

**DRAINAGE REPORTS**

**ABBREVEATED WATER & SEWER NEED REPORTS**

**WATER STUDY**

**WASTERWATER STUDY**

**STORMWATER WAIVER APPLICATION**

21 May 2018

City of Scottsdale  
Planning and Development Department  
3939 North Drinkwater Boulevard  
Scottsdale, Arizona 85251

RE: Drainage Narrative for Black Rock Coffee - Scottsdale  
CYPRESS Project No: 18.043

To Whom It May Concern:

The intent of this Drainage Narrative is to discuss and describe the existing and proposed drainage conditions at the Black Rock Coffee - Scottsdale site, herein referred to as "the Project."

#### **PROJECT DESCRIPTION AND LOCATION**

The Project site is located at 8700 East Thomas Road in Scottsdale, Arizona. The project is located in the southeast ¼ of the southeast ¼ of Section 25, Township 2 North, Range 4 East, G&SRM. The Project site occupies approximately 0.60 acres and is currently a parking lot supporting a building and use that has recently been re-developed, rendering the parking lot use obsolete. The Project has street frontage and access to Thomas Road, via existing driveway locations. To the west is Pima Park, to the north is a new storage facility, and to the east is vacant land being prepared for future development.

#### **FLOODPLAIN MAP**

According to the federal emergency management agency flood insurance rate map panel number 04025C1757H, dated October 16, 2015 the parcel is located in the unshaded zone X area, which is area defined as outside the 0.2% annual chance flood. Portions of the parcel are also located within zone X (shaded) area, which is defined as 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. Portions of the parcel are impacted by zone AE area, which is defined as regulatory floodplain with known base flood elevations.

#### **EXISTING CONDITION**

The Project is 0.60 acres in size and has previously been analyzed as part of the Pima Self Storage Development. Information contained within this narrative relies on conclusions from the Final Drainage Report for Pima Self Storage completed by Hubbard Engineering and dated February 13<sup>th</sup>, 2017 (hereinafter the "Master Report").

The Project area is part of DA-B – Phase 2 within the Master Report, sub-watershed areas DA-22 and DA-23. In the existing condition, approximately 0.97 cfs and 7.34 cfs are anticipated to discharge at the west and east existing driveways, respectively. The project is also impacted by Zone AE floodplain and analysis of the floodplain, pertinent base flood elevations cross sections, and discharge for the floodplain are included in the Master Report.

**DEVELOPED CONDITION**

The proposed improvements are largely in-line with the Master Report. Runoff will discharge generally south and east, as indicated in the Master Report. New catch basins will be installed at low points to convey stormwater to the future underground retention system.

**RETENTION/DETENTION**

The Project will meet the 100-yr, 2-hr stormwater runoff volume requirements. In the developed condition, the project site will retain the required 100-yr, 2-hr stormwater runoff volume, reducing the discharge to Thomas Road with respect to the Master Report. Retention will be accomplished via new 120" diameter CMP underground retention tanks and proper discharge of the tanks will be assured via a new dual chamber drywell.

**SYSTEM MAINTENANCE**

It shall be the responsibility of the Project owner to maintain the onsite drainage facilities. Unmaintained facilities can lead to failures such as excessive ponding, erosion, and standing nuisance water. The suggested maintenance tasks include, but are not limited to:

- 1. Monthly inspection and sediment removal from the drainage inlets and pipes.
- 2. Seasonal inspection and sediment removal from the graded swales.
- 3. Annual inspection and repair of erosion on slopes.

**CONCLUSION**

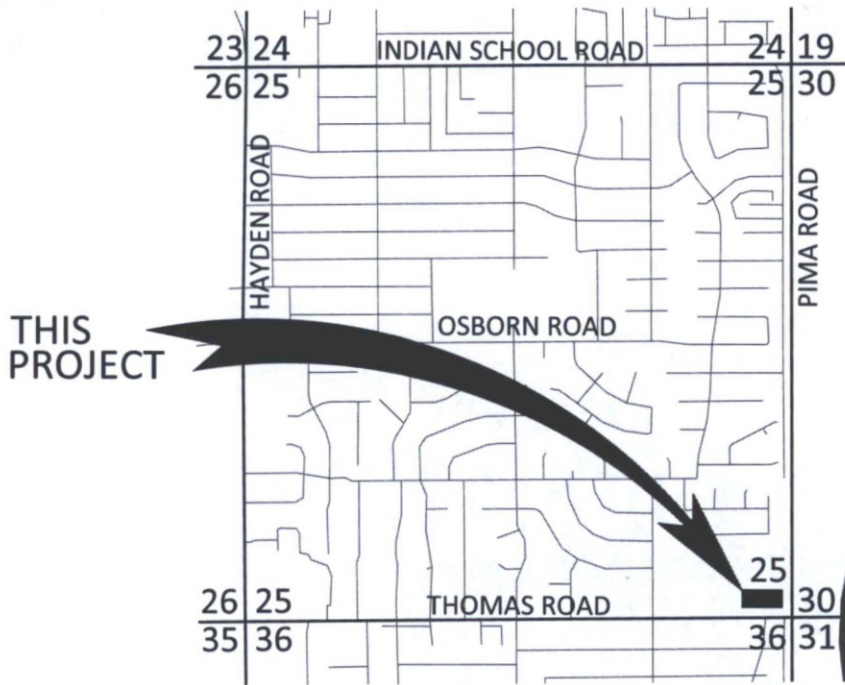
This Drainage Narrative is to accompany the Preliminary Improvement Plan for the Black Rock Coffee – Scottsdale development project. This narrative was written utilizing generally accepted engineering practices and all information herein has been researched through archived documents and all calculations were accomplished through applying the City of Scottsdale Engineering Standards.

The analysis presented in this narrative evaluates storm water runoff resulting from a statistical evaluation of storm events of particular duration and frequency up to and including a 100-year frequency event. A storm event exceeding the 100-year frequency may cause or create the risk of greater flood impact than is addressed and presented herein. The scope of this assessment does not include evaluation of storm water runoff resulting from storm events exceeding the 100-year frequency. CYPRESS assumes no responsibility for actual flood damage, increased risks of flood damage, or increased construction or development cost resulting from or related to any such events, nor shall CYPRESS be responsible for any changes in, or additions to, regulatory requirements which may result from, or be related to, any such events or changes in hydrologic or hydraulic conditions within the watershed.

