PRELIMINARY DRAINAGE REPORT

Residential Healthcare Facility

90th Street and Raintree Drive
Scottsdale, AZ 85260

Prepared For:

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Prepared by:

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Project Number: 200626

Submittal Date: October 8, 2020 (Rezoning)

Case No.: **Plan Check No.: TBD**

16-ZN-2020
10/20/20

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LIST OF FIGURES:

APPENDIX:

1. INTRODUCTION

This Preliminary Drainage Report represents the storm water analysis for the proposed Residential Healthcare Facility located in Scottsdale, Arizona. The purpose of this report is to provide the hydrologic and hydraulic analysis, 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 the collection and conveyance 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) 2018 [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 subject property consists of land located at the northwest corner of 90th Street and Raintree Circle Drive in Scottsdale, AZ:

- A portion of the Northeast 1/4 of Section 7, Township 3 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Scottsdale, Arizona.
- Parcel ID: Parcel 217-15-033; SFI Raintree Scottsdale LLC, Zoning R1-35

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:

- South: The site is bound by Raintree Circle Drive with the following across as follows:

  Parcel 217-15-952; The Robinson Group; Zoning is I-1
  Parcel 217-15-953; Wood Trust Bank; Zoning is I-1
  Parcel 217-15-954; Epstein Schneider; Zoning is I-1
  Parcel 217-15-955; GHA Technologies, Inc; Zoning is I-1
  Parcel 217-15-944; Loanpal; Zoning is C-2

- North: Parcel 217-15-036E; Alliance Defending Freedom, Zoning is I-1
- East: Directly adjacent is 90th Street. Across is a residential development; Zoning is R1-7
- West: Parcel 217-15-035A; Undeveloped; Zoning is I-1

2.3 EXISTING SITE DESCRIPTION:

The project area includes approximately 203,311 sqft. (4.67 acres) of land designated as R1-35 zoning. The existing site consists of an undeveloped parcel.

Per Topographic Survey prepared by AW Land Surveying LLC, a majority of the site slopes from northwest to south east, while the western most portion flows from northeast to southwest at approximately 1.0%. Elevation varies from approximately 1480.66 at the northwest corner to approximately 1476.82 at the southeast corner.

Refer to **FIGURE 2** attached for an aerial of the site.

2.4 PROPOSED SITE DEVELOPMENT:

Proposed development consists of a new residential healthcare facility with 3 and 4 story components, parking, and a common area with a pool. Refer to **Appendix III** - Preliminary Grading Plan for site layout.

2.5 FLOOD HAZARD ZONE:

FIRM Map Number 04013C1760L dated October 16, 2013 indicates the site is designated as Zone "X". As such, it is defined as areas determined to be outside the 0.2% annual chance floodplain and therefore is not in a special flood hazard area.

Refer to **FIGURE 3** for the FIRM.

3. EXISTING DRAINAGE CONDITIONS

3.1 OFF-SITE DRAINAGE PATTERNS

The topographic survey and city quarter section maps, **FIGURES 4 and 5**, provide the following information for offsite drainage:

- **North:**
  - Parcels 217-15-036E and 217-15-036J are developed sites that retain their onsite runoff. The existing curb and gutter along northwest of the property line and the existing retention basin along northeast of the property boundary maintain runoff from northern parcels from affecting the site.
  - There is an existing 24" RGRCP storm pipe discharging onto the northeast corner of the site via a headwall (EX HW-1). The flow discharging to the site is currently unknow. According to the Scottsdale Corporate Center, Phase 2 Grading Plan, CASE #86-DR-87, the existing 24" pipe has a slope of 0.005 ft/ft, assuming full capacity of the pipe, the maximum flow discharging to the site is 16 cfs.
- **West:**
  - There is a ridgeline within the west portion of the subject property that directs flows northeast to southwest maintaining runoff from the western adjacent parcel from entering the site.
- **South:**
  - There is an elevation difference of +/- 3 feet from north to south throughout the site, as such, offsite drainage from the south parcel does not affect the site.
- **West:**
- A scupper located in the curb line along 90th Street, approximately 60' north of the southeast corner of the site drains, also drains into the property. A second scupper is mirrored across 90th Street. According to the Storm QS map, both scuppers are connected by a pipe of unknown size and material, and discharge onsite though the existing headwall EX HW-2. The calculated runoff from 90th Street was determined through the rational method based on the estimated drainage area. Refer to **Appendix II** for Existing Conditions Drainage Area Map.

Table 1: Offsite Flows Summary		
Headwall ID	Description	Flow (CF)
EX-HW-1	24" RCP capturing runoff from north parcels	16.00
EX-HW-2	24" RCP capturing runoff from 90th Street	6.20
	TOTAL:	**22.20**

The offsite runoff from the north parcel and 90th Street exist the site through a headwall located near southeast corner of the site (EX HW-3). Considering runoff from the offsite flows specified above and including the flow from onsite EX-1 of 3.4 cfs, the estimated Q_{out} leaving EX. HW-3 is 25.60 cfs. Refer to **Appendix II** for Offsite Existing Conditions Drainage Area Map.

3.2 ON-SITE DRAINAGE PATTERNS

The site is currently undeveloped. the site slopes from northwest to southeast at approximately 0.5%. Elevation varies from approximately 1480.66 at the northwest corner to approximately 1476.82 at the southeast corner.

4. PROPOSED STORM WATER MANAGEMENT

4.1 DESIGN INTENT:

On-site drainage will be directed via overland flow and 18" storm pipes to a combined open and underground retention area on the east side of the property.

The entirety of the site is proposed as commercial use with a runoff coefficient of 0.86. There is no retention under existing conditions; however, onsite retention will be provided under proposed conditions.

Refer to **Appendix II** for **Proposed Conditions Drainage Area Map.**

The proposed design will eliminate flows from the site to off-site south, the site will be self-retaining for the 100-year, 2-hr storm event. Existing offsite drainage patterns will remain the same as in existing conditions. Flows from Existing Headwall 1 (EX-HW-1) and Existing Headwall 2 (EX-HW-2) will be rerouted to the existing storm drain manhole (EX-MH-2) on the northwest corner of 90th Street and Raintree Circle Drive via a 24" storm pipe.

Refer **Appendix III** for **Preliminary Grading and Drainage Plan.**

4.2 DESIGN STORM REQUIREMENTS:

In accordance with City of Scottsdale requirements, stormwater storage for the 100-year 2-hour storm event is required.

4.3 LAND CHARACTERISTICS:

The proposed project site consists mainly of a commercial building with a main drive and minor landscape areas along the perimeter. Based on the DS&PM, runoff coefficients for the 100-year storm event used are as follows:

- C=0.86 for commercial and industrial areas

HYDROLOGIC ANALYSIS: The 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 Rational Method equation is displayed as shown below:

$Q=C_{wt}IA$

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 (Using Five minutes for the developed areas)

A = The contributing drainage area in acres

Refer to the **Proposed Conditions Drainage Area Map** and Calculations in **Appendix II**.

4.4 STORMWATER RETENTION:

Based on topographic survey there is no retention provided in existing conditions. Based on the performed calculations above, the proposed development storage requirements for the 100-yr, 2-hr storm event are calculated as follows:

4.4.1 STORAGE REQUIRED:

Stormwater storage required for the 100-year, 2-hour event is calculated in accordance with the COS-DS&PM. Required Retention (Acre-Feet)= (P/12)*A*C

Where: P= 100 yr 2 hr precipitation in inches (Ref: Isopluvial from DS&PM, Appendix 4-1D, pg.11 and NOAA Atlas 14 table). Refer to **Appendix I** for rainfall data.

Based on the C-value identified in Section 4.3 above, the following retention is required:

Basin A (Open Retention and Underground Storage): 4.67 ac @ Cwt= 0.86

- 100-yr 2-hr.:

  V_R = 2.27/12 * 4.67 ac * 0.86 = **0.76 ac.ft. (33,106 c.f.) REQUIRED STORAGE**

4.4.2 STORAGE PROVIDED:

Retention Basin A (Combination Open & Underground Retention):

The proposed retention (Retention Basin A) consists of two open retention basins and four 10-ft diameter corrugated metal pipes, all connected via equalizer pipes. The proposed volume for the open retention was calculated using the area-sum method based on design contours. Storage volume of underground piping is calculated using $V_P= \pi(R^2) * L$. Table 2 summarizes the calculated volume

provided and volume required and verifies that proposed basins are adequate to store the required volume for the 100-yr, 2-hr storm. Refer to Appendix II for Proposed Storage Calculations.

