.096 | 2.8 | 0.952 | 2.8 | 2.744 | 2.8 | 3.808 | 2.8 | 3.976 | 2.8 | 2.184 | 2.8 | 1.792 | 2.8 | 2.352 | 2.8 | 31.53 | 3.93 | 579.60 |
| 2.9 | 1.044 | 2.9 | 1.566 | 2.9 | 5.104 | 2.9 | 1.218 | 2.9 | 5.278 | 2.9 | 0.986 | 2.9 | 2.842 | 2.9 | 3.944 | 2.9 | 4.118 | 2.9 | 2.262 | 2.9 | 1.856 | 2.9 | 2.436 | 2.9 | 32.65 | 5.05 | 745.20 |
| 3 | 1.08 | 3 | 1.62 | 3 | 5.28 | 3 | 1.26 | 3 | 5.46 | 3 | 1.02 | 3 | 2.94 | 3 | 4.08 | 3 | 4.26 | 3 | 2.34 | 3 | 1.92 | 3 | 2.52 | 3 | 33.78 | 6.18 | 910.80 |
| 3.1 | 1.116 | 3.1 | 1.674 | 3.1 | 5.456 | 3.1 | 1.302 | 3.1 | 5.642 | 3.1 | 1.054 | 3.1 | 3.038 | 3.1 | 4.216 | 3.1 | 4.402 | 3.1 | 2.418 | 3.1 | 1.984 | 3.1 | 2.604 | 3.1 | 34.91 | 7.31 | 1076.40 |
| 3.2 | 1.152 | 3.2 | 1.728 | 3.2 | 5.632 | 3.2 | 1.344 | 3.2 | 5.824 | 3.2 | 1.088 | 3.2 | 3.136 | 3.2 | 4.352 | 3.2 | 4.544 | 3.2 | 2.496 | 3.2 | 2.048 | 3.2 | 2.688 | 3.2 | 36.03 | 8.43 | 1242.00 |
| 3.3 | 1.188 | 3.3 | 1.782 | 3.3 | 5.808 | 3.3 | 1.386 | 3.3 | 6.006 | 3.3 | 1.122 | 3.3 | 3.234 | 3.3 | 4.488 | 3.3 | 4.686 | 3.3 | 2.574 | 3.3 | 2.112 | 3.3 | 2.772 | 3.3 | 37.16 | 9.56 | 1407.60 |
| 3.4 | 1.224 | 3.4 | 1.836 | 3.4 | 5.984 | 3.4 | 1.428 | 3.4 | 6.188 | 3.4 | 1.156 | 3.4 | 3.332 | 3.4 | 4.624 | 3.4 | 4.828 | 3.4 | 2.652 | 3.4 | 2.176 | 3.4 | 2.856 | 3.4 | 38.28 | 10.68 | 1573.20 |
| 3.5 | 1.26 | 3.5 | 1.89 | 3.5 | 6.16 | 3.5 | 1.47 | 3.5 | 6.37 | 3.5 | 1.19 | 3.5 | 3.43 | 3.5 | 4.76 | 3.5 | 4.97 | 3.5 | 2.73 | 3.5 | 2.24 | 3.5 | 2.94 | 3.5 | 39.41 | 11.81 | 1738.80 |
| 3.6 | 1.296 | 3.6 | 1.944 | 3.6 | 6.336 | 3.6 | 1.512 | 3.6 | 6.552 | 3.6 | 1.224 | 3.6 | 3.528 | 3.6 | 4.896 | 3.6 | 5.112 | 3.6 | 2.808 | 3.6 | 2.304 | 3.6 | 3.024 | 3.6 | 40.54 | 12.94 | 1904.40 |
| 3.7 | 1.332 | 3.7 | 1.998 | 3.7 | 6.512 | 3.7 | 1.554 | 3.7 | 6.734 | 3.7 | 1.258 | 3.7 | 3.626 | 3.7 | 5.032 | 3.7 | 5.254 | 3.7 | 2.886 | 3.7 | 2.368 | 3.7 | 3.108 | 3.7 | 41.66 | 14.06 | 2070.00 |
| 3.8 | 1.368 | 3.8 | 2.052 | 3.8 | 6.688 | 3.8 | 1.596 | 3.8 | 6.916 | 3.8 | 1.292 | 3.8 | 3.724 | 3.8 | 5.168 | 3.8 | 5.396 | 3.8 | 2.964 | 3.8 | 2.432 | 3.8 | 3.192 | 3.8 | 42.79 | 15.19 | 2235.60 |
| 3.9 | 1.404 | 3.9 | 2.106 | 3.9 | 6.864 | 3.9 | 1.638 | 3.9 | 7.098 | 3.9 | 1.326 | 3.9 | 3.822 | 3.9 | 5.304 | 3.9 | 5.538 | 3.9 | 3.042 | 3.9 | 2.496 | 3.9 | 3.276 | 3.9 | 43.91 | 16.31 | 2401.20 |
| 4 | 1.44 | 4 | 2.16 | 4 | 7.04 | 4 | 1.68 | 4 | 7.28 | 4 | 1.36 | 4 | 3.92 | 4 | 5.44 | 4 | 5.68 | 4 | 3.12 | 4 | 2.56 | 4 | 3.36 | 4 | 45.04 | 17.44 | 2566.80 |
| 4.1 | 1.476 | 4.1 | 2.214 | 4.1 | 7.216 | 4.1 | 1.722 | 4.1 | 7.462 | 4.1 | 1.394 | 4.1 | 4.018 | 4.1 | 5.576 | 4.1 | 5.822 | 4.1 | 3.198 | 4.1 | 2.624 | 4.1 | 3.444 | 4.1 | 46.17 | 18.57 | 2732.40 |
| 4.2 | 1.512 | 4.2 | 2.268 | 4.2 | 7.392 | 4.2 | 1.764 | 4.2 | 7.644 | 4.2 | 1.428 | 4.2 | 4.116 | 4.2 | 5.712 | 4.2 | 5.964 | 4.2 | 3.276 | 4.2 | 2.688 | 4.2 | 3.528 | 4.2 | 47.29 | 19.69 | 2898.00 |
| 4.3 | 1.548 | 4.3 | 2.322 | 4.3 | 7.568 | 4.3 | 1.806 | 4.3 | 7.826 | 4.3 | 1.462 | 4.3 | 4.214 | 4.3 | 5.848 | 4.3 | 6.106 | 4.3 | 3.354 | 4.3 | 2.752 | 4.3 | 3.612 | 4.3 | 48.42 | 20.82 | 3063.60 |
| 4.4 | 1.584 | 4.4 | 2.376 | 4.4 | 7.744 | 4.4 | 1.848 | 4.4 | 8.008 | 4.4 | 1.496 | 4.4 | 4.312 | 4.4 | 5.984 | 4.4 | 6.248 | 4.4 | 3.432 | 4.4 | 2.816 | 4.4 | 3.696 | 4.4 | 49.54 | 21.94 | 3229.20 |
| 4.5 | 1.62 | 4.5 | 2.43 | 4.5 | 7.92 | 4.5 | 1.89 | 4.5 | 8.19 | 4.5 | 1.53 | 4.5 | 4.41 | 4.5 | 6.12 | 4.5 | 6.39 | 4.5 | 3.51 | 4.5 | 2.88 | 4.5 | 3.78 | 4.5 | 50.67 | 23.07 | 3394.80 |
| 4.6 | 1.656 | 4.6 | 2.484 | 4.6 | 8.096 | 4.6 | 1.932 | 4.6 | 8.372 | 4.6 | 1.564 | 4.6 | 4.508 | 4.6 | 6.256 | 4.6 | 6.532 | 4.6 | 3.588 | 4.6 | 2.944 | 4.6 | 3.864 | 4.6 | 51.80 | 24.20 | 3560.40 |
| 4.7 | 1.692 | 4.7 | 2.538 | 4.7 | 8.272 | 4.7 | 1.974 | 4.7 | 8.554 | 4.7 | 1.598 | 4.7 | 4.606 | 4.7 | 6.392 | 4.7 | 6.674 | 4.7 | 3.666 | 4.7 | 3.008 | 4.7 | 3.948 | 4.7 | 52.92 | 25.32 | 3726.00 |
| 4.8 | 1.728 | 4.8 | 2.592 | 4.8 | 8.448 | 4.8 | 2.016 | 4.8 | 8.736 | 4.8 | 1.632 | 4.8 | 4.704 | 4.8 | 6.528 | 4.8 | 6.816 | 4.8 | 3.744 | 4.8 | 3.072 | 4.8 | 4.032 | 4.8 | 54.05 | 26.45 | 3891.60 |
| 4.9 | 1.764 | 4.9 | 2.646 | 4.9 | 8.624 | 4.9 | 2.058 | 4.9 | 8.918 | 4.9 | 1.666 | 4.9 | 4.802 | 4.9 | 6.664 | 4.9 | 6.958 | 4.9 | 3.822 | 4.9 | 3.136 | 4.9 | 4.116 | 4.9 | 55.17 | 27.57 | 4057.20 |
| 5 | 1.8 | 5 | 2.7 | 5 | 8.8 | 5 | 2.1 | 5 | 9.1 | 5 | 1.7 | 5 | 4.9 | 5 | 6.8 | 5 | 7.1 | 5 | 3.9 | 5 | 3.2 | 5 | 4.2 | 5 | 56.30 | 27.60 | 4226.10 |
| 6 | 1.584431 | 6 | 2.376647 | 6 | 7.746108 | 6 | 1.848503 | 6 | 8.01018 | 6 | 1.496407 | 6 | 4.313174 | 6 | 5.985629 | 6 | 6.249701 | 6 | 3.432934 | 6 | 2.816766 | 6 | 3.697006 | 6 | 49.56 | 21.96 | 4395.00 |
| 6.1 | 1.562874 | 6.1 | 2.344311 | 6.1 | 7.640719 | 6.1 | 1.823353 | 6.1 | 7.901198 | 6.1 | 1.476048 | 6.1 | 4.254491 | 6.1 | 5.904192 | 6.1 | 6.164671 | 6.1 | 3.386228 | 6.1 | 2.778443 | 6.1 | 3.646707 | 6.1 | 48.88 | 21.28 | 4560.60 |
| 6.2 | 1.541317 | 6.2 | 2.311976 | 6.2 | 7.535329 | 6.2 | 1.798204 | 6.2 | 7.792216 | 6.2 | 1.455689 | 6.2 | 4.195808 | 6.2 | 5.822754 | 6.2 | 6.079641 | 6.2 | 3.339521 | 6.2 | 2.74012 | 6.2 | 3.596407 | 6.2 | 48.21 | 20.61 | 4726.20 |
| 6.3 | 1.51976 | 6.3 | 2.279641 | 6.3 | 7.42994 | 6.3 | 1.773054 | 6.3 | 7.683234 | 6.3 | 1.435329 | 6.3 | 4.137126 | 6.3 | 5.741317 | 6.3 | 5.994611 | 6.3 | 3.292814 | 6.3 | 2.701796 | 6.3 | 3.546108 | 6.3 | 47.53 | 19.93 | 4891.80 |
| 6.4 | 1.498204 | 6.4 | 2.247305 | 6.4 | 7.324551 | 6.4 | 1.747904 | 6.4 | 7.574251 | 6.4 | 1.41497 | 6.4 | 4.078443 | 6.4 | 5.65988 | 6.4 | 5.909581 | 6.4 | 3.246108 | 6.4 | 2.663473 | 6.4 | 3.495808 | 6.4 | 46.86 | 19.26 | 5057.40 |
| 6.5 | 1.476647 | 6.5 | 2.21497 | 6.5 | 7.219162 | 6.5 | 1.722754 | 6.5 | 7.465269 | 6.5 | 1.394611 | 6.5 | 4.01976 | 6.5 | 5.578443 | 6.5 | 5.824551 | 6.5 | 3.199401 | 6.5 | 2.62515 | 6.5 | 3.445509 | 6.5 | 46.19 | 18.59 | 5223.00 |
| 6.6 | 1.45509 | 6.6 | 2.182635 | 6.6 | 7.113772 | 6.6 | 1.697605 | 6.6 | 7.356287 | 6.6 | 1.374251 | 6.6 | 3.961078 | 6.6 | 5.497006 | 6.6 | 5.739521 | 6.6 | 3.152695 | 6.6 | 2.586826 | 6.6 | 3.39521 | 6.6 | 45.51 | 17.91 | 5388.60 |
| 6.7 | 1.433533 | 6.7 | 2.150299 | 6.7 | 7.008383 | 6.7 | 1.672455 | 6.7 | 7.247305 | 6.7 | 1.353892 | 6.7 | 3.902395 | 6.7 | 5.415569 | 6.7 | 5.654491 | 6.7 | 3.105988 | 6.7 | 2.548503 | 6.7 | 3.34491 | 6.7 | 44.84 | 17.24 | 5554.20 |
| 6.8 | 1.411976 | 6.8 | 2.117964 | 6.8 | 6.902994 | 6.8 | 1.647305 | 6.8 | 7.138323 | 6.8 | 1.333533 | 6.8 | 3.843713 | 6.8 | 5.334132 | 6.8 | 5.569461 | 6.8 | 3.059281 | 6.8 | 2.51018 | 6.8 | 3.294611 | 6.8 | 44.16 | 16.56 | 5719.80 |
| 6.9 | 1.390419 | 6.9 | 2.085629 | 6.9 | 6.797605 | 6.9 | 1.622156 | 6.9 | 7.029341 | 6.9 | 1.313174 | 6.9 | 3.78503 | 6.9 | 5.252695 | 6.9 | 5.484431 | 6.9 | 3.012575 | 6.9 | 2.471856 | 6.9 | 3.244311 | 6.9 | 43.49 | 15.89 | 5885.40 |
| 7 | 1.368862 | 7 | 2.053293 | 7 | 6.692216 | 7 | 1.597006 | 7 | 6.920359 | 7 | 1.292814 | 7 | 3.726347 | 7 | 5.171257 | 7 | 5.399401 | 7 | 2.965868 | 7 | 2.433533 | 7 | 3.194012 | 7 | 42.81 | 15.21 | 6051.00 |
| 7.1 | 1.347305 | 7.1 | 2.020958 | 7.1 | 6.586826 | 7.1 | 1.571856 | 7.1 | 6.811377 | 7.1 | 1.272455 | 7.1 | 3.667665 | 7.1 | 5.08982 | 7.1 | 5.314371 | 7.1 | 2.919162 | 7.1 | 2.39521 | 7.1 | 3.143713 | 7.1 | 42.14 | 14.54 | 6216.60 |
| 7.2 | 1.325749 | 7.2 | 1.988623 | 7.2 | 6.481437 | 7.2 | 1.546707 | 7.2 | 6.702395 | 7.2 | 1.252096 | 7.2 | 3.608982 | 7.2 | 5.008383 | 7.2 | 5.229341 | 7.2 | 2.872455 | 7.2 | 2.356886 | 7.2 | 3.093413 | 7.2 | 41.47 | 13.87 | 6382.20 |
| 7.3 | 1.304192 | 7.3 | 1.956287 | 7.3 | 6.376048 | 7.3 | 1.521557 | 7.3 | 6.593413 | 7.3 | 1.231737 | 7.3 | 3.550299 | 7.3 | 4.926946 | 7.3 | 5.144311 | 7.3 | 2.825749 | 7.3 | 2.318563 | 7.3 | 3.043114 | 7.3 | 40.79 | 13.19 | 6547.80 |
| 7.4 | 1.282635 | 7.4 | 1.923952 | 7.4 | 6.270659 | 7.4 | 1.496407 | 7.4 | 6.484431 | 7.4 | 1.211377 | 7.4 | 3.491617 | 7.4 | 4.845509 | 7.4 | 5.059281 | 7.4 | 2.779042 | 7.4 | 2.28024 | 7.4 | 2.992814 | 7.4 | 40.12 | 12.52 | 6713.40 |
| 7.5 | 1.261078 | 7.5 | 1.891617 | 7.5 | 6.165269 | 7.5 | 1.471257 | 7.5 | 6.375449 | 7.5 | 1.191018 | 7.5 | 3.432934 | 7.5 | 4.764072 | 7.5 | 4.974251 | 7.5 | 2.732335 | 7.5 | 2.241916 | 7.5 | 2.942515 | 7.5 | 39.44 | 11.84 | 6879.00 |
| 7.6 | 1.239521 | 7.6 | 1.859281 | 7.6 | 6.05988 | 7.6 | 1.446108 | 7.6 | 6.266467 | 7.6 | 1.170659 | 7.6 | 3.374251 | 7.6 | 4.682635 | 7.6 | 4.889222 | 7.6 | 2.685629 | 7.6 | 2.203593 | 7.6 | 2.892216 | 7.6 | 38.77 | 11.17 | 7044.60 |
| 7.7 | 1.217964 | 7.7 | 1.826946 | 7.7 | 5.954491 | 7.7 | 1.420958 | 7.7 | 6.157485 | 7.7 | 1.150299 | 7.7 | 3.315569 | 7.7 | 4.601198 | 7.7 | 4.804192 | 7.7 | 2.638922 | 7.7 | 2.165269 | 7.7 | 2.841916 | 7.7 | 38.10 | 10.50 | 7210.20 |
| 7.8 | 1.196407 | 7.8 | 1.794611 | 7.8 | 5.849102 | 7.8 | 1.395808 | 7.8 | 6.048503 | 7.8 | 1.12994 | 7.8 | 3.256886 | 7.8 | 4.51976 | 7.8 | 4.719162 | 7.8 | 2.592216 | 7.8 | 2.126946 | 7.8 | 2.791617 | 7.8 | 37.42 | 9.82 | 7375.80 |
| 7.9 | 1.17485 | 7.9 | 1.762275 | 7.9 | 5.743713 | 7.9 | 1.370659 | 7.9 | 5.939521 | 7.9 | 1.109581 | 7.9 | 3.198204 | 7.9 | 4.438323 | 7.9 | 4.634132 | 7.9 | 2.545509 | 7.9 | 2.088623 | 7.9 | 2.741317 | 7.9 | 36.75 | 9.15 | 7541.40 |
| 8 | 1.153293 | 8 | 1.72994 | 8 | 5.638323 | 8 | 1.345509 | 8 | 5.830539 | 8 | 1.089222 | 8 | 3.139521 | 8 | 4.356886 | 8 | 4.549102 | 8 | 2.498802 | 8 | 2.050299 | 8 | 2.691018 | 8 | 36.07 | 8.47 | 7707.00 |
| 8.1 | 1.131737 | 8.1 | 1.697605 | 8.1 | 5.532934 | 8.1 | 1.320359 | 8.1 | 5.721557 | 8.1 | 1.068862 | 8.1 | 3.080838 | 8.1 | 4.275449 | 8.1 | 4.464072 | 8.1 | 2.452096 | 8.1 | 2.011976 | 8.1 | 2.640719 | 8.1 | 35.40 | 7.80 | 7872.60 |
| 8.2 | 1.11018 | 8.2 | 1.665269 | 8.2 | 5.427545 | 8.2 | 1.29521 | 8.2 | 5.612575 | 8.2 | 1.048503 | 8.2 | 3.022156 | 8.2 | 4.194012 | 8.2 | 4.379042 | 8.2 | 2.405389 | 8.2 | 1.973653 | 8.2 | 2.590419 | 8.2 | 34.72 | 7.12 | 8038.20 |
| 8.3 | 1.088623 | 8.3 | 1.632934 | 8.3 | 5.322156 | 8.3 | 1.27006 | 8.3 | 5.503593 | 8.3 | 1.028144 | 8.3 | 2.963473 | 8.3 | 4.112575 | 8.3 | 4.294012 | 8.3 | 2.358683 | 8.3 | 1.935329 | 8.3 | 2.54012 | 8.3 | 34.05 | 6.45 | 8203.80 |
| 8.4 | 1.067066 | 8.4 | 1.600599 | 8.4 | 5.216766 | 8.4 | 1.24491 | 8.4 | 5.394611 | 8.4 | 1.007784 | 8.4 | 2.90479 | 8.4 | 4.031138 | 8.4 | 4.208982 | 8.4 | 2.311976 | 8.4 | 1.897006 | 8.4 | 2.48982 | 8.4 | 33.38 | 5.78 | 8369.40 |

Wolff Legacy Scottsdale
Detention Design

| DA-2 | | DA-3 | | DA-4 | | DA-5 | | DA-6 | | DA-7 | | DA-8 | | DA-9 | | DA-10 | | RD-1 | | RD-2 | | RD-3 | | Combined | Inflow | Outflow | Cumulative Volume |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min | Q (cfs) | Time (min) | Q (cfs) | [cf] | [cf] |
| 8.5 | 1.045509 | 8.5 | 1.568263 | 8.5 | 5.111377 | 8.5 | 1.21976 | 8.5 | 5.285629 | 8.5 | 0.987425 | 8.5 | 2.846108 | 8.5 | 3.949701 | 8.5 | 4.123952 | 8.5 | 2.265269 | 8.5 | 1.858683 | 8.5 | 2.439521 | 8.5 | 32.70 | 5.10 | 8535.00 |
| 8.6 | 1.023952 | 8.6 | 1.535928 | 8.6 | 5.005988 | 8.6 | 1.194611 | 8.6 | 5.176647 | 8.6 | 0.967066 | 8.6 | 2.787425 | 8.6 | 3.868263 | 8.6 | 4.038922 | 8.6 | 2.218563 | 8.6 | 1.820359 | 8.6 | 2.389222 | 8.6 | 32.03 | 4.43 | 8700.60 |
| 8.7 | 1.002395 | 8.7 | 1.503593 | 8.7 | 4.900599 | 8.7 | 1.169461 | 8.7 | 5.067665 | 8.7 | 0.946707 | 8.7 | 2.728743 | 8.7 | 3.786826 | 8.7 | 3.953892 | 8.7 | 2.171856 | 8.7 | 1.782036 | 8.7 | 2.338922 | 8.7 | 31.35 | 3.75 | 8866.20 |
| 8.8 | 0.980838 | 8.8 | 1.471257 | 8.8 | 4.79521 | 8.8 | 1.144311 | 8.8 | 4.958683 | 8.8 | 0.926347 | 8.8 | 2.67006 | 8.8 | 3.705389 | 8.8 | 3.868862 | 8.8 | 2.12515 | 8.8 | 1.743713 | 8.8 | 2.288623 | 8.8 | 30.68 | 3.08 | 9031.80 |
| 8.9 | 0.959281 | 8.9 | 1.438922 | 8.9 | 4.68982 | 8.9 | 1.119162 | 8.9 | 4.849701 | 8.9 | 0.905988 | 8.9 | 2.611377 | 8.9 | 3.623952 | 8.9 | 3.783832 | 8.9 | 2.078443 | 8.9 | 1.705389 | 8.9 | 2.238323 | 8.9 | 30.00 | 2.40 | 9197.40 |
| 9 | 0.937725 | 9 | 1.406587 | 9 | 4.584431 | 9 | 1.094012 | 9 | 4.740719 | 9 | 0.885629 | 9 | 2.552695 | 9 | 3.542515 | 9 | 3.698802 | 9 | 2.031737 | 9 | 1.667066 | 9 | 2.188024 | 9 | 29.33 | 1.73 | 9363.00 |
| 9.1 | 0.916168 | 9.1 | 1.374251 | 9.1 | 4.479042 | 9.1 | 1.068862 | 9.1 | 4.631737 | 9.1 | 0.865269 | 9.1 | 2.494012 | 9.1 | 3.461078 | 9.1 | 3.613772 | 9.1 | 1.98503 | 9.1 | 1.628743 | 9.1 | 2.137725 | 9.1 | 28.66 | 1.06 | 9528.60 |
| 9.2 | 0.894611 | 9.2 | 1.341916 | 9.2 | 4.373653 | 9.2 | 1.043713 | 9.2 | 4.522754 | 9.2 | 0.84491 | 9.2 | 2.435329 | 9.2 | 3.379641 | 9.2 | 3.528743 | 9.2 | 1.938323 | 9.2 | 1.590419 | 9.2 | 2.087425 | 9.2 | 27.98 | 0.38 | 9694.20 |
| 9.3 | 0.873054 | 9.3 | 1.309581 | 9.3 | 4.268263 | 9.3 | 1.018563 | 9.3 | 4.413772 | 9.3 | 0.824551 | 9.3 | 2.376647 | 9.3 | 3.298204 | 9.3 | 3.443713 | 9.3 | 1.891617 | 9.3 | 1.552096 | 9.3 | 2.037126 | 9.3 | 27.31 | 27.31 | 9777.00 |
| 9.4 | 0.851497 | 9.4 | 1.277246 | 9.4 | 4.162874 | 9.4 | 0.993413 | 9.4 | 4.30479 | 9.4 | 0.804192 | 9.4 | 2.317964 | 9.4 | 3.216766 | 9.4 | 3.358683 | 9.4 | 1.84491 | 9.4 | 1.513772 | 9.4 | 1.986826 | 9.4 | 26.63 | 26.63 | 9777.00 |
| 9.5 | 0.82994 | 9.5 | 1.24491 | 9.5 | 4.057485 | 9.5 | 0.968263 | 9.5 | 4.195808 | 9.5 | 0.783832 | 9.5 | 2.259281 | 9.5 | 3.135329 | 9.5 | 3.273653 | 9.5 | 1.798204 | 9.5 | 1.475449 | 9.5 | 1.936527 | 9.5 | 25.96 | 25.96 | 9777.00 |
| 9.6 | 0.808383 | 9.6 | 1.212575 | 9.6 | 3.952096 | 9.6 | 0.943114 | 9.6 | 4.086826 | 9.6 | 0.763473 | 9.6 | 2.200599 | 9.6 | 3.053892 | 9.6 | 3.188623 | 9.6 | 1.751497 | 9.6 | 1.437126 | 9.6 | 1.886228 | 9.6 | 25.28 | 25.28 | 9777.00 |
| 9.7 | 0.786826 | 9.7 | 1.18024 | 9.7 | 3.846707 | 9.7 | 0.917964 | 9.7 | 3.977844 | 9.7 | 0.743114 | 9.7 | 2.141916 | 9.7 | 2.972455 | 9.7 | 3.103593 | 9.7 | 1.70479 | 9.7 | 1.398802 | 9.7 | 1.835928 | 9.7 | 24.61 | 24.61 | 9777.00 |
| 9.8 | 0.765269 | 9.8 | 1.147904 | 9.8 | 3.741317 | 9.8 | 0.892814 | 9.8 | 3.868862 | 9.8 | 0.722754 | 9.8 | 2.083234 | 9.8 | 2.891018 | 9.8 | 3.018563 | 9.8 | 1.658084 | 9.8 | 1.360479 | 9.8 | 1.785629 | 9.8 | 23.94 | 23.94 | 9777.00 |
| 9.9 | 0.743713 | 9.9 | 1.115569 | 9.9 | 3.635928 | 9.9 | 0.867665 | 9.9 | 3.75988 | 9.9 | 0.702395 | 9.9 | 2.024551 | 9.9 | 2.809581 | 9.9 | 2.933533 | 9.9 | 1.611377 | 9.9 | 1.322156 | 9.9 | 1.735329 | 9.9 | 23.26 | 23.26 | 9777.00 |
| 10 | 0.722156 | 10 | 1.083234 | 10 | 3.530539 | 10 | 0.842515 | 10 | 3.650898 | 10 | 0.682036 | 10 | 1.965868 | 10 | 2.728144 | 10 | 2.848503 | 10 | 1.564671 | 10 | 1.283832 | 10 | 1.68503 | 10 | 22.59 | 22.59 | 9777.00 |
| 10.1 | 0.700599 | 10.1 | 1.050898 | 10.1 | 3.42515 | 10.1 | 0.817365 | 10.1 | 3.541916 | 10.1 | 0.661677 | 10.1 | 1.907186 | 10.1 | 2.646707 | 10.1 | 2.763473 | 10.1 | 1.517964 | 10.1 | 1.245509 | 10.1 | 1.634731 | 10.1 | 21.91 | 21.91 | 9777.00 |
| 10.2 | 0.679042 | 10.2 | 1.018563 | 10.2 | 3.31976 | 10.2 | 0.792216 | 10.2 | 3.432934 | 10.2 | 0.641317 | 10.2 | 1.848503 | 10.2 | 2.565269 | 10.2 | 2.678443 | 10.2 | 1.471257 | 10.2 | 1.207186 | 10.2 | 1.584431 | 10.2 | 21.24 | 21.24 | 9777.00 |
| 10.3 | 0.657485 | 10.3 | 0.986228 | 10.3 | 3.214371 | 10.3 | 0.767066 | 10.3 | 3.323952 | 10.3 | 0.620958 | 10.3 | 1.78982 | 10.3 | 2.483832 | 10.3 | 2.593413 | 10.3 | 1.424551 | 10.3 | 1.168862 | 10.3 | 1.534132 | 10.3 | 20.56 | 20.56 | 9777.00 |
| 10.4 | 0.635928 | 10.4 | 0.953892 | 10.4 | 3.108982 | 10.4 | 0.741916 | 10.4 | 3.21497 | 10.4 | 0.600599 | 10.4 | 1.731138 | 10.4 | 2.402395 | 10.4 | 2.508383 | 10.4 | 1.377844 | 10.4 | 1.130539 | 10.4 | 1.483832 | 10.4 | 19.89 | 19.89 | 9777.00 |
| 10.5 | 0.614371 | 10.5 | 0.921557 | 10.5 | 3.003593 | 10.5 | 0.716766 | 10.5 | 3.105888 | 10.5 | 0.58024 | 10.5 | 1.672455 | 10.5 | 2.320958 | 10.5 | 2.423353 | 10.5 | 1.331138 | 10.5 | 1.092216 | 10.5 | 1.433533 | 10.5 | 19.22 | 19.22 | 9777.00 |
| 10.6 | 0.592814 | 10.6 | 0.889222 | 10.6 | 2.898204 | 10.6 | 0.691617 | 10.6 | 2.997006 | 10.6 | 0.55988 | 10.6 | 1.613772 | 10.6 | 2.239521 | 10.6 | 2.338323 | 10.6 | 1.284431 | 10.6 | 1.053892 | 10.6 | 1.383234 | 10.6 | 18.54 | 18.54 | 9777.00 |
| 10.7 | 0.571257 | 10.7 | 0.856886 | 10.7 | 2.792814 | 10.7 | 0.666467 | 10.7 | 2.888024 | 10.7 | 0.539521 | 10.7 | 1.55509 | 10.7 | 2.158084 | 10.7 | 2.253293 | 10.7 | 1.237725 | 10.7 | 1.015569 | 10.7 | 1.332934 | 10.7 | 17.87 | 17.87 | 9777.00 |
| 10.8 | 0.549701 | 10.8 | 0.824551 | 10.8 | 2.687425 | 10.8 | 0.641317 | 10.8 | 2.779042 | 10.8 | 0.519162 | 10.8 | 1.496407 | 10.8 | 2.076647 | 10.8 | 2.168263 | 10.8 | 1.191018 | 10.8 | 0.977246 | 10.8 | 1.282635 | 10.8 | 17.19 | 17.19 | 9777.00 |
| 10.9 | 0.528144 | 10.9 | 0.792216 | 10.9 | 2.582036 | 10.9 | 0.616168 | 10.9 | 2.67006 | 10.9 | 0.498802 | 10.9 | 1.437725 | 10.9 | 1.99521 | 10.9 | 2.083234 | 10.9 | 1.144311 | 10.9 | 0.938922 | 10.9 | 1.232335 | 10.9 | 16.52 | 16.52 | 9777.00 |
| 11 | 0.506587 | 11 | 0.75988 | 11 | 2.476647 | 11 | 0.591018 | 11 | 2.561078 | 11 | 0.478443 | 11 | 1.379042 | 11 | 1.913772 | 11 | 1.998204 | 11 | 1.097605 | 11 | 0.900599 | 11 | 1.182036 | 11 | 15.84 | 15.84 | 9777.00 |
| 11.1 | 0.48503 | 11.1 | 0.727545 | 11.1 | 2.371257 | 11.1 | 0.565868 | 11.1 | 2.452096 | 11.1 | 0.458084 | 11.1 | 1.320359 | 11.1 | 1.832335 | 11.1 | 1.913174 | 11.1 | 1.050898 | 11.1 | 0.862275 | 11.1 | 1.131737 | 11.1 | 15.17 | 15.17 | 9777.00 |
| 11.2 | 0.463473 | 11.2 | 0.69521 | 11.2 | 2.265868 | 11.2 | 0.540719 | 11.2 | 2.343114 | 11.2 | 0.437725 | 11.2 | 1.261677 | 11.2 | 1.750898 | 11.2 | 1.828144 | 11.2 | 1.004192 | 11.2 | 0.823952 | 11.2 | 1.081437 | 11.2 | 14.50 | 14.50 | 9777.00 |
| 11.3 | 0.441916 | 11.3 | 0.662874 | 11.3 | 2.160479 | 11.3 | 0.515569 | 11.3 | 2.234132 | 11.3 | 0.417365 | 11.3 | 1.202994 | 11.3 | 1.669461 | 11.3 | 1.743114 | 11.3 | 0.957485 | 11.3 | 0.785629 | 11.3 | 1.031138 | 11.3 | 13.82 | 13.82 | 9777.00 |
| 11.4 | 0.420359 | 11.4 | 0.630539 | 11.4 | 2.05509 | 11.4 | 0.490419 | 11.4 | 2.12515 | 11.4 | 0.397006 | 11.4 | 1.144311 | 11.4 | 1.588024 | 11.4 | 1.658084 | 11.4 | 0.910778 | 11.4 | 0.747305 | 11.4 | 0.980838 | 11.4 | 13.15 | 13.15 | 9777.00 |
| 11.5 | 0.398802 | 11.5 | 0.598204 | 11.5 | 1.949701 | 11.5 | 0.465269 | 11.5 | 2.016168 | 11.5 | 0.376647 | 11.5 | 1.085629 | 11.5 | 1.506587 | 11.5 | 1.573054 | 11.5 | 0.864072 | 11.5 | 0.708982 | 11.5 | 0.930539 | 11.5 | 12.47 | 12.47 | 9777.00 |
| 11.6 | 0.377246 | 11.6 | 0.565868 | 11.6 | 1.844311 | 11.6 | 0.44012 | 11.6 | 1.907186 | 11.6 | 0.356287 | 11.6 | 1.026946 | 11.6 | 1.42515 | 11.6 | 1.488024 | 11.6 | 0.817365 | 11.6 | 0.670659 | 11.6 | 0.88024 | 11.6 | 11.80 | 11.80 | 9777.00 |
| 11.7 | 0.355689 | 11.7 | 0.533533 | 11.7 | 1.738922 | 11.7 | 0.41497 | 11.7 | 1.798204 | 11.7 | 0.335928 | 11.7 | 0.968263 | 11.7 | 1.343713 | 11.7 | 1.402994 | 11.7 | 0.770659 | 11.7 | 0.632335 | 11.7 | 0.82994 | 11.7 | 11.13 | 11.13 | 9777.00 |
| 11.8 | 0.334132 | 11.8 | 0.501198 | 11.8 | 1.633533 | 11.8 | 0.38982 | 11.8 | 1.689222 | 11.8 | 0.315569 | 11.8 | 0.909581 | 11.8 | 1.262275 | 11.8 | 1.317964 | 11.8 | 0.723952 | 11.8 | 0.594012 | 11.8 | 0.779641 | 11.8 | 10.45 | 10.45 | 9777.00 |
| 11.9 | 0.312575 | 11.9 | 0.468862 | 11.9 | 1.528144 | 11.9 | 0.364671 | 11.9 | 1.58024 | 11.9 | 0.29521 | 11.9 | 0.850898 | 11.9 | 1.180838 | 11.9 | 1.232934 | 11.9 | 0.677246 | 11.9 | 0.555689 | 11.9 | 0.729341 | 11.9 | 9.78 | 9.78 | 9777.00 |
| 12 | 0.291018 | 12 | 0.436527 | 12 | 1.422754 | 12 | 0.339521 | 12 | 1.471257 | 12 | 0.27485 | 12 | 0.792216 | 12 | 1.099401 | 12 | 1.147904 | 12 | 0.630539 | 12 | 0.517365 | 12 | 0.679042 | 12 | 9.10 | 9.10 | 9777.00 |
| 12.1 | 0.269461 | 12.1 | 0.404192 | 12.1 | 1.317365 | 12.1 | 0.314371 | 12.1 | 1.362275 | 12.1 | 0.254491 | 12.1 | 0.733533 | 12.1 | 1.017964 | 12.1 | 1.062874 | 12.1 | 0.583832 | 12.1 | 0.479042 | 12.1 | 0.628743 | 12.1 | 8.43 | 8.43 | 9777.00 |
| 12.2 | 0.247904 | 12.2 | 0.371856 | 12.2 | 1.211976 | 12.2 | 0.289222 | 12.2 | 1.253293 | 12.2 | 0.234132 | 12.2 | 0.67485 | 12.2 | 0.936527 | 12.2 | 0.977844 | 12.2 | 0.537126 | 12.2 | 0.440719 | 12.2 | 0.578443 | 12.2 | 7.75 | 7.75 | 9777.00 |
| 12.3 | 0.226347 | 12.3 | 0.339521 | 12.3 | 1.106587 | 12.3 | 0.264072 | 12.3 | 1.144311 | 12.3 | 0.213772 | 12.3 | 0.616168 | 12.3 | 0.85509 | 12.3 | 0.892814 | 12.3 | 0.490419 | 12.3 | 0.402395 | 12.3 | 0.528144 | 12.3 | 7.08 | 7.08 | 9777.00 |
| 12.4 | 0.20479 | 12.4 | 0.307186 | 12.4 | 1.001198 | 12.4 | 0.238922 | 12.4 | 1.035329 | 12.4 | 0.193413 | 12.4 | 0.557485 | 12.4 | 0.773653 | 12.4 | 0.807784 | 12.4 | 0.443713 | 12.4 | 0.364072 | 12.4 | 0.477844 | 12.4 | 6.41 | 6.41 | 9777.00 |
| 12.5 | 0.183234 | 12.5 | 0.27485 | 12.5 | 0.895808 | 12.5 | 0.213772 | 12.5 | 0.926347 | 12.5 | 0.173054 | 12.5 | 0.498802 | 12.5 | 0.692216 | 12.5 | 0.722754 | 12.5 | 0.397006 | 12.5 | 0.325749 | 12.5 | 0.427545 | 12.5 | 5.73 | 5.73 | 9777.00 |
| 12.6 | 0.161677 | 12.6 | 0.242515 | 12.6 | 0.790419 | 12.6 | 0.188623 | 12.6 | 0.817365 | 12.6 | 0.152695 | 12.6 | 0.44012 | 12.6 | 0.610778 | 12.6 | 0.637725 | 12.6 | 0.350299 | 12.6 | 0.287425 | 12.6 | 0.377246 | 12.6 | 5.06 | 5.06 | 9777.00 |
| 12.7 | 0.14012 | 12.7 | 0.21018 | 12.7 | 0.68503 | 12.7 | 0.163473 | 12.7 | 0.708383 | 12.7 | 0.132335 | 12.7 | 0.381437 | 12.7 | 0.529341 | 12.7 | 0.552695 | 12.7 | 0.303593 | 12.7 | 0.249102 | 12.7 | 0.326846 | 12.7 | 4.38 | 4.38 | 9777.00 |
| 12.8 | 0.118563 | 12.8 | 0.177844 | 12.8 | 0.579641 | 12.8 | 0.138323 | 12.8 | 0.599401 | 12.8 | 0.111976 | 12.8 | 0.322754 | 12.8 | 0.447904 | 12.8 | 0.467665 | 12.8 | 0.256886 | 12.8 | 0.210778 | 12.8 | 0.276847 | 12.8 | 3.71 | 3.71 | 9777.00 |
| 12.9 | 0.097006 | 12.9 | 0.145509 | 12.9 | 0.474251 | 12.9 | 0.113174 | 12.9 | 0.490419 | 12.9 | 0.091617 | 12.9 | 0.264072 | 12.9 | 0.366467 | 12.9 | 0.382635 | 12.9 | 0.21018 | 12.9 | 0.172455 | 12.9 | 0.226347 | 12.9 | 3.03 | 3.03 | 9777.00 |
| 13 | 0.075449 | 13 | 0.113174 | 13 | 0.368862 | 13 | 0.088024 | 13 | 0.381437 | 13 | 0.071257 | 13 | 0.205389 | 13 | 0.28503 | 13 | 0.297605 | 13 | 0.163473 | 13 | 0.134132 | 13 | 0.176048 | 13 | 2.36 | 2.36 | 9777.00 |
| 13.1 | 0.053892 | 13.1 | 0.080838 | 13.1 | 0.263473 | 13.1 | 0.062874 | 13.1 | 0.272455 | 13.1 | 0.050898 | 13.1 | 0.146707 | 13.1 | 0.203593 | 13.1 | 0.212575 | 13.1 | 0.116766 | 13.1 | 0.095808 | 13.1 | 0.125749 | 13.1 | 1.69 | 1.69 | 9777.00 |
| 13.2 | 0.032335 | 13.2 | 0.048503 | 13.2 | 0.158084 | 13.2 | 0.037725 | 13.2 | 0.163473 | 13.2 | 0.030539 | 13.2 | 0.088024 | 13.2 | 0.122156 | 13.2 | 0.127545 | 13.2 | 0.07006 | 13.2 | 0.057485 | 13.2 | 0.075449 | 13.2 | 1.01 | 1.01 | 9777.00 |
| 13.3 | 0.010778 | 13.3 | 0.016168 | 13.3 | 0.052695 | 13.3 | 0.012575 | 13.3 | 0.054491 | 13.3 | 0.01018 | 13.3 | 0.029341 | 13.3 | 0.040719 | 13.3 | 0.042515 | 13.3 | 0.023353 | 13.3 | 0.019162 | 13.3 | 0.02515 | 13.3 | 0.34 | 0.34 | 9777.00 |
| 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0 | 13.4 | 0.00 | 0.00 | 9777.00 |