- ATTACHMENT 1**      Location Map
- ATTACHMENT 2**      FIMA FIRM Map
- ATTACHMENT 3**      Master Report + Prelim Improvement Plan

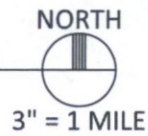


**Attachment 1**  
Location Map



IN THE SE 1/4 OF THE SE 1/4 OF SECTION 25,  
 T. 2 N., R. 4 E., G.&S.R.M.,  
 CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA

**LOCATION MAP**



**Attachment 2**  
FIMA FIRM Map

# National Flood Hazard Layer FIRMette



33°29'4.40"N

111°53'51.70"W



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## Legend

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

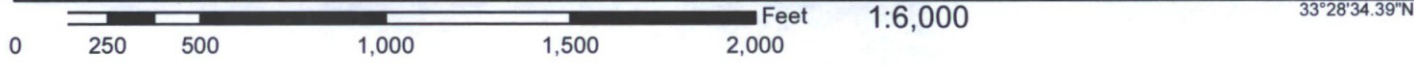
SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth
		Regulatory Floodway Zone AE, AO, AH, VE, AR
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Coastal Transect
		5.0 Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/25/2018 at 11:33:50 AM 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: base map 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.



**Attachment 3**  
**Master Report + Preliminary Improvement Plan**

# PIMA SELF STORAGE – PHASE I

LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF PIMA ROAD  
AND THOMAS ROAD

## FINAL DRAINAGE REPORT

FEBRUARY 13, 2017  
Project No.: 15138

PREPARED FOR:

WENTWORTH PROPERTY COMPANY, LLC  
2701 EAST CAMELBACK RD., SUITE 185  
PHOENIX, AZ 85016  
(602) 628-1885

PREPARED BY:

HUBBARD ENGINEERING  
1201 S. ALMA SCHOOL RD., SUITE 12000  
MESA, ARIZONA 85210  
(480) 892-3313  
MICHAEL S. WOLF, PE



**H U B B A R D**  
E N G I N E E R I N G



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Figure 2	Aerial Topographic Maps
Figure 3	Flood Insurance Rate Map

### APPENDICES

Appendix A	Reference Data
Appendix B	Rational Method Peak Flow Calculations
Appendix C	Onsite Hydraulic Calculations
Appendix D	Retention and Dissipation Calculations
Appendix E	Storm Drain Calculations

### EXHIBITS

Exhibit 1	Proposed Site Drainage Map
Exhibit 2	Proposed Grading and Drainage
Exhibit 3	Hec-Ras Cross Sections



## 1. INTRODUCTION AND SCOPE OF WORK

This report presents the results of a *Final Drainage Study* conducted by Hubbard Engineering at the request of Wentworth Property Company, LLC (“client”), for Pima Storage (“site”). The purpose of this report is to provide a hydrologic and hydraulic evaluation for the site. This report addresses off-site and on-site conditions as well as storm water runoff detention.

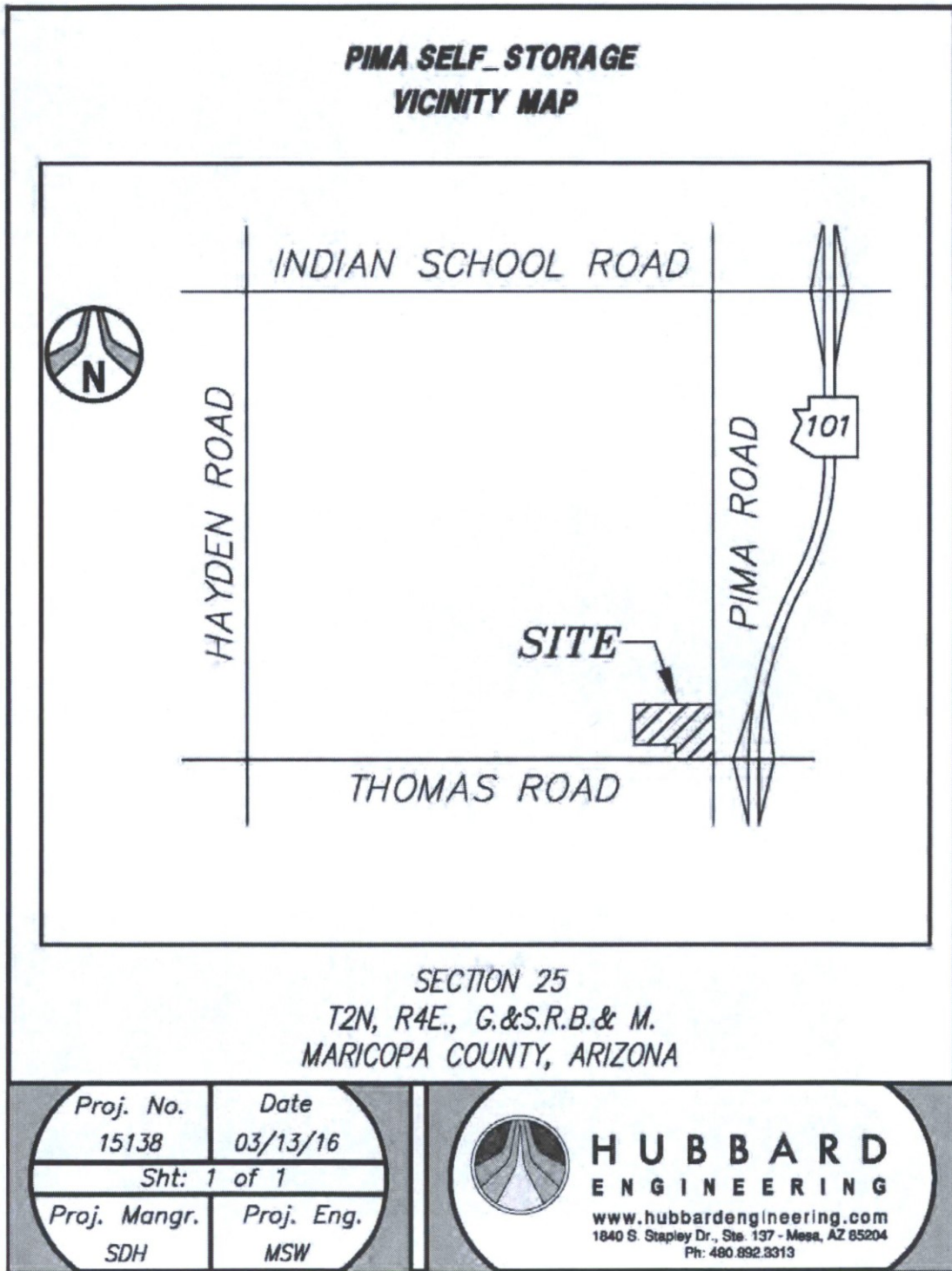
### 1.1 Site Description

The site is located in Section 25 of Township 2N, Range 4E of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The location of the site is shown on the site *Vicinity Map*, **FIGURE 1**, on the next page. The project is bounded by City Park to the west, Thomas Road to the south, Pima Rd to the east and residential subdivisions to the north.

