Drainage Reports

Abbreveated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application

Engineering

FINAL WATER & WASTE WATER BASIS OF DESIGN REPORT

FOR
WILSHIRE TOWN HOMES
7121 E. WILSHIRE DRIVE, SCOTTSDALE AZ 85251
APN 129-05-010D
COS Case # 11-DR-2017

Prepared For:
7121 WILSHIRE LLC
15 W 580 N FRONTAGE RD
BURR RIDGE IL 60527

Prepared By:
EVEREST CONSULTING SERVICES PC

7555 S. Parkcrest St.
Gilbert, AZ 85298
Tel: 623-533-0334

Revised April 2019

FINAL Basis of Design Report

☐ APPROVED
☑ APPROVED AS NOTED
☐ REVISE AND RESUBMIT

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

Disclaimer: If approved; the approval is granted under the condition that the final construction documents submitted for city review will match the information herein. Any subsequent changes in the water or sewer design that materially impact design criteria or standards will require re-analysis, re-submittal, and approval of a revised basis of design report prior to the plan review submission.; this approval is not a guarantee of construction document acceptance.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY ldillon **DATE** 4/30/2019

For improvement plan submittal address all comments shown on utility plan herein (second to last page).

Registered Professional Engineer (Civil)
CERTIFICATE NO.
31577
PUNYA P.
KHANAL
Date Signed 4/29/2019
ARIZONA, U.S.A.

Punya P. Khanal

EXPIRES 6-30-2021

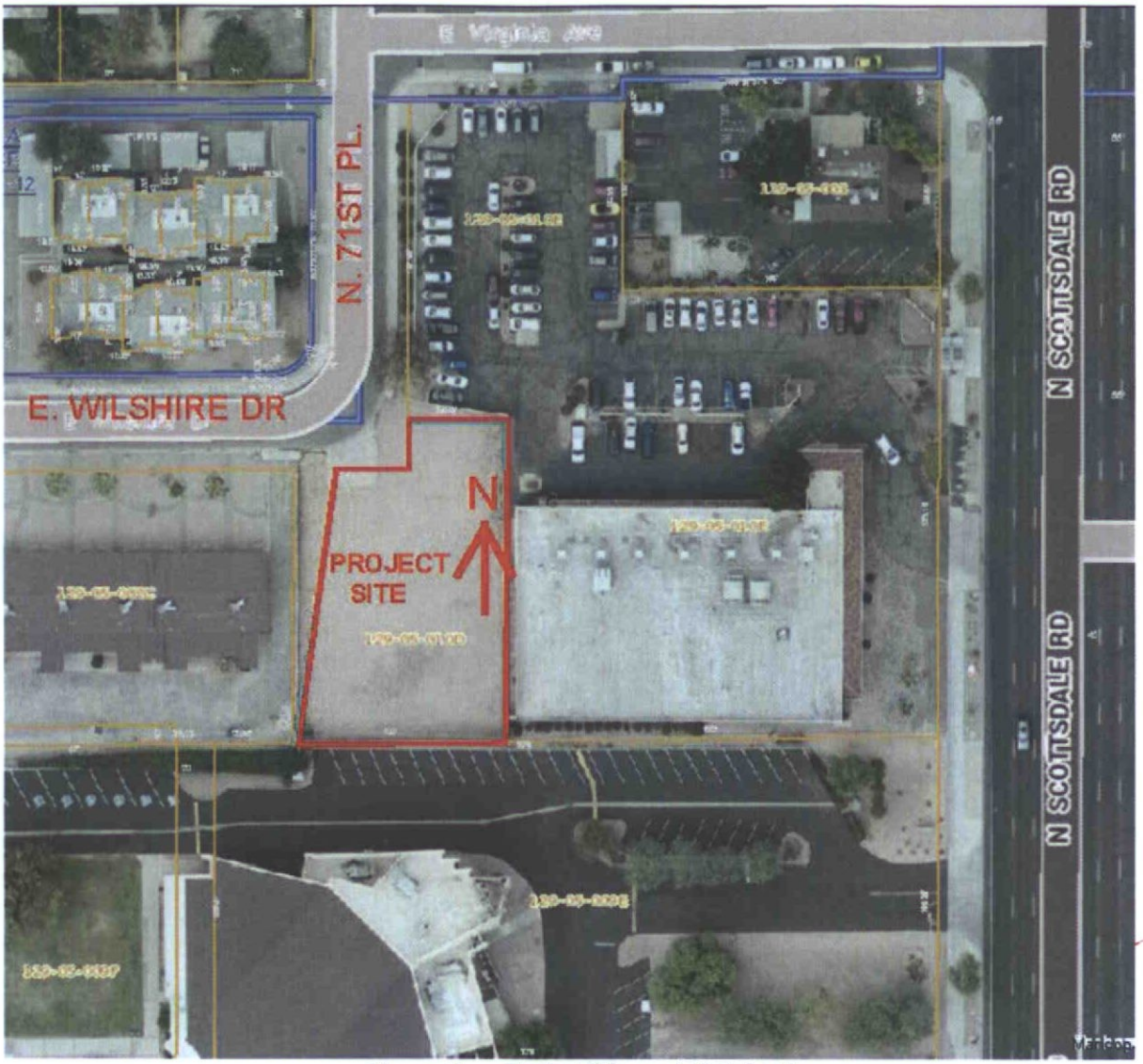


Figure 1: *Project Site and Vicinity Map*

Fire hydrant **FH1** covers the west side of the proposed development. From the topographic survey map, we measured the ground laid distance of **FH1** from the north west and southwest corners of the proposed building units and found that FH1 to be approximately 270 ft. from the SW corner of the southwest building and 145 ft. from the NW corner of the northwest building unit. Thus, the existing fire hydrant seems to provide adequate cover for fire service to the west side of the property.

Fire hydrant **FH2** covers the east side of the proposed development. We measured the ground laid distance of hydrant FH2 on Google map and found FH2 to be approximately 285 ft. from the NE corner of the NE building measured around the parking lot on the north side of the Pep Boys building. Ground laid distance of FH2 from the SE corner of SE building was approximately 285 ft. Thus, the existing Fire hydrants FH1 and FH2 being within 300 feet from the proposed site indicate that we will not need a separate fire hydrant within the property.

2.3 Existing Sewer Infrastructure

Existing sewer infrastructure consists of a sewer manhole near the southwest property corner with a 6" VCP sewer line connecting to the manhole and running north-south along the alley fronting the west side of the project parcel. This 6" VCP line connects with an 8" VCP line that runs along Wilshire Drive approximately 8.5' south of the Street centerline. There is an existing sewer service lateral for the project site. COS water and sewer utility map shows the service lateral to the parcel located at STA 1+15. City of Scottsdale quarter section utility map for QS14-44 is included as **EXHIBIT-2** to this report.

3 PROPOSED DEVELOPMENT

The developer wants to develop the site with 5 units of two-story townhomes with roof decks. Each town home will have approximately 2000 SF of living space with approximately 800 SF of roof terrace. The development will also have approximately 6,300 SF of open space.

4 PAST DEVELOPMENT

The existence of water and sewer mains along the main streets and service laterals to the project site indicated the possibility that the site may have been developed in the past. Review of the aerial photos of the site from past years showed a building and some sheds to be present on the site between the years 2011 and 2014. The building appears to have been demolished sometimes between 2014 and 2015.

5 PROPOSED UTILITY MODIFICATIONS

Wilshire Townhomes proposes to extend the existing 6" water line along 71st Place (and capped at the south end of the elbow bend) to the south along the new access driveway and tap off individual service lines from the newly extended 6-inch main line. Two 1 inch individual building service lines with 1-inch meter box and 1inch back flow preventer are tapped off to the new 6-inch main north of the private drive and the remaining 3 1' service lines with 1inch meter box and 1inch back flow preventer are tapped off to the south side of the private drive as shown in the revised site utility plan included as **EXHIBIT-3** to this report. The new 6-inch water main will be a class 350 DIP pipe. All 1-inch service lines shall be type K copper pipe. A 1-inch service line with 1-inch meter box and 1-inch back flow preventer is also provided for the landscaping need. It is extended from the backflow preventer and capped at end (refer to water construction note 6 in **EXHIBIT-3**.

As a proposed change to the sewer service lateral we propose to abandon the existing sewer service later of unknown size and replace with a 6-inch diameter collector pipe from the 6-inch VCP line along the west alley and run the 6-inch diameter collector pipe along the center of the private driveway and cap at the east end as shown in **EXHIBIT 3**. Individual building services shall be connected from this collector pipe to each building unit as shown in the accompanying site utility plan. With all the water and sewer infrastructure in place and the total developed area being less than one half of one acre, there is no need for extending water or sewer lines beyond the project site.

6 ESTIMATE OF WATER NEEDS/DEMAND

The water demand for the project is estimated using the criteria set forth in City of Scottsdale DS&PM. Applicable sections of the Manual pertaining to the type of use and/or modeling scenario are also cited as needed.

Scenario 1: Average Day Demand: By land use classification, the project is a residential project. 5 units are proposed in the gross lot area of 18891 SF. This translates into 11.5 dwelling units per acre or 11.5 DU/ac. This corresponds to the row corresponding to 8-11.9DU/ac residential land use Table in Figures 6-1.2 of the COS DP&SM for the Average Day Water Demands.

Therefore, from Figure 6-1.2, for the average day demand scenario,

Residential average demand per dwelling unit = 227.6 gallons per day (GPD)/du = 0.33 gallons per minutes (GPM) assuming a 12 hour active water use period per 24-hour day.