Notes:
hydrograph is generated based on Maricopa County Drainage Hydrology Manual page 3-10
If the inflow is less than 27.6 cfs, all the inflow is assumed to outflow. If greater than 27.6 cfs then the difference is assumed to be detained with maximum of 27.6.
During final design the inflow and outflow routing will be computed based on the head on the restricted orifice plates.

**Orifice Plates Design**
**Wolff Legacy Scottsdale**

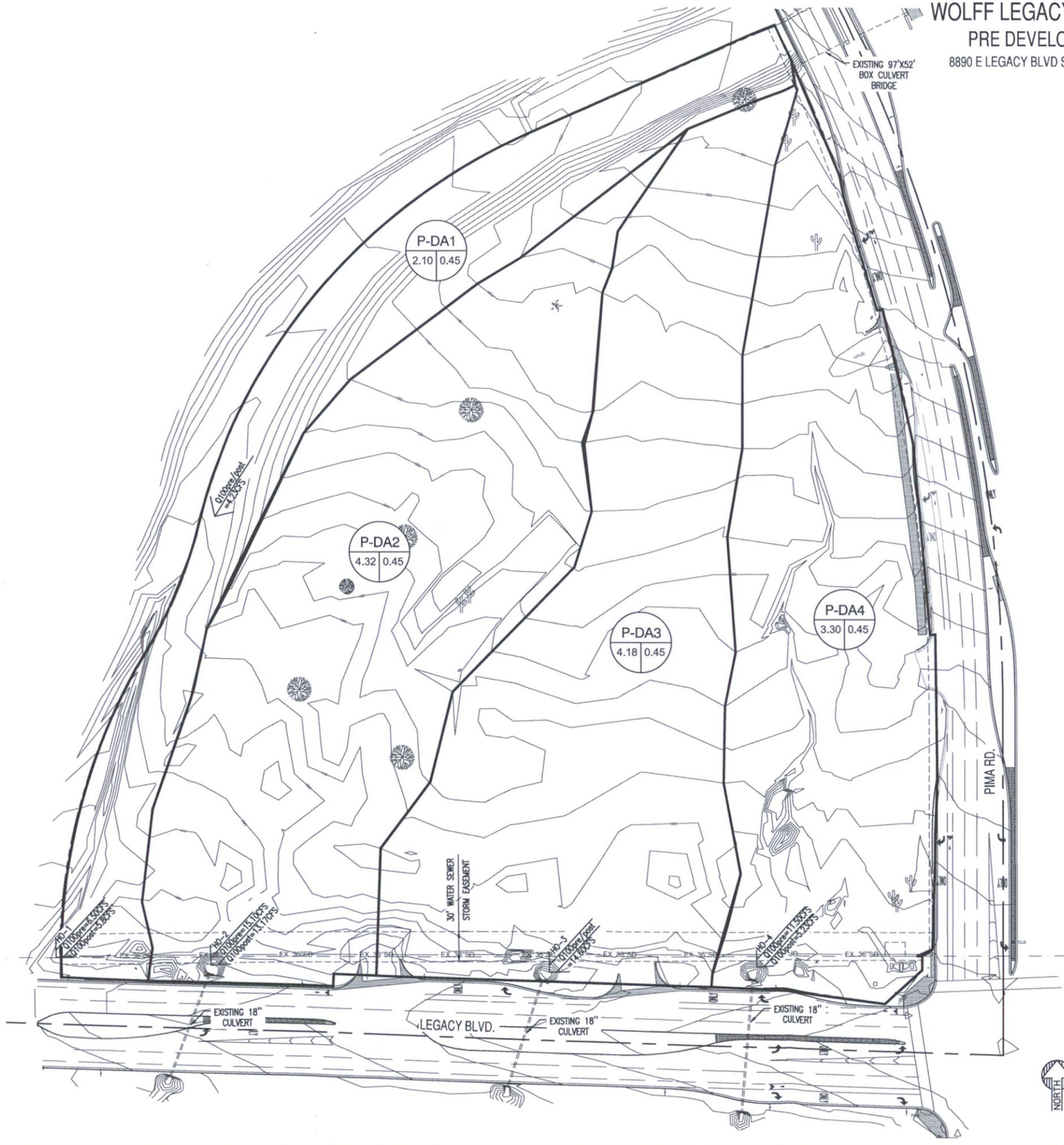
| CP Concentration Point | d | Diameter | Flow |
|---|---|---|---|
| | | orifice plate | Qi |
| | [ft] | [ft] | [cfs] |
| HO-2 | 7.36 | 1.13 | 14.63 |
| HO-3 | 6.3 | 1.11 | 13.06 |

**Flow is determine using orifice equation: $Qi = CoAg(2gd)^{0.5}$**

where:

**Co = Orifice coefficient = 0.67**
**Ag = Clear opening area , sq ft**
**d = Depth of flow , ft**
**g = Gravity, 32.2 ft/sec2**

# WOLFF LEGACY SCOTTSDALE
## PRE DEVELOPMENT DAM
8890 E LEGACY BLVD SCOTTSDALE, AZ 85255




DRAINAGE AREA ID

AREA IN ACRES — RUNOFF COEFFICIENT

DRAINAGE AREA KEY

NORTH

0' 50' 100' 150'

SCALE: 1" = 50'

Call at least two full working days Before you Excavate ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County (602) 263-1100

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SEG
8280 E. GELDING DR #101, SCOTTSDALE, ARIZONA 85260
WWW. AZSEG.COM TEL. 480.588.7229

THE WOLFF COMPANY
Since 1949

PROJECT: WOLFF LEGACY SCOTTSDALE
LOCATION: 8890 E LEGACY BLVD. SCOTTSDALE, AZ 85255

DRAWN — TAPIA
DESIGNED — TAPIA
CHECKED — COUNSELL
PROJ. MGR. — FAKIH

DATE: 04/18/18

ISSUED FOR: REZONING & PLAN AMENDMENT

| REVISION NO.: | DATE: |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |

JOB NO.: 170726

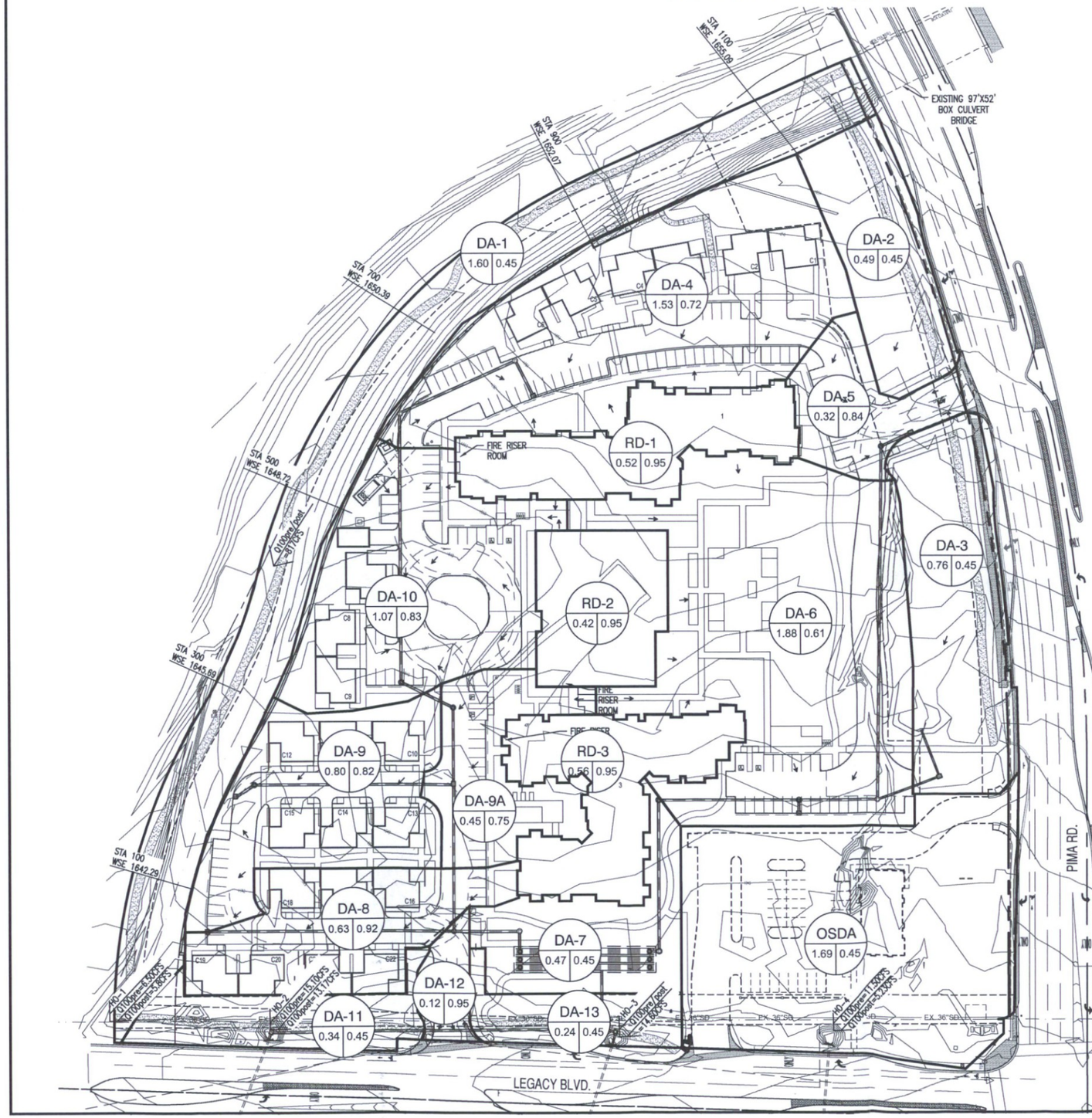
SHEET TITLE: PRE DEVELOPMENT DAM

SHEET NO.:

# WOLFF LEGACY SCOTTSDALE

## POST DEVELOPMENT DAM

8890 E LEGACY BLVD SCOTTSDALE, AZ 85255




DRAINAGE AREA ID

AREA IN ACRES — RUNOFF COEFFICIENT

DRAINAGE AREA KEY

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JOB NO.: 170726

SHEET TITLE: POST DEVELOPMENT DAM

SHEET NO.:

# *APPENDIX III*

# *Preliminary Grading & Drainage Plan*

# WOLFF LEGACY SCOTTSDALE
## PRELIMINARY GRADING & DRAINAGE PLAN
8890 E LEGACY BLVD SCOTTSDALE, AZ 85255

HOW IS PROPOSED PATH PROTECTED FROM WASHING OUT?

PROPOSED TRAILS ARE LOCATED IN VISTA CORRIDORS. REVIEW AND CHECK WITH PLANNING.

ADD Q100

LABEL AND RE-FORMAT CONTOUR DISPLAY.

PROPOSED BUILDINGS ARE LOCATED WITHIN EROSION SET BACKS. REVISE LOCATION OF BUILDINGS OR PROVIDE EROSION PROTECTION

DIMENSION FROM TOP OF BANK FOR EROSION SET BACK.

ADD Q100 PRE AND POST.

PROPOSED EASEMENT FOR FLOOD WASH

SEE ENLARGED PLAN A ON SHEET C3.10

WASH FLOWLINE

EXISTING 97'X52' BOX CULVERT BRIDGE

LATERAL EROSION SET BACK

MAINTENANCE BUILDING

ADD/LF88 ELEVATION

FUTURE DEVELOPMENT NOT A PART

SCENIC CORRIDOR

FIRE RISER ROOM

N PIMA RD.

LEGACY BLVD.

25' RADIUS R/W

302 LF WALL TW 47.25 BW 40.58

OVERFLOW 5.80 CFS

ULTIMATE OUTFALL TC=38.24

OVERFLOW 13.17 CFS

EXISTING 18" CULVERT

PROFILE B

30' WATER SEWER STORM EASEMENT

CB-14 WITH 6" DIA RESTRICTOR PLATE EAST AND WEST

OVERFLOW 14.60 CFS

EXISTING 18" CULVERT

75' R/W

58' R/W

BASIN 1
395 LF 6' CMP
Vr=9,770 CF
Vp=11,158 CF

PROFILE A

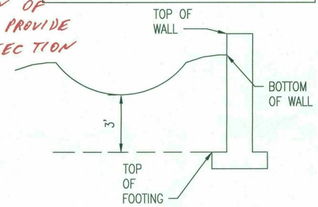
RIM=45.60
IE=35.60

RIM=46.15
IE=35.60

0.9CFS

1.20CFS

**NOTE:** RETAINING WALLS ADJACENT TO WASH INCLUDE 3' MIN SCOUR WALLS TO BOTTOM OF FOOTINGS. REFER TO DETAIL BELOW. NTS.




| BLDG NO. | HIGHEST ADJACENT GRADE (HAG) | REGULARTORY FLOOD ELEVATIONS (2') | LF 88 FLOOR ELEVATION |
|---|---|---|---|
| 1 | 54.97 | 56.97 | 57.00 |
| 2 | 52.33 | 54.33 | 54.25 |
| 3 | 49.40 | 51.40 | 51.50 |
| C1/C2 | 57.90 | 59.90 | 59.90 |
| C3/C4 | 57.31 | 59.31 | 59.40 |
| C5/C6 | 55.34 | 57.34 | 57.80 |
| C7 | 49.21 | 51.21 | 51.25 |
| C8/C9 | 47.45 | 49.45 | 49.75 |
| C10 | 46.76 | 48.76 | 49.00 |
| C11 | 45.88 | 47.88 | 48.00 |
| C12 | 44.88 | 46.88 | 47.00 |
| C13 | 46.14 | 48.14 | 48.50 |
| C14 | 45.00 | 47.00 | 47.25 |
| C15 | 44.02 | 46.02 | 46.50 |
| C16 | 46.37 | 48.37 | 48.50 |
| C17 | 43.58 | 45.58 | 47.25 |
| C18 | 43.19 | 45.19 | 46.50 |
| C19/C20 | 42.50 | 44.50 | 46.00 |
| C21/C22 | 45.25 | 47.25 | 47.25 |

TABLE 1: LF88 ELEV.

| MANHOLE OR CATCH BAIN # | RIM ELEVATION | INVERT ELEVATION |
|---|---|---|
| MH-1 | 50.05 | 35.78 |
| MH-2 | 50.50 | 38.68 |
| MH-3 | 49.09 | 40.02 |
| CB-3A | 49.00 | 40.15 |
| MH-4 | 50.00 | 40.91 |
| CB-4A | 47.98 | 41.54 |
| MH-5 | 54.61 | 44.94 |
| CB-5 | 54.31 | 45.26 |
| MH-6 | 48.00 | 36.10 |
| MH-7 | 47.94 | 36.42 |
| CB-7A | 44.30 | 37.61 |
| CB-8 | 47.49 | 38.31 |
| MH-8A | 45.18 | 39.27 |
| CB-8B | 45.00 | 39.37 |
| MH-9 | 51.11 | 40.11 |
| MH-10 | 49.55 | 40.66 |
| CB-11 | 48.30 | 41.12 |
| MH-12 | 56.74 | 43.28 |
| MH-13 | 55.55 | 44.48 |
| CB-13 | 55.43 | 44.89 |

PRELIMINARY I.E'S ARE BASED ON ASSUMED PIPE SLOPES OF 1.00% & 0.50%.

TABLE 2: CATCH BASIN & MANHOLE SCHEDULE

## KEYNOTES

1. CONSTRUCT 8" THICK RETAINING WALL. LENGTH PER PLAN.
2. TRASH ENCLOSURE PER DSPM 2-1.804 B.
3. JUNCTION BOX PER MAG STD DET 504

## PROPOSED LEGEND

- PROPERTY LINE
- WALL
- GRADE BREAK
- ADA PATH
- FUTURE PAD
- STORM LINE
- MANHOLE
- CATCH BASIN
- FLOW ARROW

Stormwater Review By:
Nerijus Baronas, P.E., CFM
Phone: 480-312-7072
Fax: 480-312-9187
e-mail: nbaronas@ScottsdaleAZ.gov
Review Cycle 3 Date 5-7-8

NORTH

SCALE: 1" = 50'

Call at least two full working days before you begin excavation. ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

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WWW.AZSEG.COM TEL. 480.588.7226


THE WOLFF COMPANY
Since 1949

PROJECT: WOLFF LEGACY SCOTTSDALE
LOCATION: 8890 E LEGACY BLVD. SCOTTSDALE, AZ 85255

| | |
|---|---|
| DRAWN | TAPIA |
| DESIGNED | TAPIA |
| CHECKED | COUNSELL |
| PROJ. MGR. | FAKIH |

DATE: 04/18/18
ISSUED FOR: REZONING & PLAN AMENDMENT

| REVISION NO.: | DATE: |
|---|---|
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| 2 | |
| 3 | |
| 4 | |

JOB NO.: 170726

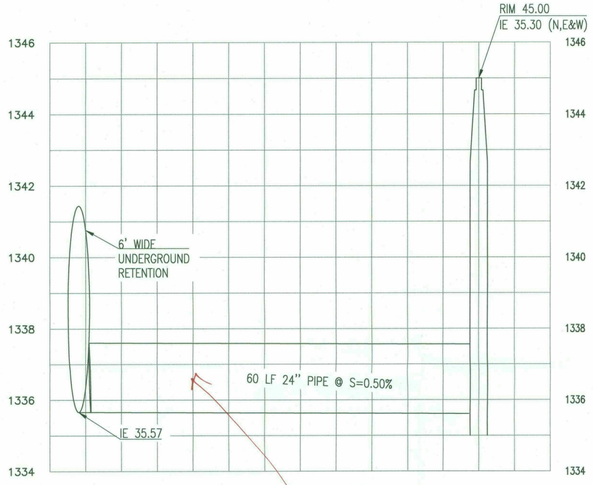
SHEET TITLE: PRELIMINARY GRADING AND DRAINAGE PLAN

SHEET NO.: C3.00

# WOLFF LEGACY SCOTTSDALE

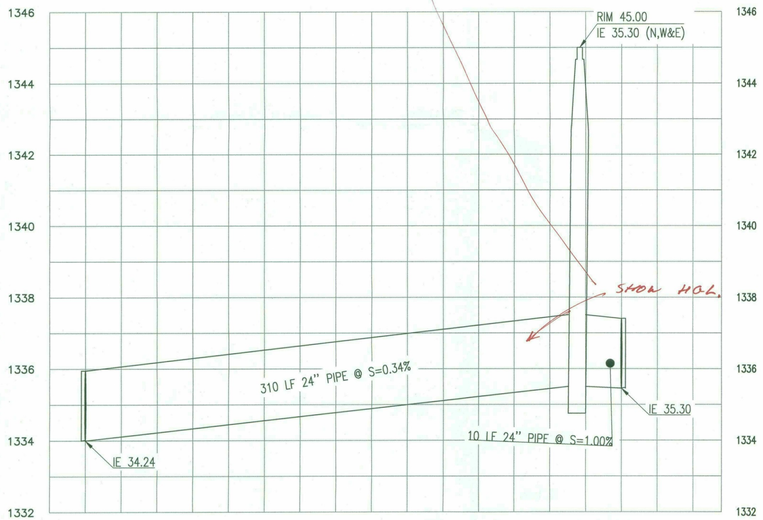
## ENLARGE VIEW & PROFILE

8890 E LEGACY BLVD SCOTTSDALE, AZ 85255



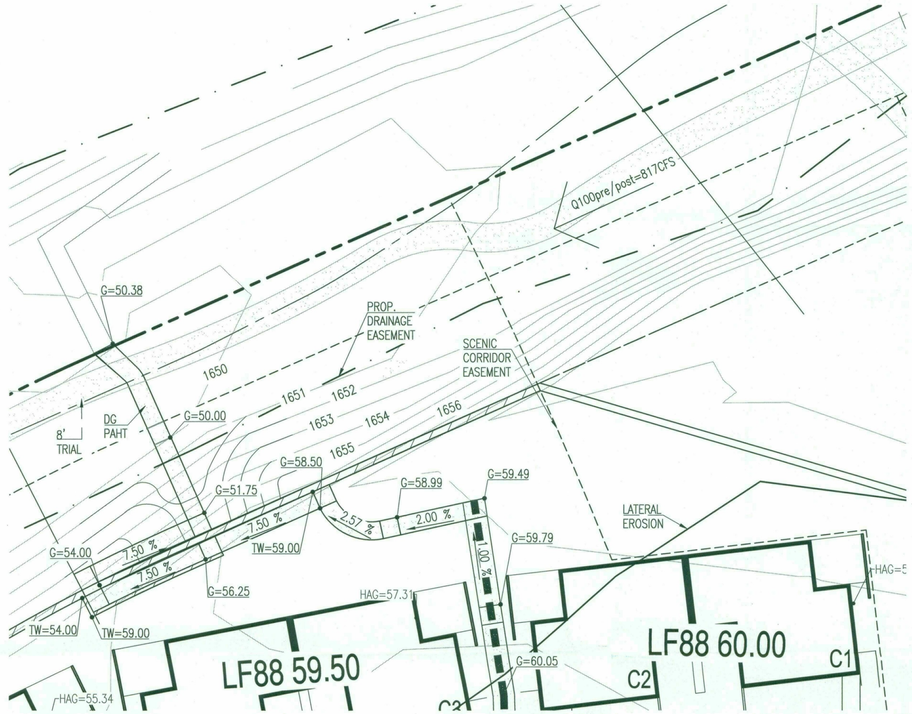

PROFILE A

SCALE: HORZ 1"=20'
VERT 1"=2'




PROFILE B

SCALE: HORZ 1"=20'
VERT 1"=2'




ENLARGED PLAN A

SCALE: HORZ 1"=20'

Stormwater Review By:
Nerijus Baronas, P.E., CFM
Phone: 480-312-7072
Fax: 480-312-7687
e-mail: nbaronas@ScottsdaleAZ.gov
Review Cycle 3 Date 5-7-18

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THE WOLFF COMPANY
Since 1949

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LOCATION: 8890 E LEGACY BLVD. SCOTTSDALE, AZ. 85255

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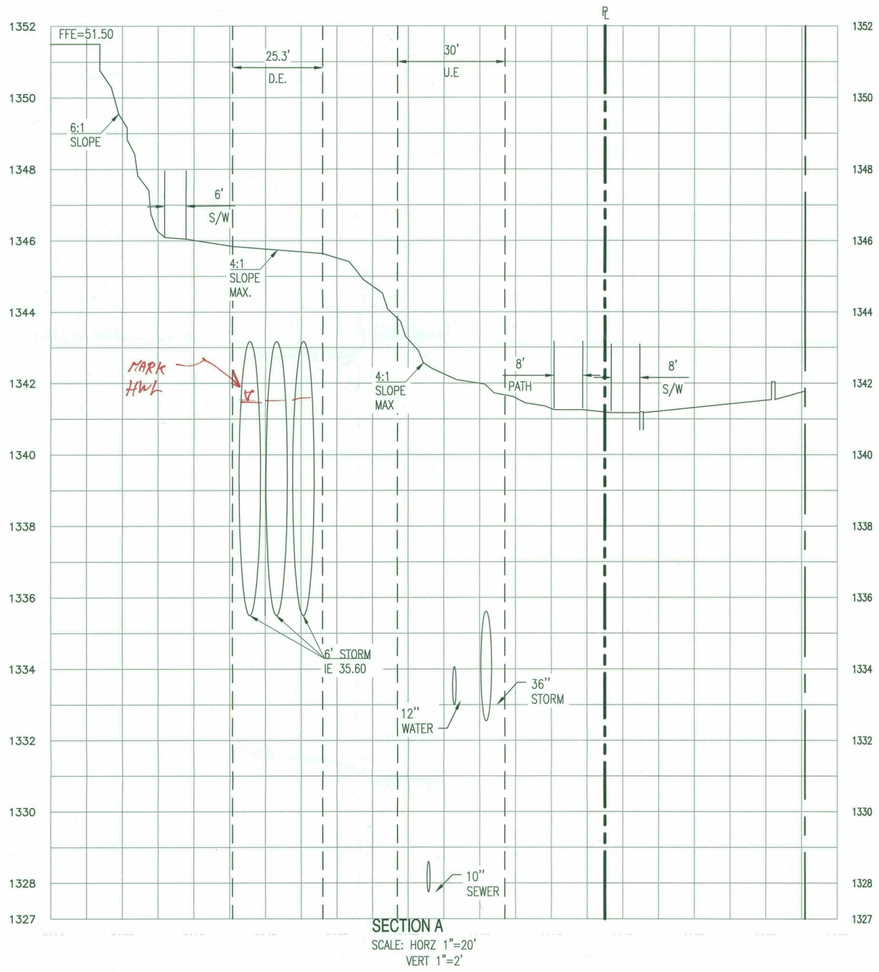
JOB NO.: 170726

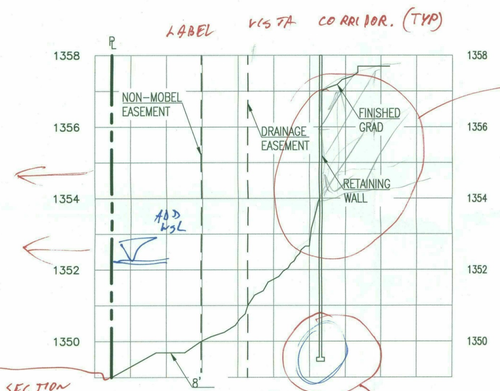
SHEET TITLE: ENLARGE VIEW & PROFILE

SHEET NO.: C3.10

# WOLFF LEGACY SCOTTSDALE
## CROSS-SECTION
8890 E LEGACY BLVD SCOTTSDALE, AZ 85255




SECTION A
SCALE: HORZ 1"=20'
VERT 1"=2'

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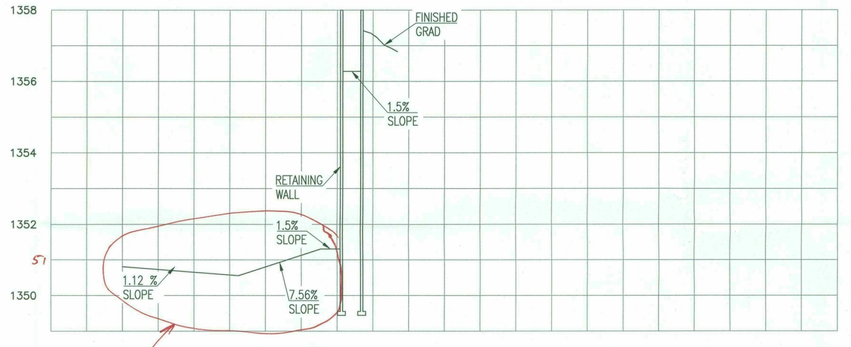
VERT 1"=2'




SECTION C
SCALE: HORZ 1"=20'
VERT 1"=2'


Stormwater Review By:
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e-mail: nbaronas@ScottsdaleAZ.gov
Review Cycle 3 Date 5-7-18





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WOLFF COMPANY
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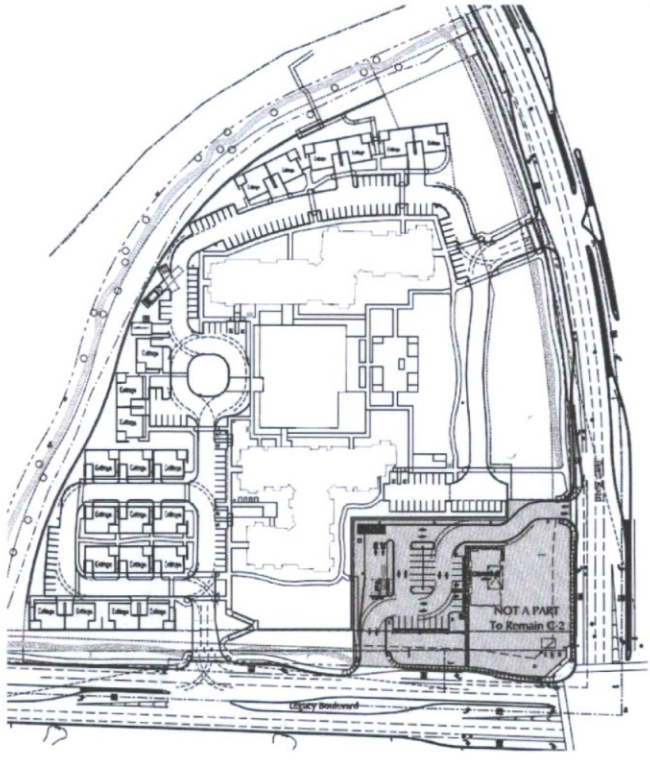
JOB NO.: 170726
SHEET TITLE: CROSS-SECTION
SHEET NO.: C3.20

# Wolff Legacy Scottsdale
# Parking Master Plan




**Prepared for:**

Mark Kaminski
The Wolff Company
6710 E. Camelback Road, Suite 100
Scottsdale, AZ 85251

**Prepared by:**

J2 Engineering and Environmental Design
4649 E. Cotton Gin Loop, Suite B2
Phoenix, AZ 84040


Project Number: 17.1059
April 19, 2018

23-ZN & 7-GP-2017
04/20/18

# Table of Contents:



## Figures:



## Tables:



## Appendices:

# 1. Executive Summary

J2 Engineering and Environmental Design (J2) has prepared a Parking Master Plan for the proposed Wolff Legacy Scottsdale development, consisting of 153 residential units and 22 cottage style residential units. Of the 153 apartments units, there will be 26 studio units, 82 one-bedroom units, and 45 two-bedroom units. Additionally, there will be a 15,000 square foot clubhouse located in the center of the proposed development. The proposed development will be located on the northwest corner of Pima Road and Legacy Boulevard, in Scottsdale, Arizona. See **Appendix A** for proposed site plan.

Through the approval of a parking master plan, Wolff Legacy Scottsdale is requesting approval to provide 175 parking stalls on site for the proposed development. Of the 175 parking stalls provided, 44 parking stalls will be provided for the 22 cottage style residential units, the remaining 131 parking stalls will be located on the surface throughout the development. To determine the parking demand for the proposed development, four (4) different parking demand calculation approaches were analyzed.

**Approach 1 – Scottsdale Code**
The City of Scottsdale parking requirement was calculated Table 9.103.A entitles Schedule of Parking Requirements within the City of Scottsdale Code of Ordinances, Article IX – Parking and Loading Requirements provides general parking requirements. See **Appendix B** for the print out of Article IX.

The proposed Wolff Legacy Scottsdale falls under the category of Residential Health Care Facilities – Minimal Care Facilities. There is not a specific parking category for independent senior living. According to Table 9.103.A of the City of Scottsdale Code of Ordinances requires the following parking stall accommodations:

- Residential Health Care Facilities:
  Minimal Care Facilities – 1.25 parking spaces for each dwelling unit

Independent senior living facilities are designed for those over a specific age and often attract part-time residents, retired residents, and widowed residents. The proposed Wolff Legacy Scottsdale development will be an age-restricted community requiring residences to be fifty-five and older. There will be an on-site central dining hall, and there is anticipated to be regular shuttle transportation services provided to residents.