### 1.2 Project Type

The site is rectangular in shape and encompasses approximately 10.78 gross acres. The site is currently developed with 1 existing building and parking lot. The proposed development for the site is a 2-phased project. Phase 1 will encompass renovation of the existing Microsemi building for storage, constructing a site wall, re-grading the driveways along Pima Road and also, re-grading a portion of landscaped area just outside of the right of way to west side of Pima Road. The landscaped area lies between the two existing driveways on Pima Rd. A basin/swale will be graded in the landscaped area. The basin/swale will consist of 6:1 side slopes adjacent to the right of way, 6:1 side slopes along the north and south sides of the driveways and a proposed block wall as shown in **Exhibit 2**. The basin/swale will provide additional capacity that is needed to keep the water surface elevation within the required tolerances. See **Exhibit 2** for the Grading and Drainage Plan. Phase 1 will encompass the addition of storage units and site improvements within Lot 1 which is the development outside the new flood plain limits. Lot 2 is the southern portion of the site that has 2 future planned retail pads. This area will be rough graded to accommodate the new flood plain. Lot 2 also includes a portion along Pima Rd that will contain the new flood plain allowing for Lot 1 to be out of the flood plain.

Figure 1 – Vicinity Map



### 1.3 Regulatory Issues

The criteria used in the drainage design and analysis of the site was established using the guidelines as described in the following:

- *Design Standards & Policies Manual Chapter 4 Grading and Drainage, City of Scottsdale, Dated January, 2010.* (Reference 1).
- *Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology* (Reference 2).
- *Drainage Design Manual for Maricopa County, Arizona, Volume II, Hydraulics* (Reference 3)

## 2. DESCRIPTION OF EXIST. DRAINAGE COND. & CHARACTERISTICS

### 2.1 Onsite Drainage

The site currently lies within the Flood Plain Zone AE with established water surface elevations. The flood zone begins at the northeast portion of the site from Pima Rd. and then fans out across the site. The flood waters pass through the site and discharges into Thomas Rd through two existing driveways.

The site has historically discharged the storm water into Thomas Rd. with no retention at a flow rate of 74.15 cfs. The site drains from the northwest to south following the same flow pattern as the flood plain.


See *Aerial Topographic Map (FIGURE 2)*.

Figure 2

# PIMA SELF\_STORAGE AERIAL MAP



Proj. No. <b>15138</b>	Date 03/30/16
Sht: 1 of 1	
Proj. Mangr. <b>SDH</b>	Proj. Eng. <b>SDH</b>



**HUBBARD  
ENGINEERING**  
www.hubbardengineering.com  
1840 S. Stapley Dr., Ste. 137 - Mesa, AZ 85204  
Ph: 480.892.3313

## 2.2 Existing Off-Site Conditions Characteristics

As discussed in the previous section, the site does lie within the Flood Plain Zone AE. The off-site flows come from the northeast of the site from Thomas Rd. and fan out through the site to eventually discharge into Thomas Rd.

The site lies within the Granite Reef Wash. The Granite Reef Wash has been analyzed previously as recorded in the Granite Reef Wash Floodplain Delineation Study prepared by Entellus for the Flood Control District of Maricopa County dated May 1997 (Reference 4). The Granite Reef Wash Floodplain Delineation Study started at River Mile 0.320 and ended at River Mile 2.218. See **Appendix A**. River Mile 2.218 is at Thomas Rd just south of the project site. Therefore, our project site is outside the limit of study for the Granite Reef Wash Floodplain Delineation Study. However, the Granite Reef Wash Floodplain Delineation Study shows an approximate flow of 644 cfs coming onto the site from the northeast corner from Pima Rd. Hubbard Engineering (HE) has submitted a CLOMR to FEMA to remove the floodplain off of the property that will have the existing and proposed storage buildings on the property. The results of the CLOMR can be found in the CLOMR approved by the City of Scottsdale for this report.

## 2.3 Flood Zone Information

Based on Flood Insurance Rate Map No. 04013C2235L, dated October 16, 2013, the property is located in Zone AE, which is described as:

“Base Flood Elevations Determined.”

The existing building has an existing exterior elevation of 1228.10 with the base flood elevation of a 1227.00. Refer to FEMA Firmette in **FIGURE 3**.

## 2.4 Adjacent Properties

The adjacent property to the north is single family and separated with a 12' site wall. An existing City park is to the west with Pima Rd. to the east and Thomas Rd. to the south.



### 3. PROPOSED DRAINAGE PLAN

#### 3.1 On-Site Hydrology

The final site configuration and grading design indicates that the Rational Method of hydrology as described in the *Drainage Design Manual for Maricopa County, Volume I* (Reference 2) will be applicable in developing design storm discharges for the site. Since the site has been historically discharging into Thomas Rd., being a part of the flood plain, the City allows the same drainage pattern so long the pre vs. post hydrology is not exceeded. The proposed site will be captured by grate inlets and be allowed to discharge via storm drain into the existing storm drain that is in Thomas Rd. See **Exhibit 1** for proposed drainage areas and **Appendix C** for inlet calculations. Based on the improvements Phase 1, of the site will discharge to the existing storm drain that is in Thomas Rd. Along the west side of property line for improvements being done in Phase 1 a swale will need to be graded on the City of Scottsdale's property to direct runoff from the City of Scottsdale's property away from the northern site, Phase 1. The remainder of the site, Phase 2, will discharge into Thomas Rd via sheet flow at a rate of 8.31 cfs. The new discharge flow rate is significantly lower than the pre discharge rate mentioned early. A typical C-value of 0.95 is used for the on-site impervious areas and a C-value of 0.45 is used for desert landscape areas in accordance with the City of Scottsdale's *Design Standards and Policies Manual* (Reference 1).

The proposed site is graded so that the off-site flow from Pima Rd will not inundate the northern site, Phase 1. See **Exhibit 2** for the grading and drainage plans for the proposed site. The northern driveway along Pima Rd has a proposed grade of 1229.00 at the property line and a high water elevation of 1228.85 was determined from the post-development HEC-RAS model ran by Hubbard Engineering. See **Table 1** below for results of the approved post-development vs pre-development water surface elevations and **Section 3.2** for additional information on the HEC-RAS models and methodology used for the models. A proposed wall will be constructed as shown in **Exhibit 2** between the northern driveway and the southern driveway along Pima Rd. The proposed top of wall at the north driveway will have an elevation of 1229. The wall will continue on at an elevation of 1229 until the wall reaches the north side of the southern driveway. The adjacent high water elevation along the entire wall has been determined to be lower than 1229. See **Exhibit 3** for River Mile cross sections mentioned in **Table 1**. The southern driveway along Pima Rd will allow inundation of the high water elevation but not on the property of Phase 1. The grades adjacent to the property of Phase 1 located near the southern driveway have been raised so that the high water elevation will not inundate the northern site, Phase 1. The grades near the driveway have a proposed elevation of 1228.25 at the property line. The adjacent high water elevation was also determined to be lower. Just south of the southern driveway the high water elevation will inundate the southern site, Phase 2 as shown on **Exhibit 2**. The proposed wall along the north side of the Phase 2 site will keep the water from inundating the northern site along with having the entrances along the south side by having elevations as shown on **Exhibit 2**. The high water elevation along the south side of the site was determined to be 1227.96 from the post-development HEC-RAS model run by Hubbard Engineering. The emergency outfall for the DA-A is located at the southwest corner of the site at an elevation of 1227.15. See approved

CLOMR for additional information also, see **Exhibit 1**. As shown in **Exhibit 2** the floodplain is kept off of the proposed northern site, Phase 1.