Table 2:

Proposed Retention Basin Summary					
Basin		TYPE	Vp	Vptotal	Vr
(ID)		(--)	(CF)	(CF)	(CF)
Basin A	Basin A1	OPEN	6,712	34,498	33,106
	Basin A2	OPEN	1,083		
	Basin A3	UG	9,425		
	Basin A4	UG	6,283		
	Basin A5	UG	5,498		
	Basin A6	UG	5,498		

4.4.3 STORMWATER DISCHARGE:

For Basins with no direct bleed-off available, Drywells are proposed in the on-site storage facilities to dispose of the stormwater within thirty-six (36) hours. The calculation is as follows:

- Minimum percolating rate of a drywell (for planning purposes) = 0.1 cfs
- Volume to be drained in 36 hours = 0.1 cfs * 36 hours * 3600 sec/hour = 12,960 cf = 0.298 acre-feet.
- Basin A retention provided = 34,498 cf
  Therefore, 34,498 cf / 12,960 cf per drywell = 2.66= 3 drywells required.
- The drywells are to be installed according to FCDMC guidelines.

4.5 ADEQ WATER QUALITY REQUIREMENTS

The total disturbed area of this site is approximately 4.67 acres. The Arizona Department of Environmental Quality requires that any site disturbance over an acre is required to submit an NOI. An NOI will be submitted to ADEQ for this site after the first submittal of the construction documents as this site disturbance is over 1 acre.

5. FLOOD SAFETY FOR DWELLINGS

5.1 FINISHED FLOOR ELEVATIONS

This project lies in an "X" Flood Zone. The ultimate outfall for the site is 1479.72 and is located at the southeast corner. Therefore, the proposed building finished floor elevations will be set a minimum of 12 inches above the 100-year high-water elevation of any adjacent streets and drainage paths. This will ensure that each building will be well above the 100-year water level.

6. CONCLUSIONS

6.1 OVERALL PROJECT:

1. The finish floor elevations will be designed a minimum of 12 inches above the 100-year water surface in adjacent streets and drainage paths and a minimum of 14 inches above the low top of curb of the lot.
2. On-site storm water retention will be provided for the 100-year, 2-hour storm event.

6.2 PROJECT PHASING:

This project will 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 2018*
2. *Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology, Flood Control District of Maricopa County, Fourth Edition, December 14, 2018*
3. *Drainage Design Manual for Maricopa County, Arizona, Volume II, Hydraulics, Flood Control District of Maricopa County, December 14, 2018*

GRADING & DRAINAGE LANGUAGE

WARNING AND DISCLAIMER OF LIABILITY

The City's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding.

The Stormwater and Floodplain Management Ordinance identifies floodplains, floodways, flood fringes and special flood hazard areas. However, a property outside these areas could be inundated by floods. Also, much of the city is a dynamic flood area; floodways, floodplains, flood fringes and special flood hazard areas may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY

The flood protection provided by the Stormwater and Floodplain Management Ordinance 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 constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the city, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder.

Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect 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.

_____ _____ _____

Plan Check # Owner Date

FIGURE 1 – Vicinity Map

FIGURE 2 - Aerial

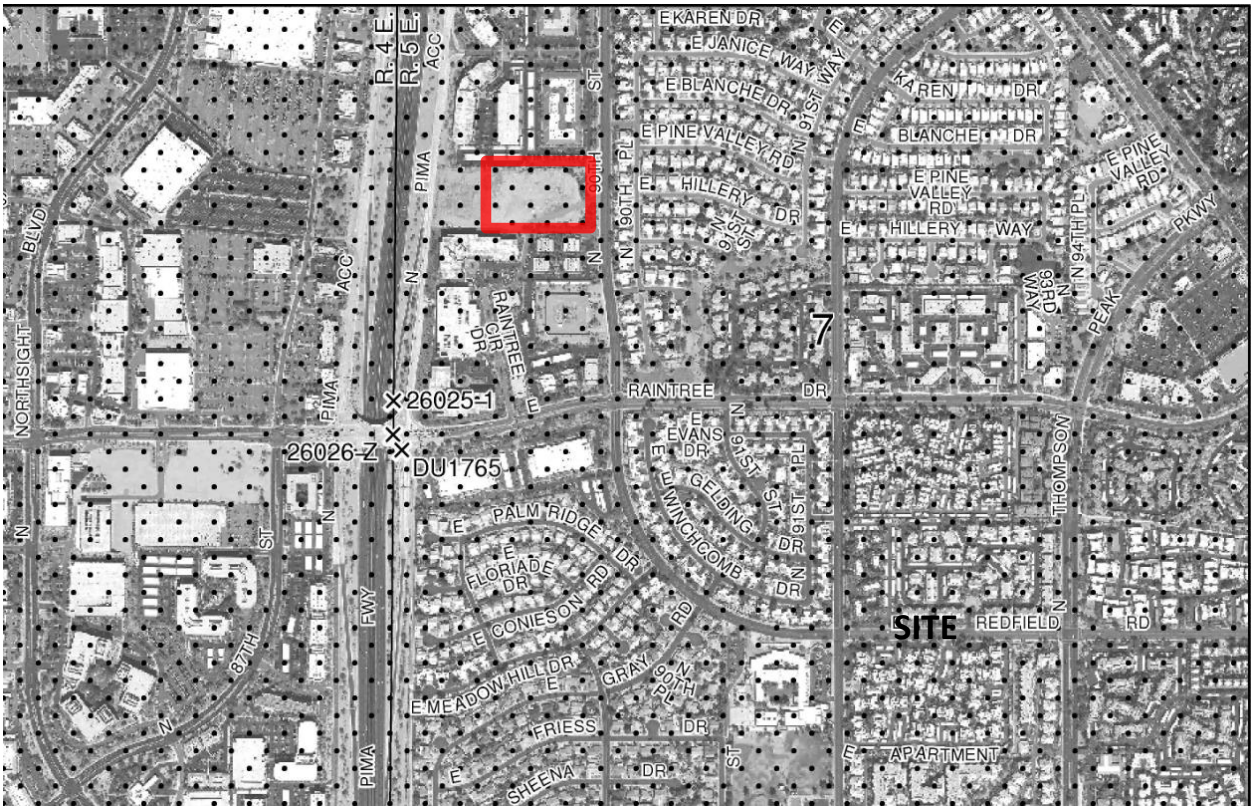
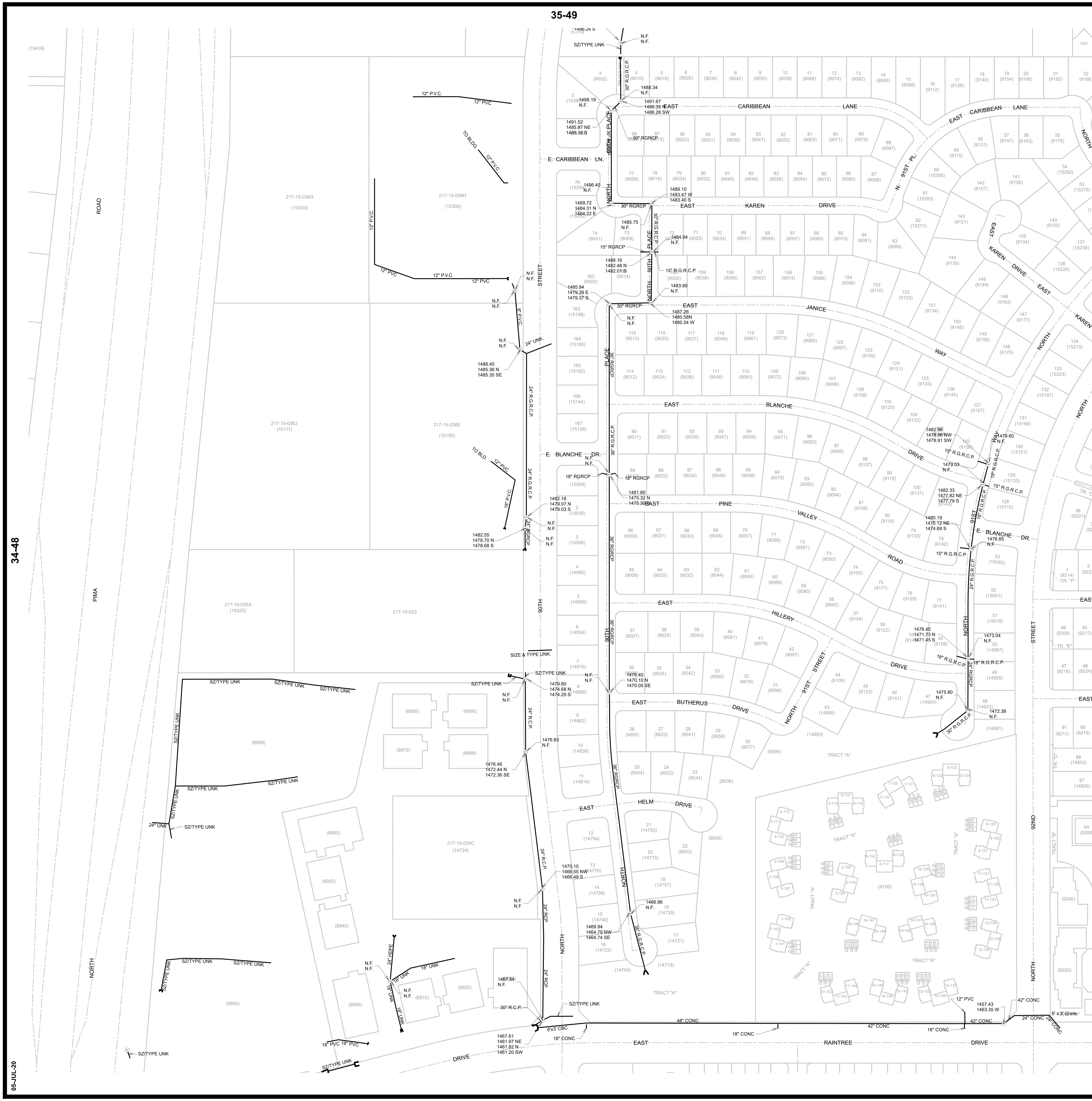