**Using the City of Scottsdale Code of Ordinances Residential Health Care – Minimal Care Facilities category to calculate the number of parking stalls required for the proposed Wolff Legacy Scottsdale development results in 219 parking stalls.**

**Approach 2 – ITE Parking Generation**
The second approach utilized the parking demand rates provided in the national publication by ITE entitled *Parking Generation, 4th Edition*:

- Method 1:
  - Land Use 252 – Senior Adult Housing – Attached
- Method 2:
  - Land Use 253 – Congregate Care Facility

**The proposed Wolff Legacy Scottsdale development falls between Land Use 252- Senior Adult Housing Attached and Land Use 253 – Congregate Care Facility, therefore, based on the ITE Parking Generation calculations, the parking demand is anticipated to fall between 72 and 116 parking spaces, which results in a surplus between 59 and 103 parking stalls.**

**Approach 3 – Other Cities and Towns**
The third approach looked at the parking requirement for other nearby cities and towns, including the Town of Gilbert, City of Glendale, and City of Surprise. **The parking requirements for the Town of Gilbert, City of Glendale, and City of Surprise resulted in a parking surplus ranging between 87 and 116 parking stalls.**

**Approach 4 – The Wolff Company Parking Experience**
The Wolff Company has built a number of similar facilities in other states. Typically the parking provided ranges between 0.85 to 1.0 parking spaces per unit. The Wolff Company has found this ratio provides adequate parking and meets and exceeds the parking needs. **For this specific development, with 175 units, this would result in 149 to 175 parking spaces, and a potential surplus of 26 parking stalls.**

**Conclusion:**
Therefore, taking into consideration the parking calculations using the ITE Parking Generation, other cities and towns parking ordinances, as well as the parking data from similar sites built by The Wolff Company, the proposed 175 parking stalls should sufficiently accommodate the parking demand for the Wolff Legacy Scottsdale development.

## 2. Introduction

J2 Engineering and Environmental Design (J2) was retained by The Wolff Company to complete a Parking Master Plan for the proposed Wolff Legacy Scottsdale (8890 East Legacy Boulevard, Scottsdale, AZ, 85255) development, located on the northwest corner of Pima Road and Legacy Boulevard, in Scottsdale, Arizona. The Wolff Legacy Scottsdale will be a senior residential development. This center will be configured to allow coordination with resident's wellness/medical providers. Services provided by the Wellness Center will include, but not be limited to concierge medicine home health care, outcall physicians (physicals and annual checkups), outcall nurses (flu shots and vaccinations), podiatry, chiropractor, massage and physical therapy, speech and occupational therapy, hearing aid consultant, nutritionist, and mental health counselor. The proposed development is bound by Pima Road to the east, Legacy Boulevard to the south, 88$^{th}$ Street to the west, and a commercial development to the north. See **Figure 1** for a vicinity map.

The proposed development is anticipated to include 153 apartment units, and 22 cottages, for a total of 175 units. Of the 153 apartments units, there will be 26 studio units, 82 one-bedroom units, and 45 two-bedroom units. See **Table 1** below. Additionally, a 15,000 square foot clubhouse will be located in the center of the proposed development. The clubhouse will provide several amenities including, a multi-purpose room, theater, art space, kitchen, fitness center, casual dining, and formal dining. It is anticipated that the clubhouse will be primarily for residents with occasional use by guests of residents. See **Figure 2** and **Appendix A** for a site plan.

**Table 1 - Wolff Legacy Scottsdale Apartment Units**

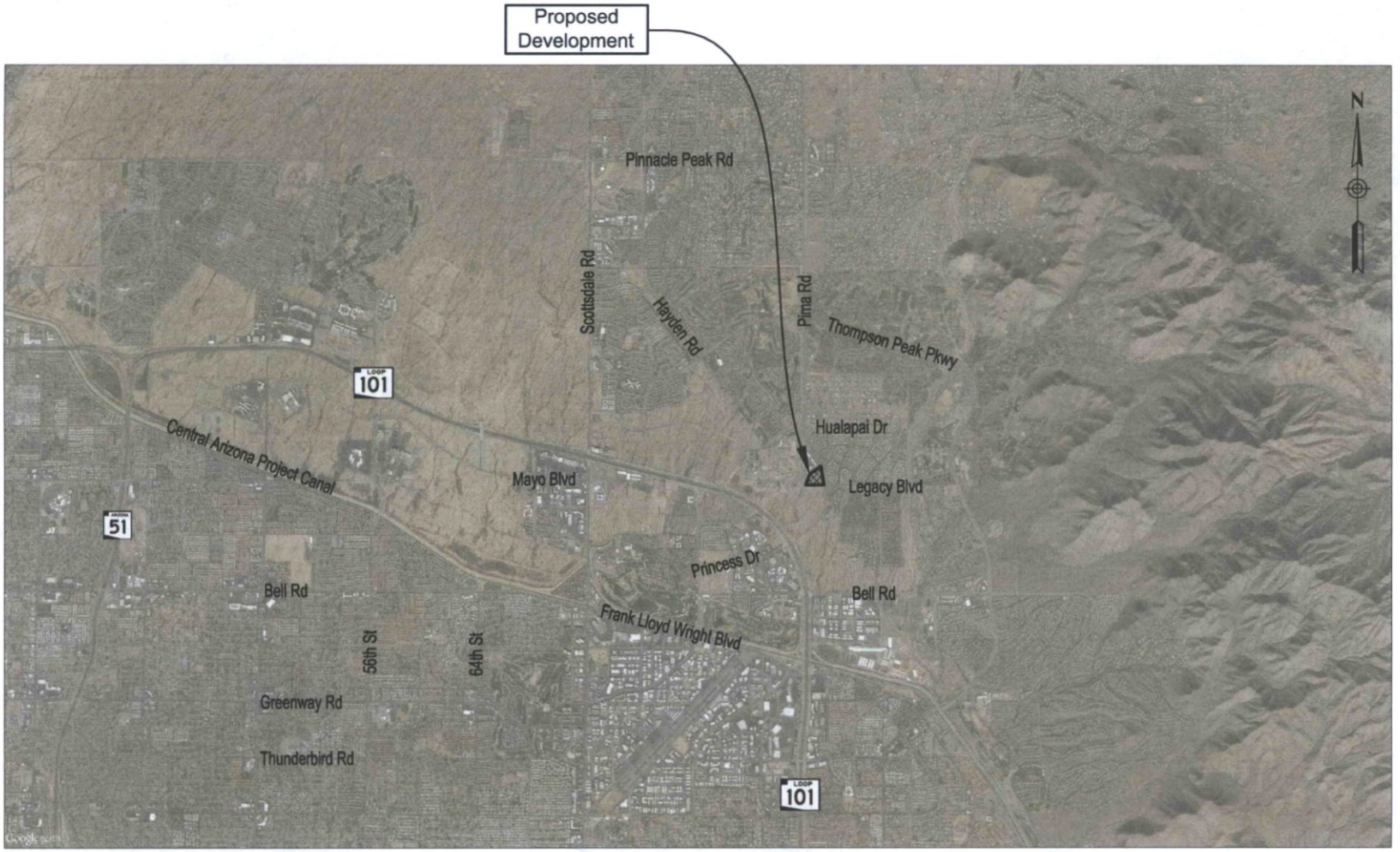
| Floor Plan Unit | Quantity | Number of Beds | Area (sq. ft.) |
|---|---|---|---|
| GS | 2 | 1 | 364 |
| S1 | 24 | 1 | 480 |
| A1 | 12 | 1 | 610 |
| A2 | 21 | 1 | 684 |
| A3 | 19 | 1 | 733 |
| A5 | 30 | 1 | 649 |
| B1 | 18 | 2 | 821 |
| B2 | 6 | 2 | 912 |
| B3 | 6 | 2 | 945 |
| B6 | 15 | 2 | 1134 |

**Scope of Study**

This Parking Master Plan calculates the number of parking spaces required for the proposed development based on the City of Scottsdale Code, ITE Parking Generation, as well as other nearby City and Town requirements. Ultimately, the objective of this Parking Master Plan is to analyze the appropriate number of parking spaces required to provide sufficient parking for the proposed Wolff Legacy Scottsdale development.

**Surrounding Area**

Located to the west, across 88th Street, is the Central Arizona Project water campus and undeveloped land. To the south, across Legacy Boulevard, is undeveloped land. To the east, across Pima Road, are the Cliffs at Ironwood Village residential community. To the immediate north of the proposed development is a commercial development consisting of a series of businesses including Pulse Fitness, Christ's Church of the Valley, Pure Flix Entertainment, and Matson Money.

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| | | | |
|---|---|---|---|
| PROJECT NO. | 171059 | DRAWN BY | GT |
| DATE | APR 2018 | CHECKED BY | JB |

Vicinity Map

Figure 1

## 3. Proposed Parking

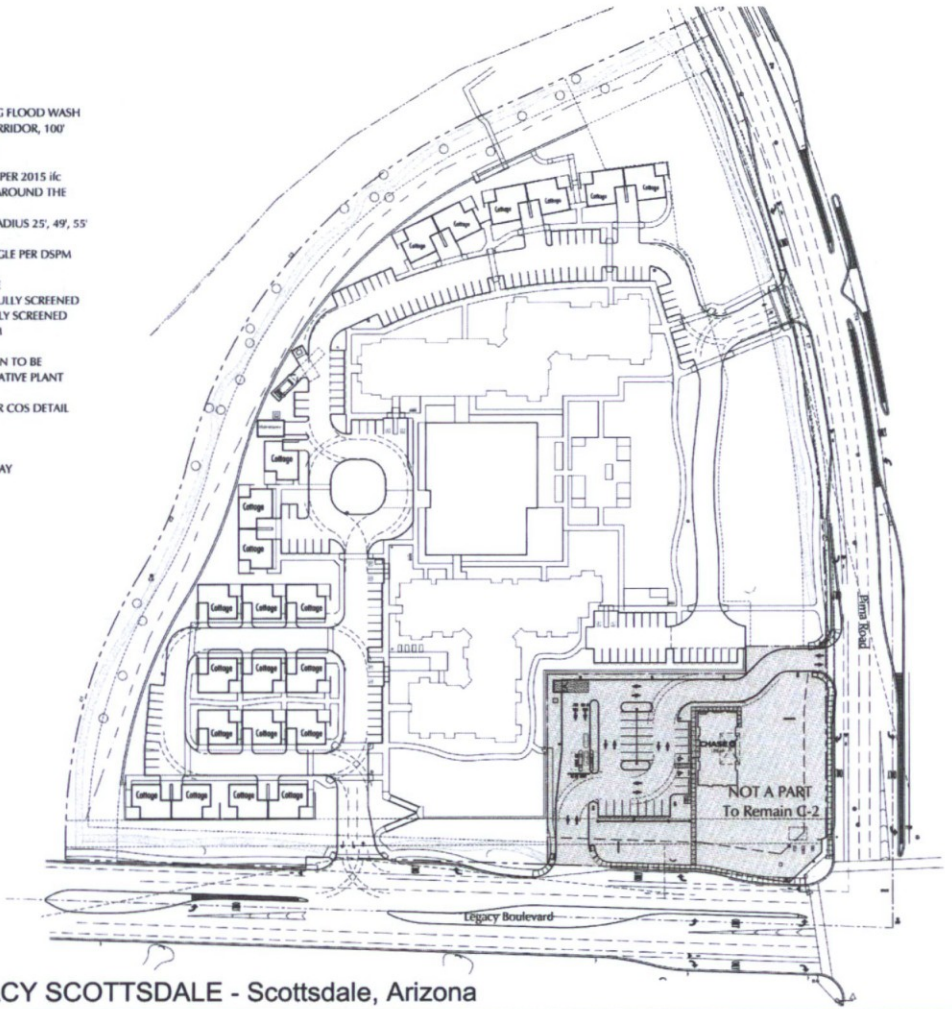
The proposed Wolff Legacy Scottsdale development will consist of 153 apartment units and 22 cottage style residential units, for a total of 175 units. Of the 153 apartments units, there will be 26 studio units, 82 one-bedroom units, and 45 two-bedroom units. Additionally, there will be a 15,000 square foot clubhouse located in the center of the proposed development. It is anticipated that the clubhouse will be primarily for residents with occasional use by guests of residents. The proposed site plan includes two (2) proposed access points for the proposed Wolff Legacy Scottsdale development. There will be a full access driveway, allowing all movements into and out of the proposed development, on Pima Road approximately 675 feet north of Legacy Boulevard. A second full access driveway, allowing all movements into and out of the proposed development, will be located along Legacy Boulevard approximately 600 feet west of Pima Road.

A total of 175 parking stalls will be provided. The 22 cottage style residential units will include a one car attached garage with an apron located in front of the garage allowing for an additional parking space. Therefore, the cottages provide a total of 44 parking spots. The remaining 131 parking stalls will be located throughout the proposed development.

See **Figure 2** for the proposed site plan.

## KEYNOTES

1. PROPERTY LINE
2. EASEMENT FOR EXISTING FLOOD WASH
3. PIMA ROAD SCENIC CORRIDOR, 100' AVERAGE/80' MINIMUM
4. CONCRETE SIDEWALK
5. FIRE HYDRANT, SPACED PER 2015 ifc 507.5.1.2, WITHIN 600' AROUND THE EXTERIOR PERIMETER
6. FIRE TRUCK TURNING RADIUS 25', 49', 55' BUCKET SWING
7. SIGHT DISTANCE TRIANGLE PER DSPM 5.3-26
8. BICYCLE PARKING SPACE
9. REFUSE COMPACTOR, FULLY SCREENED
10. REFUSE DUMPSTER, FULLY SCREENED
11. FIRE LANE, 24' MINIMUM
12. FIRE RISER ROOM
13. 8' TRAIL, FINAL LOCATION TO BE COORDINATED WITH NATIVE PLANT SURVEY
14. CH-2 SITE DRIVEWAY PER COS DETAIL #2257
15. 6' STABILIZED TRAIL
16. RETAINING WALL
17. DESERT SCENIC ROADWAY




## PROJECT DATA

| | | |
|---|---|---|
| Address | 8890 East Legacy Blvd<br>Scottsdale, Az. 85255 | |
| Site Area: | 12.08 acres net (526,291 nsf)<br>13.98 acres gross (608,909 gsf) | |
| APN | 215-07-238 | |
| Zoning Existing | C-2 ESL (HD) | |
| Zoning Proposed | C-O ESL (HD) | |
| Open Space Required | 126,310 sf (24%) | |
| Front Open Space | 63,155 sf (50% Open Space) | |
| Pima Minimum | 13,980 sf | |
| Pima Not required to exceed | 34,950 sf | |
| Legacy Minimum | 11,140 sf | |
| Legacy Not required to exceed | 27,850 sf | |
| Open Space Provided | 279,047 sf (53%) | |
| Front Open Space | 105,111 sf (83% of required OS) | |
| Pima Front Open Space | 81,237 sf | |
| Legacy Front Open Space | 23,874 sf | |
| Height Allowed | 48' | |
| Height Provided | 48' | |
| Density Allowed | 559 Units (40 / Gross Lot Area) | |
| Total Units: | 175 Units (includes cottages) | |
| Residential Area: | 139,127 sf gross | (153 units) |
| Cottage Area Total: | 30,250 sf gross | (22 units) |
| Clubhouse Area: | 16,871 sf gross | |
| Total Area: | 176,248 sf gross | |
| FAR Allowed per C-O | 425,500 gsf (.8) | |
| FAR Provided | 188,650 gsf (.35) | |
| Parking Required: | 231 spaces | |
| Residential: | 219 spaces (1.25 / unit) | |
| Commercial (2,800 sf): | 12 spaces (1 / 250sf) | |
| Bicycle Required | 24 | |
| Parking Provided: | 175 spaces | |
| Surface | 131 spaces (1 / unit) | |
| Cottage | 44 spaces | |
| Bicycle Provided | 24 spaces | |
| Accessible Spaces Required | 6 (per ADA 2010 208.2) | |
| Accessible Spaces Proposed | 8 | |

# WOLFF LEGACY SCOTTSDALE - Scottsdale, Arizona

SITE PLAN

Revised: 4/19/15 17165.000 - 1/30/18

DAVIS



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| | | | |
|---|---|---|---|
| PROJECT NO. | 171059 | DRAWN BY | GT |
| DATE | APR 2018 | CHECKED BY | JB |

Proposed Site Plan

Figure 2

## 4. City of Scottsdale Required Parking

The proposed Wolff Legacy Scottsdale development includes 153 apartment units and 22 cottage style residential units with a 15,000 square foot clubhouse.

Table 9.103.A entitled Schedule of Parking Requirements within the City of Scottsdale Code of Ordinances, Volume II (see **Appendix B** for the print out of Article IX) provides the general parking requirements.

The proposed Wolff Legacy Scottsdale falls under the category of Residential Health Care Facilities – Minimal Care Facilities. There is not a specific parking category for independent senior living. According to Table 9.103.A of the City of Scottsdale Code of Ordinances requires the following parking accommodations:

- Residential Health Care Facilities:
  Minimal Care Facilities – 1.25 parking spaces for each dwelling unit

Applying this formula to the proposed Wolff Legacy Scottsdale Development results in the following parking requirement, see **Table 2**:

**Table 2 - Scottsdale Parking Requirement**

| | Rate | | Quantity | Unit | Parking Stalls (175 proposed) |
|---|---|---|---|---|---|
| Minimal Care Facility | 1.25 | Per Dwelling Unit | 175 | Dwelling Units | 219 |

Independent senior living facilities are designed for those over a specific age and often attract part-time residents, retired residents, and widowed residents. The proposed Wolff Legacy Scottsdale development will be an age-restricted community requiring residences to be fifty-five and older. There will be an on-site central dining hall serving three meals a day, along with a bistro/pub area. Additionally, there will be regular shuttle transportation services provided to residents. Therefore, the above parking calculation as shown in **Table 2** likely exceeds the actual parking demand.

**Conclusion:**

*Using the City of Scottsdale Code of Ordinances Residential Health Care – Minimal Care Facilities category to calculate the number of parking stalls required for the proposed Wolff Legacy Scottsdale development results in 219 parking stalls. However, this parking likely exceeds the actual parking demand.*

# 5. ITE Parking Generation

The Institute of Transportation Engineers (ITE) publication titled *Parking Generation, 4th Edition* is utilized for estimating parking demand based on research and experiences of transportation engineering and planning professionals.

The proposed Wolff Legacy Scottsdale falls between two categories, Land Use (LU) 252 – Senior Adult Housing – Attached, and Land Use 253 – Congregate Care Facility. The proposed Wolff Legacy Scottsdale development will be providing centralized dining and transportation, which is similar to Land Use 253.

**METHOD 1**

Method 1 calculates the parking demand for the proposed development using Land Use 252 – Senior Adult Housing – Attached.

**Land Use 252 – Senior Adult Housing - Attached**

Senior adult housing consists of attached independent living developments, including retirement communities, age restricted housing and active adult communities. These developments may include limited social or recreational services. However, they generally lack centralized dining and on-site medical facilities. Residents in these communities live independently, are typically active (requiring little to no medical supervision) and may or may not be retired.

*The average peak period parking demand ratio is 0.59 vehicles per dwelling unit, with an 85th percentile demand ratio of 0.66 vehicles per dwelling unit.*

**Table 3 - ITE Parking Demand (Senior Adult Housing – Attached)**

| | Rate | | | Quantity | Unit | Parking Stalls (175 proposed) |
|---|---|---|---|---|---|---|
| Senior Adult Housing - Attached | Average | 0.59 | Per Dwelling Unit | 175 | Dwelling Units | 104 |
| | 85th Percentile | 0.66 | Per Dwelling Unit | 175 | Dwelling Units | 116 |

**METHOD 2**

Method 2 calculates the parking demand for the proposed development using Land Use 253 – Congregate Care Facility.

**Land Use 253 – Congregate Care Facility**

Congregate care facilities are independent living developments that provide centralized amenities such as dining, housekeeping, transportation and organized social/recreational activities. Limited medical services (such as nursing and dental) may or may not be provided. The resident may contract additional medical services or personal assistance.

*The data is limited on Congregate Care Facilities. Two suburban study sites provided a parking supply ratio of 0.5 spaces per dwelling unit, one site had a peak period parking demand ratio of 0.41 vehicles per dwelling unit, and the other site had a peak period parking demand ratio of 0.48 vehicles per dwelling unit.*

**Table 4 - ITE Parking Demand (Congregate Care Facility)**

| | Rate | | | Quantity | Unit | Parking Stalls (175 proposed) |
|---|---|---|---|---|---|---|
| Congregate Care Facility | Site 1 | 0.41 | Per Dwelling Unit | 175 | Dwelling Units | 72 |
| | Site 2 | 0.48 | Per Dwelling Unit | 175 | Dwelling Units | 84 |

**Conclusion:**

*Method 1*

*Calculated using Land Use 252 – Senior Adult Housing, the average peak period requires 104 parking stalls, and for the 85th percentile, a total of 116 parking stalls are required. This results in a parking stall surplus of 59 to 71 parking stalls.*

*Method 2*

*Calculated using Land Use 253 – Congregate Care Facility, for Site 1 the peak period requires 72 parking stalls, and for Site 2 the peak period requires 84 parking stalls. This results in a parking stall surplus of 91 to 103 parking stalls.*

*As previously discussed the proposed Wolff Legacy Scottsdale falls between the following categories Land Use 252- Senior Adult Housing Attached and Land Use 253 – Congregate Care Facility. Based on the above calculations, the parking demand is anticipated to fall between 72 and 116 parking spaces. This results in a parking surplus of 59 to 103 parking stalls.*

## 6. Other Cities and Towns Required Parking

The parking requirements for other nearby cities and towns were researched for comparison. See **Appendix C** for additional details. The following tables show the parking requirements based on the respective City or Town code.

**Table 5 - Town of Gilbert Parking Requirement**

| | Rate | | Quantity | Unit | Parking Stalls (175 proposed) |
|---|---|---|---|---|---|
| Congregate Living Facility | 0.5 | Per Dwelling Unit | 175 | Dwelling Units | 88 |
| | | | | Total | 88 |

**Table 6 - City of Glendale Parking Requirement**

| | Rate | | Quantity | Unit | Parking Stalls (175 proposed) |
|---|---|---|---|---|---|
| Retirement/Senor Housing/Convalescent/ Nursing/Congregate Care Home | 0.4 | Per Dwelling Unit | 175 | Dwelling Units | 70 |
| | | | | Total | 70 |

**Table 7 - City of Surprise Parking Requirement**

| | Rate | | Quantity | Unit | Parking Stalls (175 proposed) |
|---|---|---|---|---|---|
| Retirement Housing Services/ Congregate Living Services | 1 | Per 3 Dwelling Units | 175 | Dwelling Units | 59 |
| | | | | Total | 59 |

**Conclusion:**

*Of the three (3) nearby cities and towns that were researched for comparison, the parking requirement falls between 59 and 88 parking spaces. This results in a parking surplus of 87 to 116 parking stalls.*

## 7. Wolff Legacy Scottsdale Proposed Location and Operation

The proposed site is located within walking distance to DC Ranch Crossing, a large retail plaza located on the southeast corner of Pima Road and Legacy Boulevard. DC Ranch Crossing includes several retail shops, restaurants, salons, and fitness centers. There are continuous sidewalks along the east side of Scottsdale Road. With the build out of the proposed Wolff Legacy Scottsdale, sidewalks will be provided along Pima Road and Legacy Boulevard adjacent to the development. Bike lanes are currently provided along both sides of Pima Road and Legacy Boulevard.

Additionally, located approximately two (2) miles to the southeast is Gateway Trailhead providing access to the McDowell Sonoran Preserve. Gateway Trailhead provides its hikers with three (3) unique trails for all levels of hikers.

*On-Site Central Dining and Bistro*
There will be a central dining hall with a full kitchen and bistro/pub providing hot meals to all residents for breakfast, lunch, and dinner. There will be wait staff, kitchen staff, and bartenders.

*Transportation Services*
Wolff Legacy Scottsdale will operate a 15 passenger van 7 days a week from 8:00 am to 5:00 pm with a programmed schedule to take residents to grocery stores, shops, malls, theaters, museums, restaurants and to medical appointments. In addition to the scheduled daily trips, the van will be available to residents to schedule other group activities.

Wolff Legacy Scottsdale will also set up accounts with a car service to assist with facilitating individual or smaller group trips.

*Wolff Legacy Scottsdale Employees*
Wolff Legacy Scottsdale anticipates approximately 26 to 32 employees would be on site during peak times, which is typically between 8:00 am and 6:00 pm. The following are the approximate number of employees that will be on-site during these hours:

| | |
|---|---|
| Leasing Management | 4 employees |
| Kitchen | 11 employees, 18 during peak lunch and dinner times |
| Salon | 4 employees |
| Wellness | 2 employees |
| Fitness | 2 employees |
| Maintenance | 3 employees |
| TOTAL | 26 employees, 32 during peak lunch and dinner times |

*Experience with Similar Facilities*

The Wolff Company has built a number of similar facilities in other states. Typically, the parking provided ranges between 0.85 to 1.0 parking spaces per unit to support both residence and employee parking needs. The Wolff Company has found this ratio provides adequate parking and meets and exceeds the parking needs. For this specific development, with 175 units, this would result in 149 to 175 parking spaces. See **Appendix D** for parking data from other senior living facilities developed by the The Wolff Company.

**Table 8 - The Wolff Company Parking Experience**

| | Rate | | Quantity | Unit | Parking Stalls (175 proposed) |
|---|---|---|---|---|---|
| Similar Facilities | 0.85 | Per Dwelling Unit | 175 | Dwelling Units | 149 |
| | 1 | Per Dwelling Unit | 175 | Dwelling Units | 175 |

*Transportation for Older Americans*

According to the Federal Interagency Forum on Aging Related Statistic's publication *2016 Older Americans Key Indicators of Well-Being,* 19% of drivers 65 and older have given up driving altogether. See **Appendix E**. Additionally, 25% have trouble getting places, and 34% have reduced their travel because of health or physical problems. Based on these statistics, it is reasonable to assume that residents of this age restricted development would likely lean toward utilizing transportation services provided by Wolff Legacy Scottsdale with less reliance on a personal vehicle.

**Conclusion:**

*The pedestrian and bicycle facilities adjacent and nearby, on-site central dining services, regular transportation provided to residents, prior experience with similar sites, and proposed operation, all contribute to reducing parking demand, encourages trip reduction, and improves traffic circulation, operation, and safety. However, all parking calculations did not include any reductions or credits. Therefore, providing a total of 175 parking spaces exceeds the parking needs for the proposed Wolff Legacy Scottsdale development.*

## 8. Recommendations & Conclusions

The proposed Wolff Legacy Scottsdale will be located on the northwest corner of Pima Road and Legacy Boulevard in Scottsdale, Arizona. Wolff Legacy Scottsdale is an independent living residential development for seniors. The proposed development is anticipated to include 153 apartment units, and 22 cottages, for a total of 175 units. Of the 153 apartments units, there will be 26 studio units, 82 one-bedroom units, and 45 two-bedroom units. Additionally, a 15,000 square foot clubhouse will be located in the center of the proposed development. The clubhouse will provide several amenities including, a multi-purpose room, theater, art space, kitchen, fitness center, casual dining, and formal dining. It is anticipated that the clubhouse will be primarily for residents with occasional use by guests of residents.

A total of 175 parking stalls will be provided. The 22 cottage style residential units will include a one car attached garage with an apron located in front of the garage allowing for an additional parking space. Therefore, the cottages provide a total of 44 parking spots. The remaining 131 parking stalls will be located throughout the proposed development.

*City of Scottsdale Code of Ordinances*
The proposed Wolff Legacy Scottsdale development parking requirement based on the City of Scottsdale Code of Ordinances results in a total of 219 parking stalls.

*ITE Parking Generation*
Utilizing the ITE publication titled *Parking Generation, 4th Edition* the peak period parking demand was calculated for Land Use 252 - Senior Adult Housing – Attached, as well as Land Use 253 - Congregate Care Facility.

The proposed Wolff Legacy Scottsdale falls between Land Use 252- Senior Adult Housing Attached and Land Use 253 – Congregate Care Facility, therefore, based on the ITE Parking Generation calculations, the parking demand is anticipated to fall between 72 and 116 parking spaces, which results in a surplus between 59 and 103 parking stalls.

*Other Cities and Towns Required Parking*
The parking requirements for other nearby cities and towns were analyzed, including the Town of Gilbert, City of Glendale and City of Surprise which resulted in a 59 to 88 parking spaces required, which results in a surplus between 87 and 116 parking stalls.

*The Wolff Company Parking Experience*
Considering the on-site dining services, regular transportation provided to residents, prior experience with similar sites, and proposed operation, providing between 149 to 175 parking spaces exceeds the parking needs of the proposed Wolff Legacy Scottsdale development, with a potential surplus of 26 parking stalls.

A summary of the parking calculations are shown in **Table 9**.

**Table 9 - Parking Calculations Summary**

| | Reference Table | Parking Requirement/Demand (175 Proposed) | Requirement/Demand vs. Proposed |
|---|---|---|---|
| **Approach 1 - City of Scottsdale Code** | | | |
| City of Scottsdale Code | 1 | 219 | 44 Deficiency |
| **Approach 2 - ITE Parking Generation** | | | |
| Senior Adult Housing - Attached (Average) | 2 | 104 | 71 Surplus |
| Senior Adult Housing - Attached (85th Percentile) | 2 | 116 | 59 Surplus |
| Congregate Care Facility (Site 1) | 3 | 72 | 103 Surplus |
| Congregate Care Facility (Site 2) | 3 | 84 | 91 Surplus |
| **Approach 3 - Other Cities and Towns** | | | |
| Town of Gilbert | 4 | 88 | 87 Surplus |
| City of Glendale | 5 | 70 | 105 Surplus |
| City of Surprise | 6 | 59 | 116 Surplus |
| **Approach 4 - The Wolff Company Parking Experience** | | | |
| Minimum Parking Experience Rate | 7 | 149 | 26 Surplus |
| Maximum Parking Experience Rate | 7 | 175 | Sufficient |

The proposed Wolff Legacy Scottsdale development will be an age-restricted community requiring residents to be fifty-five and older. There will be an on-site central dining hall with a full kitchen as well as daily transportation shuttle services provided to all residents. There are pedestrian and bicycle facilities adjacent and nearby, including existing and proposed sidewalks along Pima Road and Legacy Boulevard, along with bike lanes on both roadways.

The pedestrian and bicycle facilities adjacent and nearby, on-site central dining services, regular transportation provided to residents, prior experience with similar sites, and proposed operation, all contribute to reducing parking demand, encourages trip reduction, and improves traffic circulation, operation, and safety. However, all parking calculations did not include any reductions or credits.

Therefore, taking into consideration the parking calculations using the ITE Parking Generation, other cities and towns parking ordinances, as well as the parking data from similar sites built by The Wolff Company, the proposed 175 parking stalls should sufficiently accommodate the parking demand for the Wolff Legacy Scottsdale development.

## Appendix A - Proposed Site Plan

## KEYNOTES

1. PROPERTY LINE
2. EASEMENT FOR EXISTING FLOOD WASH
3. PIMA ROAD SCENIC CORRIDOR, 100' AVERAGE/80' MINIMUM
4. CONCRETE SIDEWALK
5. FIRE HYDRANT, SPACED PER 2015 ifc 507.5.1.2, WITHIN 600' AROUND THE EXTERIOR PERIMETER
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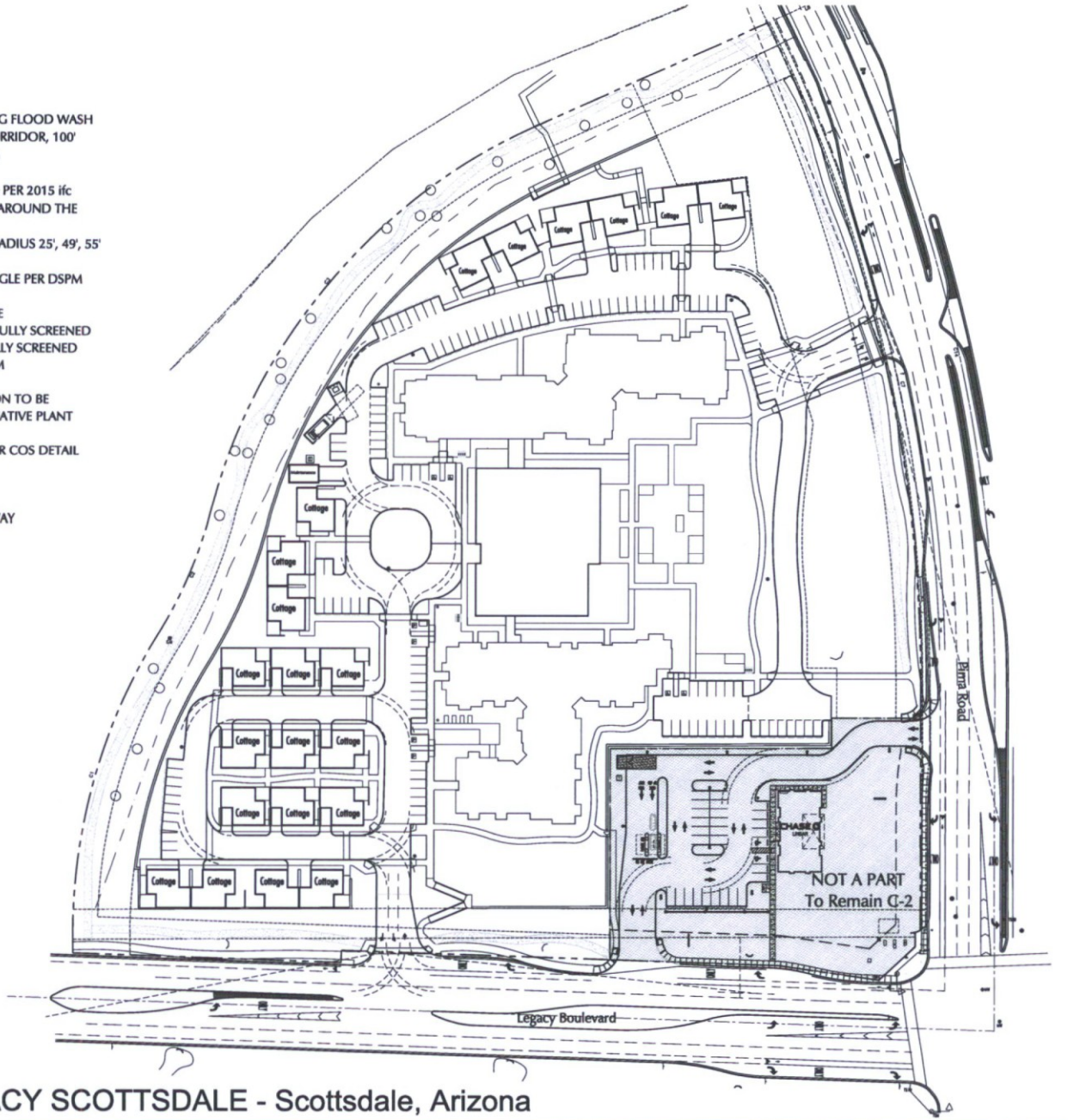
17. DESERT SCENIC ROADWAY




## PROJECT DATA

| | | |
|---|---|---|
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| Site Area: | 12.08 acres net (526,291 nsf)<br>13.98 acres gross (608,909 gsf) | |
| APN | 215-07-238 | |
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| Zoning Proposed | C-O ESL (HD) | |
| Open Space Required | 126,310 sf (24%) | |
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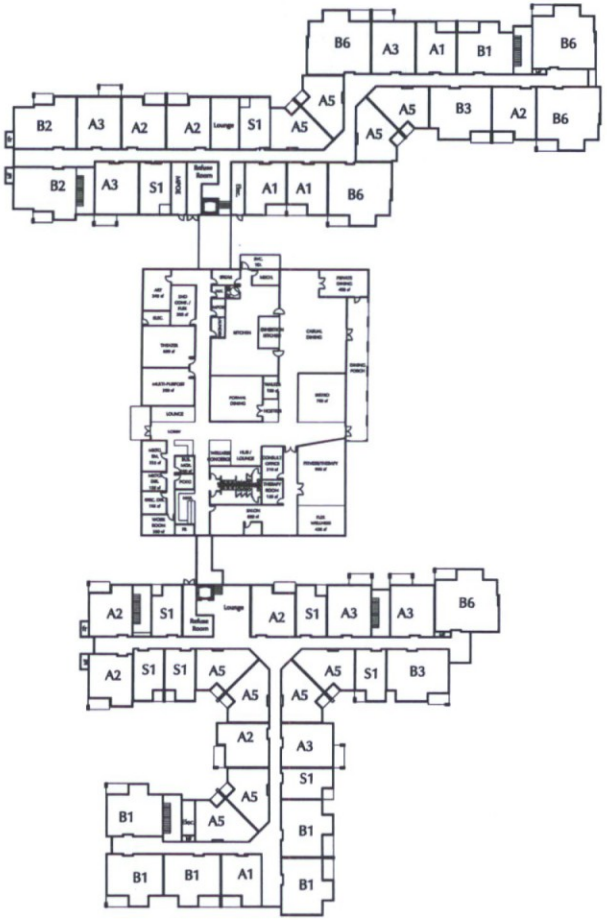
| Height Provided | 48' | |
| Density Allowed | 559 Units (40 / Gross Lot Area) | |
| Total Units: | 175 Units (includes cottages) | |
| Residential Area: | 139,127 sf gross | (153 units) |
| Cottage Area Total: | 30,250 sf gross | (22 units) |
| Clubhouse Area: | 16,871 sf gross | |
| Total Area: | 176,248 sf gross | |
| FAR Allowed per C-O | 425,500 gsf (.8) | |
| FAR Provided | 188,650 gsf (.35) | |
| Parking Required: | 231 spaces | |
| Residential: | 219 spaces (1.25 / unit) | |
| Commercial (2,800 sf): | 12 spaces (1 / 250sf) | |
| Bicycle Required | 24 | |
| Parking Provided: | 175 spaces | |
| Surface | 131 spaces (1 / unit) | |
| Cottage | 44 spaces | |
| Bicycle Provided | 24 spaces | |
| Accessible Spaces Required | 6 (per ADA 2010 208.2) | |
| Accessible Spaces Proposed | 8 | |