Table 1: Post-Development vs. Pre-Development Results

Post Project Model Comparison to Pre Project Model

Cross Section ID	FIS WSE	Duplicate Model WSE	Corrected Effective WSE	Pre Project WSE	Post Project WSE	Difference
Original Model	[NAVD 88]	[NAVD 88]	[NAVD 88]	[NAVD 88]	[NAVD 88]	
	[1]	[2]	[3]	[4]	[5]	[5] - [4]
2.355	28.58	28.59	28.86	28.89	28.85	-0.04
<b>2.342</b>			28.71	28.78	28.55	-0.23
<b>2.335</b>			28.66	28.68	28.53	-0.15
2.295	27.30	27.31	28.02	28.14	28.23	0.09
<b>2.275</b>			27.83	27.95	28.02	0.07
<b>2.269</b>			27.51	27.87	27.96	0.09
<b>2.256</b>			27.41	27.85	27.90	0.05
<b>2.243</b>			27.12	27.54	27.52	-0.02
2.218	26.14	26.25	26.26	26.17	26.17	0.00
2.208	25.88	25.92	25.92	25.82	25.82	0.00

WSE=Water Surface Elevation

Vertical Datum NAVD 88

- 2.355 Existing Cross Sections
- 2.342** Proposed Cross Sections

### 3.2 CLOMR Methodology and Study Results

The study of the re-grading and proposed construction of a wall to re-delineate the floodplain was done using HEC-RAS, Version 4.1.0 from the Army Corps of Engineers. The original HEC-2 data was obtained from the FCD of Maricopa County records [Effective Model] and converted to HEC-RAS [Duplicate Effective Model]. The existing water surface elevations from the original HEC-2 data were then compared to the HEC-RAS [Duplicate Effective Model] water surface elevations and were within 0.5-feet of the reported water surface elevations. These results can be seen in the **Table 1** located in the Request For CLOMR report done by Hubbard Engineering and is approved by the City of Scottsdale. The [Duplicate Effective Model] was then used to create the [Corrected Effective Model]. When creating the [Corrected Effective Model] it was determined that the original topography used in the FDS done by Entellus was the Maricopa County topography. The topography was flown with contours at 1 foot intervals. As part of this project, Hubbard Engineering went out and surveyed the site and surrounding area with ground survey that had a vertical tolerance of 3/4-inch. The new topography was incorporated into the

[Corrected Effective Model] along with additional cross sections and extensions of the existing cross section between river stations 2.218 to 2.355 to ensure adequate coverage of flows on the geometry.

Up to this point all the models were run using the flows determined in the current FDS study which can be found in **Appendix A** and is also located in the Request For CLOMR report approved by the City of Scottsdale and done by Hubbard Engineering. The flows that were determined in the current FDS study did not account for the existing storm drain system in Pima Road. It was determined that the existing storm drain system originated a significant distance upstream from the project site. The distance was significant enough to incorporate the flows that the existing storm drain system in Pima Road was taking on before the offsite flow approached the project site. With the assistance and coordination of the City of Scottsdale's engineering consultant, a flow rate of 50.5 cfs was determined for the Granite Reef Watershed Project as described in more detail in **Section 5.3** which is located in the approved Request For CLOMR report done by Hubbard Engineering. The storm drain capacity of 50.5 cfs was determined to be a conservative flow rate to be removed by the existing storm drain system. See **Appendix B** of the approved Request For CLOMR report done by Hubbard Engineering for local storm drain flows. This flow was then subtracted from the original flow of 644 cfs at river station 2.355 and 1,240 cfs at river station 2.218 and was then used in modeling the HEC-RAS [Pre-Project Existing Conditions Model] and the [Post-Project Proposed Conditions Model]. The study results from the [Pre-Project Existing Conditions Model] and the [Post-Project Proposed Conditions Model] were compared and analyzed. The [Post-Project Proposed Conditions Model] showed a rise in the base flood elevations of less than 1-foot. See **Tables 1 through 4** located in the approved Request For CLOMR report done by Hubbard Engineering for the water surface elevation results from the corresponding HEC-RAS models. See **Appendices C through G** which are located in the approved Request For CLOMR report done by Hubbard Engineering for all data associated with the HEC-RAS models, or **Appendix A** which is also located in the approved Request For CLOMR report done by Hubbard Engineering for the original reference data. Refer to the approved Request For CLOMR report done by Hubbard Engineering for additional information on the HEC-RAS models.

### 3.3 Proposed Drainage System

The proposed site is split into 2-major drainage areas. See **Exhibit 1**. Drainage area DA-A, Phase 1 conveys the storm water via surface flow to grate inlets which will be connected with storm pipe. The proposed storm drain system used the Rational Method to determine peak flows for each drainage area. Refer to **Appendix B and C** for calculations. The site will drain from the north to the south through a storm drain system, which will tie into an existing catch basin located at the southeast driveway along Thomas Rd. The storm drain pipe will capture the 100-yr, 2-hr storm event per the City of Scottsdale's *Design Standards and Policies Manual* (Reference 1) requirements. See **Appendix E** storm drain calculations. A small portion of DA-A will be stored in RB-1. RB-1 will also act as a swale and add additional capacity that is needed to keep the water surface elevation within the required tolerances mentioned in the approved Request For CLOMR report done by Hubbard Engineering. The storm water will convey via sheet flow to the proposed retention basin.

The second major drainage area is DA-B, Phase 2. See **Exhibit 1**. The storm water is conveyed via surface flow to Thomas Rd. as it has been historically discharging. The southern site labeled as "Phase 2" will discharge through the south driveways along at a flow rate of 8.31 cfs as previously mentioned.