FIGURE 3 – FEMA FIRM

Excerpt from 04013C1760L

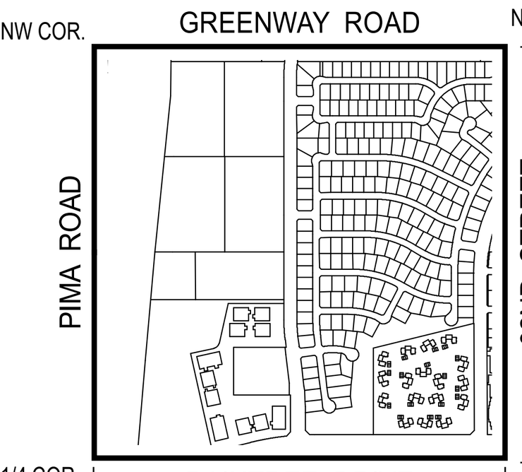


GENERAL NOTES:

- THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
- 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:

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"

STORM WATER

QUARTER SECTION MAP

34-49

NW 1/4 SEC. 7 T3N R5E

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

16-ZN-2020
10/20/20

N O T I C E

THE CITY OF SCOTTSDALE

05-JUL-20

35-49

34-48

34-50

33-49

28-APR-14

GENERAL NOTES:

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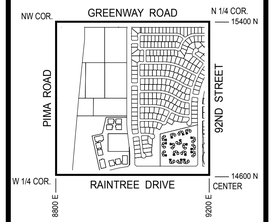
LEGEND:

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"