# WOLFF LEGACY SCOTTSDALE - Scottsdale, Arizona

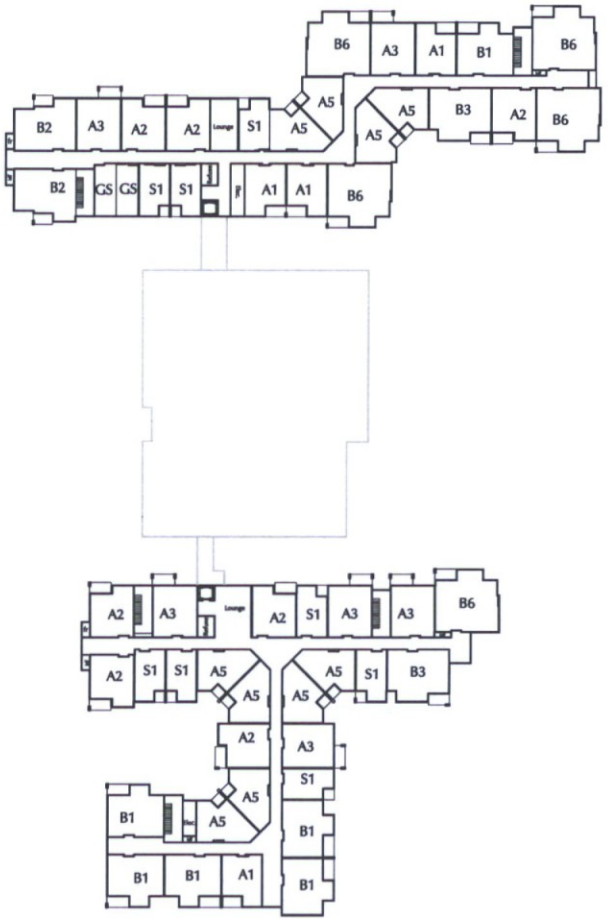
SITE PLAN

Revised: 4/19/15 17165.000 - 1/30/18

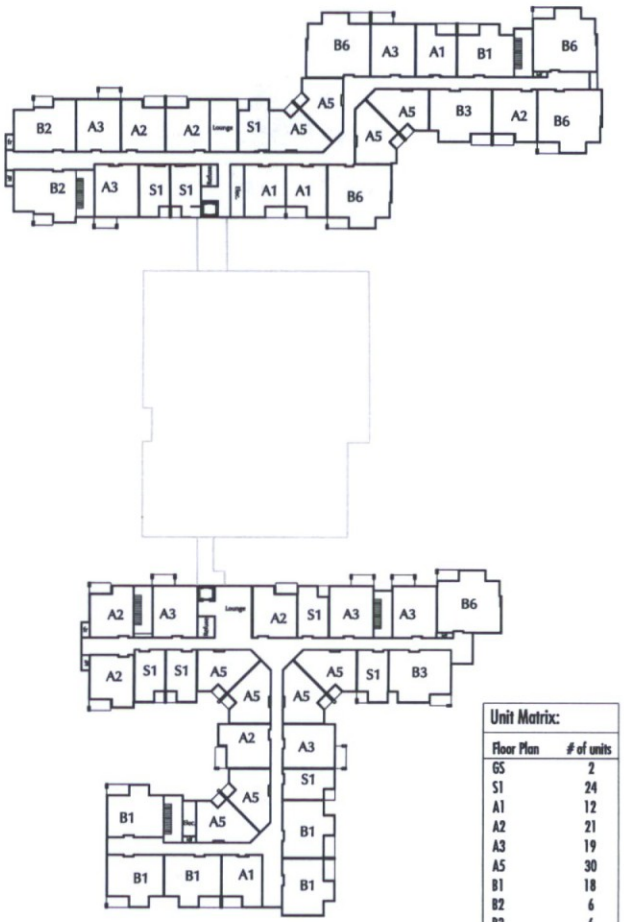
DAVIS



FIRST FLOOR PLAN
50 Units



SECOND FLOOR PLAN
52 Units



THIRD FLOOR PLAN
51 Units

**Unit Matrix:**

| Floor Plan | # of units |
|---|---|
| GS | 2 |
| S1 | 24 |
| A1 | 12 |
| A2 | 21 |
| A3 | 19 |
| A5 | 30 |
| B1 | 18 |
| B2 | 6 |
| B3 | 6 |
| B6 | 15 |
| Subtotal | 153 |
| Cottages | 22 |
| Total | 175 |

OVERALL FLOOR PLANS

Scale: 1"= 32'-0"
17165.000 - 4/23/2018

DAVIS

# WOLFF LEGACY SCOTTSDALE - Scottsdale, Arizona

## Appendix B - Scottsdale, Code of Ordinances Article

## ARTICLE IX. - PARKING AND LOADING REQUIREMENTS

### Sec. 9.100. - Parking.

### Sec. 9.101. - Purpose and scope.

The purpose of preparing and adopting the parking regulations within this Zoning Ordinance is to implement the goals of the City of Scottsdale as they are set forth by the city's General Plan and further refined here. These regulations are to provide adequate parking within the community without sacrificing urban design which enhances the aesthetic environment, encourage the use of various modes of transportation other than the private vehicle and provides a generally pleasant environment within the community. Several purposes are identified herein to achieve the above stated purpose.

The purposes of the parking ordinances of the City of Scottsdale are to:

1. Provide parking facilities which serve the goal of a comprehensive circulation system throughout the community;
2. Provide parking, city-wide that will improve pedestrian circulation, reduce traffic congestion, and improve the character and functionality of all developments;
3. Promote the free flow of traffic in the streets;
4. Encourage the use of bicycles and other alternative transportation modes;
5. Design and situate parking facilities so as to ensure their usefulness;
6. Provide an adequate number of on-site bicycle parking facilities, each with a level of security, convenience, safety, access, and durability;
7. Provide for adequate parking at transfer centers and selected transit stops in order to encourage the use of mass transit;
8. Ensure the appropriate development of parking areas throughout the city; and
9. Mitigate potential adverse impacts upon land uses adjacent to parking facilities.

(Ord. No. 2736, § 1, 3-7-95; Ord. No. 3896, § 1(Exh. § 6), 6-8-10; Ord. No. 3980, § 1(Res. 8895, § 1, Exh. A, § 44), 12-6-11; Ord. No. 4143, § 1(Res. No. 9678, Exh. A, § 244), 5-6-14)

**Editor's note—** Ord. No. 2736, § 1, adopted Mar. 7, 1995, did not specifically repeal §§ 9.100—9.104, which pertained to off-street parking; hence, §§ 9.100—9.108 adopted in said ordinance have been treated as superseding former §§ 9.100—9.104.

### Sec. 9.102. - Applications of and exemptions from parking.

A. *Additions and change of occupancy.* The standards for providing on-site parking shall apply at the time of the erection of any main building or when on-site parking is established. These standards shall also be complied with when an existing building is altered or enlarged by the addition of dwelling units or guest rooms or where the use is intensified by a change of occupancy or by the addition of floor area, seating capacity, or seats.

B. *Required parking must be maintained.* Required on-site parking spaces shall be maintained so long as the main building or use remains.

C. *Nonconforming parking.* Where vehicle parking space is provided and maintained in connection with a main building or use at the time this ordinance became effective and is insufficient to meet the requirements for the use with which it is associated, or where no such parking has been provided, then said building or structure may be enlarged or extended only if vehicle parking spaces are provided for said enlargement, extension or addition, to the standards set forth in the district regulations. No existing parking may be counted as meeting this requirement unless it exceeds the requirements for the original building and then only that excess portion may be counted.

Any commercial property which provides sufficient parking spaces to supply at least fifty (50) percent of the requirement for the property and which is destroyed by fire, hurricane, flood, or other act of God, may be restored to its original use and building outline, provided the floor area is not increased, without conforming to the parking requirements of this ordinance.

D. *Building permits.* No building permit shall be issued until parking requirements have been satisfied. Off-street parking required by this Zoning Ordinance shall not be located within the right-of-way of a street or alley.

E. *Counting flexible units.* Whenever a residential building is designed so that it can be used for separate apartments or guest rooms under the City of Scottsdale Building Code, the vehicle parking requirements shall be based upon the highest possible number of dwelling units or guest rooms obtainable from any such arrangement.

F. *Application to multiple tenant developments.* Where there is a combination of uses, the minimum required number of on-site parking spaces shall be the sum of the requirements of the individual uses, unless otherwise considered a mixed use development, mixed use commercial center, or as provided per Section 9.104.E. and F. If, in the opinion of the Zoning Administrator, the uses would not be operated simultaneously, the number of vehicle parking spaces shall be determined by the use with the highest parking demand.

G. *Free parking in the Downtown Area.* Required parking for developments within the Downtown Area shall be provided at no cost to the patrons, employees, residents, or their guests of the development. If the required parking of a development, which the required parking is on the same site as the development, is only available through the use of a valet services, the valet service shall be provided at no cost to the user.

H. *Prohibited uses of parking areas.*

1. Parking of more than 5 vehicles on any unimproved lot is prohibited, except when used for special events parking. An improved lot shall mean 1 that fulfills the requirements of Section 9.103.
2. Parking or display of vehicles other than in designated and improved areas shall be prohibited.
3. Required parking spaces shall not be used for product display or advertising.

(Ord. No. 2736, § 1, 3-7-95; Ord. No. 3896, § 1(Exh. § 6), 6-8-10; Ord. No. 3920, § 1(Exh. § 103), 11-9-10; Ord. No. 3980, § 1(Res. 8895, § 1, Exh. A, § 45), 12-6-11; Ord. No. 4117, § 1(Res. No. 9563, Exh. A, § 95), 11-19-13; Ord. No. 4143, § 1(Res. No. 9678, Exh. A, § 245), 5-6-14; Ord. No. 4265, § 1, 6-21-16)

Sec. 9.103. - Parking requirements.

A. *General requirement.* Except as provided in Sections 9.103.B, 9.104, 9.107, and 9.108, and subsections therein, each use of land shall provide the number of parking spaces indicated for that use in Table 9.103.A. and Section 9.105.

B. *Requirement in the Downtown Area.* Except as provided in Sections 9.104, 9.107, and 9.108, and subsections therein each use of land in the Downtown Area shall provide the number of parking spaces indicated for that use in Table 9.103.b. and Section 9.105. Those uses that are not specifically listed in Table 9.103.B. shall provide the number of parking spaces indicated for that use in Table 9.103.A.

C. *Required bicycle parking.* Every principal and accessory use of land which is required to provide at least forty (40) vehicular parking spaces shall be required to provide bicycle parking spaces at a rate of one (1) bicycle parking space per every ten (10) required vehicular parking spaces; and after July 9, 2010, new development shall provide, at a minimum, two (2) bicycle parking spaces. No use shall be required to provide more than one hundred (100) bicycle parking spaces.

1. Subject to the approval of the Zoning Administrator, in the Downtown Area, bicycle parking spaces may be provided within a common location that is obvious and convenient for the bicyclist, does not encroach into adjacent pedestrian pathways or landscape areas, and the location shall be open to view for natural surveillance by pedestrians. Such common bicycle parking areas shall be subject to the approval of the Zoning Administrator.

D. *Bicycle parking facilities design.* Required bicycle parking facilities shall, at a minimum, provide a stationary object to which the bicyclist can lock the bicycle frame and both wheels with a user provided U-shaped lock or cable and lock. The stationary object shall generally conform to the Design Standards & Policies Manual. The Zoning Administrator may approve alternative designs. Bicycle lockers and other high security bicycle parking facilities, if provided, may be granted parking credits pursuant to Section 9.104.C., Credit for bicycle parking facilities.

E. *Calculating required parking for transportation facilities.* Required parking for park and ride lots and major transfer centers shall be determined by the Zoning Administrator. Subject to the Design Standards & Policies Manual and the following criteria:

1. Goals of the City with regard to transit ridership along the route on which the transportation facility is located.

2. Distance from other transportation facilities with parking.

F. *Fractions shall be rounded.*

1. When any calculation for the required parking results in a fraction of a parking space, the fraction shall be rounded up to the next greater whole number.
2. When any calculation for the provided parking results in a fraction of a parking space, the fraction shall be rounded down to the next greater whole number.
3. When any calculation of a Parking P-3 District credit, improvement district credit, or in-lieu parking credit results in a fraction of a credit, the fraction shall not be rounded.

G. *Interpreting requirements for analogous uses.* The Zoning Administrator shall determine the number of spaces required for analogous uses. In making this determination, the Zoning Administrator shall consider the following:

1. The number of parking spaces required for a use listed in Table 9.103.A., or Table 9.103.B., that is similar to the proposed use;
2. An appropriate variable by which to calculate parking for the proposed use; for example, building square footage or number of employees;
3. Parking data from the same use on a different site or from a similar use on a similar site;
4. Parking data from professional publications such as those published by the Institute of Transportation Engineers (ITE) or the Urban Land Institute (ULI);

H. *Additional requirements for company vehicles.* When parking spaces are used for the storage of vehicles or equipment used for delivery, service and repair, or other such use, such parking spaces shall be provided in addition to those otherwise required by this Zoning Ordinance. Before a building permit is issued the number of spaces to be used for vehicle storage shall be shown on the plans. Unless additional spaces are provided in excess of the required number of spaces, no vehicles in addition to that number shall be stored on the site.

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| Table 9.103.A. Schedule of Parking Requirements | |
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| Amusement parks | Three (3) spaces per hole for any miniature golf course, plus one (1) space per three thousand (3,000) square feet of outdoor active recreation space, plus any additional spaces required for ancillary uses such as but not limited to game centers and pool halls. |

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| Arts festivals, seasonal | A. One (1) space for each two hundred (200) square feet of indoor public floor area, other than public restaurant space.<br>B. Restaurant at seasonal arts festivals shall be provided parking in accordance with table 9.103.a. |
| Banks/financial institutions | One (1) space per two hundred fifty (250) square feet gross floor area. |
| Bars, cocktail lounges, taverns, afterhours or micro-brewery/distillery with live entertainment | A. One (1) space per sixty (60) square feet of gross floor area; and<br>B. One (1) space per two hundred (200) gross square feet of outdoor patio area, excluding the first two hundred (200) gross square feet. |
| Bars, cocktail lounges, taverns, afterhours or micro-brewery/distillery | A. One (1) space per eighty (80) square feet of gross floor area; and<br>B. One (1) space per two hundred (200) gross square feet of outdoor patio area, excluding the first two hundred (200) gross square feet. |
| Boardinghouses, lodging houses, and other such uses | One (1) parking space for each one (1) guest room or dwelling unit. |
| Bowling alleys | Four (4) parking spaces for each lane, plus two (2) parking spaces for any pool table, plus one (1) parking space for every five (5) audience seats. |

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| Carwash | Four (4) spaces per bay or stall plus one (1) space per employee plus ten (10) stacking spaces. |
| Churches and places of worship | A. With fixed seating. One (1) space per four (4) seats in main sanctuary, or auditorium, and c below; or<br>B. Without fixed seating. One (1) space for each thirty (30) square feet of gross floor area in main sanctuary and c below.<br>C. One (1) space per each three hundred (300) square feet gross floor area of classrooms and other meeting areas. |
| Club/lodge, civic and social organizations | One (1) space per two hundred fifty (250) square feet gross floor area. |
| College/university | One (1) space per two (2) employees plus one (1) space per four (4) students, based on projected maximum enrollment. |
| Community or recreation buildings | One (1) parking space for each two hundred (200) square feet of gross floor area. |
| Conference and meeting facilities, or similar facilities | A. One (1) parking space for every five (5) seats, if seats are fixed, and/or<br>B. One (1) parking space for fifty (50) square feet of gross floor area of conference/meeting area. |
| Cultural institutions and museums | One (1) space per three hundred (300) square feet gross floor area. |

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| Dance halls, skating rinks, and similar indoor recreational uses | One (1) parking space for each three hundred (300) square feet of gross floor area in the building. |
| Dance/music/and professional schools | One (1) space per two hundred (200) square feet of gross floor area classroom area. |
| Day care center | One (1) parking space for each employee; plus one (1) space for every fifteen (15) students, plus one (1) space for each company vehicle as per Section 9.103.H., additional requirements for company vehicles. |
| Dry cleaners | One (1) space per two hundred fifty (250) square feet gross floor area. |
| Dwellings, multiple-family | Parking spaces per dwelling unit at the rate of:<br>efficiency units 1.25<br>one-bedroom 1.3<br>two-bedrooms 1.7<br>three (3) or more bedrooms 1.9 |
| Dwellings, single- and two-family and townhouses | Two (2) spaces per unit. |
| Elementary schools | One (1) parking space for each classroom plus one (1) parking space for each two hundred (200) square feet of gross floor area in office areas. |

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| Funeral homes and funeral services | A. One (1) parking space for every two (2) permanent seats provided in the main auditorium; and<br>B. One (1) parking space for every thirty (30) square feet of gross floor area public assembly area. |
| Furniture, home improvement, and appliance stores | A. Uses up to fifteen thousand (15,000) square feet of gross floor area. One (1)space per five hundred (500) square feet gross floor area; or<br>B. Uses over fifteen thousand (15,000) square feet of gross floor area. One (1) space per five hundred (500) square feet for the first fifteen thousand (15,000) square feet of gross floor area, and one (1) space per eight hundred (800) square feet area over the first fifteen thousand (15,000) square feet of gross floor area |
| Galleries | One (1) space per five hundred (500) square feet of gross floor area. |
| Game centers | One (1) space per one hundred (100) square feet gross floor area. |
| Gas station | Three (3) spaces per service bay and one (1) space per 250 square feet of accessory retail sales gross floor area. Each service bay counts for one (1) of the required parking spaces. |

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| Golf course | One (1) parking space for each two hundred (200) square feet of gross floor area in any main building plus one (1) space for every two (2) practice tees in the driving range, plus four (4) parking spaces for each green in the playing area. |
| Grocery or supermarket | One (1) space per three hundred (300) square feet gross floor area. |
| Health or fitness studio, and indoor recreational uses | A. Building area less than, or equal to, 3,000 square feet of gross floor area: one space per 250 square feet of gross floor area.<br>B. Building area greater than 3,000 square feet of gross floor area, and less than 10,000 square feet of gross floor area: one space per 150 square feet of gross floor area.<br>C. Building areas equal to, or greater than, 10,000 square feet of gross floor area, and less than 20,000 square feet of gross floor area: one space per 200 square feet of gross floor area.<br>D. Building areas equal to, or greater than, 20,000 square feet of gross floor area: one space per 250 square feet of gross floor area. |
| High schools | One (1) parking space for each employee plus one (1) space for every six (6) students, based on projected maximum enrollment. |
| Hospitals | One and one half (1.5) parking spaces for each one (1) bed. |

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| Internalized community storage | One (1) parking space for each two thousand five hundred (2,500) square feet of gross floor area. |
| Library | One (1) space per three hundred (300) square feet gross floor area. |
| Live entertainment (not including bars, restaurants, and performing arts theaters) | A. With fixed seating. One (1) parking space for two and one-half (2.5) seats.<br>B. Without fixed seating. One (1) parking space for every sixty (60) square feet of gross floor area of an establishment that does not contain fixed seating. |
| Manufactured home park | One and one-half parking spaces per manufactured home space. |
| Manufacturing and industrial uses | One (1) parking space for each five hundred (500) square feet of gross floor area. |
| Mixed-use commercial centers<br>In mixed-use commercial centers with less than 20,000 square feet of gross floor area, land uses (with parking requirements of one space per 250 square feet or fewer spaces) shall occupy at least 60 percent of gross floor area. | One (1) space per three hundred (300) square feet of gross floor area. |

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| Mixed-use developments | A. One (1) space per three hundred twenty-five (325) square feet of gross floor area of nonresidential area;<br>B. Multiple-family residential uses shall be parked at the ratios of the dwellings, multiple-family in other districts requirements, herein. |
| Office, all other | One (1) space per three hundred (300) square feet gross floor area. |
| Offices (government, medical/dental and clinics) | One (1) space per two hundred fifty (250) square feet of gross floor area. |
| Parks | Three (3) parking spaces for each acre of park area. |
| Personal care services | One (1) space per two hundred fifty (250) square feet gross floor area. |
| Plant nurseries, building materials yards, equipment rental or sales yards and similar uses | One (1) parking space for each three hundred (300) square feet gross site area of sales and display area. |
| Pool hall | Two (2) spaces per pool table. |
| Postal station(s) | One (1) parking space for each two hundred (200) square feet of gross floor area. |
| Radio/TV/studio | One (1) space per five hundred (500) square feet gross floor area, plus one (1) space per company vehicle, as per Section 9.103.H., additional requirements for company vehicles. |

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| Ranches | One (1) space per every two (2) horse stalls. |
| Residential health care facilities | A. Specialized care facilities—0.7 parking space for each bed.<br>B. Minimal care facilities—1.25 parking spaces for each dwelling unit. |
| Restaurants with live entertainment | A. When live entertainment limited to the hours that a full menu is available, and the area of live entertainment is less than fifteen (15) percent of the gross floor area, one (1) parking space per one hundred twenty (120) square feet of gross floor area; and<br>B. One (1) parking space for each three hundred fifty (350) gross square feet of outdoor public floor area, excluding the first three hundred fifty (350) gross square feet of outdoor patio area, unless the space is located next to and oriented toward a publicly owned walkway or street, in which case the first five hundred (500) gross square feet of outdoor patio area is excluded.<br>C. When live entertainment is not limited to the hours that a full menu is available, and/or the area of live entertainment is less than fifteen (15) percent of the gross floor area, one (1) parking space per sixty (60) square feet of gross floor area, plus patio requirements above. |

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| Restaurants | A. One (1) parking space per one hundred twenty (120) square feet of gross floor area; and<br>B. One (1) parking space for each three hundred fifty (350) gross square feet of outdoor patio area, excluding the first three hundred fifty (350) gross square feet of outdoor patio area, unless the space is located next to and oriented toward a publicly owned walkway or street, in which case the first five hundred (500) square gross feet of outdoor patio area is excluded. |
| Retail | One (1) space per two hundred fifty (250) square feet of gross floor area. |
| Retail, in a PCoC zoning district without arterial street frontage | One (1) space per three hundred (300) square feet gross floor area. |
| Stables, commercial | Adequate parking for daily activities shall be provided as determined by the Zoning Administrator. |
| Swimming pool or natatorium | One (1) space per one thousand (1,000) square feet gross floor area. |
| Tennis clubs | One (1) parking space per each two hundred (200) square feet of gross floor area, excluding court area, plus three (3) parking spaces per each court. The property owner shall provide additional parking spaces as necessary for tournaments, shows or special events. |

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| Theaters, cinemas, auditoriums, gymnasiums and similar places of public assembly in PNC, PCC, PCP, PRC, or PUD zoning districts | One (1) space per ten (10) seats. |
| Theaters, cinemas, auditoriums, gymnasiums and similar places of public assembly in other districts | One (1) parking space per four (4) seats. |
| Trailhead - gateway | Five hundred (500) to six hundred (600) spaces, including those for tour buses and horse trailers. |
| Trailhead - local | None required. |
| Trailhead - major community | Two hundred (200) to three hundred (300) spaces, including those for horse trailers. |
| Trailhead - minor community | Fifty (50) to one hundred (100) spaces. |
| Transportation facilities | Required parking shall be determined by the Zoning Administrator per Section 9.103.E., Calculating required parking for transportation facilities. |
| Transportation uses | Parking spaces required shall be determined by the Zoning Administrator. |
| Travel accommodations | One (1.25) parking spaces for each one (1) guest room or dwelling unit. |

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| Travel accommodations with conference and meeting facilities, or similar facilities | The travel accommodation requirements above.<br>A. Travel accommodations with auxiliary commercial uses (free standing buildings) requirements above.<br>B. One (1) parking space for every five (5) seats, if seats are fixed, and/or<br>C. One (1) parking space for fifty (50) square feet of gross floor area of conference/meeting area. |
| Travel accommodations, with auxiliary commercial uses (free standing buildings) | A. The travel accommodation requirements above.<br>B. Bar, cocktail lounge, tavern, after hours, restaurants, and live entertainment uses shall provide parking in accordance uses parking requirements herein this table.<br>C. All other free standing commercial uses. One (1) parking space for every four hundred (400) square feet of gross floor area. |
| Vehicle leasing, rental, or sales (parking plans submitted for vehicle sales shall illustrate the parking spaces allocated for each of A, B, and C.) | A. One employee parking space per 200 square feet of gross floor area,<br>B. One employee parking space per 20 outdoor vehicular display spaces, and<br>C. One patron parking space per 20 outdoor vehicular display spaces. |
| Veterinary services | One (1) space per three hundred (300) square feet gross floor area. |

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| Warehouses, mini | One (1) space per three hundred (300) square feet of gross floor area of administrative office space, plus one (1) space per each fifty (50) storage spaces. |
| Warehousing, wholesaling establishments, or separate storage buildings. | One (1) parking space for each eight hundred (800) square feet of gross floor area. |
| Western theme park | Total of all spaces required for the various uses of the theme park, may apply for a reduction in required parking per Section 9.104, Programs and incentives to reduce parking requirements. |

| Table 9.103.B. Schedule of Parking Requirements in the Downtown Area | |
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| Bars, cocktail lounges, taverns, afterhours or micro-brewery/distillery with live entertainment | A. One (1) space per eighty (80) square feet of gross floor area; and<br>B. One (1) space per two hundred (200) gross square feet of outdoor patio area, excluding the first two hundred (200) gross square feet. |
| Bars, cocktail lounges, taverns, afterhours or micro-brewery/distillery | A. One (1) space per one-hundred twenty (120) square feet of gross floor area; and<br>B. One (1) space per two hundred (200) gross square feet of outdoor patio area, excluding the first two hundred (200) gross square feet. |

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| Dwellings, multi-family | A. One parking space per dwelling unit for units with one bedroom or less.<br>B. Two parking spaces per dwelling unit, for units with more than one bedroom. |
| Financial intuitions | A. In a Type 1 area, one (1) space per five hundred (500) square feet of gross floor area; or<br>B. In a Type 2 area, all other lot widths, one (1) space per three hundred (300) square feet of gross floor area. |
| Fitness studio (no larger than 3,000 gross square feet) | A. One (1) space per three hundred (300) square feet of gross floor area.<br>B. A fitness studio larger than 3,000 gross square feet shall comply with Table 9.103.a. |
| Galleries | One (1) space per three hundred (500) square feet of gross floor area. |
| Live entertainment (not including bars, restaurants, and performing arts theaters) | A. With fixed seating. One (1) parking space for two and one-half (2.5) seats.<br>B. Without fixed seating. One (1) parking space for every eighty (80) square feet of gross floor area of an establishment that does not contain fixed seating. |
| Medical and diagnostic laboratories | One (1) space per three hundred (300) square feet of gross floor area. |

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| Mixed-use commercial centers<br>In mixed-use commercial centers with less than 20,000 square feet of gross floor area, land uses (with parking requirements of one space per 300 square feet or fewer spaces) shall occupy at least 60 percent of gross floor area. | One (1) space per three hundred fifty (350) square feet of gross floor area. |
| Mixed-use developments | A. One space per 350 square feet of gross floor area of nonresidential area; plus<br>B. Parking spaces required for multiple-family dwellings as shown in this table, except as provided in Section 9.104.H.3.d. |
| Office, including government and medical/dental offices and clinics | A. In a Type 1 area, one (1) space per five hundred (500) square feet of gross floor area; or<br>B. In a Type 2 area, all other lot widths, one (1) space per three hundred (300) square feet of gross floor area. |
| Performing arts theaters | One (1) parking space per ten (10) seats. |

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| Restaurants that serve breakfast and/or lunch only, or the primary business is desserts, bakeries, and/or coffee/tea or non-alcoholic beverage | A. One (1) parking space for each four hundred (400) square feet of gross floor area; and<br>B. One (1) space for each three hundred fifty (350) gross square feet of outdoor public floor area. Excluding the first three hundred fifty (350) gross square feet of outdoor public floor area, unless the space is located next to and oriented toward a publicly owned walkway or street, in which case the first five hundred (500) gross square feet of outdoor public floor area is excluded. |
| Restaurants, including restaurants with a micro-brewery/distillery as an accessory use. | A. One (1) parking space per three hundred (300) square feet of gross floor area; and<br>B. One (1) parking space for each three hundred fifty (350) gross square feet of outdoor patio area. Excluding the first three hundred fifty (350) gross square feet of outdoor patio area, unless the space is located next to and oriented toward a publicly owned walkway or street, in which case the first five hundred (500) gross square feet of outdoor public floor area is excluded. |

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| Restaurants, including restaurants with a micro-brewery/distillery as an accessory use, and with live entertainment | A. When live entertainment limited to the hours that a full menu is available, and the area of live entertainment is less than fifteen (15) percent of the gross floor area, one (1) parking space per three hundred (300) square feet of gross floor area; and<br>B. One (1) parking space for each three hundred fifty (350) gross square feet of outdoor public floor area. Excluding the first three hundred fifty (350) gross square feet of outdoor patio, unless the space is located next to and oriented toward a publicly owned walkway or street, in which case the first five hundred (500) gross square feet of outdoor patio area is excluded.<br>C. When live entertainment is not limited to the hours that a full menu is available, and/or the area of live entertainment is greater than fifteen (15) percent of the gross floor area, one (1) parking space per one hundred twenty (120) square feet of gross floor area, plus patio requirements above at all times. |
| Retail, personal care services, dry cleaners, and tattoo parlors | A. In a Type 1 area, one (1) space per five hundred (500) square feet of gross floor area; or<br>B. In a Type 2 area, all other lot widths, one (1) space per three hundred (300) square feet of gross floor area. |

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| Work/live | A. The required parking shall be based on the area of commercial uses, per Table 9.103.B and when applicable, Table 9.103.A.<br>B. In addition to the parking requirement for the commercial area, parking shall be provide in accordance with the dwellings, multi-family and co-housing parking requirement for developments containing more than one (1) dwelling unit, excluding the first unit (except as provided in Section 9.104.H.3.d). |
| All other uses | As specified Table 9.103.A. |

Note: 1. Type 1 and Type 2 Areas are locations of the Downtown Area described by the Downtown Plan.

(Ord. No. 2736, § 1, 3-7-95; Ord. No. 3048, § 2, 10-7-97; Ord. No. 3225, § 1, 5-4-99; Ord. No. 3879, § 1(Exh. § 26), 3-2-10; Ord. No. 3896, § 1(Exh. § 6), 6-8-10; Ord. No. 3899, § 1(Res. No. 8342, Exh. A, §§ 18, 19), 8-30-10; Ord. No. 3920, § 1(Exh. §§ 104—109), 11-9-10; Ord. No. 3926, § 1(Exh. § 13), 2-15-11; Ord. No. 3980, § 1(Res. 8895, § 1, Exh. A, § 46), 12-6-11; Ord. No. 3992, § 1(Res. No. 8922, Exh. A, § 17), 1-24-12; Ord. No. 4099, § 1(Res. No. 9439, Exh. A, §§ 17—23), 6-18-13; Ord. No. 4117, § 1(Res. No. 9563, Exh. A, §§ 96—98), 11-19-13; Ord. No. 4143, § 1(Res. No. 9678, Exh. A, §§ 246—249), 5-6-14; Ord. No. 4265, § 1, 6-21-16)

Sec. 9.104. - Programs and incentives to reduce parking requirements.

The following programs and incentives are provided to permit reduced parking requirements in the locations and situations outlined herein where the basic parking requirements of this Zoning Ordinance would be excessive or detrimental to goals and policies of the city relating to mass transit and other alternative modes of transportation.

A. *Administration of parking reductions.* Programs and incentives which reduce parking requirements may be applied individually or jointly to properties and developments. Where reductions are allowed, the number of required parking spaces which are eliminated shall be accounted for both

in total and by the program, incentive or credit which is applied. The record of such reductions shall be kept on the site plan within the project review file. Additionally, the reductions and manner in which they were applied shall be transmitted in writing to the property owner.

B. *Credit for on-street parking.* Wherever on-street angle parking is provided in the improvement of a street, credit toward on-site parking requirements shall be granted at the rate of one (1) on-site space per every twenty-five (25) feet of frontage, excluding the following:

1. Frontage on an arterial, major arterial or expressway as designated in the Transportation Master Plan.
2. Frontage on a street that is planned to be less than fifty-five (55) feet wide curb-to-curb.
3. Frontage within twenty (20) feet of a corner.
4. Frontage within ten (10) feet of each side of a driveway or alley.
5. Frontage within a fire hydrant zone or other emergency access zone.
6. Locations within the Downtown Area.

C. *Credit for bicycle parking facilities.*

1. *Purpose.* The City of Scottsdale, in keeping with the federal and Maricopa County Clean Air Acts, wishes to encourage the use of alternative transportation modes such as the bicycle instead of the private vehicle. Reducing the number of vehicular parking spaces in favor of bicycle parking spaces helps to attain the standards of the Clean Air Act, to reduce impervious surfaces, and to save on land and development costs.
2. *Performance standards.* The Zoning Administrator may authorize credit towards on-site parking requirements for all uses except residential uses, for the provision of bicycle facilities beyond those required by this Zoning Ordinance, subject to the following guidelines:
   a. Wherever bicycle parking is provided beyond the amount required per Section 9.103.C., required bicycle parking, credit toward required on-site vehicular parking may be granted pursuant to the following:
      i. Downtown Area: one (1) vehicular space per eight (8) bicycle spaces.
      ii. All other zoning districts: one (1) vehicular space per ten (10) bicycle spaces.
   b. Wherever bicycle parking facilities exceed the minimum security level required per Section 9.103.D., required bicycle parking, credit towards required onsite vehicular parking may be granted at a rate of one (1) vehicular space per every four (4) high-security bicycle spaces. High-security bicycle spaces shall include those which protect against the theft of the entire bicycle and of its components and accessories by enclosure through the use of bicycle lockers, check-in facilities, monitored parking areas, or other means which provide the above level of security as approved by the Zoning Administrator.
   c.

Wherever shower and changing facilities for bicyclists are provided, credit towards required on-site vehicular parking may be granted at the rate of two (2) vehicular spaces per one (1) shower.

d. The number of vehicular spaces required Table 9.103.A., or when applicable Table 9.103.B., shall not be reduced by more than five (5) percent or ten (10) spaces, whichever is less.

D. *Credit for participation in a joint parking improvement project.* After April 7, 1995, no new joint parking improvement projects shall be designated in the City of Scottsdale. Existing joint parking improvement projects may continue to exist, subject to the standards under which they were established.

The joint parking improvement project was a program through which a group of property owners with mixed land uses including an area of more than three (3) blocks and at least six (6) separate ownerships could join together on a voluntary basis to form a parking improvement district, providing parking spaces equal to a minimum of thirty (30) percent of their combined requirements according to the ordinance under which they were established. Each participant property could have received credit for one and one-half (1½) times his proportioned share of the parking spaces provided. The project required that a statement be filed with the superintendent of buildings stating the number of spaces assigned to each participating property. No adjustments were to be permitted subsequent to the filing of this statement.