For 5 units, total average day demand would be 5*0.33 = 1.65 GPM

Scenario 2: Peak Hour Demand: Using a peaking factor of 3.5, from section 6-1.404 of the DS&PM.

Residential peak demand per dwelling unit = 3.5*0.33 = 1.155 GPM.

For 5 units, total peak hour demand would be 1.155*5=5.78 GPM

Scenario 3: Maximum Day Demand: Maximum Day Demand includes total maximum day demand per section 6-1.404 of DS&PM plus the fire flow requirements per section 6-1.501 of the DS&PM, a minimum of 500 GPM is required for the one or two-family residential properties with interior fire sprinkler systems.

Using a maximum day factor of 2,

For 5 units, total maximum day demand would be 2*0.33*5 = 3.3 GPM

Hence the Maximum Day Demand for scenario 3 = 500+3.3 GPM = 503.3 GPM.

It is obvious that the most demanding scenario is the maximum Day Demand of 503.3 GPM.

Using a conversion factor of 448.83 GPM = 1 CFS, required flow = 503.3/448.83 = 1.12 CFS.
Assuming a maximum flow velocity of 10 fps under fire protection condition, and assuming a single service connection for fire and domestic services, the minimum size of the water pipe flowing full would be: $D = [(4 \times 1.12) / (3.14159 \times 10)]^{0.5} = 0.377$ ft. = 12*0.377 =4.5"
The new 6-inch DIP water main extended from the existing 6-inch ACP main will be adequate tom meet the required water demand.
Thus, the existing infrastructure is adequate and a detailed hydraulic modeling is not required.

7. HYDRANT FLOW TEST

To meet the requirements in section 6-1.405 of the COS DS&PM, a fire flow test was done on March 21, 2019. The flow hydrant was considered to be the existing hydrant located at the southwest corner of North 70th Street and East Virginia Avenue (designated as **FH3** in **Exhibit 2**) and the pressure hydrant was considered to be the existing hydrant located on the north side of Wilshire Drive (designated as **FH1** in **Exhibit 2**). A static pressure of 90 psi and a residual pressure of 81 psi was measured with a flow rate of 2542 GPM. Please refer to **EXHIBIT 4** for fire flow test data and location. As can be seen from the hydrant flow data that the existing system provides both the necessary flow and pressures required to service the 5 units.

8 PROPOSED SEWER PIPES FOR WASTEWATER FLOW

Because of the State code requirement that all gravity sewer lines 6" in diameter or smaller have a minimum flow velocity of 3 ft/sec when flowing full, we propose to use a 6" diameter SDR 35 PVC sewer line at a slope of 1.2% to collect sewer flow from individual units. Using Manning's equation and a pipe roughness coefficient of 0.013 (typical for all PVC pipes), the flow velocity is calculated as shown in Figure 2.

Velocity of Flow for proposed 6-inch SS pipe per State code criteria using Manning's equation

Manning's Equation for velocity of flow V is given by:

$V = (1.486/n) * (R)^{2/3} * (S)^{0.5}$, where n = 0.013

Pipe Diameter D= 6"

Hydraylic Radius R, when flowing full = D/48 ft. = 6/48 ft. =0.125 ft. where D= diameter in inches

$V= (1.486/.013) * (0.125)^{2/3} * (S)^{0.5} = 28.577 \times (S)^{0.5}$ where S = pipe slope in ft/ft =

When slope: = 1.2% = 0.012 ft/ft.

$V= 28.577 * (0.012)^{0.5} = 3.13$ ft/sec. > 3 ft/sec (OK for a 6" pipe)

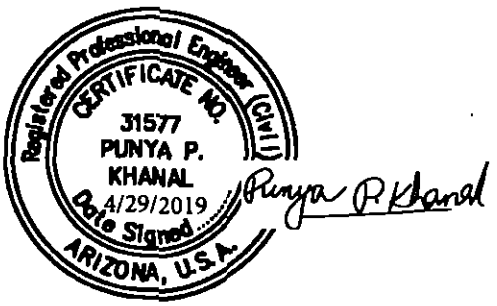
Figure 2: *Analysis of flow for 6" SS pipe flowing full at slope of 0.55% and 3% slope*

9 CONCLUSIONS & RECOMMENDATIONS

The following are our conclusions and recommendations:

1. Our analysis indicates that the water and wastewater infrastructure existing currently on the project site for Wilshire Townhomes is adequate in capacity to provide water and wastewater service to the proposed 5 single family residential units.
2. The existing water and sewer lines are also located in the close proximity of the site and therefore, we do not need to extend either water or sewer lines to serve the properties.
3. It is also the Engineer's opinion that a detailed network analysis is also not required for this project.
4. The owner will prepare a hydrant flow test as required by the City of Scottsdale and submit with the final report.

Report Prepared By:



EXPIRES 6-30-2021

Punya P. Khanal, Ph.D., PE.
Everest Consulting Services

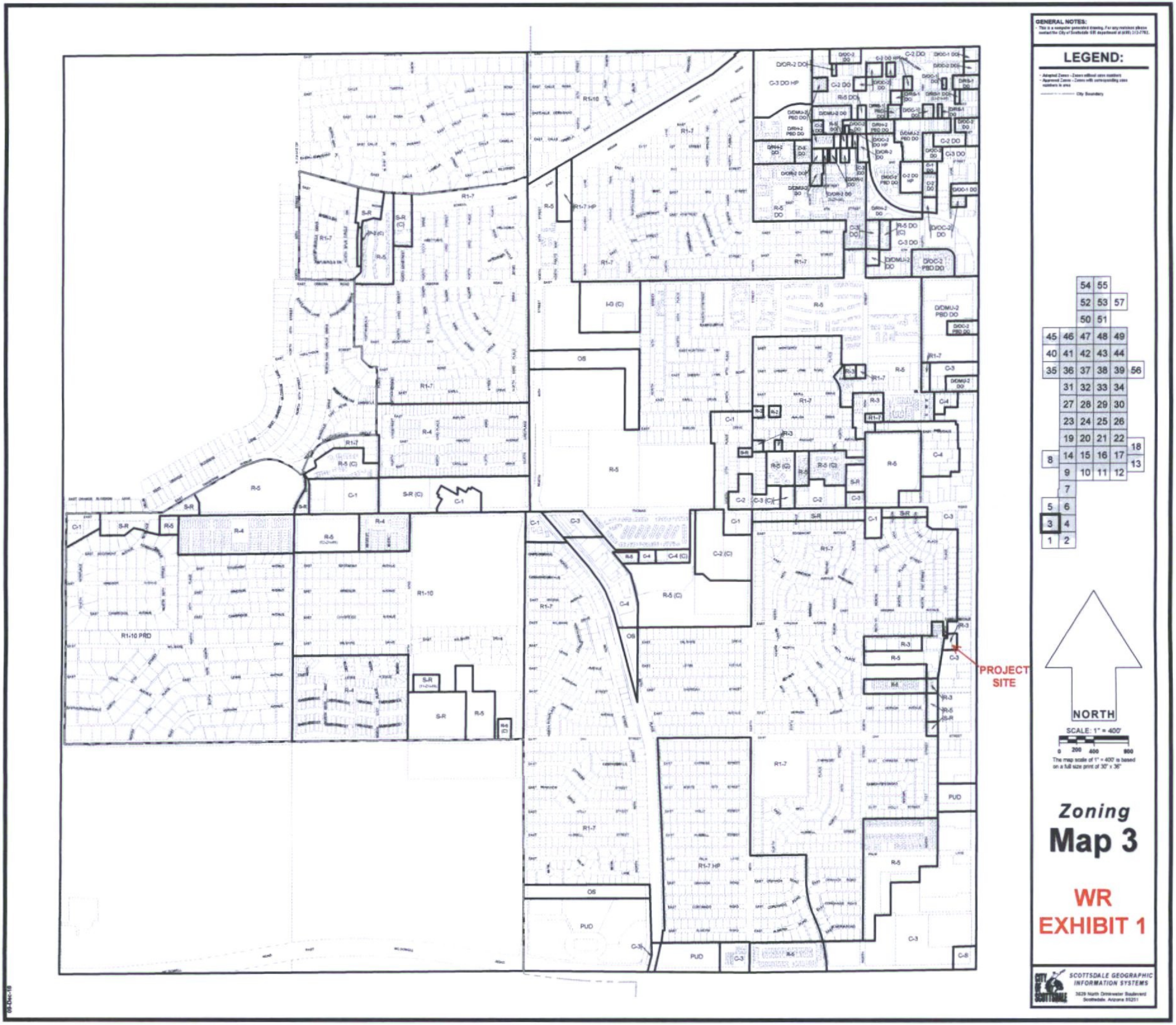
EXHIBITS

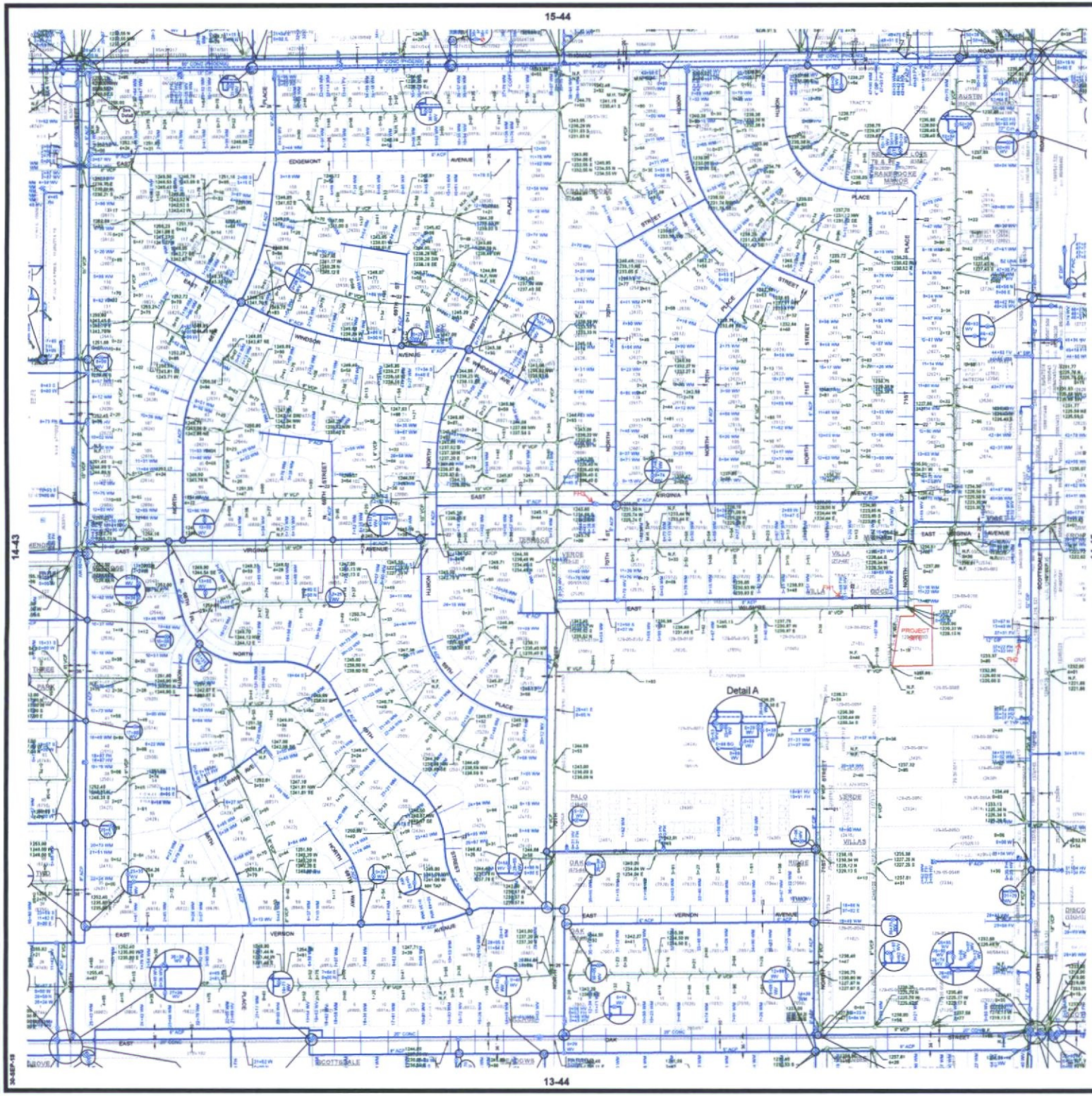
Exhibit 1 City of Scottsdale Zoning Map

Exhibit 2 City of Scottsdale QS Utility (water and Sewer) Map

Exhibit 3 Site Utility Plan for Wilshire Place Townhomes

Exhibit 4 Fire Hydrant Test Report for Wilshire Townhomes





GENERAL NOTES:

- THIS IS A COMPUTER GENERATED DRAWING, FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7782.
- 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:

- Water Valve
- Non-potable Water Valve
- Fire Hydrant
- Water Blowoff
- Water Main Reducer
- Water Sample Station
- Water Air Release Valve
- Non-potable Water Air Release Valve
- Water Pressure Reducing Valve
- Water Vault
- Water Manhole
- Non-Potable Water Manhole
- Water Pump
- Water Main
- Non-Potable Water Main
- Fire Line
- Water Service
- Non-Scottsdale Water Main
- Sewer Manhole
- Sewer Cleanout
- Sewer Lift Station
- Sewer Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Non-Scottsdale Sewer Main
- Sewer Service

VICINITY MAP

NORTH

WATER & SEWER

QUARTER SECTION MAP

14-44

NE 1/4 SEC. 34 T2N R4E

WR EXHIBIT-2

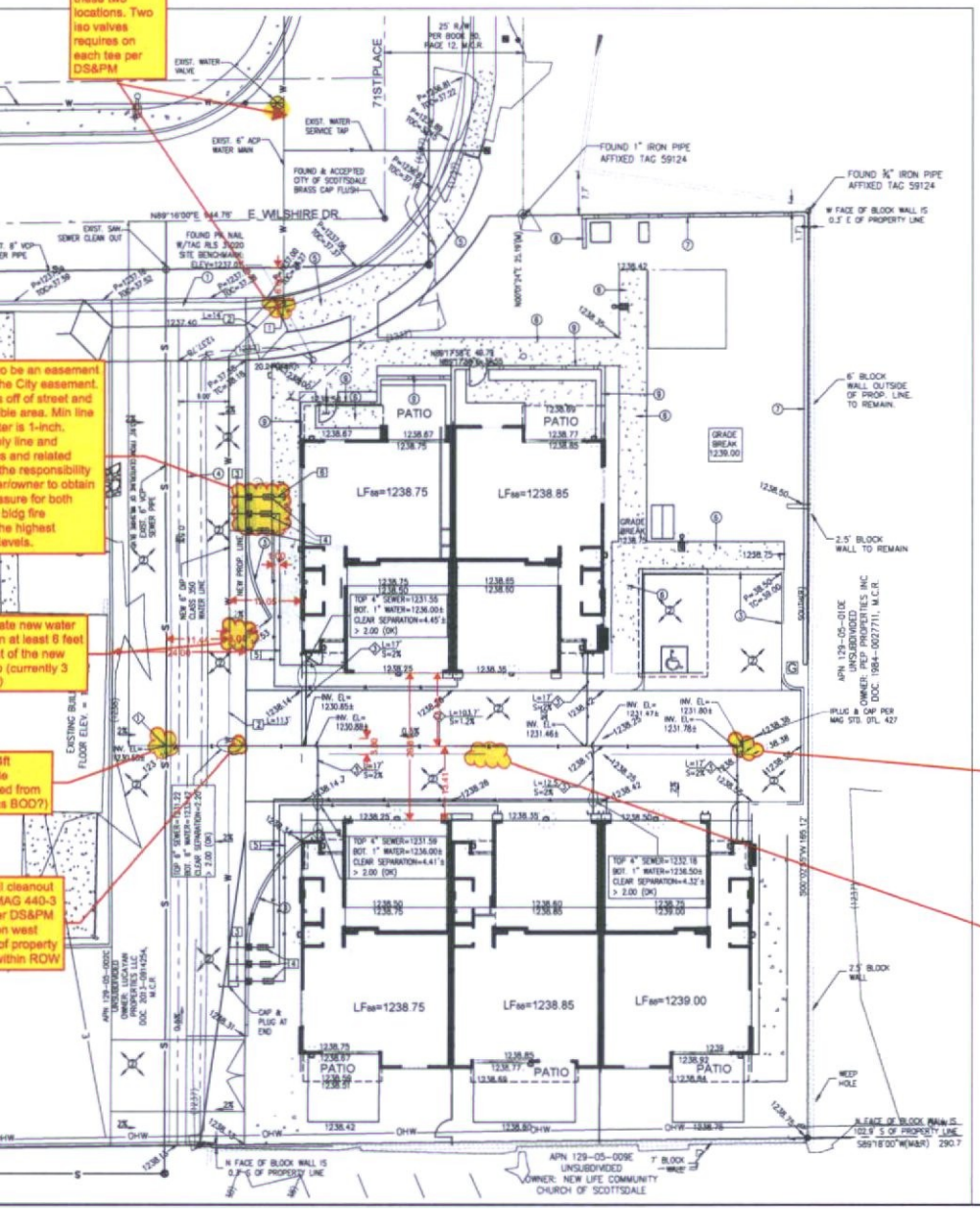
SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS
3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

30-SEP-19

SITE UTILITY PLAN
FOR WILLSHIRE PLACE TOWN HOMES

WR EXHIBIT-3

Provide 6" isolation gate valve at one of these two locations. Two iso valves requires on each tee per DS&PM



o be an easement. he City easement. s off of street and ble area. Min line ter is 1-inch. ly line and s and related the responsibility rriowner to obtain ssure for both bldg fire he highest evels.

te new water n at least 6 feet t of the new (currently 3

ft e ed from s BOD?)

l cleanout AG 440-3 r DS&PM n west of property within ROW

Instead of cap install MAG detail 441clean-out

This 6" sewer line is private and shall be labeled as such on plans. If public it would be required to be 8-inch and in a 16ft min easement.