CONTOUR

QUARTER SECTION MAP

34-49

NW 1/4 SEC. 7 T3N R5E

CITY OF SCOTTSDALE

SCOTTSDALE GEOGRAPHIC INFORMATION SYSTEMS

3629 North Drinkwater Boulevard
Scottsdale, Arizona 85251

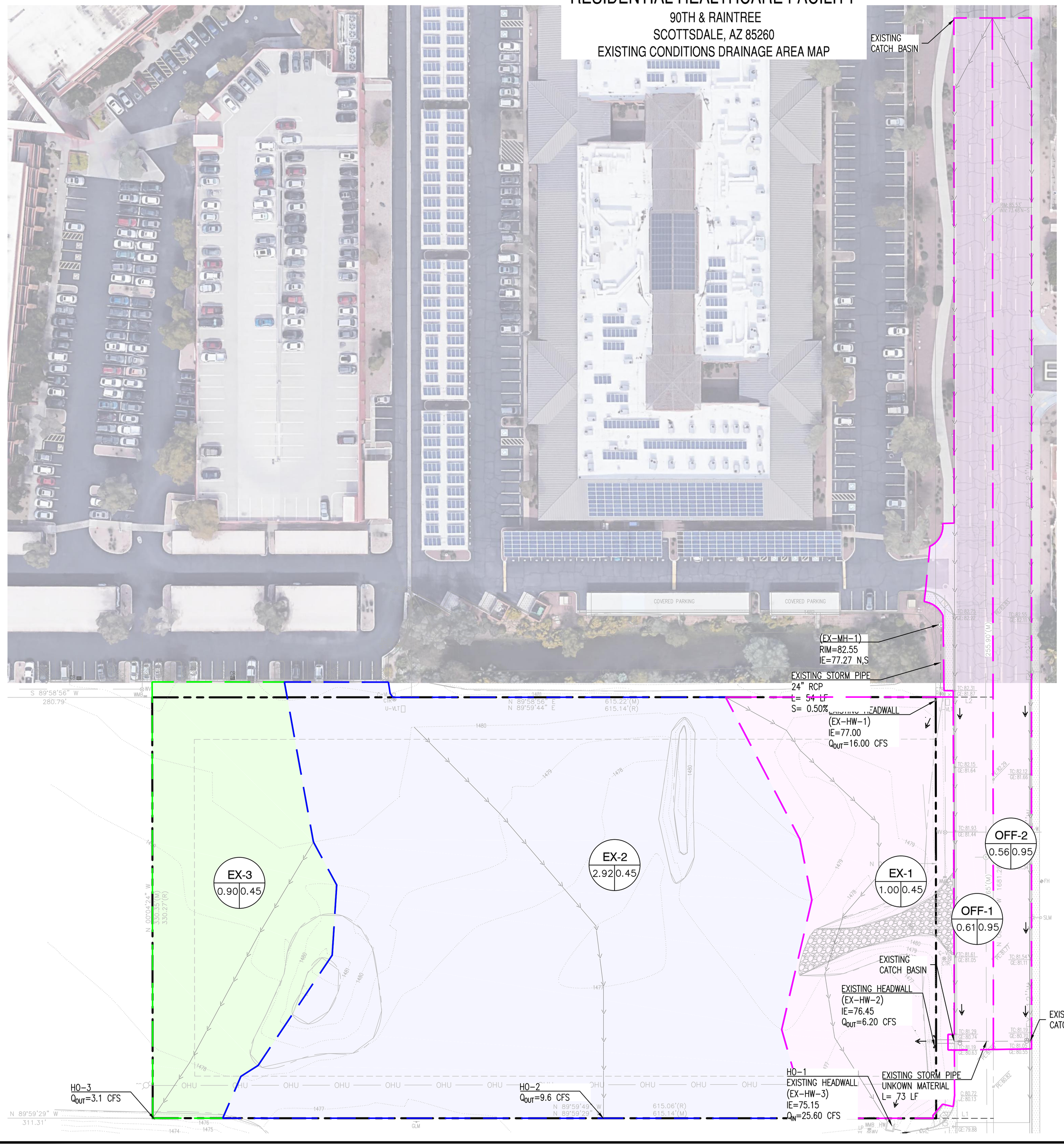
10/20/20

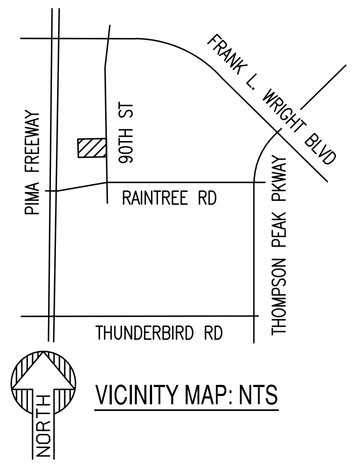
APPENDIX II

Calculations

RESIDENTIAL HEALTHCARE FACILITY

90TH & RAINTREE
SCOTTSDALE, AZ 85260
EXISTING CONDITIONS DRAINAGE AREA MAP

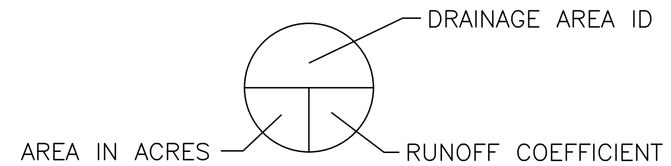




VICINITY MAP: NTS

LEGEND

- PROPERTY LINE
- DRAINAGE AREAS CONTRIBUTING TO HO-1
- DRAINAGE AREAS CONTRIBUTING TO HO-2
- DRAINAGE AREAS CONTRIBUTING TO HO-3
- FLOW ARROW
- EXISTING STORM MANHOLE
- EXISTING HEADWALL
- EXSTING STORM DRAIN PIPE



DRAINAGE AREA KEY

NORTH
0' 40' 80' 120'
SCALE: 1" = 40'

NOTE: STORM DRAIN MANHOLE RIM AND INVERTS OBTAINED FROM C.O.S. QS #34-49 AND SCOTTSDALE CORPORATE CENTER PHASE II GRADING PLAN #36286

PRELIMINARY
NOT FOR
CONSTRUCTION

SEG SUSTAINABILITY ENGINEERING GROUP
8280 E. GELDING DRIVE SUITE 101, SCOTTSDALE, ARIZONA 85260
WWW.AZSEG.COM TEL. 480.588.7226 FAX. 480.259.3534

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811 Call 811 or click Arizona811.com

PROJECT	RESIDENTIAL HEALTH CARE FACILITY
LOCATION	N 90TH ST & RAINTREE CIRCLE DR

DRAWN		KA	9/24/2020
DESIGNED		KA	9/24/2020
QC		SC	9/22/2020
QA			
PROJ. MGR.			

DATE: 9/24/2020

ISSUED FOR: REZONING

REVISION NO.:	DATE:
1	
2	
3	
4	

JOB NO.: 200626

SHEET TITLE: EXISTING CONDITIONS DRAINAGE AREA MAP

PAGE NO.: 1 OF 1

SHEET NO.:

LOCATION: Z:\SHARED\PROJECTS\GREYSTAR\RESIDENTIAL HEALTHCARE-90TH ST & RAINTREE-SCOTTSDALE-200626\11 CAD (SEG)\11.2 ENTITLEMENT-PLANNING\EX-DAM.DWG SAVED BY: KENYA.AVINA DATE: 9/24/2020

16-ZN-2020
10/2020

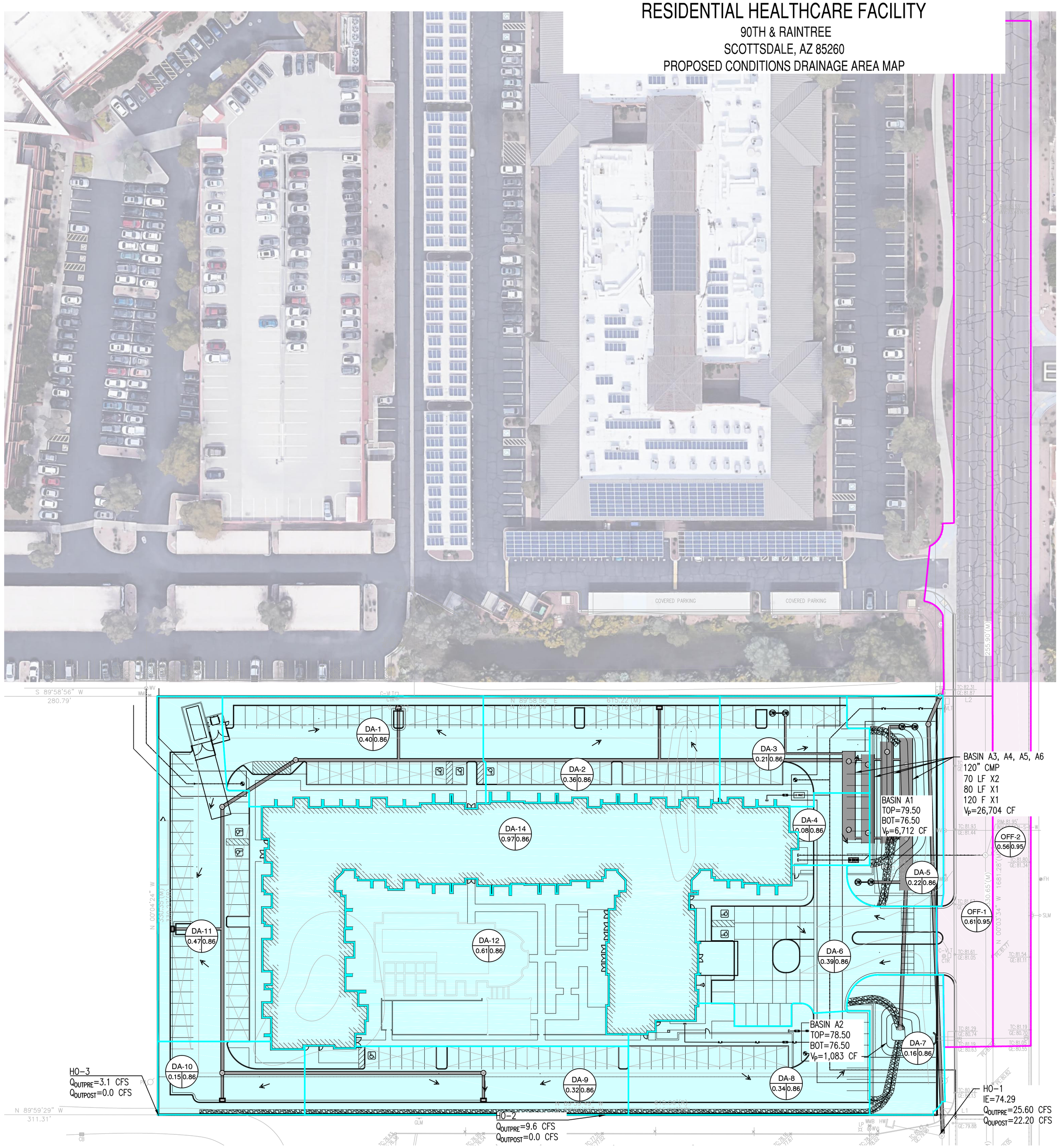
ID	Sub Basin Data							Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb		2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01													
OFF-1	0.6	798	0.00	0.00	21.0	0.042	Q (cfs)	1.0	1.4	1.8	2.3	2.7	3.1
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.53	0.53	0.53	0.53	0.53	0.53
							Volume (ac-ft)	0 0285	0.0348	0.0410	0.0478	0.0526	0.0570
							Tc (min)	16	14	12	11	11	10
							i (in/hr)	1.86	2.70	3.38	4.32	5.07	5.84
OFF-2	0.6	798	0.00	0.00	21.0	0.042	Q (cfs)	1.0	1.4	1.8	2.3	2.7	3.1
							C	0.95	0.95	0.95	0.95	0.95	0.95
							CA (ac)	0.53	0.53	0.53	0.53	0.53	0.53
							Volume (ac-ft)	0 0285	0.0348	0.0410	0.0478	0.0526	0.0570
							Tc (min)	16	14	12	11	11	10
							i (in/hr)	1.86	2.70	3.38	4.32	5.07	5.84
EX-1	1.0	334	0.00	0.00	29.2	0.040	Q (cfs)	1.0	1.4	1.7	2.1	2.8	3.4
							C	0.37	0.37	0.37	0.37	0.42	0.45
							CA (ac)	0.37	0.37	0.37	0.37	0.42	0.45
							Volume (ac-ft)	0 0143	0.0175	0.0197	0.0220	0.0278	0.0319
							Tc (min)	8	7	6	6	5	5
							i (in/hr)	2.57	3.68	4.54	5.74	6.67	7.64
EX-2	2.9	490	1,480.00	1,477.00	32.3	0.037	Q (cfs)	2.6	3.7	4.6	5.9	7.8	9.6
							C	0.37	0.37	0.37	0.37	0.42	0.45
							CA (ac)	1.08	1.08	1.08	1.08	1.23	1.31
							Volume (ac-ft)	0 0435	0.0537	0.0617	0.0716	0.0889	0.1042
							Tc (min)	9	8	7	7	6	6
							i (in/hr)	2.40	3.46	4.30	5.47	6.38	7.31
EX-3	0.9	344	1,481.00	1,478.00	46.0	0.040	Q (cfs)	0.9	1.3	1.6	2.0	2.6	3.1
							C	0.37	0.37	0.37	0.37	0.42	0.45