E. *Mixed-use shared parking programs.*

1. Purpose. A mixed-use shared parking program is an option to reduce the total required parking in large mixed-use commercial centers and mixed-use developments in which the uses operate at different times throughout the day. The city recognizes that strict application of the required parking ratios may result in excessive parking spaces. This results in excessive pavement and impermeable surfaces and discourages the use of alternate transportation modes.
2. Applicability. A mixed-use shared parking program is an alternative to a parking master plan.
3. Procedure.
   a. A mixed-use shared parking program may be proposed at the time a parking plan is required.
   b. The mixed-use shared parking program may also be requested exclusive of any other site plan review or permitting procedure.
   c. Mixed-use shared parking plans shall be reviewed by, and are subject to the approval of, the Zoning Administrator.
   d. Alternatively, the applicant may elect to have the shared parking plan reviewed by, and subject to the approval of, the City Council in a public hearing.
   e. For changes of use in mixed-use projects, the parking necessary for the new mix of uses shall not exceed the parking required by the previous mix of uses.
4. Limitations on mixed-use shared parking.

a. The total number parking spaces required by Table 9.103.B. and the total number of parking spaces required for a mixed-use commercial center and mixed-use development indicated in Table 9.103.A. shall not be used to reduce the required parking in the Downtown Area or a development that is defined as mixed-use development or mixed- use commercial center not in the Downtown Area.

b. The total number of parking spaces required by Table 9.103.A. shall not be reduced by more than twenty (20) percent.

5. Performance standards. The Zoning Administrator may authorize a reduction in the total number of required parking spaces for two (2) or more uses jointly providing on-site parking subject to the following criteria:

a. The respective hours of operation of the uses do not overlap, as demonstrated by the application on Table 9.104.A., Schedule of Shared Parking Calculations. If one (1) or all of the land uses proposing to use joint parking facilities do not conform to one (1) of the general land use classifications in Table 9.104.A., Schedule of Shared Parking Calculations, data shall indicate there is not substantial conflict in the principal operating hours of the uses. Such data may include information from a professional publication such as those published by the Institute of Transportation Engineers (ITE) or the Urban Land Institute (ULI), or by a professionally prepared parking study.

b. A parking plan shall be submitted for approval which shall show the layout of proposed parking.

c. The property owners involved in the joint use of on-site parking facilities shall submit a written agreement subject to City approval requiring that the parking spaces shall be maintained as long as the uses requiring parking exist or unless the required parking is provided elsewhere in accordance with the provisions of this Article. Such written agreement shall be recorded by the property owner with the Maricopa County Recorder's Office prior to the issuance of a building permit, and a copy filed in the project review file.

**Table 9.104.A Schedule of Shared Parking Calculations**

| General Land Use Classification | Weekdays | | | Weekends | | |
|---|---|---|---|---|---|---|
| | 12:00 a.m.— 7:00 a.m. | 7:00 a.m.— 6:00 p.m. | 6:00 p.m.— 12:00 a.m. | 12:00 a.m.— 7:00 a.m. | 7:00 a.m.— 6:00 p.m. | 6:00 p.m.— 12:00 a.m. |
| Office and industrial | 5% | 100% | 5% | 0% | 60% | 10% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Retail | 0% | 100% | 80% | 0% | 100% | 60% |
| Residential | 100% | 55% | 85% | 100% | 65% | 75% |
| Restaurant and bars | 50% | 70% | 100% | 45% | 70% | 100% |
| Hotel | 100% | 65% | 90% | 100% | 65% | 80% |
| Churches and places of worship | 0% | 10% | 30% | 0% | 100% | 30% |
| Cinema/theater, and live entertainment | 0% | 70% | 100% | 5% | 70% | 100% |

*How to use the schedule of shared parking.* Calculate the number of parking spaces required by Table 9.103.A. for each use as if that use were free-standing (the total number of parking spaces required by Table 9.103.B. and the total number of parking spaces required for a mixed-use commercial center and mixed-use development indicated in Table 9.103.A. shall not be used to reduce the required parking in the Downtown Area, or a development that is defined as mixed-use development or mixed-use commercial center not in Downtown Area.)

Applying the applicable general land use category to each proposed use, use the percentages to calculate the number of spaces required for each time period, (six (6) time periods per use). Add the number of spaces required for all applicable land uses to obtain a total parking requirement for each time period. Select the time period with the highest total parking requirement and use that total as your shared parking requirement.

F. *Parking master plan.*

1. *Purpose.* A parking master plan is presented as an option to promote the safe and efficient design of parking facilities for sites larger than two (2) acres or those sites in the Downtown Type 1 Area as designated by the Downtown Plan larger than sixty thousand (60,000) square feet. The city recognizes that strict application of the required parking standards or ratios may result in the provision of parking facilities of excessive size or numbers of parking spaces. This

results in excessive pavement and impermeable surfaces and may discourage the use of alternate transportation modes. A parking master plan provides more efficient parking through the following requirements.

2. *Applicability.* The parking master plan is appropriate to alleviate problems of reuse and is also applicable as an alternative to the above mixed-use shared parking programs.
3. *Procedure.*
   a. A parking master plan may be proposed at the time a parking plan is required.
   b. The parking master plan may also be requested exclusive of any other site plan review or permitting procedure.
   c. Parking master plans shall be reviewed by, and are subject to the approval of, the Zoning Administrator.
   d. For changes of use in mixed-use projects, the parking necessary for the new mix of uses shall not exceed the parking required by the previous mix of uses.
4. Limitations on parking master plans.
   a. The total number parking spaces required by Table 9.103.B. and the total number of parking spaces required for a mixed-use commercial center and mixed-use development indicated in Table 9.103.A. shall not be used to reduce the required parking in the Downtown Area or a development that is defined as mixed-use development or mixed-use commercial center not in the Downtown Area.
   b. The Zoning Administrator shall only permit reductions of up to twenty (20) percent of the total parking required per Table 9.103.A.
   c. Reductions of more than twenty (20) percent of required parking shall be subject to approval by the City Council.
5. Elements of a parking master plan. The contents of the parking master plan shall include:
   a. A plan, which graphically depicts where the spaces and parking structures are to be located.
   b. A report, which demonstrates how everything shown on the plan complies with or varies from applicable standards and procedures of the City.
   c. The plan shall show all entrances and exits for any structured parking and the relationship between parking lots or structures and the circulation master plan.
   d. The plan, supported by the report, shall show the use, number, location, and typical dimensions of parking for various vehicle types including passenger vehicles, trucks, vehicles for mobility impaired persons, buses, other transit vehicles and bicycles.
   e. The plan, supported by the report, shall include phasing plans for the construction of parking facilities and any interim facilities planned.
   f.

Whenever a reduction in the number of required parking spaces is requested, the required report shall be prepared by a registered civil engineer licensed to practice in the State of Arizona and shall document how any reductions were calculated and upon what assumptions such calculations were based.

g. Parking ratios used within the report shall be based upon uses or categories of uses already listed within Table 9.103.A., Schedule Of Parking Requirements (the total number of parking spaces required by Table 9.103.B. and the total number of parking spaces required for a mixed-use commercial center and mixed-use development indicated in Table 9.103.A. shall not be used to reduce the required parking in the Downtown Area or a development that is defined as mixed-use development or mixed-use commercial center not in the Downtown Area.)

h. Such other information as is determined by the reviewing authority to be necessary to process the parking master plan.

6. *Performance standards.* Parking shall comply with the requirements of the Zoning Ordinance as amended except where application of the following criteria can show that a modification of the standards is warranted. This shall be determined by the Zoning Administrator pending review of the materials described in Subsection 5. above.

a. The parking master plan shall provide sufficient number and types of spaces to serve the uses identified on the site.

b. Adequate provisions shall be made for the safety of all parking facility users, including motorists, bicyclists and pedestrians.

c. Parking master plans shall be designed to minimize or alleviate traffic problems.

d. Parking spaces shall be located near the uses they are intended to serve.

e. Adequate on-site parking shall be provided during each phase of development of the district.

f. The plan shall provide opportunities for shared parking or for other reductions in trip generation through the adoption of Transportation Demand Management (TDM) techniques to reduce trip generation, such as car pools, van pools, bicycles, employer transit subsidies, compressed work hours, and High Occupancy Vehicle (HOV) parking preference.

g. Surfacing of the lot shall be dust-proof, as provided by Section 9.106.C.1.

h. The parking master plan shall attempt to reduce environmental problems and to further the City's compliance with the federal Clean Air Act amendments of 1990 through appropriate site planning techniques, such as but not limited to reduced impervious surfaces and pedestrian connections.

i. Compliance with the federal Clean Air Act amendments of 1990 shall be considered.

j.

Reductions in the number of parking spaces should be related to significant factors such as, but not limited to:

i. Shared parking opportunities;

ii. Hours of operation;

iii. The availability and incorporation of transit services and facilities;

iv. Opportunities for reduced trip generation through pedestrian circulation between mixed-uses;

v. Off-site traffic mitigation measures;

vi. Recognized variations in standards due to the scale of the facilities;

vii. Parking demand for a specified use; and

viii. The provisions of accessible parking spaces beyond those required per Section 9.105.

k. Reductions in the number of parking spaces for neighborhood-oriented uses may be granted at a rate of one (1) space for every existing or planned residential unit located within two (2) blocks of the proposed use, and one-half (0.5) space for every existing or planned residential unit located within four (4) blocks of the proposed use.

7. *Approval.* The property owner involved in the parking master plan shall submit a written agreement, subject to City approval, requiring that the parking facility and any associated Transportation Demand Management (TDM) techniques shall be maintained without alteration unless such alteration is authorized by the Zoning Administrator. Such written agreement shall be recorded by the property owner with the Maricopa County Recorder's Office prior to the issuance of a building permit, and a copy filed in the project review file.

G. *Reserved.*

H. *Downtown Overlay District Program.*

1. *Purpose.* This parking program will ease the process of calculating parking supply for new buildings, remodels, or for buildings with new tenants or new building area.

This parking program consists of two (2) elements: Parking required and parking waiver.

2. *Parking required.* The amount of parking required shall be:

a. *If there is no change of parking intensity.*

i. If there is no change of parking intensity of the land use on any lot that has a legal land use existing as of July 31, 2003, no additional parking shall be required.

b. *Parking credits.*

i. Parking credits under this program shall be only for: parking improvement districts, permanent parking in-lieu credits, approved zoning variances for on-site parking requirements - unless the Zoning Administrator finds that the justification for the

parking variance no-longer exists, and Parking P-3 District, except as provided in Section 9.104.H.2.b.i.(1). Only these parking credits shall carry forward with any lot that has parking credits as of July 31, 2003.

(1) Parking credits associated with the Parking P-3 District shall continue to apply, unless the Parking P-3 District is removed from the property.

ii. The Downtown Overlay District does not void public agreements for parking payments of any type of parking program.

iii. Any parking improvement district credit(s) or permanent parking in-lieu credit(s) that the lot has that are in excess of the current parking demand shall remain with the lot.

iv. Property owners are still required to pay for any program that allowed them to meet the parking requirements.

c. *Increase in parking.*

i. When a property's parking requirements increase above the parking requirements on July 31, 2003, the new parking requirement is calculated as follows:

(N - O) + T = number of parking spaces required

N = new (increased) parking requirement

O = old parking requirement (on July 31, 2003)

T = total of on-site and any remote parking spaces, plus any parking credits required on July 31, 2003 to meet the old parking requirement (excluding excess on-site and remote parking spaces and any excess parking credits).

ii. As applicable, Table 9.103.A. Table 9.103.B. shall be used to calculate N and O.

iii. A waiver to this requirement is in Section 9.104.H.3.

3. *Parking waiver within the Downtown Overlay District.*

a. *Purpose.* This parking waiver is designed to act as an incentive for new buildings, and for building area expansions of downtown businesses, which the expansion will have a minimal impact on parking demand.

b. *Applicability.* Upon application, property owners may have parking requirements waived if they meet both the following criteria:

i. Are within the Downtown Overlay District, and/or the Downtown District; and

ii. The new building or the new area of a building expansion is used for retail, office, restaurant or personal care services uses allowed in the underlying district.

c. *Limitations on this parking waiver.*

i. Can be used only once per lot existing as of July 31, 2003.

ii.

Can be used for retail, office, restaurant or personal care services uses allowed in the underlying district at a ratio of one (1) space per three hundred (300) gross square feet.

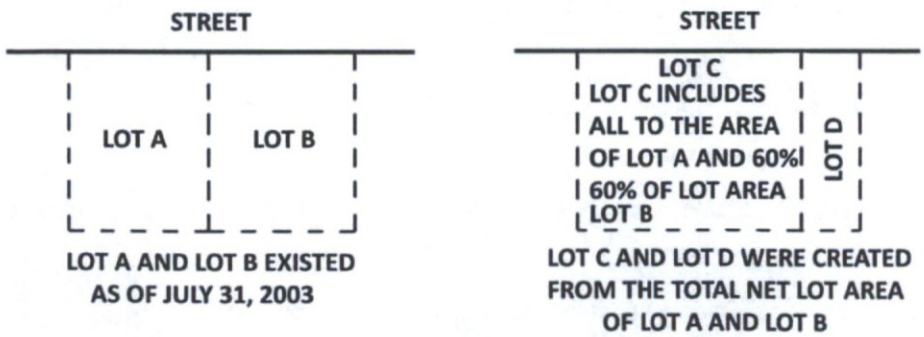
iii. Is limited to a maximum of two thousand (2,000) gross square feet of new building, or building area expansion. The two thousand (2,000) gross square feet per lot of new building, or building area expansion may be used incrementally, but shall not exceed two thousand (2,000) gross square feet of the building size of each lot existing as of July 31, 2003.

(1) Except as provided in Section 9.104.H.3.c.iii.(1)., a lot that is created after July 31, 2003 from more than one (1) lot that existed as of July 31, 2003 shall be allowed to utilize parking waiver as cumulative total of all lots that were incorporated into one (1) lot.

(2) A lot(s) that is created after July 31, 2003 from a portion of a lot(s) that existed as of July 31, 2003 shall be entitled to a waiver of area, as described in section 9.104.H.3.c.iii., based on the pro-rata portion of the net lot that was split from the existing lot(s) and incorporated into the new lot(s). For example:

As shown in Figure 9.104.A., Lot A and Lot B are reconfigured into two (2) new lot configurations, Lot C and Lot D. Lot C now includes all of the net lot area of Lot A and sixty (60) percent of the net lot area of Lot B. Lot C is entitled to the all of the waiver of Lot A and sixty (60) percent of the waiver of Lot B. Lot D is entitled only to forty (40) percent of the waiver of Lot B.

**FIGURE 9.104.A.**

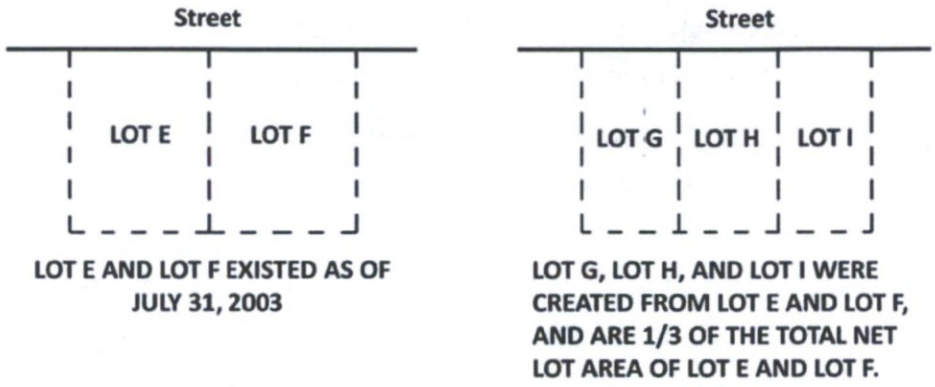



Therefore, Lot C's wavier would be three thousand two hundred (3,200) square feet of new building, or building area expansion; and Lot D's wavier would be eight hundred (800) square feet of new building, or building area expansion.

Another example may be:

As shown in Figure 9.104.B., Lot E and Lot F are reconfigured into three (3) new lots, Lot G, Lot H, and Lots I. Lot G, Lot H, and Lots I are each equal to one-third ( 1/3 ) of the total net lot area of Lot E and Lot F. therefore, Lot G, Lot H, AND Lots I each are entitled to one-third ( 1/3 ) of the total wavier that is allowed for Lot E and Lot F.

**FIGURE 9.104.B.**




LOT E AND LOT F EXISTED AS OF JULY 31, 2003

LOT G, LOT H, AND LOT I WERE CREATED FROM LOT E AND LOT F, AND ARE 1/3 OF THE TOTAL NET LOT AREA OF LOT E AND LOT F.

Therefore, Lot G's, Lot H's, and Lot I's waiver each would be one thousand three hundred thirty-three and one-third (1,333.33) square feet of new building, or building area expansion.

iv. Cannot be used on land that issued to meet a property's current parking requirement unless the same number of physical parking spaces are replaced elsewhere on site, or through the purchase of permanent in-lieu parking credits.

d. *Residential addition parking waiver.* No additional parking is required for up to four new dwelling units that are added to a development as part of a 2,000 square foot (or smaller) nonresidential gross floor area expansion.

(Ord. No. 2736, § 1, 3-7-95; Ord. No. 3520, § 1, 7-1-03; Ord. No. 3543, § 1(Exh. 1), 12-9-03; Ord. No. 3774, § 2, 3-18-08; Ord. No. 3896, § 1(Exh. § 6), 6-8-10; Ord. No. 3920, § 1(Exh. §§ 110—114), 11-9-10; Ord. No. 3980, § 1(Res. 8895, § 1, Exh. A, § 47), 12-6-11; Ord. No. 4005, § 1(Res. No. 8947, Exh. A, § 199, 200), 4-3-12; Ord. No. 4099, § 1(Res. No. 9439, Exh. A, §§ 24, 25), 6-18-13; Ord. No. 4143, § 1(Res. No. 9678, Exh. A, §§ 250—261), 5-6-14)

Sec. 9.105. - Mobility impaired accessible spaces.

A. *Purpose.* The City encourages all development to provide adequate facilities for accessibility to people with mobility impairments covered by the Americans with Disabilities Act (ADA) and the Fair Housing Act (FHA), as amended.

B. *Required accessible parking spaces.*

1. Accessible parking spaces for any building or use shall conform to the ADA, FHA and Article IX.
2. Outpatient facilities in a hospital. Minimum: ten (10) percent of the provided parking.
3. Rehabilitation facilities specializing in treating mobility impairments. Minimum: twenty (20) percent of the provided parking.
4. Other uses. Minimum: four (4) percent of the provided parking.

C. *Reductions in the required accessible parking spaces.*

1. To reduce the number of accessible parking spaces, the property owner shall submit a development application to the Zoning Administrator, including the following:
   a. A report indicating the actual demand for the number of accessible parking spaces in the development project, and
   b. Any other information requested by the Zoning Administrator.
2. The Zoning Administrator may approve a reduction in the required accessible parking spaces, if:
   a. The development project provides over five hundred (500) parking spaces;
   b. The development project includes major employment use(s);
   c. The development project is within six hundred (600) feet of a public transit route and stop;
   d. The development project has minimal direct daily visitors;
   e. The reduced demand for accessible parking spaces is supported by the request; and
   f. The request is supported by other relevant information determined by the Zoning Administrator.
3. The accessible parking spaces required shall not be less than two (2) percent of the provided parking spaces, or as required by ADA, whichever results in more accessible parking spaces.

D. *Existing developments.*

1. The location and any restriping of accessible parking spaces shall comply with the approved site plan, and applicable ADA and FHA requirements.
2. Reconfiguring any onsite parking shall be subject to City approval. All reconfigured accessible parking spaces shall conform with Article IX. and the Design Standards & Policies Manual.

E. *Location of accessible spaces.*

1. Each accessible parking space shall be located adjacent to the shortest route to the accessible building entrance used by the public.
2. Accessible parking spaces shall be dispersed, but located nearest to accessible entrances, for any building with multiple accessible entrances.
3. Accessible parking spaces shall be dispersed, but located nearest to accessible entrances, throughout a development project with multiple buildings.
4. The minimum width of the accessible route shall conform to the ADA, FHA and the Design Standards and Policies Manual.

5. Accessible parking in a parking structure or podium parking may be provided on one level adjacent to the shortest route to the accessible building entrance.
6. Where a development project provides fewer than five (5) on-site parking spaces accessed from an alley, the Zoning Administrator may approve a nearby on-street accessible parking space upon finding the space affords:
    a. Greater accessibility to the accessible building entrance, and
    b. Greater convenience.

F. *Standards.* Accessible parking spaces and access aisles shall conform to the Design Standards & Policies Manual, and the following:
1. Minimum accessible parking space width: eleven (11) feet.
2. Minimum accessible parking space length: In accordance with Section 9.106.
3. Access aisle width: five (5) feet.
4. Two (2) adjacent accessible parking spaces may share an access aisle.

G. *Identification.* Identification, signage and markings of the accessible parking spaces, access aisles and access routes shall conform to the ADA, FHA, and the Design Standards and Policies Manual.

H. *Slope.*
1. Maximum slope of a ramp from the access aisle to a sidewalk: 1:12 ratio.
2. Maximum slope and cross slope of the access aisle and route: 1:50 ratio.

I. *Accessible tenant covered parking, podium parking, and parking structure parking spaces for multiple dwelling development projects.*
1. Minimum: the same percentage as non-accessible tenant covered, podium parking, and parking structure parking spaces.

J. *Accessible separate garage parking for multiple dwelling development projects.*
1. Where separate garages for the dwelling units are provided in a multiple dwelling development project, the site plan shall designate which garages are adaptable for accessible parking.
2. Minimum: the same percentage as non-accessible separate garages.
3. The dimensions of each accessible parking space and access aisle shall comply with Article IX.

K. *Accessible covered parking, garage, podium parking, and parking structure parking for visitors of multiple dwelling development projects.*
1. Minimum: the same percentage as non-accessible covered parking, garage, podium parking, and parking structure parking spaces.

L. *Common covered accessible parking for employees.* The property owner shall provide accessible covered parking space(s) upon request from an employee that is employed by an establishment on the property if the property owner provides non-accessible common covered parking.

M. *Accessible non-residential covered parking, garage, podium parking, and parking structure parking.*
1.

Minimum: the same percentage as non-accessible covered parking, garage, podium parking, and parking structure parking spaces.

N. *Reasonable accommodations.* Property with a parking structure or podium parking that was permitted before January 26, 1992 with a Certificate of Occupancy issued before January 26, 1993, and which is unable to provide accessible parking within the parking structure or podium parking due to structural or other reasonable limitations, shall provide reasonable accommodations on the property for accessible covered parking, subject to the Zoning Administrator's approval.

O. *Vertical clearance.* In addition to ADA and FHA requirements:

1. Minimum accessible parking space vertical clearance: eight (8) feet two (2) inches.
2. Minimum vehicular drive aisle vertical clearance to and from covered parking, garage, podium parking, and parking structure accessible parking space(s): eight (8) feet two (2) inches.

P. *Passenger loading zones.* Passenger loading zones shall conform to the ADA, FHA and the Design Standards and Policies Manual.

Q. The ADA, FHA, and Section 504 of the Rehabilitation Act of 1973, as amended, apply if any part of this Section 9.105 is determined unenforceable.

(Ord. No. 2736, § 1, 3-7-95; Ord. No. 3896, § 1(Exh. § 6), 6-8-10; Ord. No. 3920, § 1(Exh. § 115), 11-9-10; Ord. No. 4117, § 1(Res. No. 9563, Exh. A, § 99), 11-19-13)

Sec. 9.106. - Design standards for public and private on-site ingress, egress, maneuvering and parking areas.

A. *Standard Parking space dimension.*

1. *Vehicular.*

a. Except for parallel parking spaces, as indicated below, and in Table 9.106.A. parking spaces shall have a minimum width of nine (9) feet and a minimum length of eighteen (18) feet. Parallel parking spaces shall have a minimum width of nine (9) feet and a minimum length of twenty-one (21) feet.

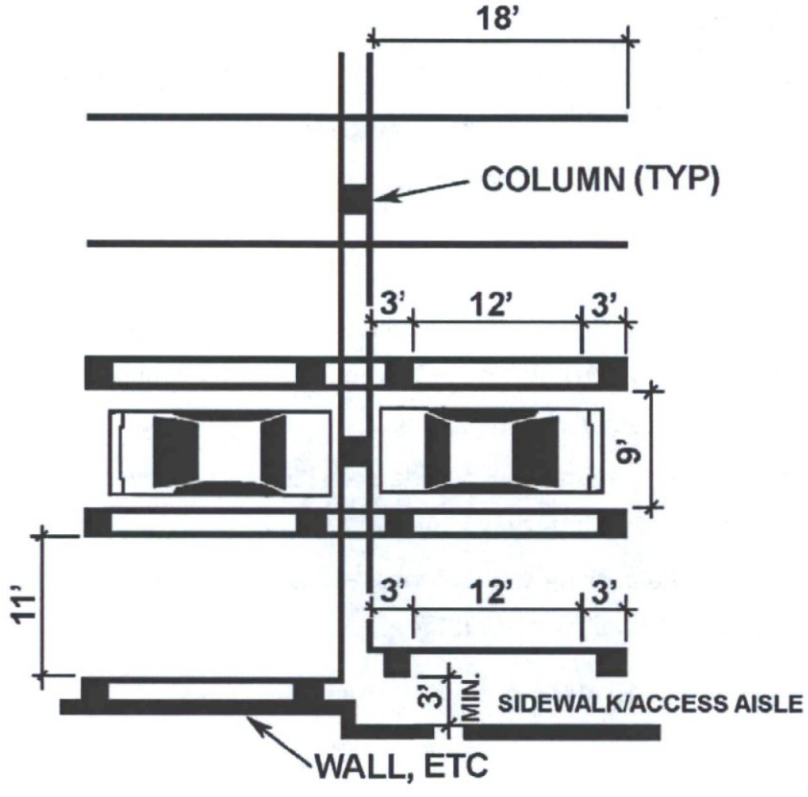
i. For new development and/or redevelopment constructed after July 9, 2010, when a side of a parking space is adjacent to a wall, column, or other obstruction, except as provided in Sections 9.106.A.1.a.ii. and 9106.A.1.a.iii., that is taller than six (6) inches, and where a minimum three-foot wide unobstructed pedestrian access aisle is not provided between the wall, column, or other obstruction and the parking spaces, the width of the parking space shall be increased by two (2) feet on the obstructed side, as illustrated by Figure 9.106.A.

(1). The entire required width and length of a parking space(s) shall not be obstructed by a column, or obstruction that is greater than six (6) inches in height, as illustrated by Figure 9.106.A.

ii.

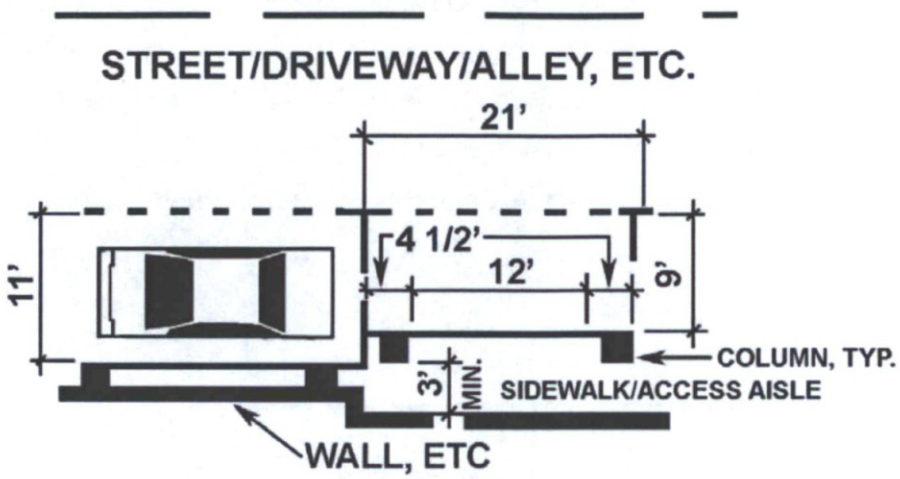
For new development and/or redevelopment constructed after July 9, 2010, when a side of a parking space, excluding a parallel parking space, that is adjacent to a column that is taller than six (6) inches, the obstructed side shall be unobstructed for a minimum of twelve (12) feet, which is between the front three (3) feet and rear three (3) feet of the parking space, as further illustrated by Figure 9.106.A.

**FIGURE 9.106.A. Column, etc. Obstructions**




iii. For new development and/or redevelopment constructed after July 9, 2010, when a side of a parallel parking space that is adjacent to a wall, column, or other obstruction that is taller than six (6) inches, the obstructed side shall be unobstructed for a minimum of twelve (12) feet, which is between the front four and one-half (4½) feet and rear four and one-half (4½) feet of the parking space, as further delineated by Figure 9.106.B.

**Figure 9.106.B. Parallel Parking Space Side Obstructions**

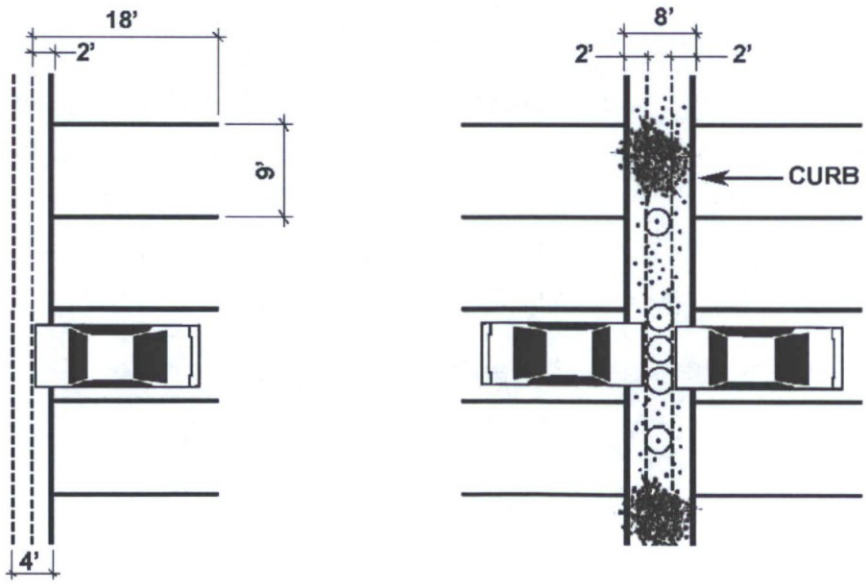



b. As illustrated in Figure 9.106.C., the front length of the space may over-hang a curb or low planter of a maximum height of six (6) inches and a maximum depth of two (2) feet which may not be calculated as required open space, or required parking lot landscaping. If a low planter is utilized the following conditions shall be met:

   i. Where the front of a parking stall overhangs a curb or planter on one (1) side only, the minimum width of the planter shall be four (4) feet.

   ii. Where the front of a parking stall overhangs a curb or planter on both sides, the minimum width of the planter shall be eight (8) feet.

**Figure 9.106.C. Parking Stall Overhangs**




c.

Where special circumstances exist, such as, but not limited to, a lot size, the Development Review Board may approve parking space sizes different from the requirements of the sections of 9.106.A.1. and Table 9.106.A.; but may not approve aisle sizes different from the requirements of Table 9.106.A.

2. *Bicycle.* Bicycle parking spaces shall have a minimum width of two (2) feet and a minimum length of six (6) feet, unless the spaces are provided by a pre-manufactured bicycle rack or locker which differ from this dimension, in which case the dimension of the pre-manufactured rack or locker shall suffice.

B. *Parking layout.* Minimum layout dimensions are established in Table 9.106.A. and Figure 9.106.D. which shall apply to all off-street parking areas with the exception that parking spaces accessed by an alley shall require a minimum of ten (10) feet from the back of the space to the alley centerline.

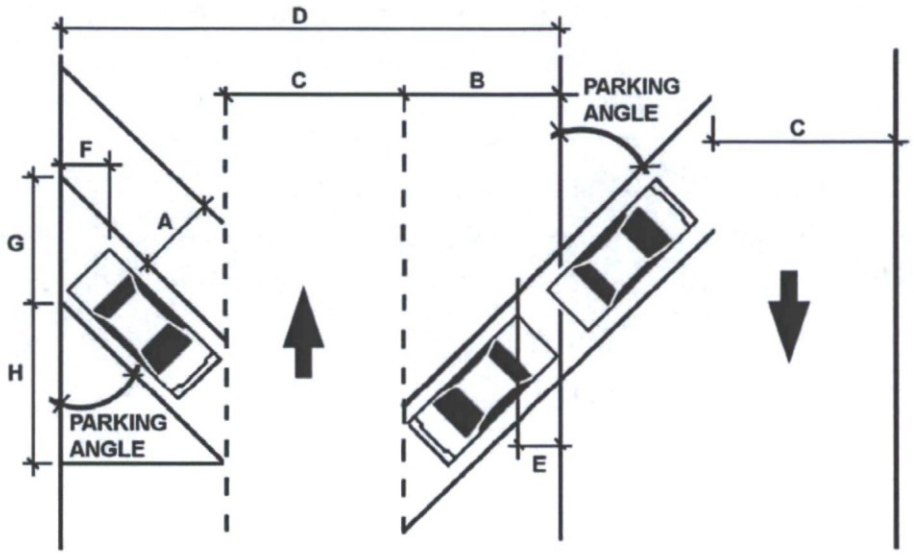
**Table 9.106.A. On-Site Parking Dimensions**

| Angle | Stall Width (A) [1, 3] | Vehicle Projection (B) [1] | Aisle (C)* [1, 2] | Typical Module (D) [1] | Interlock Reduction (E) [1] | Overhang (F) [1] | Curb Length (G) [1] | End of Row Waste (H) [1] |
|---|---|---|---|---|---|---|---|---|
| 0° | 21 | 9.0 | 12.0 | 40.0 | 0 | 0 | 21.0 | — |
| 45° | 9.0 | 19.1 | 12.0 | 50.2 | 6.4 | 1.4 | 12.7 | 19.1 |
| 50° | 9.0 | 19.6 | 14.5 | 53.7 | 5.8 | 1.5 | 11.7 | 16.4 |
| 55° | 9.0 | 19.9 | 16.0 | 55.8 | 5.2 | 1.6 | 11.0 | 13.9 |
| 60° | 9.0 | 20.1 | 18.0 | 58.2 | 4.5 | 1.7 | 10.4 | 11.6 |
| 65° | 9.0 | 20.1 | 20.0 | 60.2 | 3.8 | 1.8 | 9.9 | 9.4 |
| 70° | 9.0 | 20.0 | 22.0 | 62.0 | 3.1 | 1.9 | 9.6 | 7.3 |
| 75° | 9.0 | 19.7 | 24.0 | 63.4 | 2.3 | 1.9 | 9.3 | 5.3 |
| 90° | 9.0 | 18.0 | 24.0 | 60.0 | 0 | 2.0 | 9.0 | 0 |

Note:

1. All measurements are in feet.
2. No two-way drive aisle shall be less than twenty-four (24) feet in width.
3. An accessible parking stall width and access aisle shall comply with Section 9.105.E.

**Figure 9.106.D.**




C. *Design and improvement standards.*

1. *Vehicular.*

a. Residential uses with up to four (4) units: parking, maneuvering, ingress and egress areas, for residential uses, with a total area of three thousand (3,000) square feet or greater, shall be improved in compliance with the Design Standards & Policies Manual and thereafter maintained by surfacing, to prevent emanation of dust, with (1) concrete, asphalt, cement or sealed aggregate pavement; (2) three (3) inches deep crushed rock completely contained in a permanent border; or (3) another stabilization material approved by Maricopa County.

b. Nonresidential uses and residential uses with more than four (4) units: parking, maneuvering, ingress and egress areas for (1) industrial, commercial, and nonresidential uses, and (2) residential uses with more than four (4) units shall be improved in compliance with the Design Standards & Policies Manual and thereafter maintained with regard to:

i. Grading and drainage.

ii. Surfacing, to prevent emanation of dust, with (1) concrete, asphalt, cement or sealed aggregate pavement; (2) three (3) inches deep crushed rock completely contained in a permanent border; or (3) another stabilization material approved by Maricopa County.

iii. Parking stall layout and markings.

iv. Protective pipes at driveway entrances.

v. Curbs, barriers and wheel stops. This requirement shall not apply within the taxilane safety area.

vi. Directional signs.

c. Nonresidential uses and residential uses with more than four (4) units: parking areas for (1) industrial, commercial, and nonresidential uses, and (2) residential uses with more than four (4) units shall meet the following standards:

i. The parking lot shall be designed so that vehicles exiting therefrom will not be required to back out across any sidewalk or street.

ii. Except as permitted in Section 9.106.C.1.c.ii.(1). All required on-site parking spaces shall be accessed directly from a drive aisle, alley or driveway. All on-site parking facilities shall be provided with appropriate means of vehicular access to a public street.