WATER CONSTRUCTION NOTES

KEY	DESCRIPTION	UNIT	EST. QTY
1	FIELD VERIFY LOCATION OF EXISTING CAP ON EXISTING 6" ø ACP WATER MAIN AND CONNECT NEW 6" ø DIP CLASS 50 MAINLINE WITH A 6" #, 45° DIP CLASS 350 ELBOW JOINT. THRUST BLOCK PER MAG DET. 380.	EA	1
2	CONSTRUCT 6" ø DIP 350 WATER SERVICE LINE. LENGTH OF EACH SECTION AS CALLED OUT IN PLAN. PLUG AND CAP AT SOUTH END PER MAG STD. DTL. 427.	LF	127
3	CONSTRUCT 1" ø WATER SERVICE CONNECTIONS WITH 1" WATER METER FOR DOMESTIC WATER AND LANDSCAPING WATER USE PER COS STD. DTL. 2330.	EA	6
4	CONSTRUCT 1" REDUCED PRESSURE PRINCIPLE BACK FLOW PREVENTER PER COS STD. DTL. 2384	EA	6
5	EXTEND 1" DOMESTIC WATER SERVICE LINES FROM BACK FLOW PREVENTER TO INDIVIDUAL BUILDING UNITS AND CAP AT END AS SHOWN IN PLAN. ADJUST PIPE ALIGNMENT AND LENGTHS ON SITE AS NEEDED.	EA	5
6	EXTEND LANDSCAPE WATER SERVICE LINE FROM BACK FLOW PREVENTER TO LANDSCAPE AREA AND CAP AT END AS SHOWN IN PLAN.	EA	1

SEWER CONSTRUCTION NOTES

KEY	DESCRIPTION	UNIT	EST. QTY
A	FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF THE EXISTING 6" VCP SEWER LINE AND CONSTRUCT A 6" ø TWO WAY CLEAN OUT PER MAG STD. DTL. 441.	EA	1
B	CONSTRUCT 6" ø SDR 35 PVC SEWER COLLECTOR LINE ALONG THE DRIVEWAY PER MAG STD. DTL. 441. SLOPE AS SHOWN IN PLAN. CAP AT END PER MAG STD. DTL. 427.	LF	103.7
C	CONSTRUCT 4" ø SDR 35 SEWER SERVICE LINE TO INDIVIDUAL BUILDING UNIT PER MAG STD. DTL. 440-1 AND CAP AT END PER MAG STD. DTL. 427. LENGTH AND SLOPE AS SHOWN IN PLAN. REFER TO PLUMBING PLAN FOR CONTINUATION INTO BUILDING.	EA	5

N

10' 5' 0 10'

SCALE: 1" = 10'
CONTOUR INTERVAL = 1 FOOT

REVISIONS

SITE UTILITY PLAN FOR
WILLSHIRE PLACE TOWN HOMES
7121 E. WILSHIRE DR. SCOTTSDALE, AZ 85257
APN: 129-05-010D

EVEREST CONSULTING SERVICES, PC
CONSULTING ENGINEERS
7555 S. PARKCREST STREET, GILBERTE, AZ 85298
TEL: (623) 533-0334, Email: everestconsult1@gmail.com

EXPIRES 6-30-2021

DATE: 04/27/2019
SCALE: 1" = 10'
DRAWN: PPK
CHECKED: PPK
JOB # 18-17

SHEET TITLE
SITE UTILITY PLAN

SHEET # C5
SHEET 5 OF 5

Arizona Flow Testing LLC

WR
EXHIBIT- 4

HYDRANT FLOW TEST REPORT

Project Name:	Wilshire Place
Project Address:	7121 East Wilshire Drive, Scottsdale, Arizona, 85257
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	19100
Flow Test Permit No.:	C57697
Date and time flow test conducted:	March 21, 2019 at 7:50 AM
Data is current and reliable until:	September 21, 2019
Conducted by:	Floyd Vaughan – Arizona Flow Testing, LLC (480-250-8154)
Witnessed by:	Ray Padilla –City of Scottsdale-Inspector (602-541-0586)

Raw Test Data

Static Pressure: **90.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **81.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **35.0 PSI**

(Measured in pounds per square inch)

Diffuser Orifice Diameter: One 4-inch Pollard Diffuser
(Measured in inches)

Coefficient of Diffuser: .9

Flowing GPM: **2,542 GPM**
(Measured in gallons per minute)

GPM @ 20 PSI: **7,696 GPM**

Data with 18 PSI Safety Factor

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

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

Residual Pressure: **63.0 PSI**
(Measured in pounds per square inch)

Distance between hydrants: Approx.: 920 feet

Main size: Not Provided

Flowing GPM: **2,542 GPM**

GPM @ 20 PSI: **6,555 GPM**

Flow Test Location

North

Request for Stormwater Storage Waiver

CITY OF SCOTTSDALE

City of Scottsdale Plan/Case Numbers:

11 - DR - 2017 ____ - PP - ____ PC#_____

Requests for stormwater storage waivers are reviewed as part of case submittals for the associated project. This form should be included in the preliminary drainage report with the applicant's portion completed. The preliminary drainage report shall include supporting documentation and analysis as needed to support the requested wavier.

Date 2/11/2019 Project Name Wilshire Town Homes

Project Location 7121 E. Wilshire Drive, Scottsdale, AZ. 85257

Applicant Contact Edmir Dzudza, Architect Company Name E-Project International, LLC

Phone 602-359-4407 E-mail edmir@e-projectinternational.com

Address 917 W. Kathleen Road, Phoenix, AZ 85007

Waiver Criteria

A project must meet at least one of three criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed and sealed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

It should be noted that reductions in stormwater storage relating to

☐ 1. The development is adjacent to a conveyance facility that an engineering analysis shows is designed and constructed to handle the additional runoff from the site as a result of development.

☑ 2. The development is on a parcel less than one-half acre in size.

☐ 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO).

For a full storage waiver, a conflict with ESLO is limited to:

- Property located in the hillside landform as defined in the city Zoning Ordinance
- Property in the upper desert landform that has a land slope steeper than 5% as defined in the city Zoning Ordinance
- Property within the ESL zoning overlay district where the only viable location for a stormwater storage basin requires blasting

This full waiver only applies to those portions of property meeting one of these three requirements.

100-year/2-hour storage is allowed, but not required for redevelopment projects and development within the ESL zoning overlay. Rather, these projects must store enough stormwater to attenuate post-development flows to predevelopment levels, considering the 10- and 100-year storm events (S.R.C. Sections 37-50 and 37-51).

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

FILE COPY

_____ _____

Stormwater Management Department

7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 • Phone: 480-312-2500

Request for Stormwater Storage Waiver

CITY OF SCOTTSDALE

City of Scottsdale Plan/Case Numbers:

11 - DR - 2017` ____ - PP - ____ PC#_____

CITY STAFF TO COMPLETE THIS PAGE

Project Name Wilshire Town Homes

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐1 ☐2 ☐3

Recommended Conditions of Waiver:

☐ All storage requirements waived.

☐ Post-development peak discharge rates do not exceed pre-development conditions.

☐ Other:

Explain: _____

_____

☐ **Waiver approved per above conditions.**

_____ _____

Floodplain Administrator or Designee Date

Stormwater Management Department

7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 • Phone: 480-312-2500

Request for Stormwater Storage Waiver

CITY OF SCOTTSDALE

City of Scottsdale Plan/Case Numbers:

11 - DR - 2017 ____ - PP - ____ PC#_____

In-Lieu Fee and In-Kind Contributions

In-lieu fees are only applicable to projects where post-development peak discharge rates exceed pre-development levels, based on the 10- and 100-year storm events. If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide a storage basin, sized as described below, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $3.00 per cubic foot of stormwater storage for a virtual storage basin designed to mitigate the increase in runoff associated with the 100-year/2-hour storm event. The applicant may submit site-specific in-lieu fee calculations subject to the Floodplain Administrator's approval.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater-related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name Wilshire Town Homes

The waived stormwater storage volume is calculated using a simplified approach as follows:

$V = \Delta CRA$; where

V = stormwater storage volume required, in cubic feet,
ΔC = increase in weighted average runoff coefficient over disturbed area ($C_{post} - C_{pre}$),
R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and
A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where
V_w = volume waived,
V = volume required, and
V_p = volume provided

R = 2.15 inch = 0.179 ft
ΔC= 0.097
A = 15889 SF
V = 277 CF
V_p= 0 CF
V_w= 277 CF

☑ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $3.00 per cubic foot = $831.00

☐ An in-kind contribution will be made, as follows:

_____

_____

_____

☐ No in-lieu fee is required. Reason:

_____

_____

Approved by:

_____ _____

Floodplain Administrator or Designee Date

Stormwater Management Department
7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 • Phone: 480-312-2500

PRELIMINARY DRAINAGE REPORT

For

Wilshire Town Homes

APN 129-057-010D

ECS Ref # 18-17

Located at

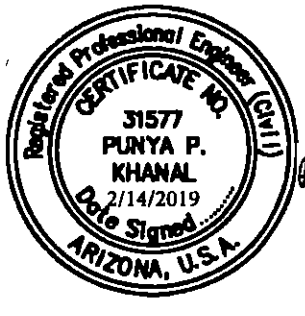
7121 E. WILSHIRE DRIVE

SCOTTSDALE, AZ 85251

Report Prepared by:

Everest Consulting Services, PC
7555 S. Parkcrest Street
Gilbert, AZ 85298
Tel: 623-533-0334

February 2019



Digitally signed by Punya P. Khanal
DN: cn=Punya P. Khanal, o=Everest Consulting Services, ou, email=everestconsult1@gmail.com, c=US
Date: 2019.02.14 22:16:32 -07'00'

EXPIRES 6-30-2021

TABLE OF CONTENTS

1. Introduction and purpose

This report presents the preliminary hydrology study and drainage report for the proposed site development of the residential parcel located at 7121 E. Wilshire Drive, Scottsdale, AZ. The purpose of this report is to document and present the existing on-site and off-site drainage conditions and the proposed on-site grading and drainage work for the development of 5 2-story Townhome buildings and associated infrastructure.