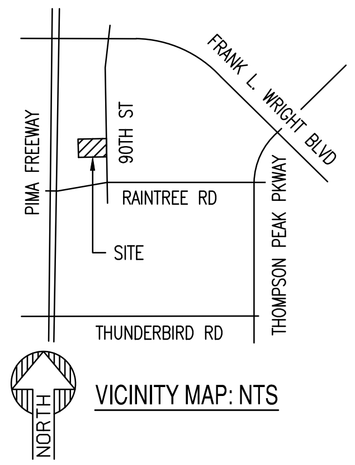
* Non default value

ID	Sub Basin Data						Sub Basin Hydrology Summary					
	Area (acres)	Length (ft)	USGE	DSGE	Slope (ft/mi)	Kb	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Major Basin ID: 01												
							CA (ac) 0.33	0.33	0.33	0.33	0.38	0.41
							Volume (ac-ft) 0.0113	0.0141	0.0159	0.0184	0.0239	0.0285
							Tc (min) 7	6	5	5	5	5
							i (in/hr) 2.72	3.86	4.77	5.96	6.82	7.68

RESIDENTIAL HEALTHCARE FACILITY

90TH & RAINTREE
SCOTTSDALE, AZ 85260
PROPOSED CONDITIONS DRAINAGE AREA MAP





VICINITY MAP: NTS

STORM WATER STORAGE SUMMARY:

TOTAL VOLUME REQUIRED:
V_R=33,306 CF

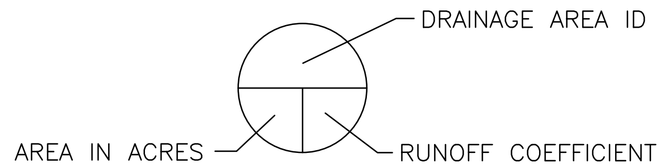
TOTAL 10' CMP PROVIDED:
70+70+70+80+120=340 LF
V_{P1}=3.14*(5')^2*988=26,704 CF

TOTAL OPEN RETENTION:
V_{P2}=6,712+1,083=7,795 CF

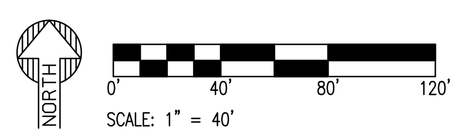
TOTAL BASIN PROVIDED:
V_{PTOTAL}=34,498 CF

LEGEND

- PROPERTY LINE
- DRAINAGE AREAS CONTRIBUTING TO HO-1
- DRAINAGE AREAS CONTRIBUTING TO BASIN A
- FLOW ARROW
- EXISTING STORM MANHOLE
- EXISTING HEADWALL
- EXSTING STORM DRAIN PIPE



DRAINAGE AREA KEY



SCALE: 1" = 40'

NOTE: STORM DRAIN MANHOLE RIM AND INVERTS OBTAINED FROM C.O.S. QS #34-49 AND SCOTTSDALE CORPORATE CENTER PHASE II GRADING PLAN #36286

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Arizona811.com
Call 811 or click Arizona811.com

PROJECT	RESIDENTIAL HEALTH CARE FACILITY
LOCATION	N 90TH ST & RAINTREE CIRCLE DR

DRAWN	KA	9/24/2020
DESIGNED	KA	9/24/2020
QC	SC	9/22/2020
QA		
PROJ. MGR.		

DATE: 10/8/2020
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JOB NO.: 200626

SHEET TITLE: PROPOSED CONDITIONS DRAINAGE AREA MAP

PAGE NO.: 1 OF 1
SHEET NO.:

LOCATION: Z:\SHARED\PROJECTS\GREYSTAR\RESIDENTIAL HEALTHCARE-90TH ST & RAINTREE-SCOTTSDALE-200626\11 CAD (SEG)\11.2 ENTITLEMENT-PLANNING\P-DAM.DWG SAVED BY: KENYA.AVINA DATE: 10/8/2020

19-ZN-2020
10/2020

Provided Storage Calculations

BASIN A1					
ELEV.	AREA	DEPTH	AVG V	SUM V	COMMENT
(FT)	(SF)	(FT)	(CF)	(CF)	
76.5	573			0.00	Bottom
		1.00	1,063.99		
77.5	1,555			1,063.99	
		1.00	2,149.61		
78.5	2,744			3,213.60	
		1.00	3,498.26		
79.5	4,253			6,711.85	Pond Top

BASIN A2					
ELEV.	AREA	DEPTH	AVG V	SUM V	COMMENT
(FT)	(SF)	(FT)	(CF)	(CF)	
76.50	128			0.00	Bottom
		1.00	309.76		
77.50	492			309.76	
		1.00	773.03		
78.50	1,054			1,082.79	Top

UG Storage ID	Diameter (FT)	Length (FT)	Volume (CF)
A3	10	120	9,425
A4	10	80	6,283
A5	10	70	5,498
A6	10	70	5,498

Existing 24in RGRCP

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Normal Depth	12.0 in
Diameter	24.0 in

Results	
Discharge	8.00 cfs
Flow Area	1.6 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	6.0 in
Top Width	2.00 ft
Critical Depth	12.1 in
Percent Full	50.0 %
Critical Slope	0.005 ft/ft
Velocity	5.09 ft/s
Velocity Head	0.40 ft
Specific Energy	1.40 ft
Froude Number	1.013
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.001 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	50.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	12.0 in
Critical Depth	12.1 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft

APPENDIX III

Preliminary Grading and Drainage Plans

RESIDENTIAL HEALTHCARE FACILITY

90TH STREET AND RAINTREE
SCOTTSDALE, AZ 85260
PRELIMINARY GRADING PLAN

PROJECT ADDRESS
90TH STREET & RAINTREE DRIVE, SCOTTSDALE, ARIZONA 85260.

PROJECT DESCRIPTION
NEW 151-UNIT RESIDENTIAL HEALTHCARE FACILITY WITH 3 STORIES AND 4 STORIES COMPONENTS, PARKING, AND COMMON AREA.

LEGAL DESCRIPTION
A PORTION OF THE NORTHWEST QUARTER OF SECTION 7, TOWNSHIP 3 NORTH, RANGE 5 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.

BENCHMARK:
BENCHMARK IS A BRASS FLUSH, BEING THE SOUTH QUARTER CORNER OF SECTION 7, T3N, R5E.