(1) Residential parking space may be provided in a two (2) parking space tandem configuration if the tandem spaces are allocated to the same residential dwelling. Tandem parking spaces shall be accessed directly from a drive aisle, alley or driveway.

iii. All parking lots shall be illuminated in accordance with Section 7.600, Outdoor Lighting, or as determined by the Development Review Board.

iv. Illumination of an on-site parking area shall be arranged so as not to reflect direct rays of light into adjacent residential districts and streets. In no case shall such lighting cause more than one (1) footcandle of light to fall on adjacent properties as measured horizontally at the lot line, or as approved by the Development Review Board. Shields shall be used where necessary to prevent exposure of adjacent properties.

v. Any wall, fence or landscaping provided shall be adequately protected from damage by vehicles using the parking lot and shall be properly maintained and kept in good repair at all times.

d. The effective dates for the improvement standards regarding surfacing set forth in this section shall be:

i. October 1, 2008 for parking, maneuvering, ingress and egress areas for industrial, commercial, and nonresidential uses, and residential uses with more than four (4) units; and

ii. October 1, 2009 for parking, maneuvering, ingress and egress areas, for residential uses, with a total area of three thousand (3,000) square feet or greater.

2. *Bicycle.*

a. The type of bicycle parking facility provided shall be determined according to the requirements of Section 9.103.C., Required bicycle parking, and Section 9.104.C, Credit for bicycle parking facilities.

b. Bicycle facilities shall be located on the same site as the generating land use and within fifty (50) feet of the building entrance in a location which does not extend into pedestrian sidewalks or vehicular traffic lanes.

c. Lighting shall be provided along the access route from the bicycle facility to the building if the route is not completely visible from lighting on the adjacent sidewalks or vehicular parking facilities. Such lighting shall be provided in accordance with Section 7.600, Outdoor Lighting, or as determined by the Development Review Board.

3. *Covered parking.*

a. No covered parking shall be allowed in a required yard or building setback.

D. *Driveway parking prohibited except in residential districts.* Except in residential districts, parking in driveways connecting the public right-of-way with a parking area or garage shall not be permitted on or adjacent to the driveway.

E. *Landscape design.*

1. Parking lot landscaping and landscape islands shall be provided in accordance with Article X.

2. Parking structures fronting on a public street shall include pedestrian-related amenities such as sitting areas, planters, and visually-interesting wall surfaces at the street level along the street frontage, subject to design approval by the Development Review Board.

F. *Screening.*

1. Parking lot areas and on-site vehicular circulation (including drive-throughs and drive-ins, but excluding access driveways to streets and alleys) shall be screened from all streets and alleys by a three-foot tall masonry wall or berm and/or opaque landscape materials, subject to design approval by the Development Review Board.

2. Outdoor vehicle display areas shall be screened, subject to design approval by the Development Review Board.

(Ord. No. 2736, § 1, 3-7-95; Ord. No. 2887, § 1, 3-19-96; Ord. No. 2977, § 1, 12-17-96; Ord. No. 3225, § 1, 5-4-99; Ord. No. 3274, § 2, 12-7-99; Ord. No. 3774, § 3, 3-18-08; Ord. No. 3896, § 1(Exh. § 6), 6-8-10; Ord. No. 3920, § 1(Exh. § 116), 11-9-10; Ord. No. 4005, § 1(Res. No. 8947, Exh. A, § 201), 4-3-12; Ord. No. 4099, § 1(Res. No. 9439, Exh. A, §§ 26—28), 6-18-13; Ord. No. 4117, § 1(Res. No. 9563, Exh. A, § 100), 11-19-13; Ord. No. 4143, § 1(Res. No. 9678, Exh. A, § 262), 5-6-14)

Sec. 9.107. - Remote parking.

A. *Remote parking.* Parking off a development site is permitted under the following procedures.

B. *Remote parking agreement.* The remote parking agreement shall be subject to approval by the Zoning Administrator and City Attorney. The document shall contain the following and be recorded against the properties where the parking and served use are located.

1. A term of at least five (5) years, to protect the city's interests in providing long-term, stable parking for the served use.

2. Discontinuation of the served use if the remote parking becomes unavailable.
3. Maintenance requirements.
4. Termination, violations and enforcement provisions.

C. *Zoning Administrator review.* The Zoning Administrator shall consider whether the remote parking:
1. Is within six hundred (600) feet of the property line of the served use.
2. Is accessible to the served use by a direct, safe, continuous pedestrian way.
3. Serves the purposes of this Zoning Ordinance.

(Ord. No. 4099, § 1(Res. No. 9439, Exh. A, § 29), 6-18-13)

**Editor's note**— Ord. No. 4099, § 1(Res. No. 9439, Exh. A, § 29), adopted June 18, 2013, repealed and reenacted § 9.107 in its entirety to read as herein set out. Prior to inclusion of said ordinance, said provisions pertained to locating required parking relative to the use served. See also the Code Comparative Table.

Sec. 9.108. - Special parking requirements in districts.

A. *Planned Regional Center (PRC).* The provisions of Article IX shall apply with the following exceptions:
1. There shall be no parking required for courtyards or other open spaces, except that those portions thereof used for sales or service activities shall provide parking as specified elsewhere by this Zoning Ordinance.
2. Parking for dwellings shall be covered.

B. *Theme Park District (WP).* The provisions of Article IX shall apply with the following exceptions:
1. The number of spaces required in Table 9.103.A. may be proportionately reduced by the provision of bus parking. Bus parking provided in lieu of automobile parking spaces may account for a maximum reduction of fifty (50) percent of the spaces required in Table 9.103.A.
2. If any bus parking is provided in lieu of automobile parking spaces, one (1) overflow automobile parking space shall be provided for each twenty-five (25) persons for whom seating is provided as indicated on the approved development plan.

C. *Downtown.* In Type 1 Areas of the Downtown Area, all parking shall be accessed from an alley or a street adjacent to a side yard. Unless approved by the Development Review Board, there shall be no curb cuts on streets abutting a front yard within any Type 1 Area.

D. *In-lieu parking program in the Downtown Overlay District (DO) and the Downtown District (D).*
1. *Purpose.* The purpose of the in-lieu parking program is to assist the property owners of small properties to reinvest, develop, and redevelop to the highest and best use of the property, and to accommodate different land uses throughout the life span of a development. In addition, the purpose of the in-lieu parking program is to foster a pedestrian-oriented environment with a

sustainable urban design and character for all properties in the Downtown Area, by reducing the total number of physical parking spaces on a property. Also, as specified below, fees associated lieu parking program shall be utilized for the downtown parking program and downtown tram service.

2. *Parking requirements.* A property owner may satisfy a property's nonresidential parking requirement through the City's in-lieu parking program by an in-lieu parking payment(s) made to the City's downtown parking program enhancement account for in-lieu parking credits. The regulations of the in-lieu parking program shall not be eligible for a variance. The City shall not be obligated to approve a property owner's request to participate in the in-lieu parking program.
3. *Approvals required.*
    a. The City Council shall determine whether or not to allow a property owner to participate in the in-lieu parking program based on the following considerations:
        i. New development, reinvestment, or redevelopment of the property;
        ii. The use of the property fosters a pedestrian-oriented environment with an urban design and character, and the use of public transit or the downtown tram service;
        iii. Property size and configuration;
        iv. The amount of public parking available to the area;
        v. The future opportunity to provide public parking in the area; or
        vi. Open space and public realm areas are maintained and/or parking lots convert into open space and public realm.
    b. The Zoning Administrator may administratively approve participation in the in-lieu parking program for up to, and including five (5) in-lieu parking credits, provided that the allowance is based on the City Council considerations of Section 9.108.D.3.a. The Zoning Administrator approval shall not exceed a total of five (5) in-lieu parking credits per lot.
        i. An appeal of the Zoning Administrator's, denial for participation in-lieu parking program shall be heard by City Council.
            (1) Appeals must be filed with the City Clerk no later than thirty (30) days after the Zoning Administrator issues any written denial for participation in-lieu parking program.
        ii. The City Council shall evaluate an appeal, and may approve or deny participation in-lieu parking program based on the considerations specified in Section 9.108.D.3.a.
4. *In-lieu parking credit fees.* The amount of the in-lieu parking credit fee(s) shall be established by the City Council, and may include penalty fees for late payment, legal fees, administrative fees, an interest rate to account for the time value of money for the in-lieu parking installment purchase option, and any other fee the City Council deems necessary to implement the in-lieu parking program.
5. *Use of in-lieu parking fees.* The use of the in-lieu parking fees paid to the City shall be used for the operation of a downtown parking program which may include, but is not limited to, the provision and maintenance of public parking spaces, the operation of tram shuttle services linking public

parking facilities and downtown activity centers, and services related to the management and regulations of public parking.

6. *In-lieu parking payments.* Fractional parking requirements may be paid for on a pro-rata basis. The property owner may purchase, or the City Council may require in-lieu parking credits to be purchased, either as permanent parking credits or as term parking credits in accordance with the following:
   a. *Permanent in-lieu parking credits.* Parking space credits purchased under this permanent in-lieu option shall be permanently credited to the property. These parking credits may be purchased either by installment payments to the City over a fixed period of time, or by payment of a lump sum fee.
      i. Under the lump sum purchase option, purchase shall be made by the property owner through payment of the total fee, in accordance with the procedures adopted by the Zoning Administrator and a written agreement, satisfactory to the City, with the property owner.
      ii. The installment purchase option shall require an initial cash deposit and a written agreement, satisfactory to the City, binding the property owner to make subsequent monthly installment payments. The installment purchase agreement shall not create a payment term longer than fifteen (15) years, and shall include, but not limited to, payment procedures approved by the Zoning Administrator. Payment of the lump sum in-lieu fee, or payment of the installment purchase deposit and execution by both parties of the installment purchase agreement, shall be completed prior to the issuance of a building permit if a building permit is required, or to the issuance of a certificate of occupancy.
   b. *Monthly term in-lieu parking credits:* Parking credits obtained by payment of a monthly in-lieu fee under this option are only for the term of the activity requiring the parking and are not permanently credited to the property. A monthly term in-lieu parking credit(s) requires a written agreement, satisfactory to the City, binding the property owner to make subsequent monthly payments. The agreement shall include, but not limited to payment procedures approved by the Zoning Administrator. The first monthly payment shall be made in accordance with the agreement.
   c. *Evening-use term in-lieu parking credits.* Parking credits obtained by payment of a monthly in-lieu fee under this option are only for the term of the activity requiring the parking, limited to uses only open for business between the hours of 5:00 p.m. and 3:00 a.m., and are not permanently credited to the property. An evening-use term in-lieu parking credit requires a written agreement satisfactory to the City binding the property owner to make monthly payments. The agreement shall include, but not limited to payment procedures approved by the Zoning Administrator. The first monthly payment shall be made in accordance with agreement.

(Ord. No. 2736, § 1, 3-7-95; Ord. No. 3225, § 1, 5-4-99; Ord. No. 3520, § 1, 7-1-03; Ord. No. 3543, § 1(Exh. 1), 12-9-03; Ord. No. 3662, § 2, 2-7-06; Ord. No. 3879, § 1(Exh. § 27), 3-2-10; Ord. No. 3896, § 1(Exh. § 6), 6-8-10; Ord. No. 3920, § 1(Exh. § 119), 11-9-10; Ord. No. 4099, § 1(Res. No. 9439, Exh. A, § 30), 6-18-13; Ord. No. 4143, § 1(Res. No. 9678, Exh. A, § 263), 5-6-14)

Sec. 9.109. - Evening-use parking.

A. *Evening-use parking.* Evening-use parking is parking for establishments conducting business between 5:00 p.m. and 3:00 a.m.

B. *Evening-use parking application* . The property owner of the served use shall file an application for proposed evening-use parking, including:

   1. A lighting plan for the parking in conformance with Article VII.
   2. An analysis of the location and availability of private parking spaces.
   3. A remote parking agreement in accordance with this article if the parking is not on the same property as the served use.

C. *Zoning Administrator approval of evening-use parking.* The Zoning Administrator may approve an application for evening-use parking if the plans and analysis show the parking:

   1. Is within six hundred (600) feet of the property line of the served use.
   2. Is accessible to the served use by a direct, safe, continuous pedestrian way.
   3. Serves the purposes of this Zoning Ordinance.

(Ord. No. 4099, § 1(Res. No. 9439, Exh. A, § 31), 6-18-13; Ord. No. 4143, § 1(Res. No. 9678, Exh. A, § 264), 5-6-14)

Sec. 9.110. - High occupancy vehicle parking.

A. Parking for carpools, vanpools, and other high occupancy vehicles shall be located nearest the main building entrance with priority over all other parking except for mobility-impaired accessible parking.

(Ord. No. 4099, § 1(Res. No. 9439, Exh. A, § 32), 6-18-13)

Sec. 9.200. - Off-Street Loading.

Sec. 9.201. - General regulations.

All buildings hereafter erected or established shall have and maintain loading space(s) as determined by Development Review Board approval as outlined in article I, Section 1.900 hereof and subject to conditions herein.

A. No part of an alley or street shall be used for loading excepting areas designated by the city.

B.

No loading space that is provided in an approved development review shall hereafter be eliminated, reduced or converted, unless equivalent facilities are provided elsewhere.

C. All loading space shall be surfaced and maintained subject to the standards of Section 9.106.C.1.

(Ord. No. 3225, § 1, 5-4-99; Ord. No. 3774, § 4, 3-18-08; Ord. No. 3896, § 1(Exh. § 6), 6-8-10)

# Appendix C - Other Cities and Towns Parking Requirements

# Town of Gilbert Parking Requirements

GILBERT
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2. The additional parking space permitted by this section shall comply with the following standards:

   a. The parking space shall have a surface of asphalt, concrete, decomposed granite or gravel.

   b. The surface may consist of 2 parallel concrete or cement strips. The area between such parallel strips shall be landscaped with vegetative or non-vegetative ground cover.

   c. No parked vehicle may obstruct or encroach on a sidewalk.

   d. Access to the parking space shall be via a curb cut, rolled curb, or driveway.

3. No motor vehicle, recreational vehicle or trailer shall be parked in the front or side setback visible from the street, except on a driveway or additional parking space permitted in this section.

## 4.204 Number of Parking Spaces Required

This Section sets forth parking space requirements for all uses except uses in Shopping Center and Regional Commercial districts. Unless otherwise approved pursuant to Subsections 4.203H: Deferred Parking for Unique Uses or 4.203I: Off-Site Parking in the Heritage Village Center Zoning District and Gateway Districts, required parking spaces shall be located on the same building site as the use or building they serve, unless cross-access and cross-parking agreements are in effect. Parking on public or private streets shall not be used to satisfy the off-street parking requirement.

**Table 4.204: Off-Street Parking Requirements**

| *Use Classification* | *Requirement (Gross Floor Area)* |
|---|---|
| Agritainment | Determined by Zoning Administrator |
| Ambulance Services | 1 space per 250 sq. ft. |
| Animal Services<br>*Animal Grooming* | 1 space per 250 sq. ft. |
| *Animal Shelter* | 1 space per 250 sq. ft. |
| *Feed and Tack Sales* | 1 space per 350 sq. ft. |
| *Kennel* | 1 space per 250 sq. ft. |
| *Large Animal Hospitals* | 1 space per 300 sq. ft. |
| *Small Animal Clinics* | 1 space per 250 sq. ft. |
| Automated Teller Machine | None required |
| Automated Teller Machine, Remote | 2 spaces per machine |
| Banks and Other Financial Institutions | 1 space per 200 sq. ft. |
| Banquet Facility | Determined by Zoning Administrator |
| Bed and Breakfast Homes | 2 enclosed spaces; plus 1 space per guest room |
| Building Maintenance Services | 1 space per 300 sq. ft. |

**Table 4.204: Off-Street Parking Requirements**

| *Use Classification* | *Requirement (Gross Floor Area)* |
|---|---|
| Building Material and Home Improvement Sales and Service, Retail | 1 space per 250 sq. ft. |
| Building Material and Home Improvement Sales and Service, Wholesale | 1 space per 800 sq. ft. |
| Business Services | 1 space per 250 sq. ft. |
| Call Center | 1 space per 150 sq. ft. |
| Cemetery | None required |
| Cemetery, Pet | None required |
| Civic, Social and Fraternal Organizations | 1 space per 200 sq. ft. or 1 space per 4 fixed seats, whichever is greater |
| Colleges or Universities, Public Or Private | 1 space per 200 sq. ft. of classroom and office area |
| Congregate Living Facility | 0.5 spaces per unit |
| Contractor's yard | 1 space per 250 sq. ft. of office area |
| Convention Center | 1 space per 200 sq. ft. or 1 space per 4 fixed seats, whichever is greater |
| Crematorium | 1 space per 300 sq. ft. |
| Crop and Animal Raising, Commercial | None required |
| Crop Raising, Non-Commercial | None required |
| Cultural Institutions | 1 space per 200 sq. ft. or 1 space per 4 fixed seats, whichever is greater |
| Day Care Centers | 1 space per 300 sq. ft. |
| Day Care Homes | No additional spaces required |
| Day Care , Residential | No additional spaces required |
| Dry Cleaning and Laundry Outlet | 1 space per 250 sq. ft. |
| Dry Cleaning and Laundry Central Plant | 1 space per 300 sq. ft. |
| Eating and Drinking Establishments<br>*Bars/Night Clubs/Lounges/Dance Halls* | 1 space per 100 sq. ft.; plus 1 space per 400 sq. ft. of outdoor dining area |
| *Restaurants, Beverage Service* | 1 space per 75 sq. ft.; plus 1 space per 400 sq. ft. of outdoor dining area |
| *Restaurants, Full Service* | 1 space per 100 sq. ft.; plus 1 space per 400 sq. ft. of outdoor dining area |
| *Restaurants, Limited Service* | 1 space per 100 sq. ft.; plus 1 space per 400 sq. ft. of outdoor dining area |
| Entertainment and Recreation, Indoor | 1 space per 150 sq. ft. of indoor area |
| Entertainment and Recreation, Outdoor | 2 spaces per court;<br>45 spaces per soccer field;<br>35 spaces per baseball or softball field;<br>1 space per batting cage;<br>2 spaces per miniature golf hole |
| Farm Stand | 1 space per 50 sq. ft. of sales area |
| Farmers' Market | 1 space per 50 sq. ft. of sales area |
| Food Preparation<br>*Large-Scale* | 1 space per 300 sq. ft. |
| *Small Scale* | 1 space per 250 sq. ft. |
| Funeral and Undertaking Services | 1 space per 100 sq. ft. of assembly area; plus 1 space per 200 sq. ft. of office area |
| Garden Supply Store and Plant Nurseries | 1 space per 400 sq. ft. of sales and display area |

**Table 4.204: Off-Street Parking Requirements**

| *Use Classification* | *Requirement (Gross Floor Area)* |
|---|---|
| Golf Course | 5 spaces per hole |
| Government Offices and Facilities | 1 space per 200 sq. ft. |
| Group Homes For The Handicapped | No additional spaces required |
| Haunted House | 1 space per 100 sq. ft. |
| Health Care Facilities | |
| *Hospital* | 1.5 spaces per bed |
| *Urgent Care Facility* | 1 space per 100 sq. ft. |
| *Medical Offices and Clinics* | 1 space per 150 sq. ft. |
| Home Occupation | No additional parking required |
| Homeowners Association Facilities | 1 space per 250 sq. ft. building area |
| Hotels and Commercial Lodging | 1.1 spaces per guest room, suite or unit; public eating and drinking establishments calculated separately |
| Instruction Services, Specialized | 1 space per 200 sq. ft. of instructional area |
| Laboratories, Commercial | 1 space per 150 sq. ft. |
| Laundry Services | 1 space per 250 sq. ft. |
| Loft Unit | 1.5 spaces per unit |
| Maintenance and Repair Services | 1 space per 300 sq. ft. |
| Manufacturing and Assembly | |
| *Artisan* | 1 space per 500 sq. ft. |
| *Light* | 1 space per 500 sq. ft. |
| *General* | 1 space per 500 sq. ft. |
| *Heavy* | 1 space per 1,000 sq. ft. |
| Mining and Quarrying | 1 space per 250 sq. ft. of office area |
| Nursing Home | 0.5 spaces per bed |
| Offices, General | 1 space per 250 sq. ft. |
| Pawn Shop | 1 space per 250 sq. ft. |
| Personal Services | 1 space per 200 sq. ft. |
| Public Safety Facilities | 1 space per 250 sq. ft. |
| Recreational Vehicle Park | 1 space per 100 sq. ft. of office area, plus 2 spaces per permanent residential unit |
| Place of Worship | 1 space per 100 sq. ft. of assembly area, plus 1 space per 200 sq. ft. of other indoor area |
| Research and Development | 1 space per 200 sq. ft. |
| Residential, Permanent<br>*Single Family (on-street parking permitted)* | 2 enclosed spaces per unit.<br>Residential uses in the Heritage District may provide 2 unenclosed spaces on site |
| *Single Family (no on-street parking)* | 2 enclosed spaces per unit; plus .25 guest spaces per unit; plus 6 guest spaces at the primary active open space and 3 guest spaces at each secondary active open space. Residential uses in the Heritage District may provide 2 unenclosed spaces on site. |

**Table 4.204: Off-Street Parking Requirements**

| *Use Classification* | *Requirement (Gross Floor Area)* |
|---|---|
| *Single Family, Lot Width is less than 55'*<br>*or*<br>*Single Family, Lot Driveway length is less than 20'* | 2 enclosed spaces per unit; plus 0.5 guest parking spaces per unit; plus 0.5 guest parking spaces per unit that does not provide a minimum of 80 square feet of additional enclosed parking area; plus 6 guest spaces at the primary active open space and 3 guest spaces at each secondary active open space. All required guest parking spaces must be striped and equally distributed throughout the development, as approved on the parking plan; required dwelling unit guest parking spaces shall be located within 250' of the dwelling unit's front lot line, as measured by the pedestrian route. Parking plan design review approval required. |
| *Multi-Family* | 1 space per 1-bedroom/studio unit.<br>2 spaces per 2 or more bedroom units; all plus .25 guest spaces per unit.<br>1 space per unit shall be covered, of which 25% shall be enclosed |
| *Secondary Dwelling* | 1 additional space |
| Retail Sales, Convenience | 1 space per 100 sq. ft. |
| Retail Sales, Furniture | 1 space per 500 sq. ft. |
| Retail Sales, General | 1 space per 250 sq. ft. |
| Sexually-Oriented Business | 1 space per 250 sq. ft. |
| Schools, Public or Private | Elementary: 2 spaces per classroom<br>Junior High: 2 spaces per classroom<br>High: 7 spaces per classroom |
| Special Assistance Shelters | 1 space per 500 sq. ft. |
| Stables, Commercial | 1 space per 2 horse stalls |
| Storage, Personal Property<br>*Indoor* | 8 spaces plus 2 covered spaces per dwelling unit |
| *Outdoor* | 2 covered spaces per dwelling unit |
| Swap Meet and Auction, Indoor | 1 space per 200 sq. ft. |
| Swap Meet and Auction, Outdoor | 1 space per 200 sq. ft. of sales area |
| Teen Nightclub | 1 space per 200 sq. ft. |
| Transportation Passenger Terminals | Determined by Zoning Administrator |
| Utilities<br>*Facilities* | 1 space per 250 sq. ft. of office area |
| *Service Yards* | 1 space per 250 sq. ft. of office area |
| *Well Site* | No additional spaces required |
| Vehicle Equipment Sales, Leasing and Services<br>*Car Wash, Automated or Self-Service* | 2 spaces minimum |
| *Car Wash, Full Service* | 10 spaces minimum |
| *Commercial Vehicle/Equipment Sales and Rental; New and Used* | 1 space per 250 sq. ft. of indoor area |
| *Fueling Facility* | 1 space per 100 sq. ft. of convenience retail sales, plus 2 spaces per service bay |
| *Fueling Facility, Alternative* | 1 space per fueling station |

**Table 4.204: Off-Street Parking Requirements**

| Use Classification | Requirement (Gross Floor Area) |
|---|---|
| Vehicle Equipment Sales, Leasing and Services(continued) | |
| *Fueling Facility, Fleet* | None required |
| *Motor Vehicle Sales and Leasing, New and Used* | 1 space per 250 sq. ft. of interior display space; plus 1 space per 3 service bays; plus 1 space per 25 vehicles displayed outdoors |
| *Non-Commercial Vehicle Rental* | 1 space per 100 sq. ft. |
| *Vehicle Services, Light and Heavy* | 3 spaces per service bay plus 1 space per 100 sq. ft. of office and sales area |
| Warehousing | |
| *Freight/Truck Terminal and Warehouse* | 1 space per 1000 sq. ft. plus 1 space per 250 sq. ft. office area |
| *Petroleum and Gas Storage* | 1 space per 250 sq. ft. of office area |
| *Salvage or Junkyards* | 1 space per 200 sq. ft. of office area |
| Waste Management | |
| *Hazardous Waste Collection and Transfer Facility* | 1 space per 250 sq. ft. of office area |
| *Hazardous Waste Disposal Facility* | 1 space per 250 sq. ft. of office area |
| *Non-Hazardous Waste Collection Transfer Facility* | 1 space per 250 sq. ft. of office area |
| *Non-Hazardous Waste Disposal Facility* | 1 space per 250 sq. ft. of office area |
| *Non-Hazardous Material Recycling Collection Facility* | |
| *Large Scale* | 1 space per 250 sq. ft. of office area |
| *Small Scale* | None required |
| Wireless Communication Facilities | None required |

## 4.205 Number of Parking Spaces Required for Shopping Center and Regional Commercial

This section sets forth parking space requirements for uses in the Shopping Center and Regional Commercial districts. Required parking spaces shall be located on the same building site as the use or building they are intended to serve, unless cross-access and cross-parking agreements are in effect. Parking on public or private streets shall not be used to satisfy the off-street parking requirement.

**Table 4.205: Off-Street Parking Requirements for Shopping Center and Regional Commercial Districts**

| Use Classification | Requirement (Gross Floor Area) |
|---|---|
| Shopping Center | 1 space per 250 sq. ft. |
| Regional Commercial | 1 space per 200 sq. ft. |

# City of Glendale Parking Requirements

**Section 7.400 Off-Street Parking.**

**7.401 Purpose.**

A. To provide adequate parking to meet the needs of residents, employees, and business patrons.

B. To prevent excess unused parking areas which encourage reliance on the automobile and discourage pedestrian use.

C. To reduce the scale of parking areas through landscaping and by breaking them into smaller areas.

(Ord. No. 1772, 7-23-93)

**7.402 General Requirements.**

A. Each parking space shall be at least ten (10) feet wide and twenty (20) feet deep, except that parking spaces at an angle of sixty (60) degrees or less may be nine (9) feet wide.

B. Other requirements of aisle widths are contained in the City of Glendale Engineering Design Guidelines.

C. All parking spaces and driveway areas serving such parking spaces shall be surfaced with concrete, asphalt, or paving blocks.

D. Required parking shall be provided on-site or on contiguous lots.

E. Square feet shall mean the gross floor area of the building.

F. No part of any vehicle may overhang into a public sidewalk or within five (5) feet of a street curb where no sidewalk exists.

G. All parked vehicles must comply with unobstructed view easement and sight distance requirements as identified in the City of Glendale Engineering Design Guidelines.

H. Parking of commercial vehicles in residential districts is limited to one (1) commercial vehicle with a one (1) ton chassis, having a capacity of not more than ten thousand (10,000) pounds gross vehicle weight rating (GVWR).

I. Landscaping and screening of parking lots shad be in accordance with the City of Glendale Landscape Ordinance (Chapter 19 of the City Code).

J. Parking lots shall be designed in groupings no larger than 200 spaces. Larger lots shall be divided by buildings, plazas, or significant landscaped area oriented for pedestrian use.

K. The parking or storage of construction related equipment, such as dump trucks, utility trailers, flatbed hauling trailers, cement mixers, ditch diggers, etc., shall be permitted for forty-eight (48) hours in a thirty (30) day period in a residential district, unless prohibited by other City ordinances. It is prohibited to have more than two (2) pieces of equipment on the property at one (1) time or to bring such equipment in for repairs or preventative maintenance. The only exception to this regulation would be when on-site construction is being performed by such equipment.

(Ord. No. 1772, 7-23-93)

**7.403 Parking Requirements by Use.**

| USE | MINIMUM # OF SPACES | MAXIMUM # OF SPACES |
|---|---|---|
| Auditorium, Stadium, Public Assembly, Private Clubs, Health Clubs, Theaters | 1:100 sq. ft. or 1:5 seats | no maximum |

| | | |
|---|---|---|
| Auto Repair | 2 spaces per service bay; plus 1 space per every 250 sq. ft. of retail or office area. | no maximum |
| Banks, Financial Institutions | 1:250 sq. ft. | 1:200 sq. ft. |
| Barber Shop or Beauty Shop | 1:100 sq. ft. | no maximum |
| Churches | 1:5 seats or 90 lineal inches of pew space | no maximum |
| Cocktail Lounge | 1:100 sq. ft. | no maximum |
| Home Furnishings, Major Appliances | 1:500 sq. ft. | 1:400 sq. ft. |
| Hospitals | 1:bed | no maximum |
| Manufacturing/Assembly Wholesale/ Warehouse | 1:600 sq. ft. | 1:300 sq. ft. |
| Mixed Uses | To be determined by Planning Director. | |
| Motels/Hotels<br>Restaurant/Bar<br>Banquet/Meeting Rooms | 1:room<br>1:200 sq. ft.<br>1:200 sq. ft. | no maximum |
| Office, General, Professional<br>Medical/Dental | 1:300 sq. ft.<br>1:150 sq. ft. | no maximum |
| Indoor Recreation Facility<br>Amusement Center or Arcades<br>Batting Cages<br><br>Bowling Alley | 1:100 sq. ft.<br>1:100 sq. ft.<br>1:cage<br>4:lane plus accessory uses if separate outside entrances are provided. | no maximum |
| Outdoor Recreation Golf<br><br>Driving Ranges<br>Miniature Golf Courses<br>Skating Rinks | 1:tee space (10 lineal feet)<br>1:hole<br>1:200 sq. ft.<br>1:200 sq. ft. | no maximum |
| Regional Malls | 1:225 sq. ft. | 1:180 sq. ft. |
| Residential<br>Single-family<br>Multi-family<br>Studio or 1 Bedroom<br>2 or more Bedrooms<br>1 Designated guest space for every 3 units. | <br>2:unit-1 covered<br>2:unit-1 covered<br>1 space<br>2 spaces | no maximum |
| Restaurant-freestanding | 1:100 sq. ft. | no maximum |
| Retail/Shopping Center (including up to 10% restaurant, health club, beauty shops . . . additional | 1:250 sq. ft. | 1:200 sq. ft. |

| | | |
|---|---|---|
| percentages calculated at rate for each use) | | |
| Retirement/Senior Housing/ Convalescent/Nursing/Congregate Care Home | .4:unit | no maximum |
| Schools | | |
| Elementary | 2:classroom or largest single public assembly area, whichever is greater. | |
| Jr. High | 3:classroom or largest single public assembly area, whichever is greater. | |
| High School | 7:classroom or largest single public assembly area, whichever is greater. | no maximum |
| College | 10:classroom or largest single public assembly area, whichever is greater. | |
| Vocational/Technical | 1:2 students | |

(Ord. No. 1772, 7-23-93; Ord. No. 2028, § 1, 10-13-98)

**7.404 Drive-Thru Requirements.**

Notwithstanding any other provision of this section, additional vehicle storage spaces shall be provided for all uses having vehicle pick-up windows as follows:

A. A drive-thru lane with a minimum storage for six (6) vehicles shall be provided at twenty (20) feet per vehicle for all convenience uses except pharmacy related drive-thru lanes.

B. A pharmacy related drive-thru lane shall have a minimum storage for three (3) vehicles within twenty (20) feet per vehicle.

C. The drive-thru lane shall not encroach upon or block driveways or parking spaces.

(Ord. No. 1772, 7-23-93; Ord. No. 1959, § 1, 9-30-97)

**Section 7.500 Standards for Uses Subject to Conditions.**

**7.501 Generally.**

Pursuant to Section 3.403, applications for administrative reviews as authorized in this Zoning Ordinance or Amendments thereto, shall be filed on an application form with the required documentation specified on guidelines provided by the Planning Department with appropriate fees.

(Ord. No. 1772, 7-23-93)

**7.502 Group Homes.**

Adult Care Homes, Juvenile Group Homes, Group Homes for the Disabled, and Supervisory Care Facilities (for purposes of this Section 7.502, such uses are collectively referred to as "Group Homes") shall be permitted, provided that:

# City of Surprise Parking Requirements

SURPRISE

ARIZONA

area and structures. Sufficient evidence to establish the status of applicants as owners of parties in interest shall be provided. The application shall include plans showing the location of the uses or structures for which off-street parking facilities are required, the location of the off-street parking facilities, and the schedule of times used by those sharing parking in common; and

d. Pursuant to the same procedure and subject to the same limitations and requirements by which the cooperative parking plan was approved and registered, any such plan may be amended or withdrawn, either partially or completely, if all land and structures remaining under such plan comply with all the conditions and limitations of the plan, and all land and structures withdrawn from such plan comply with the regulations of this division.

(3) *Shared parking.* Developments that contain a mix of uses on the same parcel, as set forth in Table 9-1, may reduce the amount of required parking in accordance with the following methodology:

a. Determine the minimum parking requirements in accordance with Table 9-1 for each land use as if it were a separate use;

b. Multiply each amount by the corresponding percentages for each of the five time periods set forth in columns (B) through (F) of Table 9-2;

c. Calculate the total for each time period; and

d. Select the total with the highest value as the required minimum number of parking spaces.