1.1 Engineer's Statement:

This Drainage Report has been prepared in accordance with the current version of the City of Scottsdale Design Standards and Policies Manual, Drainage Design Manuals for Maricopa County, Volume 1 – Hydrology and Volume 2 – Hydraulics and City of Scottsdale Zoning Code.

2. Site Location and Description

The subject parcel with APN Number 129-05-010D is located at the southeast corner of Wilshire Drive and 71st Place in the City of Scottsdale AZ. The parcel is bounded by a developed commercial parcel APN 129-05-010E to the east and northeast, by another developed residential parcel APN 129-05-002C to the west, by a developed commercial parcel APN 129-05-009E to the south and by Wilshire Drive and 71st Place to the north and northwest. Wilshire Drive turns north and becomes 71st Place at the north frontage of the property. Both Wilshire Drive and 71st Place are paved roads with asphalt concrete paving. Frontage access to the property will be provided from Wilshire Drive just west of the turnaround area. 71st Place provides outside access through Virginia Avenue on the north which then connects to Scottsdale Road. Soil at the site is primarily silty sand and can be classified as belonging to the SCS hydrologic soil group B. The site is currently vacant and the surface is all dirt without any vegetation cover. However, the site used to be a developed site with a residential building and vegetation covers as seen from the aerial photograph of the site in 2012.. **EXHIBIT-1** shows the colored aerial map of the site on an 11'x17" sheet. The 2012 aerial map shows the then existing building on the site including vegetation covered as well as uncovered and unbuilt areas within the site. Currently, the site seems to essentially be flat with the lot sloping generally from the south to the north with an approximate average slope of 0to 0.5%. The landform can be classified as urban infill land. Figure 1 shows the location of the site and the area in the vicinity.

3. Proposed Development:

The developer proposes to construct 5 units of two-story Town Home buildings with roof deck with essential water, sewer and ingress/egress facilities to serve these Townhomes in the approximately 15246 sq. ft. parcel currently zoned as R-3.

4. FEMA Flood Plain Classification

The subject parcel is located in an area designated as Flood Zone "shaded X" located in the FEMA Flood Insurance Rate Map (FIRM) Panel 2235 of 4425, Map # 04013C2235L, Map revised October 16, 2013. Zone shaded X is defined by FEMA as areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depth of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood. The FEMA Firmette map for the site is included as **EXHIBIT-2** of this report.

5. Existing Conditions and Offsite Runoff

The site does not receive any offsite runoff from any directions. The site is blocked off by existing block walls on east, west and south and by Wilshire Drive and 71st Place roll curbs and sidewalks on

the north and northeast. The site is relatively flat as shown by the recent topographic survey and seems to be a little higher along the property boundaries on the east, west and south and the low point being on the north. A 24"x36" print of the recent topographic survey map is included as **EXHIBIT 3** to this report. This topographic survey map seems to agree with the City of Scottsdale contour map which also shows the site to be sloping from the southwest to the northeast with contour line 1238 being on the south and west and a contour line 1237 running near the middle of the site.

Figure 1: Project Vicinity Map

6 On-Site Drainage Description and Hydrology:

6.1 Existing Conditions:

The site slopes in general from the southwest to the northeast/north. Currently, all onsite runoff due to minor runoff events seems to be ponding on site and infiltrating under the existing dirt surface. During heavy storm events, the onsite runoff should follow the historic flow pattern from the south/southwest to north/northeast demonstrated by the City of Scottsdale contours and supported in general by the recent topographic survey included as **EXHIBIT-3** to this drainage report.

6.2 Onsite Drainage Management:

As part of the on-site drainage management, the site is graded to drain from the south to the north following its historic drainage pattern as shown in the accompanying grading and drainage plan. With regard to on-site stormwater retention, since this is a predeveloped property, the onsite stormwater retention volume is based on the pre-development versus post-development condition. The site is less than 0.5 acres, therefore owner has opted to request a stormwater retention waiver with the payment of in lieu fees. Onsite stormwater volume required to be retained is calculated in the following section and a stormwater retention waiver form has been completed, signed by the Engineer and submitted with this drainage report and other submittal package. As such, on site drainage management involves grading of the site and routing of the very limited onsite runoff safely through their historic flow path towards the north property line to drain into Wilshire Drive.

6.3 On-Site Hydraulics:

All flow will be sheet flow less than 12" in depth. Therefore, this is not required for this project.

6.4 Proposed Drainage Management

Proposed drainage management involves the grading design to make the onsite runoff drain from the south to the north towards Wilshire Drive as sheet flow via the two driveways driveway A and driveway B as shown in the preliminary grading and drainage plan. Proposed preliminary grading and drainage plan showing existing and proposed spot elevations is included as **EXHIBIT-4** to this drainage report

7. Storm Water Retention and First Flush Requirements:

Per section 4-1.201 of the 2018 DPSM of the COS, this property qualifies for retention volume based on post development versus predevelopment condition. For this condition, required storage volume for stormwater runoff is given by the formula:

$Vr = \Delta C(R/12)A$

Where Vr = Required storage volume in CF

ΔC = Increase in Weighted Runoff Coefficient over disturbed area (Cpost-Cpre)

R= Precipitation amount = depth in inches of 100-year 2-hour rainfall event.

A= Lot area in SF.

The precipitation amount is obtained from the site-specific NOAA-14 precipitation table. For this project, the NOAA site-specific precipitation table is shown as **EXHIBIT-5** of this drainage report. From the Table in **EXHIBIT 5**, this is 2.15".

For Predevelopment Condition:

Total predevelopment lot area = 15246 SF

Total predevelopment covered area measured from scaled aerial map of the year 2012 included as EXHIBIT-2 = 4690 sf

Total predevelopment covered area = 4690 SF (Assume C= 0.95)

Total predevelopment uncovered area = 15246-4690 = 10556 SF (Assume C= 0.45 for desert area)

Weighted predevelopment Coefficient Cpre = (4690*0.95+10556*0.45)/15246 = 0.603

Post development condition:

Total post-development lot area = 15885 SF

Total post-development uncovered or open area from architectural site plan = 7933 SF (Assume C = 0.45)

Total post-development covered area = 15885 SF – 7933 SF = 7952 SF (Assume C= 0.95)

Weighted post-development Coefficient Cpost = (7952*0.95+7933*0.45)/15885 = 0.700

Required retention volume = (0.700-0.603)*(2.15/12)*15885 = 276.1 CF = 277 CF (say)

We are requesting a storm water retention waiver on this project and have included a completed stormwater retention waiver form signed by the Engineer as **EXHIBIT-6** to this drainage report. The owner will also submit a completed waiver form separately and pay the appropriate in-lieu fee.

10 Minimum Finish Floor Elevation Requirement:

Minimum Finish Floor Elevation of the new buildings is set as shown in the accompanying preliminary grading and drainage plan. The lowest existing grade on site being at 1237, this LF_{88} exceeds the minimum of 1 foot above the lowest existing grade as shown in the accompanying preliminary grading and drainage plan.

11. Storm Water Pollution Prevention Plan:

This is not applicable for this project.

12 Sedimentation and Erosion Hazard Discussion:

This is not applicable for this project.

13 Storm water Permits Requirements (404/401 permits etc.):

These permits are not required for this project and the City of Scottsdale Section 404 form will be submitted separately by the owner.

Report Prepared & Submitted

Punya P. Khanal

Digitally signed by Punya P. Khanal
DN: cn=Punya P. Khanal, o=Everest Consulting Services, ou, email=everestconsult1@gmail.com, c=US
Reason: I am the author of this document
Date: 2019.02.14 22:17:39 -07'00'

EXPIRES 6-30-2021

Punya P. Khanal, Ph.D., P.E.
Everest Consulting Services, PC

REFERENCES:

1. Drainage Design Manual of Maricopa County, Volume I Hydrology, August 15, 2013
2. City of Scottsdale Design Standards and Policy Manual, 2018

EXHIBITS:

EXHIBIT-1 Color Exhibit of 2012 Aerial Map (11'x17")
EXHIBIT-2 FEMA FIRMette Map
EXHIBIT-3 Current Topographic Map of Site and Adjacent Areas
EXHIBIT-4 Preliminary Grading and Drainage Plan
EXHIBIT-5 Site Specific NOAA-14 Precipitation Table
EXHIBIT-6 COS Storm Water Storage Waiver Form

COVERED AREA DELINEATION FOR
7121 E. WILSHIRE DRIVE
APN 129-05-010D
BASED ON 2012 AERIAL MAP

APN 129-05-010D

DATE:	12/17	DRAWN:	PPK
SCALE:	1"=20'	CHECKED:	PPK
JOB #	18-17	SHEET #	

EXHIBIT # 1

EVEREST CONSULTING SERVICES, PC
CONSULTING ENGINEERS
7555 S. PARKCREST STREET, GILBERT, AZ 85298

2012 COLOR AERIAL

National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (Zone A, V, A99
- With BFE or Depth Zone AE, AO, A
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Haz
- of 1% annual chance flood with depth less than one foot or with areas of less than one square m
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk d Levee. See Notes. Zone X
- Area with Flood Risk due to Leve

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Z
- Effective LOMRs
- Area of Undetermined Flood Haza

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Ch
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approxin point selected by the user and does not repr an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/10/2018 at 3:27:33 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