### **3.4 Storm Water Storage**

As previously mentioned a small portion of DA-A will be stored in RB-1. The storm water will convey via sheet flow to the proposed retention basin RB-1. The proposed basin will have 6:1 side slopes as shown in the **Exhibit 2** and have a depth of 0.85 feet. The required volume that the retention basin must hold per City of Scottsdale's *Design Standards and Policies Manual* (Reference 1) is 821 cubic feet. The proposed retention basin will provide 3,231 cubic feet of water. The basin will not require any drywells see drain time calculations in **Appendix D**. In the case that the retention basin reaches an elevation higher than 1225.85 the water will drain into a catch basin and drain through the storm drain system shown in **Exhibit 1**. The retention required and retention provided calculations can be found in **Appendix D**.

For storm events that exceed the 100-year, 2-hour event, or for back-to-back events that inundate the retention facilities, the storm water will cascade toward the low outfall of the site, Phase 1. The ultimate outfall is located at the southwest corner of the site at an elevation of 1227.15 ft. See **Exhibit 1**. The ultimate outfall for Phase 2 is the south driveways at an elevation of 1225.90.

### **3.5 Finish Floor Elevations**

The site is split into Lot 1 and Lot 2. The approved CLOMR for the project takes the flood plain out of Lot 1 so there are no requirements for the proposed finish floors that pertain to the new flood plain. The 2 proposed retail pads in Lot 2 will be in the new flood plain. The CLOMR modeling has incorporated the proposed building footprints within the flood plain determination. Based on the model, the adjacent water surface elevation will be 1,227.96. The proposed finish floor elevations of the 2 retail pads will need to be a minimum of 1,229.00 in order to meet the 1' above water surface elevation requirement.

## **4. SPECIAL CONDITIONS**

### **4.1 Section 404 & 401**

The site is not delineated as a 404 & 401 jurisdiction.

### **4.2 AZPDES**

More than one acre of land will be disturbed and will require an AZPDES permit.

### **4.3 ESL**

The site does not qualify as an Environmentally Sensitive Land on the City of Scottsdale Environmentally Sensitive Land Inventories.

## **5. DATA ANALYSIS METHODS**

### **5.1 Peak Flows and Stormwater Storage**

Storage for the 100-year, 2-hour and peak flow for the 100-year storm was determined by rational method per COS Requirements. See the associated Appendices for the references and parameters that were used to calculate the storm water flows and required retention.

## 6. SUMMARY AND CONCLUSION

- The project is bound by Thomas Rd to the south, Pima Rd. to the east, City park to the west and a single family residence to the north.
- The proposed development for this site consists of self-storage.
- The site has moved out of the Flood Plain Zone AE.
- The City is in process of designing a new public storm drain in Pima Rd. to mitigate the existing flood plain. This mitigation will have the potential to taking the site, Phase 2 out of the flood plain.
- The majority of the site will convey the 100-yr storm event into storm drain pipe and discharge into the existing storm system south of the site. The remainder of the storm water will discharge via surface flow into Thomas Rd.
- Subject site is currently located in Flood Plain Zone AE per FEMA No. 04013C2235L.

## 7. REFERENCES

1. *Design Standards & Policies Manual Chapter 4 Grading and Drainage, City of Scottsdale, Dated January, 2010.*
2. *Drainage Design Manual For Maricopa County, Arizona, Volume I, Hydrology, Flood Control District Of Maricopa County, February 2011.*
3. *Drainage Design Manual For Maricopa County, Arizona, Volume II, Hydraulics, Flood Control District Of Maricopa County, January 1996.*  
*Flood Insurance Rate Map (F.I.R.M.) Maricopa County, Arizona and Incorporated areas, Panel 2235 of 4425*
4. *Granite Reef Wash FloodPlain Delineation Study (FCD 95-29), Entellus, May 1997.*