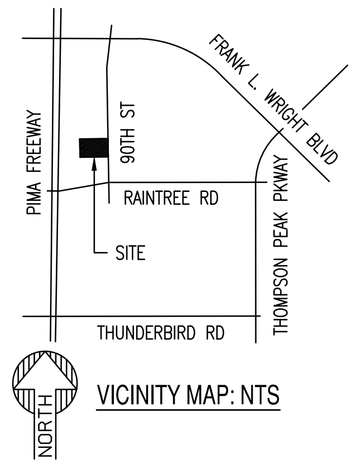
ELEVATION = 1447.20 (NAVD88)

BASIS OF BEARING:
THE BASIS OF BEARING AND ALL MONUMENTATION SHOWN HEREON IS BASED ON THE MONUMENT LINE OF 90TH STREET, USING A BEARING OF SOUTH 00 DEGREES 03 MINUTES 34 SECONDS EAST, AS SHOWN ON RECORD OF SURVEY, RECORDED IN BOOK 896, PAGE 1, MARICOPA COUNTY RECORDS.

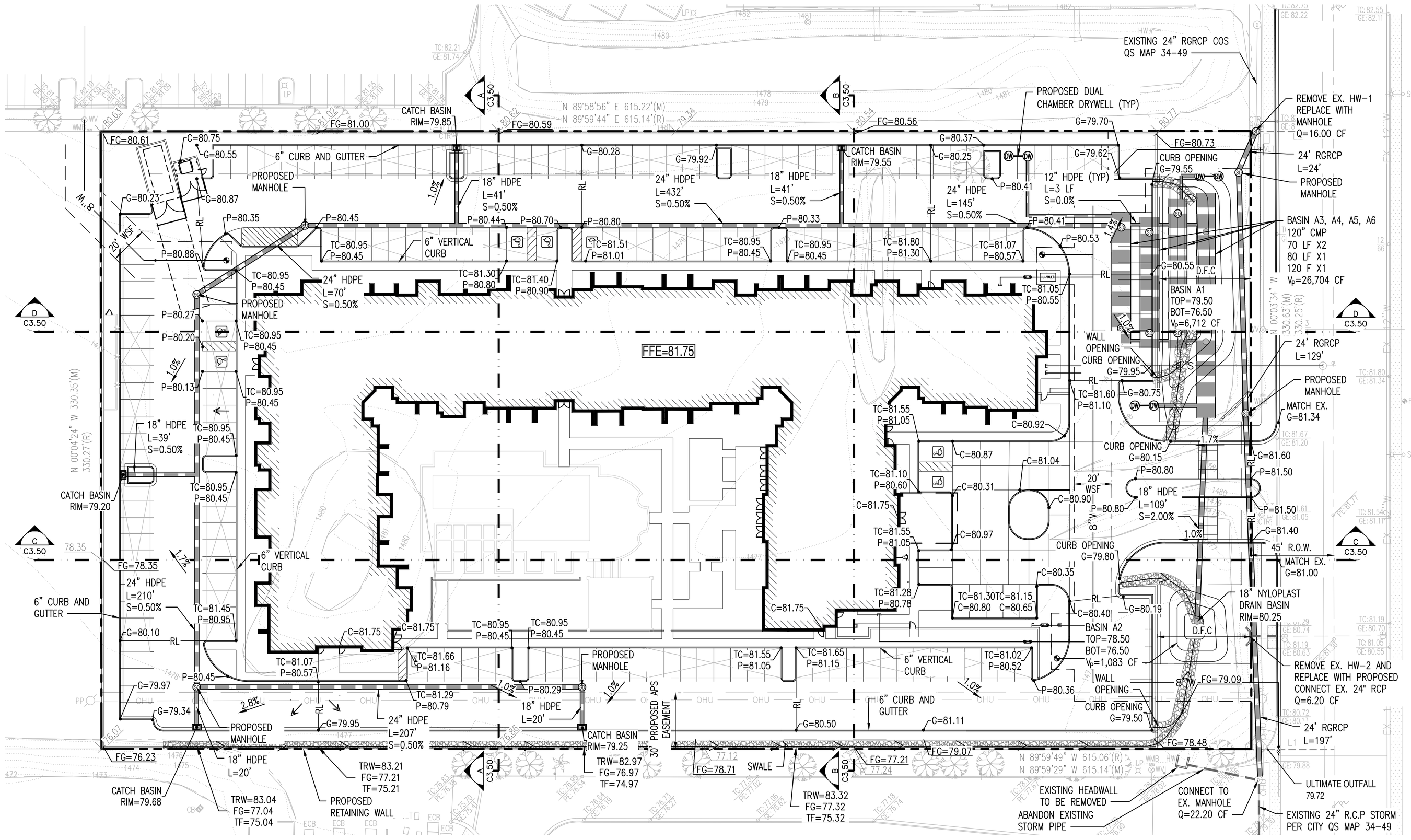
PARCEL INFORMATION:
APN:	217-15-033
ZONING:	C-O
LOT SIZE:	4.66 ACRES (202,950 SF)-(NET AREA/GROSS AREA)
FLOOD ZONE:	ZONE X (0.2 % ANNUAL FLOOD HAZARD)

ARCHITECT:
TODD & ASSOCIATES, INC.
4019 N.44TH ST.
PHOENIX, AZ 85018
PHONE: 602-952-8280p

CIVIL ENGINEER:
SUSTAINABILITY ENGINEERING GROUP
8280 E GELDING DR., SUITE 101
SCOTTSDALE, AZ 85260
PHONE 480-237-2507
ATTN: ALI FAKIH
ALI@AZSEG.COM



VICINITY MAP: NTS



STORM WATER STORAGE SUMMARY:
TOTAL VOLUME REQUIRED:
V_R=33,306 CF

TOTAL 10' CMP PROVIDED:
70+70+70+80+120=340 LF
V_{P1}=3.14*(5')^2*988=26,704 CF

TOTAL OPEN RETENTION:
V_{P2}=6,712+1,083=7,795 CF

TOTAL BASIN PROVIDED:
V_{PTOTAL}=34,498 CF

PROPOSED LEGEND:
- G=XX.XX — GUTTER ELEVATION, TC = G+0.5'
- P=XX.XX — PAVEMENT ELEVATION
- C=XX.XX — CONCRETE ELEVATION
- PROPERTY LINE
- CURB AND GUTTER
- RL — RIDGELINE
- XX — MAJOR CONTOUR
- XX — MINOR CONTOUR
- FLOW ARROW
- CATCH BASIN
- STORM PIPE
- RIP-RAP
- CONCRETE PAVEMENT
- HEAVY DUTY PAVEMENT
- LIGHT DUTY PAVEMENT
- DW — DRYWELL
- WATER METER
- GATE VALVE
- FIRE HYDRANT

EXISTING LEGEND:
- XXXX — EX. MAJOR CONTOURS
- XXXX — EX. MINOR CONTOURS
- TC:XX.XX FL:XX.XX — EX. SPOT ELEVATION
- P=XX.XX — EX. PAVEMENT ELEVATION
- EASEMENT LINE AS NOTED
- EX. S — SEWER LINE
- S — SEWER MANHOLE
- EX. W — WATER LINE
- WV — WATER VALVE
- FIRE HYDRANT
- STORM DRAIN LINE
- CB — STORM CATCH BASIN
- D — STORM MANHOLE
- GAS — GAS LINE
- IRR — IRRIGATION LINE
- SIGN
- STREET LIGHT

CUT AND FILL QUANTITIES
(FOR PERMIT FEE ESTIMATION ONLY.
CONTRACTOR TO PERFORM ITS OWN CALCULATIONS)

FILL	+15,402 CY
CUT	– 322 CY
NET FILL (COMPACTED IMPORT)	+15,080 CY

NORTH

PRELIMINARY GRADING AND DRAINAGE PLAN

0' 30' 60' 90'

SCALE: 1" = 30'

PRELIMINARY
NOT FOR
CONSTRUCTION

SUSTAINABILITY ENGINEERING GROUP
SEG
8280 E. GELDING DRIVE SUITE 101, SCOTTSDALE, ARIZONA 85260
WWW.AZSEG.COM TEL. 480.588.7226 FAX. 480.259.3534

Blue Stake, Inc. Arizona 811 at least two full working days before you begin excavation
ARIZONA811 Call 811 or visit Arizona811.com

PROJECT	LOCATION
RESIDENTIAL HEALTH CARE FACILITY	N 90TH ST & RAINTREE CIRCLE DR

DRAWN	KA	9/24/2020
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QC	SC	9/22/2020
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SHEET TITLE: **PRELIMINARY GRADING AND DRAINAGE PLAN**