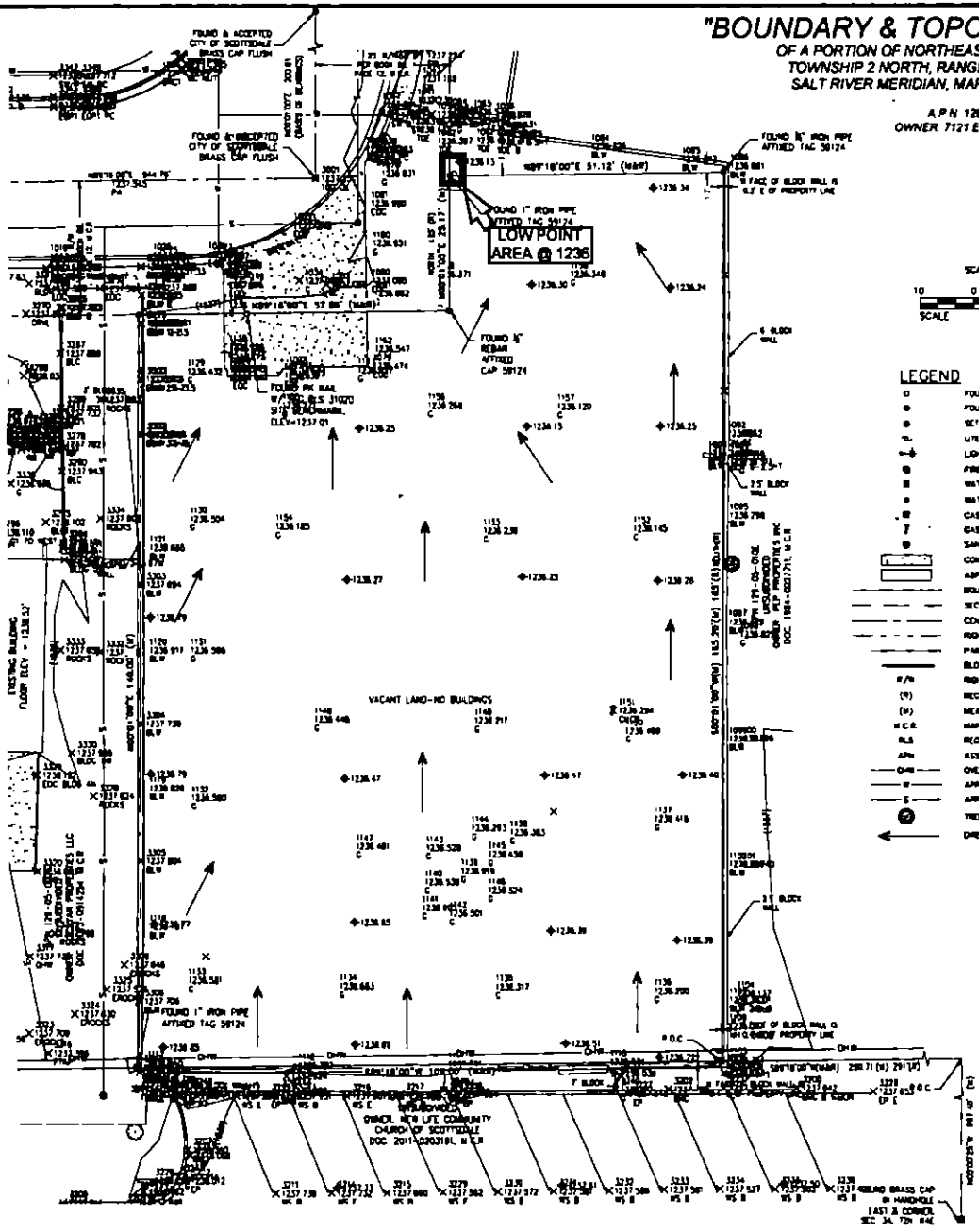
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

EXHIBIT-2

"BOUNDARY & TOPOGRAPHIC SURVEY"

OF A PORTION OF NORTHEAST QUARTER OF SECTION 34, TOWNSHIP 2 NORTH, RANGE 4 EAST, OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA.

A.P.N. 128-05-010D
OWNER: 7121 E WILSHIRE LLC



SCALE 1" = 10'

SCALE: 10 0 10 20 FEET

LEGEND

- FOUND MONUMENT AS NOTED
- FOUND BRASS CAP FLUSH
- SET 1/2" REBAR W/ CAP, AZLS 39124
- UTILITY POLE
- LIGHT POLE/ STREET SIGN
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- GAS METER
- GAS MARKER & TRACE LINE
- SANITARY SEWER MANHOLE
- CONCRETE
- ASPHALT PAVING
- BOUNDARY LINE
- SECTION LINE
- CENTER LINE
- RIGHT OF WAY
- PARCEL LINE
- BLOCK WALL
- R/W — RIGHT-OF-WAY
- (R) — RECORD
- (M) — MEASURED
- M.C.R. — MARICOPA COUNTY RECORDS
- R.L.S. — REGISTERED LAND SURVEYOR
- APN — ASSESSOR PARCEL NUMBER
- OHP — OVERHEAD WIRE
- W — APPROXIMATE UNDERGROUND WATER LINE
- S — APPROXIMATE UNDERGROUND SEWER LINE
- TREE (UNKNOWN TYPE)
- DIRECTION OF RUNOFF FLOW

LEGAL DESCRIPTION (FROM DOC # 2016-0813217 M.C.R.)

THAT PART OF THE NORTH HALF OF THE NORTH HALF OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 34, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF THE NORTH HALF OF THE NORTH HALF OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 34;

THENCE SOUTH 89 DEGREES 18 MINUTES WEST, ALONG THE SOUTH LINE OF SAID NORTH HALF OF THE NORTH HALF OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 34, 591 FEET TO THE TRUE POINT OF BEGINNING;

THENCE CONTINUING ALONG SAID SOUTH LINE, 100 FEET;

THENCE NORTH 140 FEET;

THENCE NORTH 89 DEGREES 18 MINUTES EAST, 57.99 FEET;

THENCE NORTH, 25 FEET, MORE OR LESS;

THENCE NORTH 89 DEGREES 18 MINUTES EAST, 81.12 FEET;

THENCE SOUTH, 165 FEET TO THE TRUE POINT OF BEGINNING;

EXCEPT BEGINNING AT A POINT WHICH IS 955.80 FEET AND NORTH 89 DEGREES 18 MINUTES EAST, 81.00 FEET, FROM THE SOUTHWEST CORNER OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 34, SAID POINT BEING THE SOUTHEAST CORNER OF A 1.45 ACRE TRACT;

THENCE NORTH 01 DEGREES 01 MINUTE WEST, 140.00 FEET;

THENCE NORTH 89 DEGREES 18 MINUTES EAST, 35.34 FEET;

THENCE SOUTH 00 DEGREES 07 MINUTES WEST, 141.00 FEET TO THE POINT OF BEGINNING.

BENCHMARK

THE BENCHMARK USED FOR THIS SURVEY WAS A BRASS CAP IN HAND HOLE AT THE SOUTHEAST CORNER OF SECTION 34, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER MERIDIAN, ARIZONA, HAVING AN ELEVATION OF 1235.89' (NAVD88 DATUM) MARICOPA COUNTY DDACS # 34018-1

SITE BENCHMARK BEING FOUND MASONRY NAIL AND TAG "91939 OGETZ" AT THE NORTHWEST CORNER OF THE SUBJECT PROPERTY ALONG THE RIGHT-OF-WAY OF WILSHIRE DRIVE, HAVING AN ELEVATION OF 1237.01' (NAVD88 DATUM)

BASIS OF BEARINGS

N 89°51' 00" E (ASSUMED) ALONG THE MONUMENTED CENTERLINE OF 75th PLACE, AS SHOWN HEREON

RECORD DOCUMENTS USED

WARRANTY DEED FILED IN DOCUMENT NO. 2016-0813217, M.C.R.
SUBDIVISION PLAT OF VERDE VILLA FILED IN BOOK 88, PAGE 13, M.C.R.

NOTES

1. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT AND THE PROPERTY IS SUBJECT TO ALL MATTERS OF RECORD NOT SHOWN HEREON