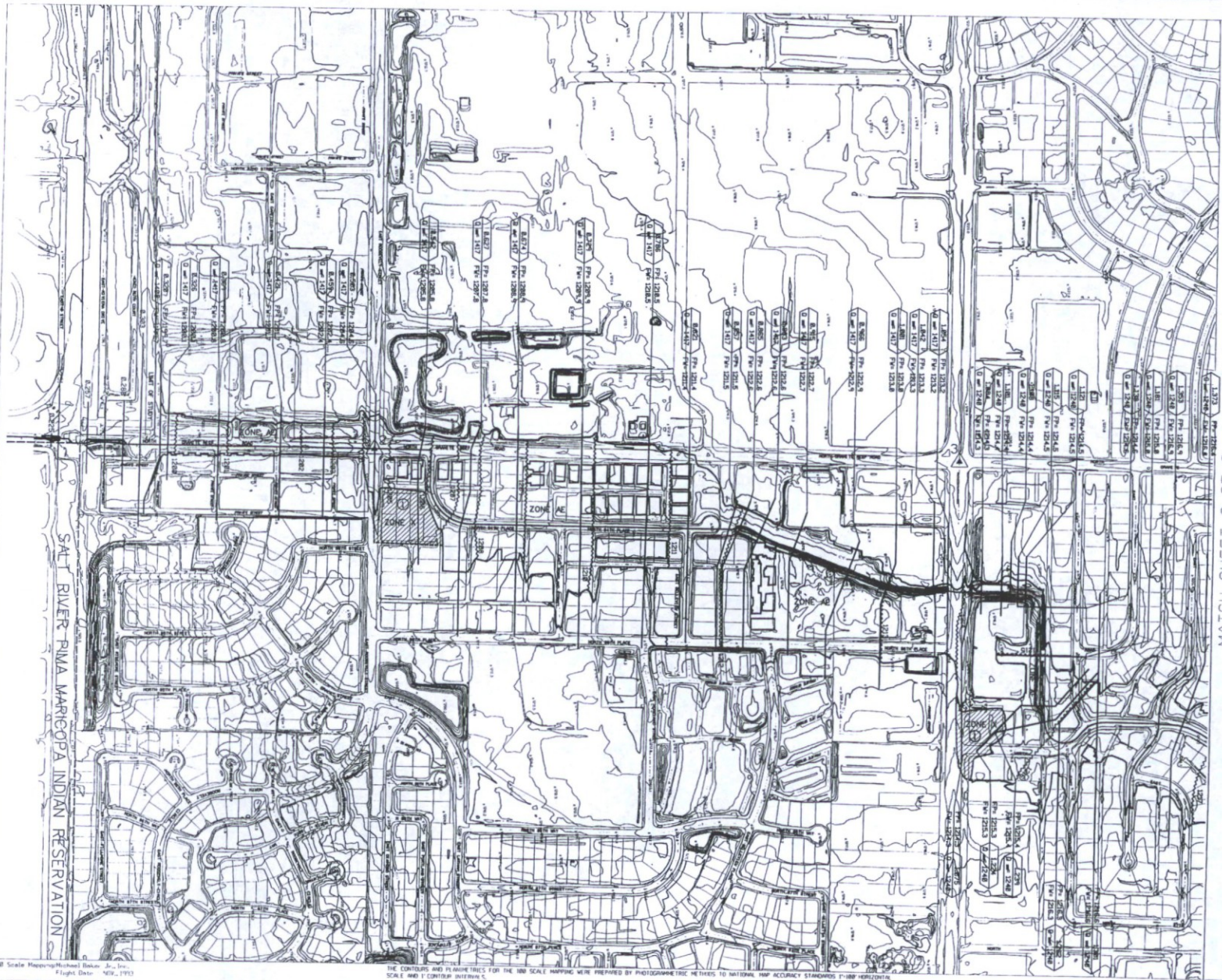
## 8. LIMITATIONS

This report is focused on providing practical design information, evaluation, and calculations for statistical flood events up to and including the 100-year frequency flood. The procedures used herein are derived from, and performed with, currently accepted engineering methodologies and practices. Additionally, the criteria for this evaluation is designed to conform to currently applicable ordinances, regulations and policies effected by the appropriate jurisdictional regulatory authorities for the site.

The analysis presented herein focuses on developing design estimates of storm water runoff resulting from a statistical evaluation of storm events of particular duration and frequency up to and including a 100-year frequency event. A storm event exceeding the 100-year frequency event may cause or create the risk of greater flood impact than is addressed and presented herein. However, the scope of this assessment does not include evaluation of storm water runoff resulting from storm events exceeding the 100-year frequency event. Hubbard Engineering assumes no responsibility for actual flood damage, increased risks of flood damage, or increased construction or development cost resulting from or related to any such events. Nor shall Hubbard Engineering be responsible for any changes in, or additions to, regulatory requirements which may result from, or be related to, any such events or changes in hydrologic or hydraulic conditions within the watershed.

In performing the services contained herein, Hubbard Engineering has received or will receive information prepared or compiled by others. Hubbard Engineering, as engineering professionals, are not required to verify the information, but may rely on the information unless actual knowledge concerning the validity of the information is known or is obvious to the professional. Therefore, Hubbard Engineering is entitled to rely upon the accuracy and completeness of this information without independent evaluation or verification.

**Appendix A**  
Reference Data  
*Pima Storage*



### FLOOD CONTROL DISTRICT OF MARICOPA COUNTY FLOOD DELINEATION STUDY OF GRANITE REEF WASH F.C.D. CONTRACT NO. FCD 96-29

- LEGEND**
- 100-YR FLOODPLAIN BOUNDARY
  - 100-YR FLOODWAY BOUNDARY
  - HYDRAULIC BASE LINE & RIVER MILE
  - CROSS SECTION: FP=1287.8, 8.627; FW=1287.8, 0=1417
  - ELEVATION REFERENCE MARK: 1500
  - BASE FLOOD ELEVATIONS
  - ZONE DESIGNATIONS: ZONE AE
  - CORPORATE LIMITS: Corporate Limits
  - SECTION LINE: Section Boundary

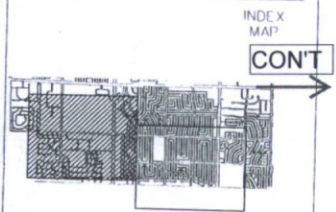
**ELEVATION REFERENCE MARKS**

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICA VERTICAL DATUM OF 1988

I.D. NUM	ELEV. (FT)	DESCRIPTION/LOCATION
1	1188.06	ARIZONA DEPARTMENT OF TRANSPORTATION BRASS CAP AT INTERSECTION OF MCKEEL'S ROAD & GRANITE REEF ALLEWAYMENT
2	1202.70	C.P.S. BRASS CAP IN HAND HOLE INTERSECTION OF ROOSEVELT STREET & GRANITE REEF ROAD
3	1218.10	MARICOPA COUNTY BRASS CAP IN HAND HOLE INTERSECTION OF MADWELL ROAD & GRANITE REEF ROAD

**NOTES**

① ZONE X - AREAS OF 100-YEAR FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FEET OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE, AND AREAS PROTECTED BY LEVELS FROM 100-YEAR FLOOD SEE SPECIAL PROBLEM SECTION



**Entellus**

8000 N. 41st St., Suite 300  
Phoenix, AZ 85018  
Phone: 602 944-0000  
Fax: 602 944-0011

DESIGN CHK:	HAAS	DATE:	05/19/92
DESIGN CHK:	SEW	DATE:	05/19/92
PLANS CHK:	ECLES	DATE:	05/19/92
PLANS CHK:	HAAS	DATE:	05/19/92
DESIGNED BY:	HAAS	DATE:	05/19/92
DESIGNED BY:	HAAS	DATE:	05/19/92

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

DATE: \_\_\_\_\_

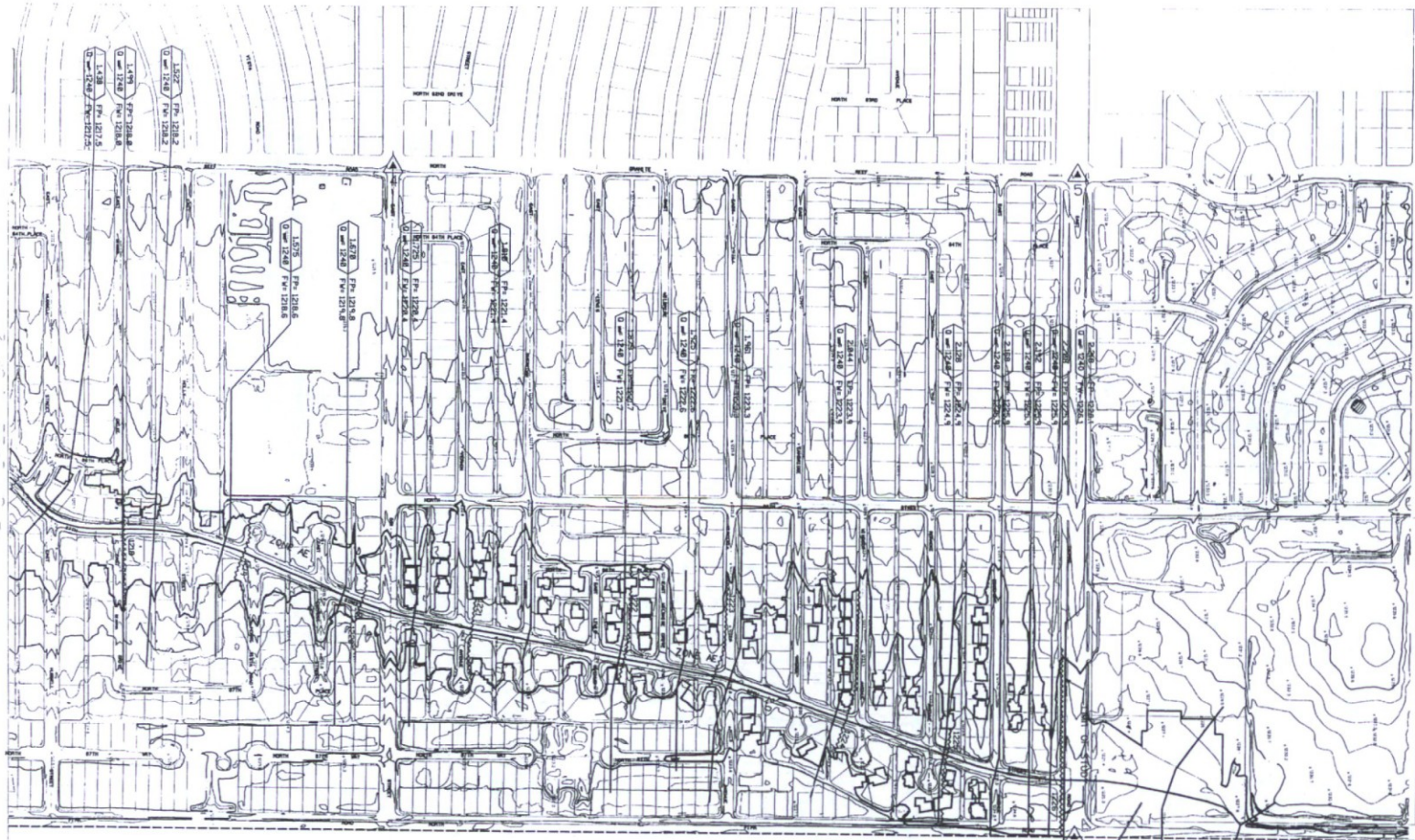
SCALE: 1" = 200'