(e) *Parking ratios.*

| Table 9-1 Parking Ratios | | | |
|---|---|---|---|
| Use/Activity | Minimum Vehicle Spaces | Maximum Vehicle Spaces | Minimum Bicycle Spaces |
| **Residential Buildings** | | | |
| Single-family detached dwellings | 2 per DU | — | — |
| Single-family attached dwellings | 2 per DU | — | — |
| Duplex structures | 1 per DU | 2 per DU | — |
| Zero lot line or row houses | 1 per DU | 2 per DU | — |

| | | | |
|---|---|---|---|
| Accessory dwelling units | 1 per DU | — | — |
| Townhouses | 2 per DU | 2.5 per DU | — |
| Multifamily dwellings: | | | |
| Studio 1.5 spaces/unit | Studio 1.5 Spaces<br>1 bedroom 1.5 | 1.9 per DU | 0.5 per DU |
| 1 Bedroom 1.5 spaces/unit | | | |
| 2 Bedroom 2.0 spaces/unit | | | |
| 3+ Bedroom 2.5 spaces/unit | | | |
| Retirement housing services | 1 per three DUs | 1.5 per DU | — |
| Congregate living services | 1 per three DUs | 1.5 per DU | — |
| Assisted living services | 0.5 per room | 1 per room | — |
| Life care or continuing care services | 0.5 per room | 1 per room | — |
| Skilled nursing services | 0.5 per room | 1 per room | — |
| Group home | 0.5 per room | 1 per room | — |
| Dormitories | 1 per 2 beds | 1 per bed | 0.5 per DU |

| | | | |
|---|---|---|---|
| **Hotels, Motels, or Other Accommodation Services** | | | |
| Bed-and-breakfast inn | 1 per guest room plus 2 spaces for owner's portion | — | — |
| Hotel, motel | 0.8 per room plus 1 per 800 sf of public meeting area and restaurant space | 1 per room plus 1 per 400 sf of public meeting area and restaurant space | 1 per 20 rooms + 1 per 400 sf of meeting area and restaurant space |
| **Commercial Buildings** | | | |
| Commercial center | 1 per 300 sf GFA | 1 per 200 sf GFA | 1 per 10 vehicle spaces. Max 4 for each major entrance. |
| Shop or store building with drive-through facility | 1 per 250 sf GFA | 1 per 140 sf GFA | 1 per 10 vehicle spaces. Max 4. |
| Restaurant, with incidental consumption of alcoholic beverages | 1 per 75 sf GFA | 1 per 50 sf GFA | 1 per 20 vehicle spaces |
| Stand-alone store or shop building | 1 per 300 sf GFA | 1 per 200 sf GFA | 1 per 10 vehicle spaces |

## Appendix D - Wolff Company Parking Experience

## Senior Parking Summary:

THE WOLFF COMPANY

Date: 5-Sep-17

| Project | Location | # Units | Open | Carport | Garage | Structured Garage | Parking Provided | Ratio (space / unit) | Parking Required | |
|---|---|---|---|---|---|---|---|---|---|---|
| Cornerstone Snr. | Henderson, NV | 146 | 132 | 40 | 17 | | 189 | 1.29 | 187 | (1 PS/DU; 1 PS/50 SF Assembly) **10% Reduction |
| 1st & Main | Colorado Springs, CO | 160 | 71 | 42 | 25 | | 138 | 0.86 | 97 | (0.6/DU) |
| Riverpark Snr. | Oxnard, CA | 136 | 42 | 70 | | | 112 | 0.82 | 164 | (1 PS/1-BD; 2 PS/2-BD; 1 PS/GS) |
| Martin Way Snr. | Lacey, WA | 135 | 88 | 20 | | | 108 | 0.80 | 45 | (1 PS/3 DU) |
| Tropicana Snr. | Clark County, NV | 132 | 48 | 54 | | | 102 | 0.77 | 96 | (1 PS/3 Beds + 1/Emp) |
| Issaquah Snr. | Issaquah, WA | 146 | 78 | | | 32 | 110 | 0.75 | 105 | (0.5/DU + 1/Emp) |
| Rancharrah Snr. | Reno, NV | 146 | 97 | 42 | | | 139 | 0.95 | 171 | (0.9 PS/Bdrm) |
| Reynolds Rnch. | Lodi, CA | 142 | 49 | 63 | 11 | | 123 | 0.87 | 123 | (0.75 PS/DU + 0.10 PS/DU Guest) |
| Riverhouse Snr. | Spokane, WA | 132 | 73 | 20 | 15 | | 108 | 0.82 | 53 | (1 PS/4 Bdrm + 1.0/Staff) |
| Eagle River Snr. | Eagle, ID | 146 | 82 | 34 | | | 116 | 0.79 | 64 | (1 PS/3 Beds) |
| Del Amo Snr. | Torrance, CA | 177 | 6 | | | 152 | 158 | 0.89 | 177 | (1 PS/DU) |
| LifeBridge Snr. | Kirkland, WA | 155 | 74 | | | 31 | 105 | 0.68 | 236 | (1.2/S; 1.3/1; 1.6/2; 10% Guest) |
| | *Averages* | *146* | | | | | | *0.86* | | |

**Comments:**

- Parking required data is based on Zoning/Design Review Approvals

## Appendix E - 2016 Older Americans Key Indicators of Well-Being

2016

# Older Americans

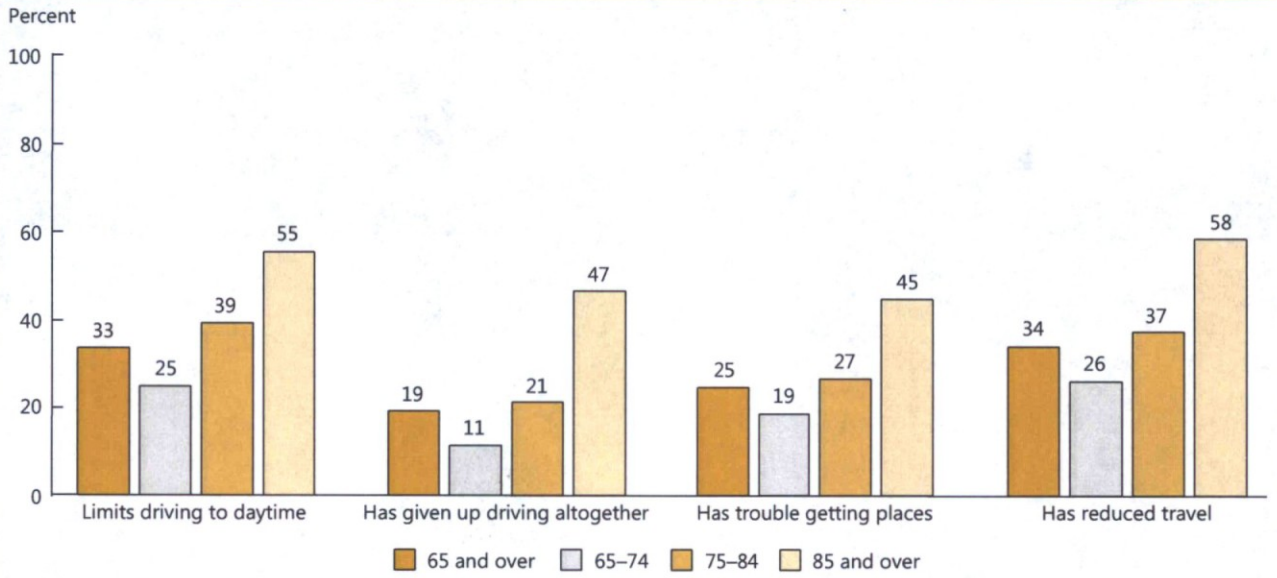
## Key Indicators of Well-Being

FEDERAL INTERAGENCY FORUM ON AGING RELATED STATISTICS

# INDICATOR 41: **Transportation**

The ability to travel independently to appointments, to the grocery store, and to visit friends plays an important role in the daily lives of older adults. For many older adults, the ability to travel independently may change due to health or physical problems. However, access to modes of transportation such as riding with a friend or using public transit may help older adults continue to get the services they need.

**Percentage of noninstitutionalized Medicare beneficiaries age 65 and over who made a change in transportation mode due to a health or physical problem, by type of change and age group, 2013**




Reference population: These data refer to noninstitutionalized Medicare beneficiaries.
SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey, Access to Care.

- In 2013, 33 percent of the noninstitutionalized Medicare population age 65 and over had limited their driving to daytime because of a health or physical problem. The percentage of people who had limited their driving to daytime was greater for those age 85 and over (55 percent) than for those ages 65–74 (25 percent).
- Furthermore, 19 percent of the noninstitutionalized Medicare population age 65 and over had given up driving altogether, about 24 percent had trouble getting places, and 34 percent had reduced their travel because of a health or physical problem.

*Data for this indicator's charts and bullets can be found in Table 41 on page 155.*

# PRELIMINARY SEWER CAPACITY REPORT

# Wolff Legacy Scottsdale

## Assisted Living Facility
## 8890 E Legacy Blvd.
## Scottsdale, AZ 85255

**PRELIMINARY Basis of Design Report**

- ☐ ACCEPTED
- ☑ ACCEPTED AS NOTED
- ☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE
SCOTTSDALE WATER
9379 E San Salvador D
Scottsdale, AZ 8525

Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY scan DATE 3/12/2018

**Prepared For:**

THE WOLFF COMPANY
Since 1949

Registered Professional Engineer (Civil)
CERTIFICATE NO.
45621
ALI SAMIH
FAKIH
Date Signed 11-17-17
ARIZONA, U.S.A.

EXPIRES 12-31-18

**Prepared by:**

SEG

Preliminary Utility Plan calls out 6" sewer. Revise in final version to agree with report.


**Sustainability Engineering Group**
8280 E. Gelding Drive, Suite 101
Scottsdale, AZ 85260
480.588.7226 www.azSEG.com


**Project Number: 170726**

**Submittal Date: November 21, 2017**

**Case No.: 791-PA-2017** **Plan Check No.: TBD**

23-ZN-2017
02/20/2018

# PRELIMINARY SEWER CAPACITY REPORT

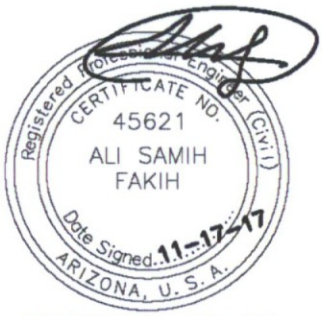
# Wolff Legacy Scottsdale

## Assisted Living Facility
## 8890 E Legacy Blvd.
## Scottsdale, AZ 85255

**Prepared For:**

THE WOLFF COMPANY

Since 1949




EXPIRES 12–31–18

**Prepared by:**

SEG

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8280 E. Gelding Drive, Suite 101
Scottsdale, AZ 85260
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**Project Number: 170726**

**Submittal Date: November 21, 2017**

**Case No.: 791-PA-2017** **Plan Check No.: TBD**


EXPIRES 12-31-18

## TABLE OF CONTENTS:

## LIST OF FIGURES:



## APPENDIX:

# 1. INTRODUCTION

## 1.1 SUMMARY OF PROPOSED DEVELOPMENT:

The proposed development consists of the construction of a new assisted living facility with 151 apartment type units within the north and south larger buildings, a communal area with a theater, salon, and 6,000 sf restaurant in the central building, and 22 cottage units. The purpose of this sewer capacity design report is to provide analysis of the impact that this development will have on the City's sewer system and to obtain a letter of capacity assurance from the City of Scottsdale.

## 1.2 LEGAL DESCRIPTION:

The project is located at 8890 E Legacy Blvd. in Scottsdale, AZ at the northwest corner of E. Legacy Blvd. and N. Pima Rd. The site consists of one parcel of land located in a portion of the SW ¼ of Section 30 and the NW ¼ of Section 31, Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The parcel ID number is 215-07-238 and the parcel net area is 531,822.9 sf (12.209 net acres). Refer to **FIGURE 1 - Vicinity Map** for the project's location with respect to major cross streets.

## 1.3 EXISTING AND PROPOSED SITE ZONING AND LAND USES:

The overall project parcel is zoned C-2 ESL (HD). The land use is designated as commercial. The site is an empty lot and will be developed into an assisted living facility.

## 1.4 REFERENCES:

The project falls within Environmentally Sensitive Lands overlay per C.O.S. zoning.

# 2. DESIGN DOCUMENTATION

## 2.1 DESIGN COMPLIANCE:

The analysis of the proposed and existing sewer system is done in compliance with Chapter 7 – Wastewater of the City of Scottsdale 2010 update of the Design Standards & Policies Manual (DS&PM). Design flow calculations for the on-site system will be based on the recommendations in Section 7-1.403 of the DS&PM.

# 3. EXISTING CONDITIONS

## 3.1 EXISTING ZONING & LAND USE:

Land ownership, as defined by ALTA/NSPS Land Title Survey by AW Land Surveying, LLC dated 11/13/2017 includes 531,822.9 square feet, 12.209 +/- acres (net) of commercially zoned land. City of Scottsdale zoning map designates this parcel as C-2 ESL HD. The C.O.S. conceptual land use map designates this parcel for commercial use.

## 3.2 EXISTING TOPOGRAPHY, VEGETATION AND LANDFORM FEATURES:

This site is an undeveloped parcel. The topography generally slopes from the north east (elevation 1660+/) to the southwest (elevation 1638 +/-) at approximately 2% with a change in elevation of

approximately thirty-eight (38) feet. The site consists of grass, brush, rock, and other desert landscape.

Refer to **FIGURE 2** for an aerial of the overall project existing conditions.

### 3.3 EXISTING UTILITIES:

**Sanitary Sewer: QS 39-49** City of Scottsdale

- A north-south running 8" PVC main is available in N. Pima Road at approximately 8' deep.
- An east-west 10" and 12" PVC main is available along the southern portion of the site in an easement north of E. Legacy Blvd at approximately 9' deep. This main changes from 10" to 12" around the center of the property in a manhole that has not been detected by surveyors.

Refer to **FIGURE 3** for the City quarter section map **(QS 39-49)**

## 4. PROPOSED CONDITIONS

### 4.1 SITE PLAN:

The development is proposed to be 2 new buildings for assisted living units, a community center building, 22 cottages, and parking. Refer to **APPENDIX III** for Utility Plans.

### 4.2 PROPOSED SEWER SYSTEM:

For the purposes of this preliminary report, it is assumed that on-site sewer will consist of the following:

- One 8" main line connected from the Legacy Blvd line at the southern end of the site and running north along the main drive to pick up the building connections.

Refer to **APPENDIX III** for Utility Plans.

### 4.3 MAINTENANCE RESPONSIBILITIES:

The on-site sewer line for the proposed development will be private and maintained by the property owner. The off-site sewer is a public system owned and maintained by the City of Scottsdale.

## 5. SANITARY SYSTEM COMPUTATIONS

### 5.1. SEWER FLOW DEMANDS:

The proposed development is calculated to have 151 apartment units in the two large buildings, one common area with a 6,000 sf restaurant in the central building, and 22 cottage units. The apartment units will be treated as high density condos for the purpose of this report, the cottage units will utilize the residential design flow of 100 gallons per capita per day and the standard 2.5 persons per dwelling unit as outlined in the DS&PM giving an overall flow of 250 gpd per cottage unit.

DS&PM, Chapter 7 – Wastewater specifies the following for each use:

| | |
|---|---|
| Restaurant | 1.2 GPD / sq. ft. |
| High Density Condo | 140 GPD/ room |

Refer to Table 1 below for the proposed design flow:

| *Table 1 - Sewer Demand Calculations - Proposed Conditions* | | | | | |
|---|---|---|---|---|---|
| Use | Units / Area | Average Day Demand Factor (GPD) | Average Day Demand (GPD) | Peaking Factor | Peak Hour (GPD) |
| Apartments | 151 rooms | 140 per room | 21,140 | 4.5 | 95,130 |
| Cottages | 22 bldgs | 250 per bldg | 5,500 | 4 | 22,000 |
| Restaurant | 6,000 sq. ft. | 1.2 per sq. ft. | 7,200 | 6 | 43,200 |
| | | **Total Flows** | **33,840** | | **160,330** |

### 5.2. VARIANCE FROM STATED DESIGN FLOWS:

Stated design flows for the on-site system will be used as recommended.

### 5.3. DEMAND FACTORS:

DS&PM requires a peak factor of 6 for restaurant, 4.5 for high density condo uses, and 4 for residential flow. Refer to Section 5.1, Table 1, above for calculations.

### 5.4. SEWER CAPACITY CALCULATIONS

The sewer capacities have been calculated using FlowMaster V8i. Refer to **APPENDIX II** for pipe calculation output.

The existing 12" line is sloped at approximately 1.25%. Per the FlowMaster Calculation in **Appendix II**, the full flow capacity at a d/D of 0.65 is 1,947,266 GPD. The new flow of 160,330 GPD represents 8.23% of the pipe capacity

The slope of the new 8" sewer line varies from 0.75% to 5% and can take the design flow of 160,330 GPD with d/D equal to 0.22 and 0.14, respectively. The calculations for the capacity of these pipes can be found in **Appendix II**.

## 6. SUMMARY

### 6.1 SUMMARY OF PROPOSED IMPROVEMENTS:

- The proposed wastewater improvement was designed based on the current City of Scottsdale's design standards and policies.
- The impact on the existing 12" line is an increase of 8.23% of full flow (d/D=0.65).
- All new infrastructure on-site will be 8" in size and privately maintained.

### 6.2 PROJECT SCHEDULE:

The infrastructure is proposed to be constructed in a single phase.

# 7 SUPPORTING MAPS

## 7.1 UTILITY PLANS

Refer to **APPENDIX III** for Utility Plans.

# 8 REFERENCES

1. *COS QS Sewer Plan number 39-49*
2. *City of Scottsdale Design Standards & Policies Manual, 2010 (Chapter 7 – Wastewater)*


E-Havasupai-Dr
E-Diamond-Rim-Dr
E-Rimrock-Dr
E-Hualapai-Dr
N-84th-St
N-84th-Pl
N-Grayhawk-Dr
N-88th-Way
N-89th-Pl
E-Maple-Dr
N-90th-St
N-91st-Way
N-92nd-Way
N-92nd-Pl
E-Palm-Tree-Dr
E-Topeka-Dr
N-95th-Pl
N-97th-St
N-98th-Pl
E-Kemper-Way
E-Legacy-Ln
N-98th-St
PROJECT LOCATION
88th-St
E-Princess-Dr
Legacy-Blvd
N-95th-Way
N-94th-Pl
E-Desert-View
E-Desert-Park-Dr
E-Trailside-View
E-Canyon-View
N-Pima-Rd
N-91st-St
E-Iwa-De-Vaquero-Dr
N-93rd-Pl
N-94th-St
N-94th-Way
E-Piedra-Dr
N-96th-Way
E-Puerta-Del-Viento
N-98th-Way
N-99th-St
101
Pima-Fwy
E-Union-Hills-Dr
E-Mayo-Blvd
E-Theresa-Dr
N-85th-St
N-Hayden-Pl

FIGURE 1


E-Downing-Olson-Dr
N-91st-St
E-Rosemonte-Dr
PROJECT
LOCATION
N-90th-Way
E-Rockwood-Dr
N-91st-St
E-Nittany-Dr
E-Union-Hills-Dr
88th-St
E-Princess-Dr
Legacy-Blvd

FIGURE 2

## NOTES TO USERS

This map is for use in administering the Nation Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs) and/or floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

**Coastal Base Flood Elevations** shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

**Boundaries of the floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Arizona State Plane Central zone (FIPSZONE 0202). The **horizontal datum** was NAD 83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. Map users wishing to obtain flood elevations referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29) may use the following Maricopa County website application: http://www.fcd.maricopa.gov/Maps/gismaps/apps/gdacs/application/index.cfm

This web tool allows users to obtain point-specific datum conversion values by zooming in and hovering over a VERTCON checkbox on the layers menu on the left side of the screen. The VERTCON grid referenced in this web application was also used to convert existing flood elevations from NGVD 29 to NAVD 88.

To obtain current elevation, description, and/or location information for National Geodetic Survey bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at http://www.ngs.noaa.gov. To obtain information about Geodetic Densification and Cadastral Survey bench marks produced by the Maricopa County Department of Transportation, please visit the Flood Control District of Maricopa County website at:
http://www.fcd.maricopa.gov/Maps/gismaps/apps/gdacs/application/index.cfm.

**Base map** information shown on this FIRM was derived from multiple sources. Aerial imagery was provided in digital format by the Maricopa County Department of Public Works, Flood Control District. The imagery is dated October 2009 to November 2009. Additional National Agricultural Imagery Program (NAIP) imagery was provided by the Arizona State Land Department (ALRIS) and is dated 2007. The coordinate system used for the production of the digital FIRM is State Plane Arizona Central NAD83 HARN, International Feet.

The **profile base line** depicted on this map represents the hydraulic modeling baselines that match flood profiles in the FIS report. As a result of improved topographic data, the profile base line, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

**Corporate limits** shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community, as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM, visit the **FEMA Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have questions about this map, how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.


## LEGEND

**SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

**FLOODWAY AREAS IN ZONE AE**

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

**OTHER FLOOD AREAS**

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

**OTHER AREAS**

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

**COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**

**OTHERWISE PROTECTED AREAS (OPAs)**

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 12
- 6000000 M — 5000-foot grid ticks: Arizona State Plane coordinate system, central zone (FIPSZONE 0202), Transverse Mercator
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
April 15, 1998

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
December 3, 1997 - September 30, 1998 - July 19, 2001 - September 30, 2005
October 16, 2013 - to add base flood elevation, to add special flood hazard areas, to incorporate previously issued letters of map revision, to add roads and road names, to update corporate limits, to change floodway, to advance suffix, to change base flood elevations, and to add floodway.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

**PANEL 1320L**

# FIRM
## FLOOD INSURANCE RATE MAP
## MARICOPA COUNTY, ARIZONA
## AND INCORPORATED AREAS

**PANEL 1320 OF 4425**
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| MARICOPA COUNTY | 040037 | 1320 | L |
| PHOENIX, CITY OF | 040051 | 1320 | L |
| SCOTTSDALE, CITY OF | 045012 | 1320 | L |

FIGURE 3

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**
**04013C1320L**
**MAP REVISED**
**OCTOBER 16, 2013**

Federal Emergency Management Agency

# *APPENDIX I*

# *Design Requirements*

4. The water line and sanitary sewer line will run parallel to each other, with 9 feet of separation to the pipes' centerline in order to maintain 6 feet of clearance at manholes.
5. Deflections in the sanitary sewer line shall be designed to nominal fitting angles within standard tolerances and will occur at the same locations where the water line is deflected.

See Section 6-1.302 for related water system criteria.

## DESIGN FLOWS

7-1.403

### A. Residential

Sanitary sewer lines 8 to 12 inches in diameter will be designed using 100 gallons per capita per day (gpcpd) and a peaking factor of 4.

Sanitary sewer lines larger than 12 inches in diameter will be designed using 105 gpcpd and a peaking factor developed from "Harmon's Formula":

$$Q_{max} = Q_{avg}\,[1+14 / (4+P1/2)]$$

$$P = Population / 1{,}000$$

Residential densities are to assume 2.5 persons per dwelling unit, apartment or town home.

### B. Commercial and Industrial

Wastewater flows for uses other than those listed below shall be based upon known regional or accepted engineering reference sources approved by the Water Resources Department.

| AVERAGE DAY SEWER DEMANDS | | |
|---|---|---|
| **Land Use** | **Demand** | **Peaking Factor** |
| Commercial/Retail | 0.5 per sq. ft. | 3 |
| Office | 0.4 per sq. ft. | 3 |
| Restaurant | 1.2 per sq. ft. | 6 |
| High Density Condominium | 140 per room | 4.5 |
| Resort Hotel (includes site amenities) | 380 per room | 4.5 |
| School: without cafeteria | 30 per student | 6 |
| School: with cafeteria | 50 per student | 6 |
| Cultural | 0.1 per sq. ft. | 3 |

**FIGURE 7.1-2 AVERAGE DAY SEWER DEMAND IN GALLONS**

## HYDRAULIC DESIGN

7-1.404

No public sanitary sewer lines will be less than 8 inches in diameter unless permission is received in writing from the Water Resources Department.

Sanitary sewer lines should be designed and constructed to give mean full flow velocities of not less than 2.5 fps, based upon Manning's Formula, using an "*n*" value of 0.013.

Conversely, to prevent abrasion and erosion of the pipe material, the maximum velocity will be limited to 10 fps at estimated peak flow. Where velocities exceed this maximum figure, the engineer will be required to submit a hydraulic analysis along with construction recommendations to the Water Resources Department for consideration. In no case will velocities greater than 15 fps be allowed.

Actual velocities will be analyzed under peak flow conditions for each reach of pipe.

# *APPENDIX II*

## *Calculations*

# Worksheet for Design Flow for 8" Pipe @ 0.75%

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.013 | |
| Channel Slope | 0.00750 | ft/ft |
| Diameter | 0.67 | ft |
| Discharge | 160330.00 | gal/day |

## Results

| | | |
|---|---|---|
| Normal Depth | 0.22 | ft |
| Flow Area | 0.10 | $ft^2$ |
| Wetted Perimeter | 0.82 | ft |
| Hydraulic Radius | 0.12 | ft |
| Top Width | 0.63 | ft |
| Critical Depth | 0.23 | ft |
| Percent Full | 33.1 | % |
| Critical Slope | 0.00647 | ft/ft |
| Velocity | 2.46 | ft/s |
| Velocity Head | 0.09 | ft |
| Specific Energy | 0.31 | ft |
| Froude Number | 1.08 | |
| Maximum Discharge | 1.13 | $ft^3/s$ |
| Discharge Full | 1.05 | $ft^3/s$ |
| Slope Full | 0.00042 | ft/ft |
| Flow Type | SuperCritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 33.12 | % |
| Downstream Velocity | Infinity | ft/s |

## Worksheet for Design Flow for 8" Pipe @ 0.75%

### GVF Output Data

| | | |
|---|---|---|
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 0.22 | ft |
| Critical Depth | 0.23 | ft |
| Channel Slope | 0.00750 | ft/ft |
| Critical Slope | 0.00647 | ft/ft |

# Worksheet for Design Flow for 8" Pipe @ 5.00%

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.013 | |
| Channel Slope | 0.05000 | ft/ft |
| Diameter | 0.67 | ft |
| Discharge | 160330.00 | gal/day |

## Results

| | | |
|---|---|---|
| Normal Depth | 0.14 | ft |
| Flow Area | 0.05 | $ft^2$ |
| Wetted Perimeter | 0.63 | ft |
| Hydraulic Radius | 0.08 | ft |
| Top Width | 0.54 | ft |
| Critical Depth | 0.23 | ft |
| Percent Full | 20.5 | % |
| Critical Slope | 0.00646 | ft/ft |
| Velocity | 4.83 | ft/s |
| Velocity Head | 0.36 | ft |
| Specific Energy | 0.50 | ft |
| Froude Number | 2.75 | |
| Maximum Discharge | 2.91 | $ft^3/s$ |
| Discharge Full | 2.70 | $ft^3/s$ |
| Slope Full | 0.00042 | ft/ft |
| Flow Type | SuperCritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 20.47 | % |
| Downstream Velocity | Infinity | ft/s |

## Worksheet for Design Flow for 8" Pipe @ 5.00%

### GVF Output Data

| | | |
|---|---|---|
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 0.14 | ft |
| Critical Depth | 0.23 | ft |
| Channel Slope | 0.05000 | ft/ft |
| Critical Slope | 0.00646 | ft/ft |

# Worksheet for Full Flow for Existing 12" Pipe @ d/D=0.65

## Project Description

| | |
|---|---|
| Friction Method | Manning Formula |
| Solve For | Discharge |

## Input Data

| | | |
|---|---|---|
| Roughness Coefficient | 0.013 | |
| Channel Slope | 0.01250 | ft/ft |
| Normal Depth | 0.65 | ft |
| Diameter | 1.00 | ft |

## Results

| | | |
|---|---|---|
| Discharge | 1947265.61 | gal/day |
| Flow Area | 0.54 | $ft^2$ |
| Wetted Perimeter | 1.88 | ft |
| Hydraulic Radius | 0.29 | ft |
| Top Width | 0.95 | ft |
| Critical Depth | 0.74 | ft |
| Percent Full | 65.0 | % |
| Critical Slope | 0.00876 | ft/ft |
| Velocity | 5.58 | ft/s |
| Velocity Head | 0.48 | ft |
| Specific Energy | 1.13 | ft |
| Froude Number | 1.31 | |
| Maximum Discharge | 4.28 | $ft^3/s$ |
| Discharge Full | 3.98 | $ft^3/s$ |
| Slope Full | 0.00715 | ft/ft |
| Flow Type | SuperCritical | |

## GVF Input Data

| | | |
|---|---|---|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

## GVF Output Data

| | | |
|---|---|---|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 65.00 | % |
| Downstream Velocity | Infinity | ft/s |

## Worksheet for Full Flow for Existing 12" Pipe @ d/D=0.65

### GVF Output Data

| | | |
|---|---|---|
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 0.65 | ft |
| Critical Depth | 0.74 | ft |
| Channel Slope | 0.01250 | ft/ft |
| Critical Slope | 0.00876 | ft/ft |

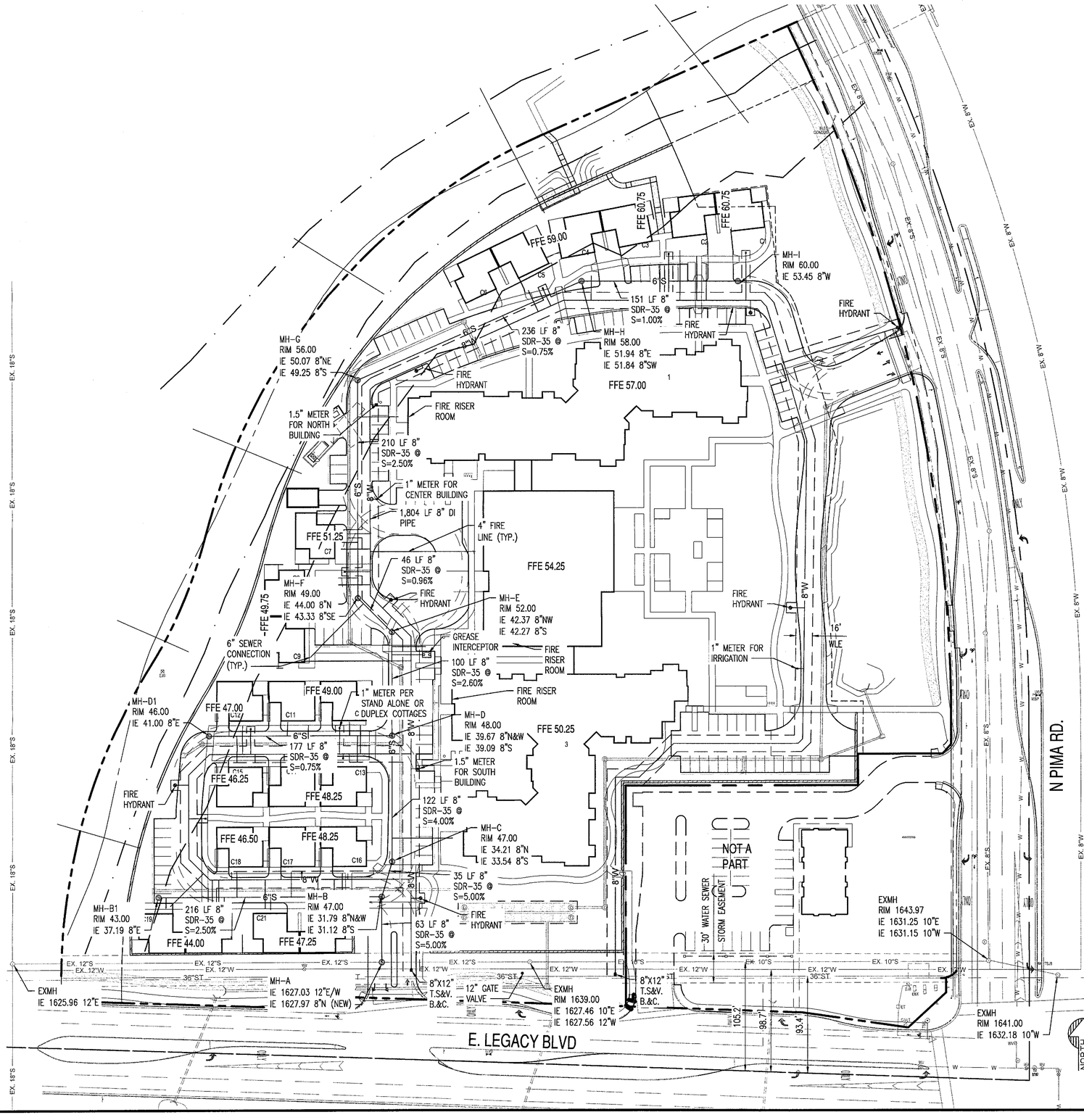
# *APPENDIX III*

## *Utility Plan*

# WOLFF LEGACY SCOTTSDALE

## PRELIMINARY UTILITY PLAN

8890 E LEGACY BLVD SCOTTSDALE, AZ 85255




PROPOSED LEGEND:

- PROPERTY LINE
- 8"W — WATER LINE
- 8"S — SEWER LINE
- FIRE HYDRANT
- SEWER MANHOLE
- GREASE INTERCEPTOR

NORTH

0' 50' 100' 150'

SCALE: 1" = 50'

Call at least two full working days before you begin excavation. ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-600-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

NOTE TO CONTRACTOR:
THIS SET OF DRAWINGS AND DOCUMENTS IS INTENDED AS A SET OF GUIDELINES FOR THE PROJECT AND ARE INTENDED TO BE USED IN CONJUNCTION WITH A SET OF CONSTRUCTION DRAWINGS. THESE DRAWINGS ARE NOT INTENDED TO BE USED AS IS AND TO INCORPORATE ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES INCLUDING FEDERAL A.D.A. REQUIREMENTS. THIS SET ASSUMES THAT THERE ARE NO UNUSUAL SOIL CONDITIONS OR WIND LOADS. THE FAILURE OF THIS CONDITION MAY REQUIRE SIGNIFICANT CHANGES TO THESE DOCUMENTS. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES. CONTRACTOR TO CONTACT ENGINEER WITH QUESTIONS OR CLARIFICATIONS AND WHERE DESIRED. CONTRACTORS SHALL ALSO VISIT THE SITE BEFORE BIDDING. CONTRACTORS ARE REQUIRED TO KNOW ALL OBSERVABLE CONDITIONS AND APPLICABLE CODES.

SEC

8280 E GELDING DR #101, SCOTTSDALE, ARIZONA 85260
WWW.AZSEG.COM TEL. 480.588.7226

THE WOLFF COMPANY
Since 1949

PROJECT: WOLFF LEGACY SCOTTSDALE
LOCATION: 8890 E. LEGACY BLVD. SCOTTSDALE, AZ 85255

| | |
|---|---|
| DRAWN | TAPIA |
| DESIGNED | TAPIA |
| CHECKED | COUNSELL |
| PROJ. MGR. | FAKIH |

DATE: 02/20/18

ISSUED FOR: REZONING & PLAN AMENDMENT

| REVISION NO.: | DATE: |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |

JOB NO.: 170726

SHEET TITLE: PRELIMINARY UTILITY PLAN

SHEET NO.: C4.00

# PRELIMINARY WATER CAPACITY REPORT

# Wolff Legacy Scottsdale

## Assisted Living Facility
## 8890 E Legacy Blvd.
## Scottsdale, AZ 85255

**PRELIMINARY Basis of Design Report**

- ☐ ACCEPTED
- ☑ ACCEPTED AS NOTED
- ☐ REVISE AND RESUBMIT

CITY OF SCOTTSDALE
SCOTTSDALE WATER
9379 E San Salvador Dr.
Scottsdale, AZ 85258

Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY scan DATE 12/15/2017

**Prepared For:**

THE WOLFF COMPANY
Since 1949

**Prepared by:**

Registered Professional Engineer (Civil)
CERTIFICATE NO.
45621
ALI SAMIH
FAKIH
Date Signed 11-21-17
ARIZONA, U.S.A.

EXPIRES 12-31-18

SEG


**Sustainability Engineering Group**
8280 E. Gelding Drive, Suite 101
Scottsdale, AZ 85260
480.588.7226 www.azSEG.com


**Project Number: 170726**

**Submittal Date: November 21, 2017**

**Case No.: 791-PA-2017** **Plan Check No.: TBD**

23-ZN-2017
11/27/17


EXPIRES 12-31-18

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## APPENDIX:

# 1. EXECUTIVE SUMMARY

The proposed development consists of the construction of a new assisted living facility with 151 apartment type units within the north and south larger buildings, a communal area with a theater, salon, and 6,000 sf restaurant in the central building, and 22 cottage units. The purpose of this water capacity design report is to provide analysis of the impact that this development will have on the City's water system.

Water service for the development is to be provided by the City of Scottsdale. An existing 12" ACP water main runs along the southern property line approximately 85' north of Legacy Blvd center line interior to the property. An 8" C900 main runs along Pima Rd 50' east of the street centerline but will not be used for this project. Refer to **Figure 3** for COS Quarter Section map.

A certified fire hydrant flow testing was performed on November 2, 2017, by Arizona Flow Testing LLC at locations as shown on the provided report. The test was performed at 8:00 a.m. Considering a 40 psi safety factor, the fire flow test recorded a static pressure of 72.0 psi and residual pressure of 62.0 psi at 1,842 gpm with a calculated flow at 20 psi of 4,487 gpm. The flow test documentation is included in **Appendix I**.

# 2. INTRODUCTION

## 2.1 PLAN OBJECTIVE:

The purpose of this report is to provide discussions and calculations defining the water system design necessary to comply with the requirements outlined in the City of Scottsdale Design Standards & Policy Manual (DS&PM). Preparation of this report has been done in accordance with Chapter 6 of the DS&PM.

## 2.2 SITE LOCATION

The project property consists of a parcel of land located in a portion of the SW ¼ of Section 30 and the NW ¼ of Section 31, Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The parcel ID number is 215-07-238 and the parcel area is 531,822.9 square feet, 12.209 +/- acres. Refer to **FIGURE 1 - Vicinity Map** for the project's location with respect to major cross streets.

## 2.3 PROPOSED DEVELOPMENT

### 2.3.1 Existing Site Description:

Land ownership, as defined by ALTA/NSPS Land Title Survey by AW Land Surveying, LLC dated 11/13/2017 includes 531,822.9 square feet, 12.209 +/- acres (net) of commercially zoned land. City of Scottsdale zoning map designates this parcel as C-2 ESL HD. The C.O.S. conceptual land use map designates this parcel for commercial use.

This site is an undeveloped parcel. The topography generally slopes from the north east (elevation 1660+/-) to the southwest (elevation 1638 +/-) at approximately 2% with a change in elevation of approximately thirty-eight (38) feet. The site consists of grass, brush, rock, and other desert landscape.

Refer to **FIGURE 2** for an aerial of the overall project existing conditions.

The City of Scottsdale Water & Sewer Quarter Section Map (39-49) shows water mains onsite along Legacy Blvd and in Pima Rd. as follows:

- One 12" ACP water main runs interior to the site approximately 85' north of the centerline along Legacy Blvd.
- One 8" C900 water main runs north/south approximately 50' east side of the centerline along Pima Rd.
- One 12" DIP water main runs north/south along the centerline of Pima Rd.