PAGE NO.:	SHEET NO.:
	C3.00

LOCATION: Z:\SHARED\PROJECTS\GREYSTAR\RESIDENTIAL HEALTHCARE-90TH ST & RAINTREE-SCOTTSDALE-200626\11 CAD (SEG)\11.2 ENTITLEMENT-PLANNING\PRELIMINARY GRADING.DWG SAVED BY: KENYA.AVINA DATE: 10/8/2020

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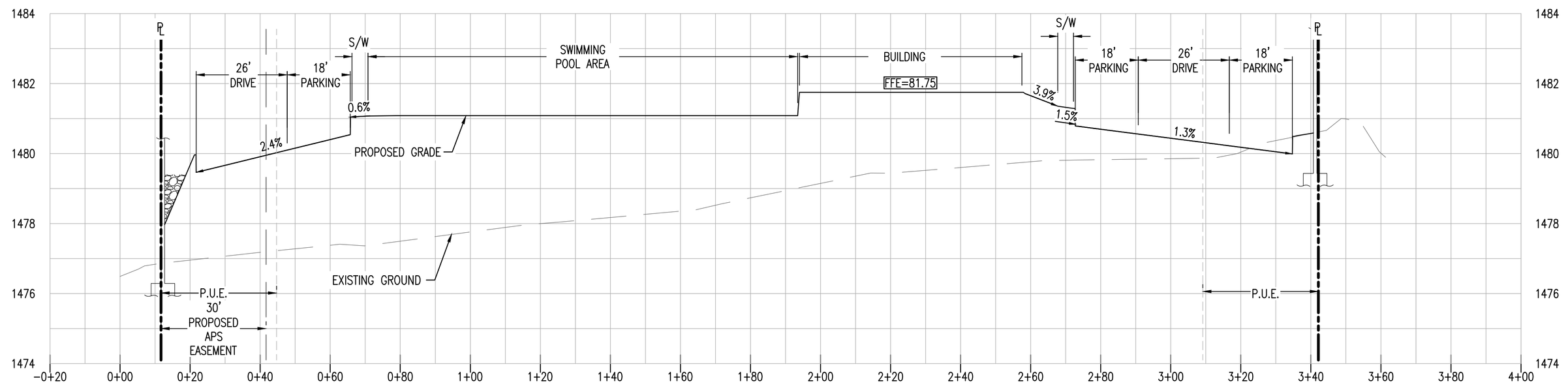
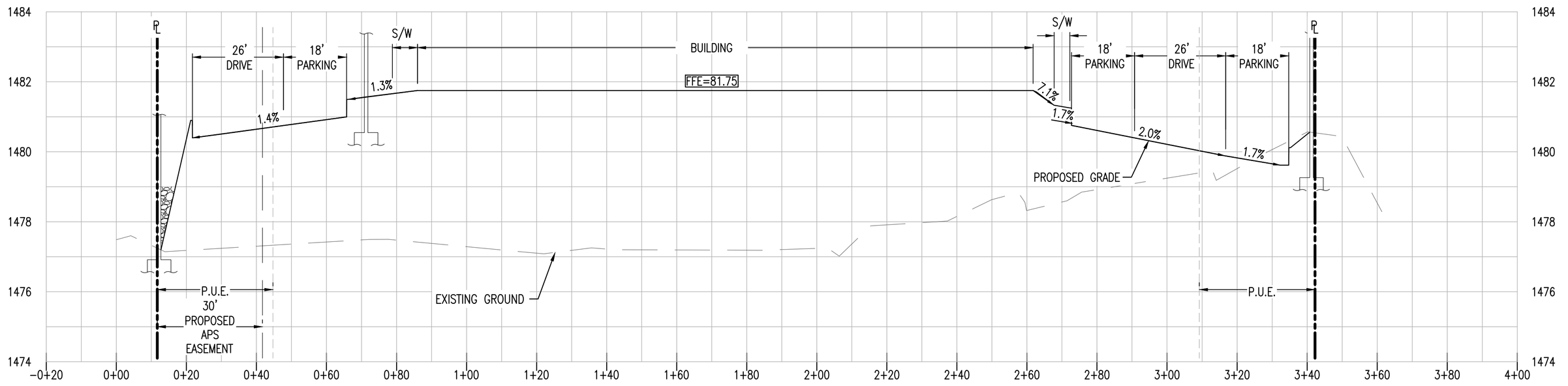


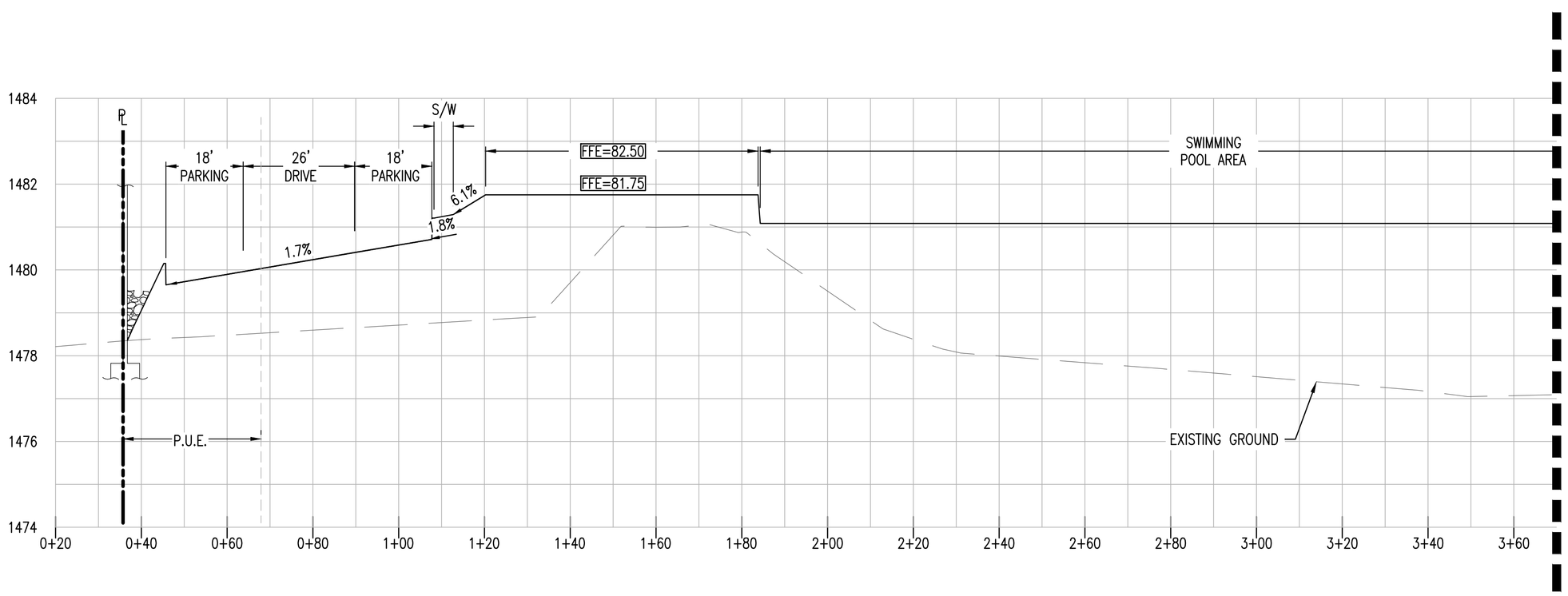
PROFILE VIEW A-A

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



PROFILE VIEW B-B

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



PROFILE VIEW C-C

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'

PRELIMINARY
NOT FOR
CONSTRUCTION

SEG
SUSTAINABILITY ENGINEERING GROUP
8280 E. GELDING DRIVE SUITE 101, SCOTTSDALE, ARIZONA 85260
WWW. AZSEG.COM TEL. 480.588.7226 FAX. 480.259.3534

PROJECT
RESIDENTIAL HEALTH CARE FACILITY

LOCATION
N 90TH ST & RAINTREE CIRCLE DR

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SHEET TITLE:
PRELIMINARY SITE CROSS SECTIONS

PAGE NO.:

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LOCATION: Z:\SHARED\PROJECTS\GREYSTAR\RESIDENTIAL HEALTHCARE-90TH ST & RAINTREE-SCOTTSDALE-200626\11 CAD (SEG)\11.2 ENTITLEMENT-PLANNING\PRELIMINARY GRADING.DWG SAVED BY: KENYA.AVINA DATE: 9/24/2020

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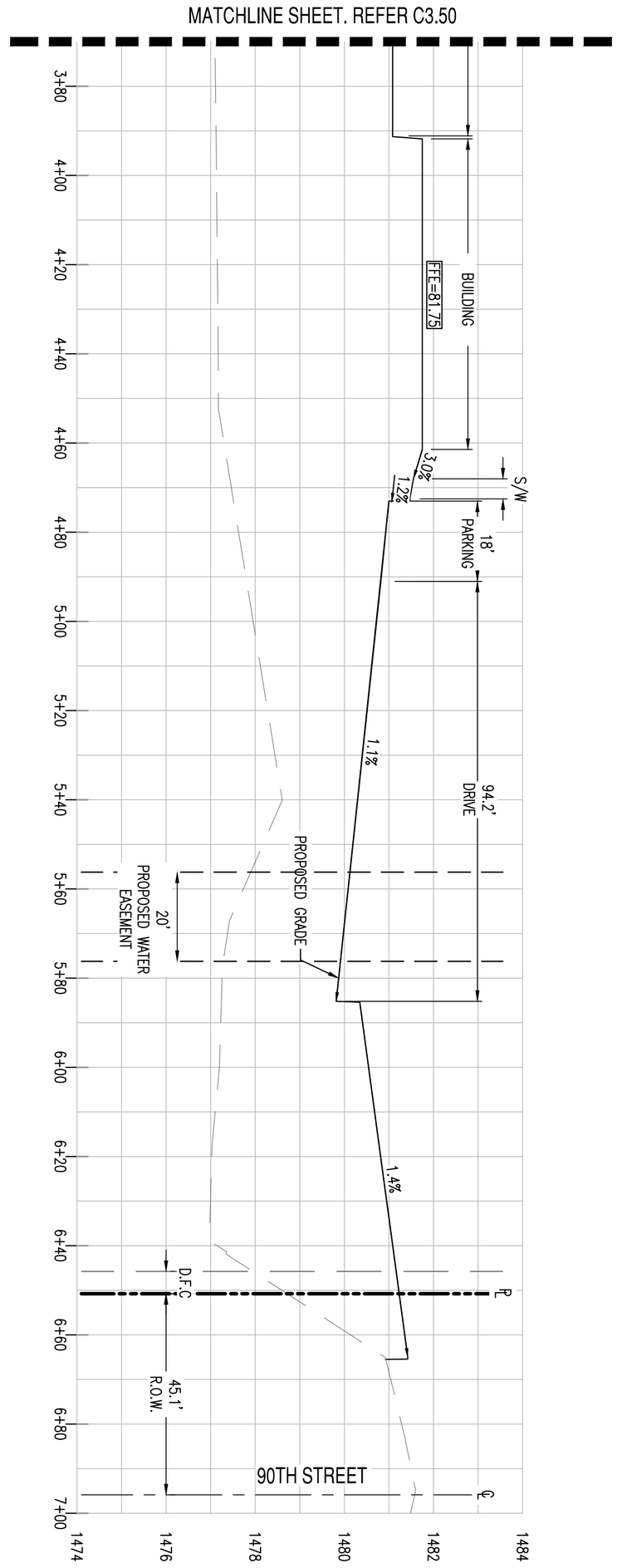
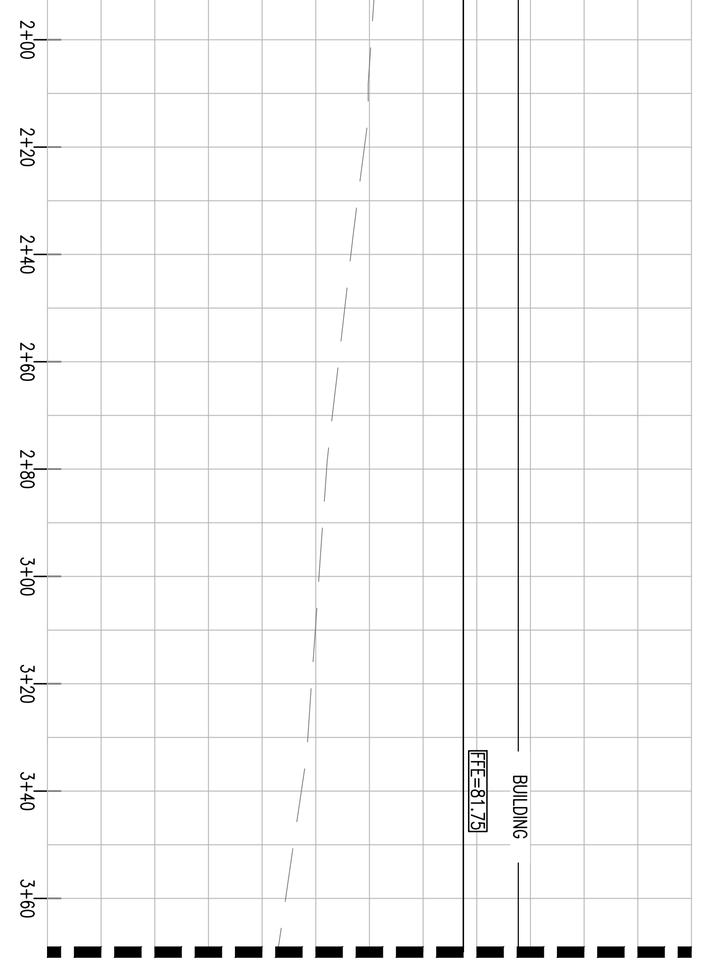
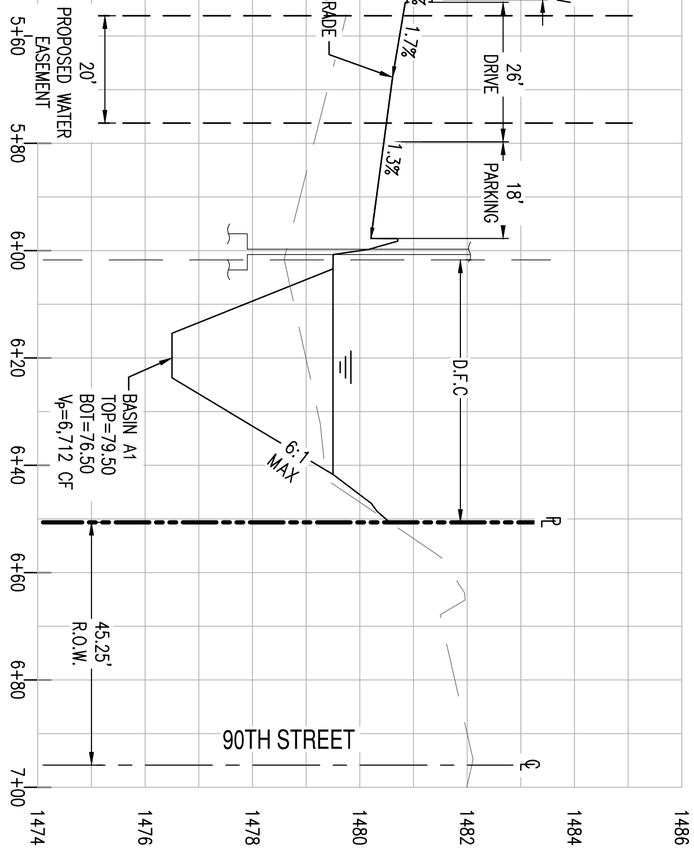


PROFILE VIEW C-C
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



PROFILE VIEW D-D
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



PROFILE VIEW D-D
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'

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Arizona Blue Stake, Inc. 811 or Arizona811.com
Call 811 or click Arizona811.com before you dig

PROJECT
RESIDENTIAL HEALTH CARE FACILITY

LOCATION
N 90TH ST & RAINTREE CIRCLE DR

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PAGE NO.:	SHEET NO.: C3.51