SHEET 1 OF 2

100 Scale Photogrammetric Base, J.C., Inc.  
Flight Date: 04-19-92

THE CONTOURS AND PLUMB LINES FOR THE 100 SCALE MAPPING WERE PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS F-100 HORIZONTAL SCALE AND 1" CONTOUR INTERVAL.

Draw: Norel, C-13245, SHEET 15, 05/19/92  
Date: REV. MAY 22, 1992 10:00am



**FLOOD CONTROL DISTRICT  
OF MARICOPA COUNTY**  
FLOOD DELINEATION STUDY OF  
GRANITE REEF WASH  
F.C.D. CONTRACT NO. FCD 96-29  
11/11/11

100 FT. FEETINGS AND BOUNDARIES  
100 FT. FLOODWAY BOUNDARY

HYDRAULIC BASE LINE & RIVER MILE  
CROSS SECTION: FP 1287.0, 8.627, FM 1287.0, Q<sub>max</sub> = 1417

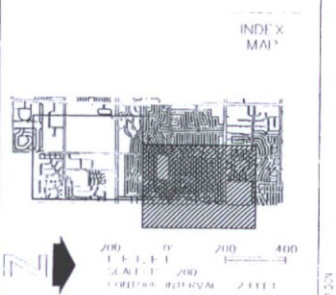
ELEVATION REFERENCE MARK  
▲ 1500

BASE FLOOD ELEVATIONS  
ZONE DESIGNATIONS: ZONE AE  
CORPORATE LIMITS: Corporate Limits  
SECTION LINE: Section Boundary

ELEVATION REFERENCE MARKS  
NOTE: ALL ELEVATIONS ARE BASED ON NORTH  
AMERICA DATUM (NAD 83) TO YEAR

ID. MARK: ELEV. (FT.) DESCRIPTION/LOCATION

- 4 1277.01 MARICOPA COUNTY TRACT 1400, BY HARDY HOLT INTERESTS (HOLT & COMPANY) (HOLT ROAD)
- 5 1276.12 U.S. DEPARTMENT OF AGRICULTURE (HOLT ROAD)
- 6 1252.75 U.S. DEPARTMENT OF AGRICULTURE (HOLT ROAD & GRANITE REEF ROAD)



**Entellus**  
2000 W. GILBERT, SUITE 300  
PHOENIX, AZ 85020  
PHONE: 602.241.0000  
FAX: 602.241.0001

DESIGN	BY: JAA	DATE: 11/11/11	PROJECT: FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK	BY: JAA	DATE: 11/11/11	PROJECT: FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PLAN	BY: JAA	DATE: 11/11/11	PROJECT: FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PLAN CHK	BY: JAA	DATE: 11/11/11	PROJECT: FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
QUANTITY	BY: JAA	DATE: 11/11/11	PROJECT: FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ENTELLUS ENGINEERING, INC. 11/11/11

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**Appendix B**  
Rational Peak Flow Calculations  
*Pima Storage*

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-1**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	158.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	29.00	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.35	[ft]
Drainage Area (A)=	0.53	[acres]	Elevation <sub>Difference</sub> :	1.65	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.01044	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.041745	4.0	4.72
50	-0.00625	0.04	0.041745	3.0	6.6
100	-0.00625	0.04	0.041745	3.0	7.48

Peak Discharge (Q):  
 $Q = C * i * A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

<b>Q<sub>10</sub></b>	=	2.23	<b>[cfs]</b>
<b>Q<sub>50</sub></b>	=	3.23	<b>[cfs]</b>
<b>Q<sub>100</sub></b>	=	3.74	<b>[cfs]</b>

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-2**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	227.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	31.00	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.60	[ft]
Drainage Area (A)=	0.67	[acres]	Elevation <sub>Difference</sub> :	3.40	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.01498	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.04108	4.0	4.72
50	-0.00625	0.04	0.04108	3.0	6.6
100	-0.00625	0.04	0.04108	3.0	7.48

Peak Discharge (Q):  
 $Q = C * i * A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

**Q<sub>10</sub> = 2.85 [cfs]**  
**Q<sub>50</sub> = 4.12 [cfs]**  
**Q<sub>100</sub> = 4.77 [cfs]**

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-3**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	55.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.27	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.70	[ft]
Drainage Area (A)=	0.08	[acres]	Elevation <sub>Difference</sub> :	0.57	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.01036	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.046743	2.0	4.72
50	-0.00625	0.04	0.046743	2.0	6.6
100	-0.00625	0.04	0.046743	2.0	7.48

Peak Discharge (Q):  
 $Q = C * i * A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

<b>Q<sub>10</sub></b>	=	0.35	<b>[cfs]</b>
<b>Q<sub>50</sub></b>	=	0.51	<b>[cfs]</b>
<b>Q<sub>100</sub></b>	=	0.59	<b>[cfs]</b>