2. PROPERTY ZONED: R-3 (CITY OF SCOTTSDALE)

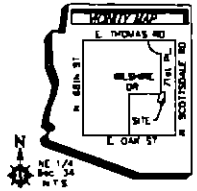
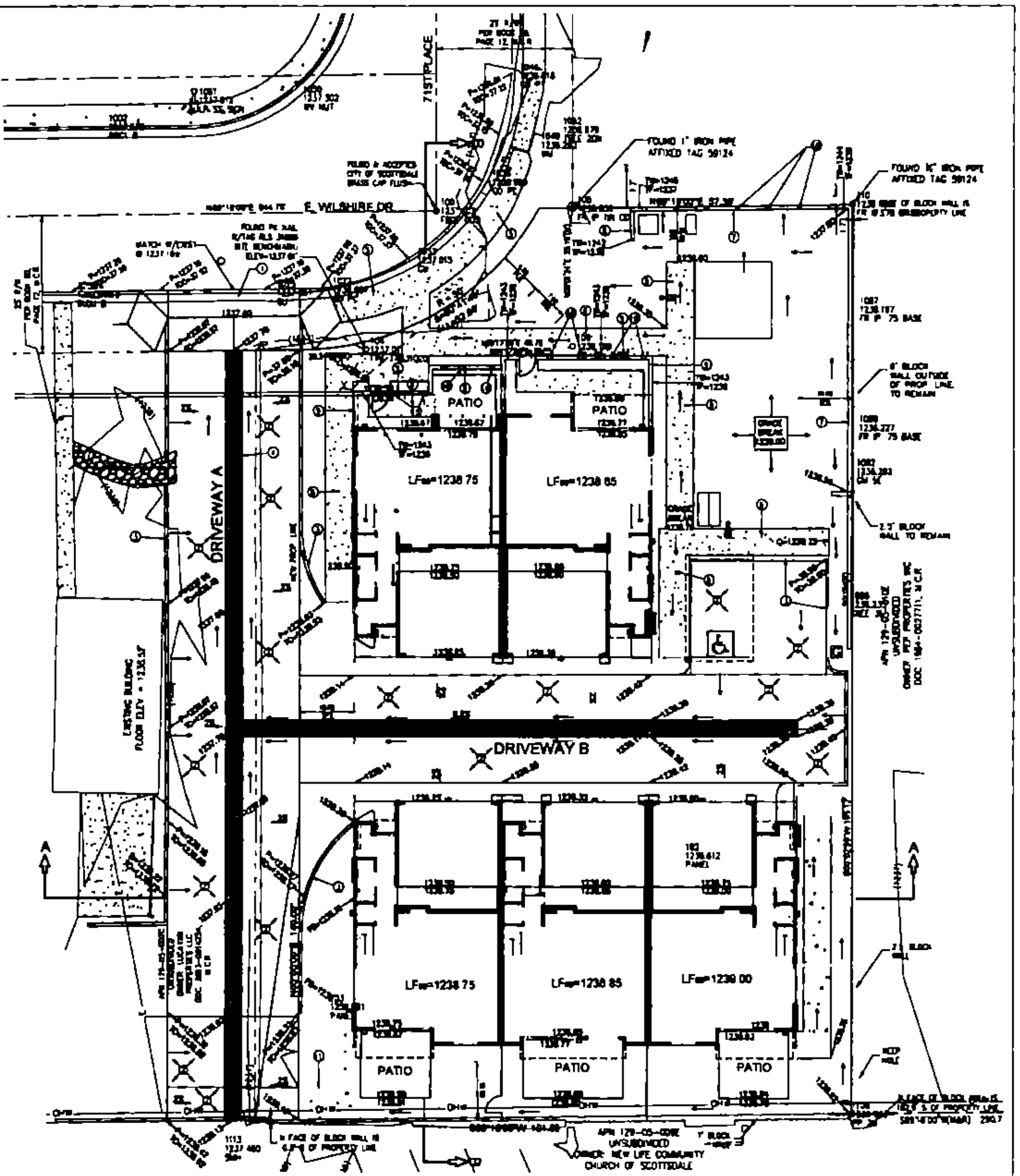


EXHIBIT-3

P.O. BOX 7132
Phoenix, Arizona 85360
623 330-8835

7121 E Wilshire, LLC	DATE 10/4/18
7121 E Wilshire Drive	SCALE AS SHOWN
Scottsdale, Arizona 85257	SHEET 1 OF 1
SEC 34 T 2N R 4E	JOB (Book) 37

GRADING, DRAINAGE & OFFSITE IMPROVEMENT PLANS FOR WILLSHIRE PLACE TOWN HOMES



BENCHMARK
THE BENCHMARK USED FOR THIS SURVEY WAS A OLD BRASS CAP AT THE SOUTH ¼ CORNER OF SECTION 34, HAVING AN ELEVATION OF 1232.831 (NAVD88 DATUM)

SITE BENCHMARK
SITE BENCHMARK BEING FOUND MASONRY NAIL AND TAG "31020 COETZ" AT THE NORTHWEST CORNER OF THE SUBJECT PROPERTY ALONG THE RIGHT-OF-WAY OF WILSHIRE DRIVE, HAVING AN ELEVATION OF 1237.01' (NAVD88 DATUM)

BASIS OF BEARINGS
N 00°01'00" E (ASSUMED), ALONG THE MONUMENTED CENTERLINE OF 76th PLACE, AS SHOWN HEREON

EXHIBIT-4

GRADING & DRAINAGE CONSTRUCTION NOTES

KEY	DESCRIPTION	UNIT	EST. QTY
1	CONSTRUCT DRIVEWAY ENTRANCE PER COS STD. DTL. 2250, [illegible]	EA	1
2	CONSTRUCT 3" ASPHALT CONCRETE PAVEMENT PER COS DSPM SECTION 510 OVER 5" OF AGGREGATE BASE COMPACTED TO 100% OF PROCTOR DRY DENSITY PER MAG SPECIFICATION SECTION 310. PAVEMENT SECTION AS SHOWN ON SHEET C4	SY	675
3	CONSTRUCT TYPE B SINGLE CURB PER MAG STD. DTL. 222	LF	305
4	CONSTRUCT 3' WIDE, 6" THICK CONCRETE VALLEY GUTTER. CROSS SECTION AS SHOWN IN PAVEMENT SECTION DETAIL ON [illegible] SHEET	LF	242
5	CONSTRUCT 5' WIDE ATTACHED SIDEWALK IN THE RIGHT-OF-WAY ALONG THE [illegible] ON 71ST PLACE	SF	250
6	CONSTRUCT 5' WIDE SIDEWALK ON-SITE	SF	1125
7	CONSTRUCT 6' HIGH MASONRY BLOCK WALL PER COS STD. DTL. FOR 6' MAX. HEIGHT RESIDENTIAL WALL	LF	120
8	CONSTRUCT 4' HIGH MASONRY BLOCK SCREEN WALL PER COS STD. DTL. FOR 6' MAX. HEIGHT RESIDENTIAL WALL	LF	8
9	CONSTRUCT 5' HIGH [illegible] WALL PER COS STD. DTL. FOR 6' MAX. HEIGHT RESIDENTIAL WALL	LF	120
10	CONSTRUCT 4"x8" DRAINAGE OPENING AT 5' O.C. ALONG BOTTOM OF WALL. INVERT ELEVATION AT 1/2" ABOVE FINISHED GRADE	EA	15
11	CONSTRUCT DUAL TRASH ENCLOSURE PER COS DETAIL	EA	1

ON-SITE RETENTION CALCULATIONS

SITE QUALIFIES FOR STORM WATER RETENTION BASED ON POST-DEVELOPMENT VERSUS PRE-DEVELOPMENT VOLUME PER CITY OF SCOTTSDALE DSPM, 2018 EDITION. RETENTION VOLUME IS [illegible]

VOLUME OF ON-SITE STORMWATER REQUIRED TO BE RETAINED IS 717 CF AS SHOWN IN THE ACCOMPANYING DRAINAGE REPORT. OWNER IS OPTING FOR A WAIVER FOR ON-SITE STORM WATER RETENTION AND PAY IN-LIEU FEE.

EXHIBIT-4

COMMUNITY NUMBER	PANEL NUMBER AND DATE	SUFFIX	FIRM REVISION DATE	FIRM INDEX DATE	FIRM ZONE	BASE FLOOD ELEV (IN AO ZONE, USE DEPTH)
045012	2235	L	(10/16/13)	(09/30/05)	X	N/A

ENGINEER'S CERTIFICATION: THE LOWEST FLOOR ELEVATION(S) AND/OR FLOOD PROOFING ELEVATION(S) ON THIS PLAN ARE SUFFICIENTLY HIGH TO PROVIDE PROTECTION FROM FLOODING CAUSED BY A 100 YEAR STORM AND ARE IN ACCORDANCE WITH CITY OF SCOTTSDALE REVISED CODE, CHAPTER 37 - FLOODPLAIN AND STORMWATER REGULATION.

SCALE: 1" = 10'
CONTOUR INTERVAL = 1 FOOT

GRADING & DRAINAGE PLAN FOR WILLSHIRE PLACE TOWN HOMES

EVEREST CONSULTING SERVICES, PC
CONSULTING ENGINEERS
7553 S. PARKCREST STREET, GILBERT, AZ 85298

DATE	03/14/2019
SCALE	1" = 10'
DRAWN	PPK
CHECKED	PPK
JOB #	18-17

SHEET TITLE: GRADING & DRAINAGE PLAN
SHEET # C3
SHEET 3 OF 5

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.477°, Longitude: -111.9275°
Elevation: 1241.66 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