Refer to **Figure 3** for the COS Water **Quarter Section Map (39-49).**

### 2.3.2 Proposed Site Development:

The development is proposed to be 2 new buildings for assisted living units, a community center building, 22 cottages, and parking. Refer to **APPENDIX III** for Utility Plans.

The 12" ACP along Legacy Blvd will be tapped in two places for an 8" line to create a looped water system onsite. Fire, irrigation, and domestic services will be tapped off the new 8" public waterline created.

## 3. DESIGN CRITERIA

### 3.1 UTILITY DEVELOPER GUIDE CRITERIA

This project is designed in accordance with the City of Scottsdale DS&PM. Refer to **Table 1** below for applicable "Design Criteria for Water Systems".

***Table 1: COS Design Criteria by demand type***

| Land Use | Average Day Demand (gpd) | Max Day Peaking Factor | Peak Hour Peaking Factor |
|---|---|---|---|
| Apts (High Density Condo) | 185.3 / unit | 2 | 3.5 |
| Restaurant | 1.3 / sq. ft. | 2 | 3.5 |
| Cottages (12-22DU/Ac) | 227.6 / sq. ft. | 2 | 3.5 |

The apartments will be treated as high density condo units. The cottages have a building and outside space of approximately 3,000 sf. This equates to about 14.50DU/ac.
(43,560 sf) / (3,000 sf/DU) = 14.52 DU/ac

The water system pressures, velocities, head losses and fire flow are in accordance with the COS DS&PM as follows:

**Minimum Pressures:**

*50 psi residual pressure at the highest delivery point and 30 psi @ max day +fire flow*

**Maximum Pressures:**

*In accordance with the DS&PM, all structures shall have an individual pressure reducing valve on the customer side of the meter.*

**Velocity & Head loss:**

- *10 ft. headloss maximum per 1,000 linear feet of pipe for pipes less than 16 inches in diameter.*

*Hazen-Williams Coefficient* *130 (for new pipes).*

**Fire Flows:**

Based on preliminary development concepts, a 1,500 gpm system fire flow demand is assumed. The fire hydrant flow test in Appendix I and max day + fire flow demand results support this demand.

# 4. DEMANDS

## 4.1 PROJECT USE DESCRIPTION

Refer to **Table 2** below for the proposed water demand calculations based on the design criteria established in *Section 3.1* above.

***Table 2: WATER DEMAND CALCULATIONS***

| | Units or Area (sq. ft.) | ADD (gpd) | Max Day Peaking Factor | Peak Hour Peaking Factor | Avg. Day Demand (GPD) | Max. Day Demand (GPD) | Peak Hour (GPD) |
|---|---|---|---|---|---|---|---|
| Apartments (North) | 71 | 185.3 | 2 | 3.5 | 13,156.3 | 26,312.6 | 46,047.1 |
| Apartments (South) | 80 | 185.3 | 2 | 3.5 | 14,824.0 | 29,648.0 | 51,884.0 |
| Restaurant | 6,000 | 1.3 | 2 | 3.5 | 7,800.0 | 15,600.0 | 27,300.0 |
| Cottages | 22 | 227.6 | 2 | 3.5 | 5,007.2 | 10,014.4 | 17,525.2 |
| | | | | | | | |
| | | TOTAL DEMANDS (GPD): | | | 40,787.5 | 81,575.0 | 142,756.3 |
| | | TOTAL DEMANDS (gpm): | | | 28.3 | 56.6 | 99.1 |

## 4.2 ZONING

Per Figure 6.1-3 in the DS&PM, this project is in pressure zone 5.

## 4.3 PHASING OF DEMANDS

The project is proposed to be constructed in a single phase.

## 4.4 SUMMARY NARRATIVE OF DEMANDS

The demand scenario that governs the design was the peak hour demand.

# 5. EXISTING FACILITIES / CONDITIONS

## 5.1 PREVIOUS MASTER PLANS

No existing master plan or water report is available from COS for this project.

# 6. PROPOSED FACILITIES

## 6.1 DISTRIBUTION SYSTEM PIPING

### 6.1.1 Onsite:

The proposed water supply will consist of approximately 1,804 lf of new 8" water line and approximately 45 lf of new 6" water line to 3 new fire hydrants. The proposed pipe will be DIP in accordance with COS requirements.

Domestic service will be provided to the apartment buildings by 1 ½" meters, the communal area by a 1" meter, single or duplex cottages will be fed by a 1" water meter. Irrigation will be provided by a 1" meter / service connection. All meters, except single cottages, will be provided w/ backflow prevention.

6.1.2 Offsite Infrastructure:
No offsite infrastructure is proposed with this site.

# 7. WATER COMPUTATIONS

## 7.1 DESCRIPTION OF MODEL

The proposed water system is designed to meet the criteria of COS Water, the Arizona Department of Environmental Quality ("ADEQ"), and Maricopa County Environmental Services Department ("MCESD").

Bentley WaterCAD® Version 8i is the computer modeling tool used in this study.

Network analysis input parameters included the following:

1. Pipe diameters (inches)
2. Pipe lengths (feet)
3. Pipes invert elevations (feet)
4. General Purpose Valve to model Water Meter and Double Check Valve Assembly
5. A reservoir and a pump to model the fire flow test performed
6. System demands (gpm)
7. Fire flows (gpm)
8. Model piping is ductile iron pipe using Hazen-Williams frictional losses (C = 130)

Output parameters included but were not limited to:

1. Pressure (psig)
2. Flow rates (gpm)
3. Velocities (fps)
4. Head loss (feet)

## 7.2 ASSUMPTIONS

Please refer to *Section 3.1* for the design criteria.

The general methodology used to design this public water infrastructure consists of modeling a network of water distribution mains to meet COS pressure, head loss, and water demand requirements during daily demands and fire events. The connection to the water system is modeled as a reservoir and pump. The pump will simulate the pressure drop and the available flow from the existing water system as depicted by the fire flow test. Refer to **APPENDIX I** for a copy of the fire flow test results.

Irrigation, water feature, and pool filling if applicable are from a dedicated service and meter. It is assumed that these water uses occur during low peak hours and are therefore not considered in this modeling.

### 7.3 SUMMARY OF RESULTS

A summary of the modeling results is presented below in **Table 3**. Detailed WaterCAD® results are presented in **Appendix III**.

***Table 3: WaterCAD® Analysis Results***

| Demand Scenario | Water Demand (GMP) | Pressure (PSIG) | | | | Velocity (ft/s) | Pipe ID |
|---|---|---|---|---|---|---|---|
| | | Min. | Node | Max. | Node | | |
| Average Day | 28.3 | 67 | J-6 | 74 | J-1 | 0.13 | P-1 |
| Maximum Day | 56.6 | 67 | J-6 | 74 | J-1 | 0.25 | P-1 |
| Peak Hour | 99.1 | 67 | J-6 | 74 | J-1 | 0.44 | P-1 |
| Max. + Fire Flow | 1500 + Max day | 30 | J-8 | N/A | N/A | N/A | N/A |

These results indicate that the proposed water system meets *COS DS&PM* for daily water usage and fire flow events.

## 8. SUMMARY / CONCLUSIONS

### 8.1 CONFORMANCE TO DESIGN GOALS

- The proposed water main is designed in accordance with COS design standards and policies[2].
  - Minimum 50 psi static, 30 psi @ peak hour required, 67 psi provided.
  - Minimum 30 psi (10 psi fs) @ max+ fire flow required, 30 psi provided.
  - 10 fps maximum velocity is not exceeded.
  - The system supports the minimum 1,500 gpm fire flow requirements.
- It is shown in section 7.3 that the proposed water system meets the COS criteria for Daily water usage and fire flow events as described in Section 3.1.

### 8.2 REQUIRED FACILITIES AND PHASING

- Proposed facility improvements for this project are limited to a new 8" DIP on-site water line loop connection, 14 new 1" domestic water meters, 2 new 1.5" domestic water meters, a new 1" landscape meter, and 3 new fire hydrants.
- This project will be constructed in a single phase.

## 9. REFERENCES

1. *COS QS Water Plan number 39-49*
2. *City of Scottsdale Design Standards & Policies Manual, 2010 (Chapter 6 – Water)*

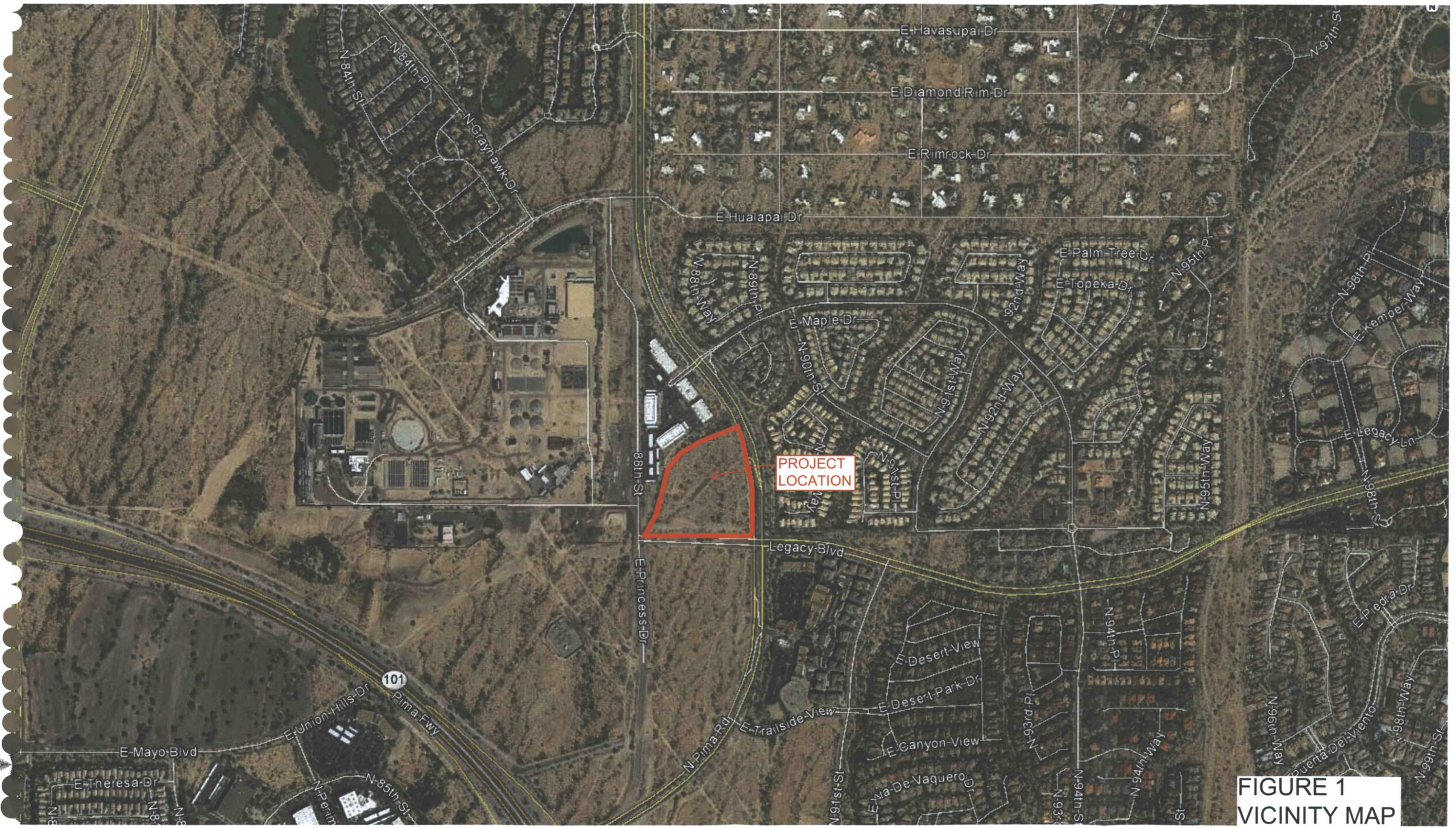



FIGURE 1
VICINITY MAP


FIGURE 2
AERIAL

40-49

39-48

39-50

PROJECT LOCATION

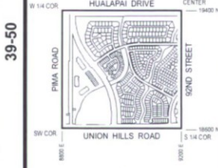
**GENERAL NOTES:**

- THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7760.
- THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS 'CALCULATED ON THE MAP.

## LEGEND:

- Air Release Valve
- Non-potable Air Release Valve
- Blowoff
- Cap
- Cathodic Protection
- Fill Drain
- Fire Hydrant
- Non-GPS Point
- Pressure Reducing Valve
- Pump
- Reducer
- Sample Station
- Water Manhole
- Non-Potable Manhole
- Well
- Valve
- Non-potable Valve
- Vault
- Water Main
- Non-Potable Main
- Fire / Private Main
- Non-Scottsdale Main

VICINITY MAP




NORTH

SCALE: 1" = 100'

0 50 100 200

The map scale of 1" = 100' is based on a full size print of 30" x 36"

# WATER

QUARTER SECTION MAP

# 39-49

SW 1/4 SEC. 30 T4N R5E

FIGURE 3

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS
3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

**N O T I C E**

THIS DOCUMENT IS PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY. THE CITY OF SCOTTSDALE DOES NOT WARRANT THE ACCURACY OR SUITABILITY OF THIS MAP FOR ANY PARTICULAR PURPOSE. IT SHOULD NOT BE RELIED UPON WITHOUT FIELD VERIFICATION.

THE CITY OF SCOTTSDALE

29-OCT-17

# *APPENDIX I*

# *Flow Test Data*

# Arizona Flow Testing LLC

## HYDRANT FLOW TEST REPORT

| | |
|---|---|
| Project Name: | Not Provided |
| Project Address: | Pima Rd. & Legacy (NWC), Scottsdale, Arizona 85255 |
| Client Project No.: | Not Provided |
| Arizona Flow Testing Project No.: | 17242 |
| Flow Test Permit No.: | C54157 |
| Date and time flow test conducted: | November 2, 2017 at 8:00 AM |
| Data is current and reliable until: | May 2, 2018 |
| Conducted by: | Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154) |
| Witnessed by: | Larry Frandle –City of Scottsdale-Inspector (602-828-0847) |

**Raw Test Data**

Static Pressure: **112.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **102.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **24.0 PSI**
(Measured in pounds per square inch)

Diffuser Orifice Diameter: One (4 inch) Hose Monster
(Measured in inches)

Coefficient of Diffuser: .7875

Flowing GPM: **1,842 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **6,105 GPM**

**Data with 40 PSI Safety Factor**

Static Pressure: **72.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **62.0 PSI**
(Measured in pounds per square inch)

Scottsdale requires a maximum Static Pressure of 72 PSI for AFES Design.

Distance between hydrants: Approx. 920 Feet

Main size: Not Provided

Flowing GPM: **1,842 GPM**

GPM @ 20 PSI: **4,487 GPM**

**Flow Test Location**

North


North Pima Road

Project Site
Pima Rd. & Legacy
(NWC)

Legacy Blvd.

Flow Fire Hydrant

East Rockwood Drive

North 90th Way

Pressure Fire Hydrant

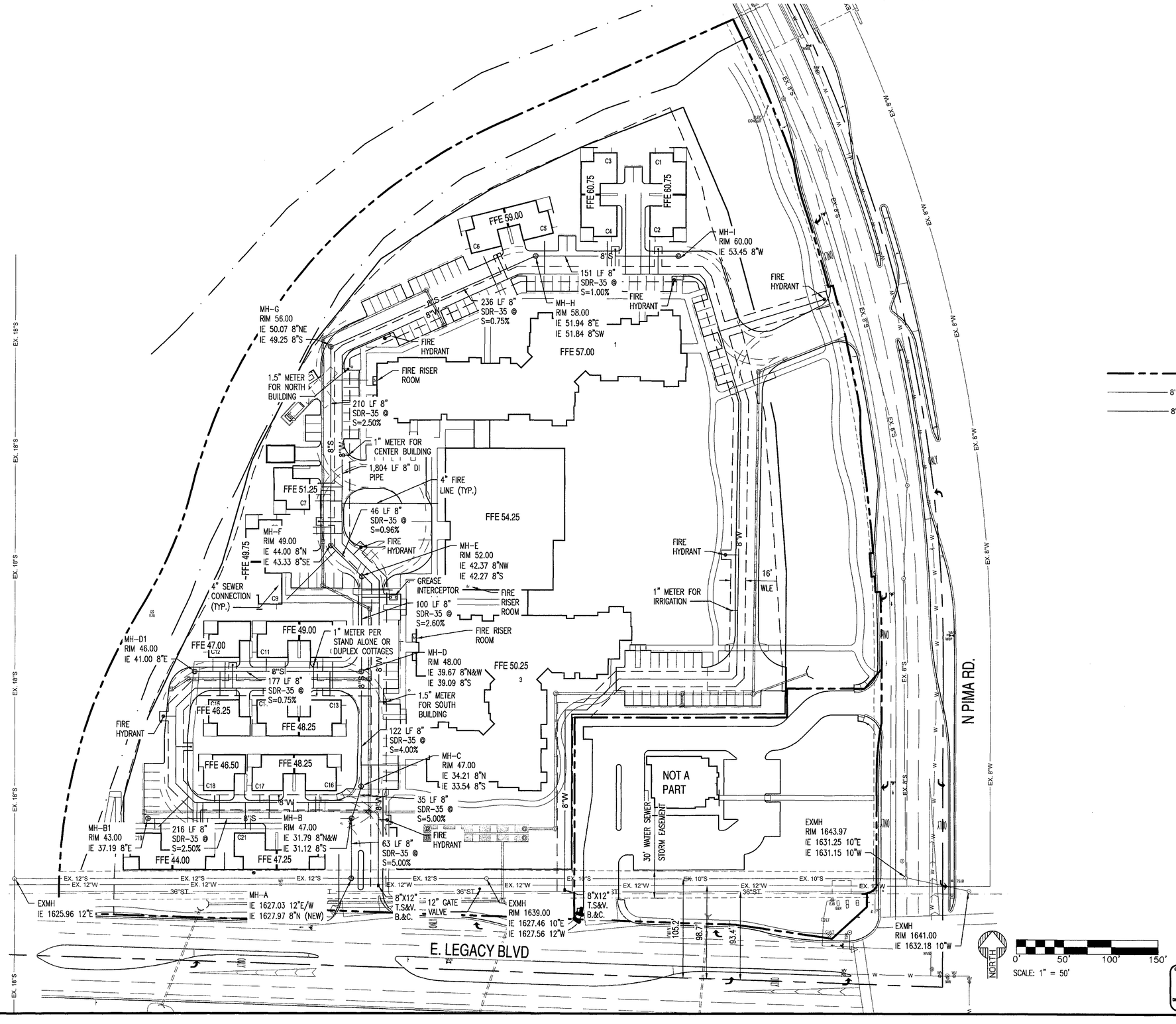
# *APPENDIX II*

## *Utility Plan*

# WOLFF LEGACY SCOTTSDALE

## PRELIMINARY UTILITY PLAN

8890 E LEGACY BLVD SCOTTSDALE, AZ 85255




PROPOSED LEGEND:

- PROPERTY LINE
- 8"W — WATER LINE
- 8"S — SEWER LINE
- FIRE HYDRANT
- SEWER MANHOLE
- GREASE INTERCEPTOR

Call at least two full working days before you begin excavation. ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County (602) 263-1100

NOTE TO CONTRACTOR:
THIS SET OF DRAWINGS AND DOCUMENTS IS INTENDED AS A SET OF GUIDELINES FOR THE PROJECT AND ARE INTENDED TO BE USED IN CONJUNCTION WITH A SET OF CONSTRUCTION SPECIFICATIONS TO BE SUPPLIED BY OWNER. THEY MUST BE READ TO INCORPORATE ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES AND REGULATIONS. THE CONTRACTOR SHALL VERIFY THAT THE PLANS AND DETAILS ARE NO UNUSUAL SOIL CONDITIONS OR AREA LOADS. THE FAILURE OF THIS CONDITION MAY REQUIRE SIGNIFICANT CHANGES TO THESE DOCUMENTS.
IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO CONFORM TO ALL APPLICABLE CODES AND TO INFORM THE OWNER/ARCHITECTS OF ANY QUESTIONS REGARDING THE PLANS AND DETAILS. CONTRACTORS SHALL ALSO VISIT THE SITE BEFORE BIDDING. CONTRACTORS ARE REQUIRED TO KNOW ALL OBSERVABLE CONDITIONS AND APPLICABLE CODES.

SEG

8280 E GELDING DR #101 SCOTTSDALE, ARIZONA 85260
WWW.AZSEG.COM TEL 480.588.7226

THE WOLFF COMPANY
Since 1949

PROJECT
WOLFF SCOTTSDALE LEGACY

LOCATION
8890 E LEGACY BLVD.
SCOTTSDALE, AZ 85255

| | |
|---|---|
| DRAWN | POUNDS |
| DESIGNED | POUNDS |
| CHECKED | COUNSELL |
| PROJ. MGR. | FAKIH |

DATE: 11/20/17

ISSUED FOR: REZONING & PLAN AMENDMENT

| REVISION NO.: | DATE: |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |

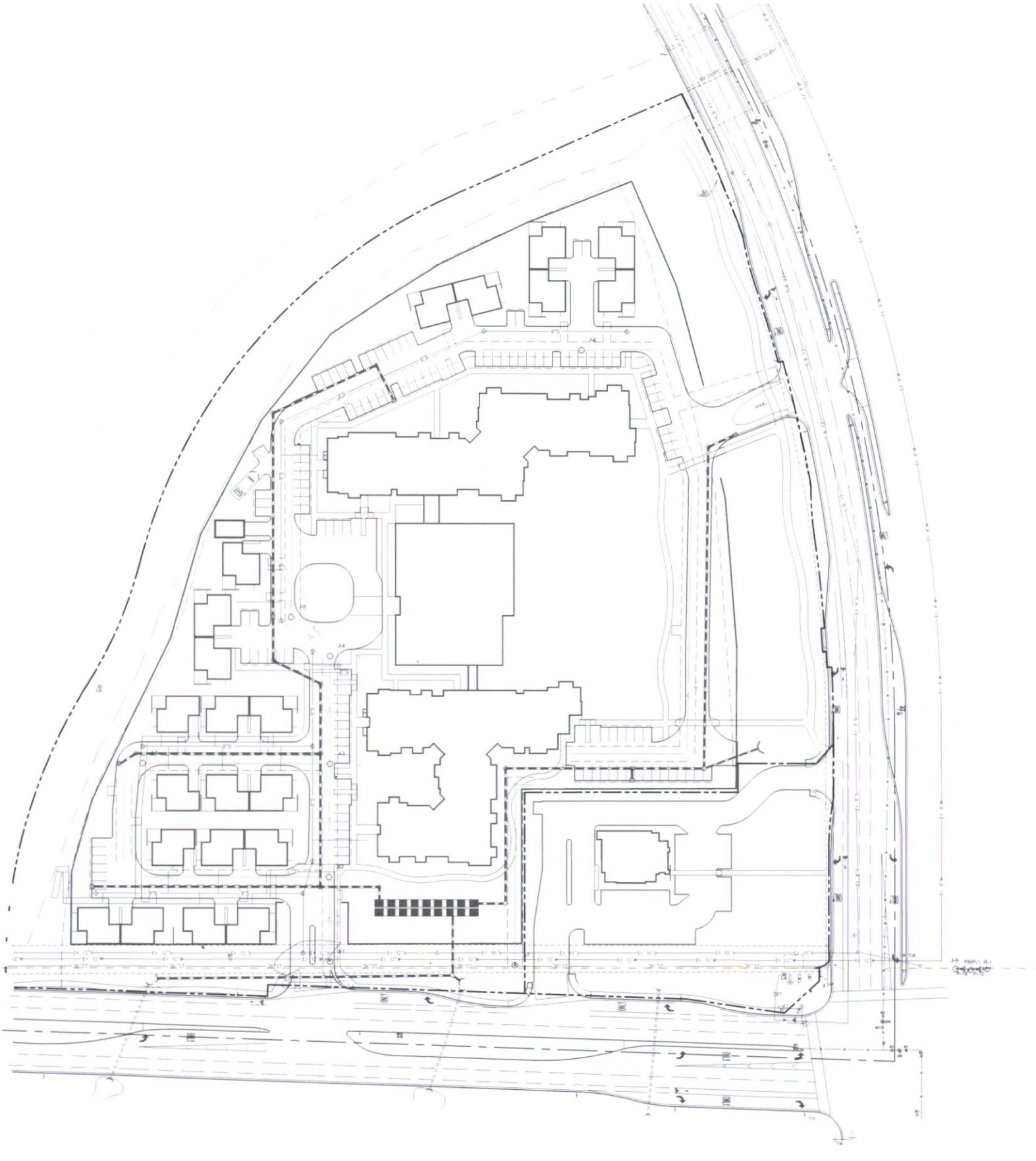
JOB NO.: 170726

SHEET TITLE: PRELIMINARY UTILITY PLAN

SHEET NO.: C4.00

# *APPENDIX III*

# *Water Model Calculations*



8" PIPE

12" PIPE

# Pump Definition Detailed Report: Fire Flow Test
## Active Scenario: Peak Hour Scenario

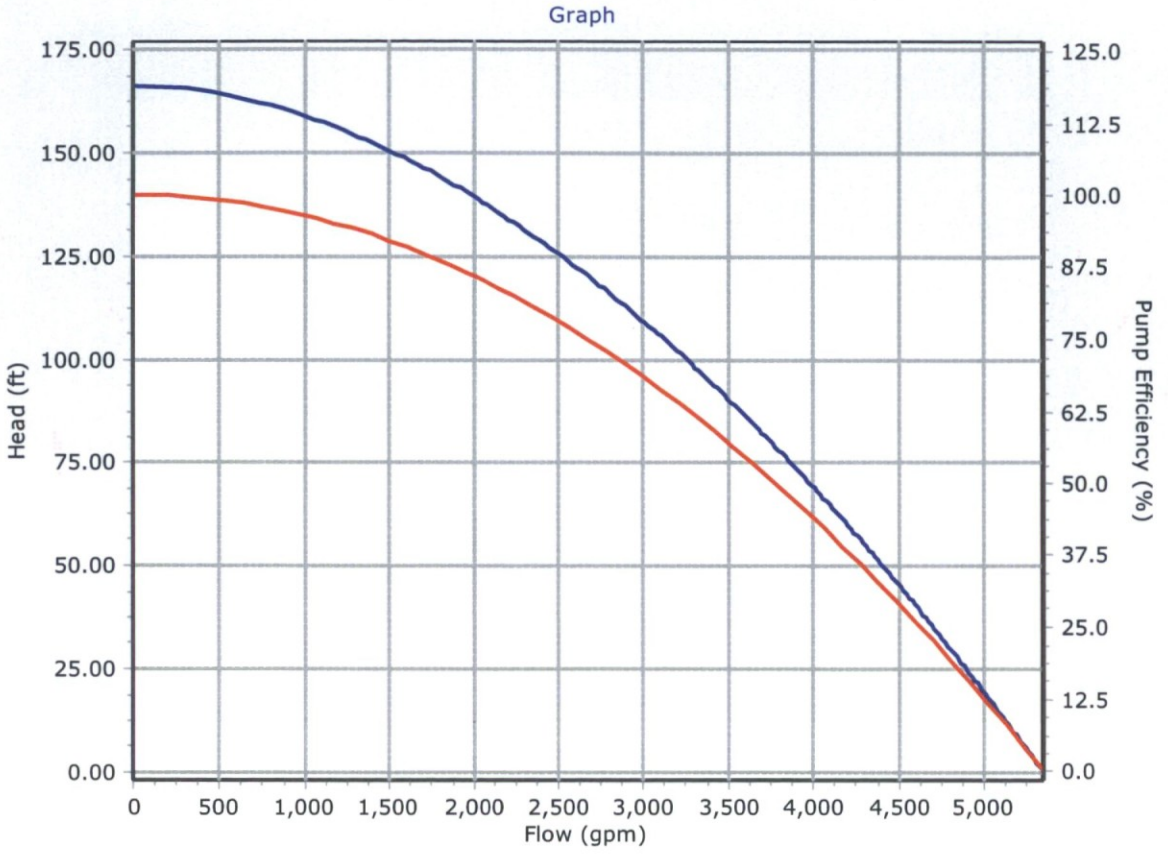
| Element Details | | | |
|---|---|---|---|
| ID | 65 | Notes | |
| Label | Fire Flow Test | | |

| Pump Definition Type | | | |
|---|---|---|---|
| Pump Definition Type | Standard (3 Point) | Design Head | 143.22 ft |
| Shutoff Flow | 0 gpm | Maximum Operating Flow | 4,487 gpm |
| Shutoff Head | 166.32 ft | Maximum Operating Head | 46.20 ft |
| Design Flow | 1,842 gpm | | |

| Pump Efficiency Type | | | |
|---|---|---|---|
| Pump Efficiency Type | Best Efficiency Point | Motor Efficiency | 100.0 % |
| BEP Efficiency | 100.0 % | Is Variable Speed Drive? | False |
| BEP Flow | 0 gpm | | |

| Transient (Physical) | | | |
|---|---|---|---|
| Inertia (Pump and Motor) | 0.000 lb·ft² | Specific Speed | SI=25, US=1280 |
| Speed (Full) | 0 rpm | Reverse Spin Allowed? | True |

# Pump Definition Detailed Report: Fire Flow Test
## Active Scenario: Peak Hour Scenario



# FlexTable: Junction Table

## Active Scenario: Average Day Demand Scenario

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|
| J-1 | 40.00 | 0 | 210.81 | 74 |
| J-2 | 47.50 | 0 | 210.81 | 71 |
| J-3 | 47.75 | 10 | 210.81 | 71 |
| J-4 | 45.50 | 2 | 210.81 | 72 |
| J-5 | 49.00 | 0 | 210.81 | 70 |
| J-6 | 56.00 | 10 | 210.81 | 67 |
| J-7 | 43.00 | 0 | 210.81 | 73 |
| J-8 | 52.00 | 5 | 210.81 | 69 |
| J-9 | 43.00 | 0 | 210.81 | 73 |

# FlexTable: Pipe Table

## Active Scenario: Average Day Demand Scenario

| Label | Length (Scaled) (ft) | Start Node | Stop Node | Diameter (in) | Hazen-Williams C | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|---|---|---|---|---|---|---|---|---|
| P-1 | 90 | J-1 | J-2 | 8.0 | 130.0 | 20 | 0.13 | 0.000 |
| P-2 | 120 | J-2 | J-3 | 8.0 | 130.0 | 13 | 0.08 | 0.000 |
| P-3 | 195 | J-3 | J-4 | 8.0 | 130.0 | -5 | 0.03 | 0.000 |
| P-4 | 332 | J-4 | J-2 | 8.0 | 130.0 | -7 | 0.04 | 0.000 |
| P-6 | 523 | J-5 | J-6 | 8.0 | 130.0 | 1 | 0.01 | 0.000 |
| P-7 | 902 | J-6 | J-7 | 8.0 | 130.0 | -9 | 0.06 | 0.000 |
| P-8 | 197 | J-7 | J-1 | 12.0 | 130.0 | 20 | 0.06 | 0.000 |
| P-9 | 114 | J-3 | J-8 | 8.0 | 130.0 | 7 | 0.05 | 0.000 |
| P-10 | 58 | J-8 | J-5 | 8.0 | 130.0 | 2 | 0.01 | 0.000 |
| P-12 | 17 | PMP-1 | R-1 | 24.0 | 130.0 | -28 | 0.02 | 0.000 |
| P-13 | 465 | J-7 | J-9 | 12.0 | 130.0 | -28 | 0.08 | 0.000 |
| P-14 | 16 | J-9 | PMP-1 | 24.0 | 130.0 | -28 | 0.02 | 0.000 |

# FlexTable: Pump Table

## Active Scenario: Average Day Demand Scenario

| Label | Elevation (ft) | Pump Definition | Status (Initial) | Hydraulic Grade (Suction) (ft) | Hydraulic Grade (Discharge) (ft) | Flow (Total) (gpm) | Pump Head (ft) |
|---|---|---|---|---|---|---|---|
| PMP-1 | 44.50 | Fire Flow Test | On | 44.50 | 210.81 | 28 | 166.31 |

# FlexTable: Reservoir Table

## Active Scenario: Average Day Demand Scenario

| Label | Elevation (ft) | Flow (Out net) (gpm) | Hydraulic Grade (ft) |
|---|---|---|---|
| R-1 | 44.50 | 28 | 44.50 |

# Fire Flow Node FlexTable: Fire Flow Report
## Active Scenario: Max Day + Fire Flow Scenario

| Label | Fire Flow (Needed) (gpm) | Fire Flow (Available) (gpm) | Pressure (Calculated Residual) (psi) | Junction w/ Minimum Pressure (System) | Velocity of Maximum Pipe (ft/s) |
|---|---|---|---|---|---|
| J-1 | 1,500 | 3,468 | 34 | J-6 | 10.00 |
| J-2 | 1,500 | 1,895 | 56 | J-6 | 10.00 |
| J-3 | 1,500 | 1,997 | 53 | J-6 | 10.00 |
| J-4 | 1,500 | 1,943 | 54 | J-6 | 10.00 |
| J-5 | 1,500 | 2,244 | 46 | J-6 | 10.00 |
| J-6 | 1,500 | 2,704 | 30 | J-8 | 8.98 |
| J-7 | 1,500 | 3,468 | 34 | J-6 | 10.00 |
| J-8 | 1,500 | 2,164 | 47 | J-6 | 10.00 |
| J-9 | 1,500 | 3,500 | 39 | J-6 | 2.52 |

# FlexTable: Junction Table

## Active Scenario: Peak Hour Scenario

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|---|---|---|---|---|
| J-1 | 40.00 | 0 | 210.70 | 74 |
| J-2 | 47.50 | 0 | 210.69 | 71 |
| J-3 | 47.75 | 36 | 210.68 | 70 |
| J-4 | 45.50 | 7 | 210.68 | 71 |
| J-5 | 49.00 | 2 | 210.68 | 70 |
| J-6 | 56.00 | 35 | 210.68 | 67 |
| J-7 | 43.00 | 0 | 210.70 | 73 |
| J-8 | 52.00 | 19 | 210.68 | 69 |
| J-9 | 43.00 | 0 | 210.72 | 73 |

# FlexTable: Pipe Table

## Active Scenario: Peak Hour Scenario

| Label | Length (Scaled) (ft) | Start Node | Stop Node | Diameter (in) | Hazen-Williams C | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|---|---|---|---|---|---|---|---|---|
| P-1 | 90 | J-1 | J-2 | 8.0 | 130.0 | 69 | 0.44 | 0.000 |
| P-2 | 120 | J-2 | J-3 | 8.0 | 130.0 | 46 | 0.29 | 0.000 |
| P-3 | 195 | J-3 | J-4 | 8.0 | 130.0 | -16 | 0.10 | 0.000 |
| P-4 | 332 | J-4 | J-2 | 8.0 | 130.0 | -23 | 0.15 | 0.000 |
| P-6 | 523 | J-5 | J-6 | 8.0 | 130.0 | 5 | 0.03 | 0.000 |
| P-7 | 902 | J-6 | J-7 | 8.0 | 130.0 | -30 | 0.19 | 0.000 |
| P-8 | 197 | J-7 | J-1 | 12.0 | 130.0 | 69 | 0.20 | 0.000 |
| P-9 | 114 | J-3 | J-8 | 8.0 | 130.0 | 26 | 0.16 | 0.000 |
| P-10 | 58 | J-8 | J-5 | 8.0 | 130.0 | 7 | 0.04 | 0.000 |
| P-12 | 17 | PMP-1 | R-1 | 24.0 | 130.0 | -99 | 0.07 | 0.000 |
| P-13 | 465 | J-7 | J-9 | 12.0 | 130.0 | -99 | 0.28 | 0.000 |
| P-14 | 16 | J-9 | PMP-1 | 24.0 | 130.0 | -99 | 0.07 | 0.000 |

# FlexTable: Pump Table

## Active Scenario: Peak Hour Scenario

| Label | Elevation (ft) | Pump Definition | Status (Initial) | Hydraulic Grade (Suction) (ft) | Hydraulic Grade (Discharge) (ft) | Flow (Total) (gpm) | Pump Head (ft) |
|---|---|---|---|---|---|---|---|
| PMP-1 | 44.50 | Fire Flow Test | On | 44.50 | 210.72 | 99 | 166.22 |

# FlexTable: Reservoir Table

## Active Scenario: Peak Hour Scenario

| Label | Elevation (ft) | Flow (Out net) (gpm) | Hydraulic Grade (ft) |
|---|---|---|---|
| R-1 | 44.50 | 99 | 44.50 |