EXHIBIT-5

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	0.182 (0.153-0.221)	0.238 (0.201-0.289)	0.323 (0.271-0.391)	0.389 (0.324-0.468)	0.478 (0.392-0.573)	0.547 (0.442-0.653)	0.617 (0.489-0.734)	0.688 (0.537-0.819)	0.784 (0.596-0.934)	0.858 (0.639-1.02)
10-min	0.276 (0.232-0.336)	0.362 (0.305-0.439)	0.492 (0.412-0.595)	0.592 (0.493-0.713)	0.727 (0.596-0.872)	0.832 (0.673-0.993)	0.939 (0.745-1.12)	1.05 (0.818-1.25)	1.19 (0.908-1.42)	1.31 (0.973-1.56)
15-min	0.343 (0.288-0.417)	0.448 (0.378-0.544)	0.610 (0.511-0.738)	0.734 (0.612-0.884)	0.901 (0.739-1.08)	1.03 (0.835-1.23)	1.16 (0.924-1.38)	1.30 (1.01-1.54)	1.48 (1.13-1.76)	1.62 (1.21-1.93)
30-min	0.461 (0.388-0.561)	0.603 (0.509-0.733)	0.821 (0.688-0.994)	0.988 (0.824-1.19)	1.21 (0.995-1.46)	1.39 (1.12-1.66)	1.57 (1.24-1.86)	1.75 (1.37-2.08)	1.99 (1.52-2.37)	2.18 (1.63-2.60)
60-min	0.571 (0.480-0.694)	0.746 (0.630-0.907)	1.02 (0.852-1.23)	1.22 (1.02-1.47)	1.50 (1.23-1.80)	1.72 (1.39-2.05)	1.94 (1.54-2.31)	2.17 (1.69-2.57)	2.47 (1.88-2.94)	2.70 (2.01-3.22)
2-hr	0.662 (0.565-0.788)	0.857 (0.733-1.02)	1.15 (0.978-1.36)	1.37 (1.15-1.62)	1.68 (1.39-1.97)	1.91 (1.57-2.24)	2.15 (1.74-2.52)	2.39 (1.90-2.81)	2.72 (2.11-3.20)	2.98 (2.25-3.52)
3-hr	0.718 (0.610-0.861)	0.921 (0.787-1.11)	1.21 (1.03-1.45)	1.44 (1.21-1.72)	1.76 (1.46-2.09)	2.02 (1.65-2.39)	2.29 (1.84-2.71)	2.57 (2.03-3.03)	2.96 (2.27-3.49)	3.27 (2.44-3.88)
6-hr	0.865 (0.751-1.01)	1.10 (0.955-1.28)	1.41 (1.22-1.65)	1.65 (1.42-1.93)	1.99 (1.69-2.31)	2.26 (1.89-2.61)	2.53 (2.08-2.93)	2.82 (2.27-3.26)	3.20 (2.52-3.71)	3.51 (2.69-4.08)
12-hr	0.966 (0.848-1.12)	1.22 (1.07-1.42)	1.55 (1.36-1.80)	1.81 (1.57-2.09)	2.16 (1.85-2.48)	2.43 (2.06-2.78)	2.70 (2.26-3.10)	2.98 (2.45-3.42)	3.35 (2.69-3.87)	3.65 (2.88-4.24)
24-hr	1.16 (1.04-1.30)	1.47 (1.32-1.66)	1.91 (1.71-2.14)	2.25 (2.01-2.52)	2.73 (2.42-3.06)	3.11 (2.73-3.47)	3.50 (3.06-3.91)	3.91 (3.39-4.36)	4.47 (3.83-4.99)	4.92 (4.17-5.50)
2-day	1.25 (1.12-1.41)	1.60 (1.44-1.80)	2.11 (1.88-2.36)	2.51 (2.23-2.80)	3.06 (2.71-3.42)	3.51 (3.09-3.92)	3.98 (3.48-4.45)	4.47 (3.87-5.00)	5.15 (4.41-5.78)	5.70 (4.83-6.42)
3-day	1.32 (1.19-1.49)	1.70 (1.52-1.90)	2.23 (1.99-2.50)	2.66 (2.37-2.98)	3.27 (2.89-3.65)	3.75 (3.30-4.19)	4.27 (3.73-4.77)	4.81 (4.17-5.38)	5.57 (4.77-6.24)	6.19 (5.24-6.95)
4-day	1.40 (1.25-1.57)	1.79 (1.60-2.01)	2.38 (2.10-2.64)	2.82 (2.51-3.15)	3.47 (3.07-3.87)	3.99 (3.51-4.46)	4.56 (3.98-5.09)	5.16 (4.46-5.76)	6.00 (5.12-6.70)	6.68 (5.65-7.49)
7-day	1.55 (1.38-1.74)	1.97 (1.77-2.22)	2.61 (2.33-2.92)	3.12 (2.77-3.49)	3.84 (3.40-4.30)	4.42 (3.89-4.94)	5.04 (4.40-5.63)	5.70 (4.93-6.37)	6.63 (5.66-7.42)	7.37 (6.24-8.27)
10-day	1.68 (1.50-1.88)	2.15 (1.93-2.41)	2.84 (2.53-3.17)	3.39 (3.02-3.78)	4.16 (3.68-4.64)	4.78 (4.21-5.33)	5.44 (4.75-6.06)	6.13 (5.32-6.84)	7.10 (6.08-7.93)	7.88 (6.68-8.81)
20-day	2.07 (1.85-2.30)	2.66 (2.38-2.96)	3.50 (3.14-3.90)	4.15 (3.71-4.61)	5.01 (4.46-5.57)	5.68 (5.03-6.31)	6.35 (5.61-7.07)	7.04 (6.18-7.84)	7.96 (6.93-8.89)	8.67 (7.49-9.70)
30-day	2.41 (2.16-2.69)	3.10 (2.78-3.48)	4.09 (3.66-4.54)	4.84 (4.32-5.37)	5.84 (5.19-6.48)	6.61 (5.85-7.32)	7.40 (6.52-8.20)	8.21 (7.19-9.10)	9.29 (8.08-10.3)	10.1 (8.73-11.3)
45-day	2.80 (2.52-3.11)	3.60 (3.24-4.01)	4.74 (4.26-5.27)	5.59 (5.01-6.21)	6.70 (5.99-7.44)	7.54 (6.71-8.38)	8.39 (7.43-9.32)	9.23 (8.14-10.3)	10.3 (9.06-11.5)	11.2 (9.74-12.5)
60-day	3.10 (2.79-3.44)	4.00 (3.60-4.44)	5.26 (4.73-5.83)	6.18 (5.54-6.84)	7.37 (6.60-8.16)	8.25 (7.36-9.15)	9.14 (8.12-10.1)	10.00 (8.85-11.1)	11.1 (9.80-12.4)	12.0 (10.5-13.4)

[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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Request for Stormwater Storage Waiver

CITY OF SCOTTSDALE

City of Scottsdale Plan/Case Numbers:

11 - DR - 201☒ ____ - PP - ____ PC#_____

Requests for stormwater storage waivers are reviewed as part of case submittals for the associated project. This form should be included in the preliminary drainage report with the applicant's portion completed. The preliminary drainage report shall include supporting documentation and analysis as needed to support the requested wavier.

Date 2/11/2019 Project Name ☒ [redacted]

Project Location ☒121☒ [redacted]

Applicant Contact [redacted] Company Name E-[redacted]

Phone ☒02-☒9-440☒ E-mail [redacted]

Address 91☒ [redacted]

Waiver Criteria

A project must meet at least one of three criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed and sealed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

It should be noted that reductions in stormwater storage relating to

☐ 1. The development is adjacent to a conveyance facility that an engineering analysis shows is designed and constructed to handle the additional runoff from the site as a result of development.

☑ 2. The development is on a parcel less than one-half acre in size.

☐ 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO).

For a full storage waiver, a conflict with ESLO is limited to:

- Property located in the hillside landform as defined in the city Zoning Ordinance
- Property in the upper desert landform that has a land slope steeper than 5% as defined in the city Zoning Ordinance
- Property within the ESL zoning overlay district where the only viable location for a stormwater storage basin requires blasting

This full waiver only applies to those portions of property meeting one of these three requirements.

100-year/2-hour storage is allowed, but not required for redevelopment projects and development within the ESL zoning overlay. Rather, these projects must store enough stormwater to attenuate post-development flows to predevelopment levels, considering the 10- and 100-year storm events (S.R.C. Sections 37-50 and 37-51).

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

EXHIBIT-☒

_____ _____

Stormwater Management Department

7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 • Phone: 480-312-2500

Request for Stormwater Storage Waiver

CITY OF SCOTTSDALE

City of Scottsdale Plan/Case Numbers:

11 - DR - 201[redacted] ____ - PP - ____ PC#_____

CITY STAFF TO COMPLETE THIS PAGE

Project Name [redacted]

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐1 ☐2 ☐3

Recommended Conditions of Waiver:

☐ All storage requirements waived.

☐ Post-development peak discharge rates do not exceed pre-development conditions.

☐ Other:

Explain: _____

_____

☐ **Waiver approved per above conditions.**

_____ _____

Floodplain Administrator or Designee Date

Stormwater Management Department

7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 • Phone: 480-312-2500

Request for Stormwater Storage Waiver

CITY OF SCOTTSDALE

City of Scottsdale Plan/Case Numbers:

__11__ - DR - 201[redacted] ____ - PP - ____ PC#_____

In-Lieu Fee and In-Kind Contributions

In-lieu fees are only applicable to projects where post-development peak discharge rates exceed pre-development levels, based on the 10- and 100-year storm events. If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide a storage basin, sized as described below, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $3.00 per cubic foot of stormwater storage for a virtual storage basin designed to mitigate the increase in runoff associated with the 100-year/2-hour storm event. The applicant may submit site-specific in-lieu fee calculations subject to the Floodplain Administrator's approval.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater-related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name [redacted]

The waived stormwater storage volume is calculated using a simplified approach as follows:

$V = \Delta CRA$; where
V = stormwater storage volume required, in cubic feet,
ΔC = increase in weighted average runoff coefficient over disturbed area ($C_{post} - C_{pre}$),
R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and
A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where
V_w = volume waived,
V = volume required, and
V_p = volume provided

R = 2[redacted]
ΔC= 0[redacted]9[redacted]
A = 1[redacted]
V = 2[redacted]
V_p= 0[redacted]
V_w= 2[redacted]

☑ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $3.00 per cubic foot = [redacted]1[redacted]0

☐ An in-kind contribution will be made, as follows:

_____

_____

_____

☐ No in-lieu fee is required. Reason:

_____

_____

Approved by:

_____ _____

Floodplain Administrator or Designee Date

Stormwater Management Department

7447 E Indian School Road, Suite 125, Scottsdale, AZ 85251 • Phone: 480-312-2500