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-4**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	36.50	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.27	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.70	[ft]
Drainage Area (A)=	0.07	[acres]	Elevation <sub>Difference</sub> :	0.57	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.01562	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.047201	2.0	4.72
50	-0.00625	0.04	0.047201	1.0	6.6
100	-0.00625	0.04	0.047201	1.0	7.48

Peak Discharge (Q):  
 $Q = C * i * A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

<b>Q<sub>10</sub></b>	= 0.30	<b>[cfs]</b>
<b>Q<sub>50</sub></b>	= 0.43	<b>[cfs]</b>
<b>Q<sub>100</sub></b>	= 0.50	<b>[cfs]</b>

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET  
RATIONAL METHOD  
Hubbard Engineering  
Project No. 15138**

**Concentration Point ID: DA-5**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	41.50	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.27	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.70	[ft]
Drainage Area (A)=	0.07	[acres]	Elevation <sub>Difference</sub> :	0.57	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.01373	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
Vegetation Cover: <25 [%]  
Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
T<sub>c</sub> = 11.4\*L<sup>0.5</sup>\*K<sub>b</sub><sup>0.52</sup>\*S<sup>-0.31</sup>\*i<sup>-0.38</sup>+Time to Retention

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.047261	2.0	4.72
50	-0.00625	0.04	0.047261	2.0	6.6
100	-0.00625	0.04	0.047261	2.0	7.48

Peak Discharge (Q):

Q = C<sub>i</sub>\*i<sub>i</sub>\*A [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

Q <sub>10</sub>	=	0.29	[cfs]
Q <sub>50</sub>	=	0.42	[cfs]
Q <sub>100</sub>	=	0.49	[cfs]

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-6**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	213.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	30.20	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.00	[ft]
Drainage Area (A)=	0.23	[acres]	Elevation <sub>Difference</sub> :	3.20	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.01502	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.043974	4.0	4.72
50	-0.00625	0.04	0.043974	3.0	6.6
100	-0.00625	0.04	0.043974	3.0	7.48

Peak Discharge (Q):  
 $Q = C * i * A$  [cfs]

A [acres]  
 i<sup>3</sup> [in/hr]  
 C<sup>1</sup> Runoff Coefficient  
 C<sub>10</sub><sup>(3)</sup> = 0.90  
 C<sub>50</sub><sup>(3)</sup> = 0.93  
 C<sub>100</sub><sup>(3)</sup> = 0.95

**Q<sub>10</sub>** = 0.98 [cfs]  
**Q<sub>50</sub>** = 1.42 [cfs]  
**Q<sub>100</sub>** = 1.64 [cfs]

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-7A**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	82.60	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.12	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.60	[ft]
Drainage Area (A)=	0.24	[acres]	Elevation <sub>Difference</sub> :	0.52	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00630	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	Kb=m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.043871	3.0	4.72
50	-0.00625	0.04	0.043871	3.0	6.6
100	-0.00625	0.04	0.043871	3.0	7.48

Peak Discharge (Q):  
 $Q = C * i * A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

**Q<sub>10</sub> = 1.02 [cfs]**  
**Q<sub>50</sub> = 1.47 [cfs]**  
**Q<sub>100</sub> = 1.71 [cfs]**

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-7B**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	72.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.93	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.50	[ft]
Drainage Area (A)=	0.19	[acres]	Elevation <sub>Difference</sub> :	1.43	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.01986	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.044525	2.0	4.72
50	-0.00625	0.04	0.044525	2.0	6.6
100	-0.00625	0.04	0.044525	2.0	7.48

Peak Discharge (Q):  
 $Q = C_i * i * A$  [cfs]

A [acres]  
 i<sup>3</sup> [in/hr]  
 C<sup>i</sup> Runoff Coefficient  
 C<sub>10</sub><sup>(3)</sup> = 0.90  
 C<sub>50</sub><sup>(3)</sup> = 0.93  
 C<sub>100</sub><sup>(3)</sup> = 0.95

**Q<sub>10</sub> = 0.80 [cfs]**  
**Q<sub>50</sub> = 1.16 [cfs]**  
**Q<sub>100</sub> = 1.34 [cfs]**

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-8**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	45.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.90	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.90	[ft]
Drainage Area (A)=	0.10	[acres]	Elevation <sub>Difference</sub> :	1.00	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.02222	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.046317	2.0	4.72
50	-0.00625	0.04	0.046317	1.0	6.6
100	-0.00625	0.04	0.046317	1.0	7.48

Peak Discharge (Q):

$Q = C \cdot i \cdot A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

**Q<sub>10</sub>** = 0.41 [cfs]  
**Q<sub>50</sub>** = 0.60 [cfs]  
**Q<sub>100</sub>** = 0.69 [cfs]

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-9**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	167.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.20	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.90	[ft]
Drainage Area (A)=	0.17	[acres]	Elevation <sub>Difference</sub> :	0.30	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00180	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.04485	7.0	4.2
50	-0.00625	0.04	0.04485	6.0	6.3
100	-0.00625	0.04	0.04485	6.0	7.04

Peak Discharge (Q):  
 $Q = C * i * A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

**Q<sub>10</sub>** = 0.63 [cfs]  
**Q<sub>50</sub>** = 0.97 [cfs]  
**Q<sub>100</sub>** = 1.12 [cfs]

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-10**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	153.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.20	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.90	[ft]
Drainage Area (A)=	0.10	[acres]	Elevation <sub>Difference</sub> :	0.30	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00196	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m = -0.00625
i	[in/hr]	b = 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.046233	6.0	4.44
50	-0.00625	0.04	0.046233	6.0	6.3
100	-0.00625	0.04	0.046233	5.0	7.48

Peak Discharge (Q):  
 $Q = C \cdot i \cdot A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

**Q<sub>10</sub>** = 0.40 [cfs]  
**Q<sub>50</sub>** = 0.58 [cfs]  
**Q<sub>100</sub>** = 0.72 [cfs]

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET  
RATIONAL METHOD  
Hubbard Engineering  
Project No. 15138**

**Concentration Point ID: DA-11**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	153.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.30	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.90	[ft]
Drainage Area (A)=	0.13	[acres]	Elevation <sub>Difference</sub> :	0.40	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00261	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
Vegetation Cover: <25 [%]  
Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
T<sub>c</sub> = 11.4\*L<sup>0.5</sup>\*K<sub>b</sub><sup>0.52</sup>\*S<sup>-0.31</sup>\*i<sup>-0.38</sup>+Time to Retention

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.045489	6.0	4.44
50	-0.00625	0.04	0.045489	5.0	6.6
100	-0.00625	0.04	0.045489	5.0	7.48

Peak Discharge (Q):

Q = C<sub>i</sub>\*i\*A [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

**Q<sub>10</sub>** = 0.53 [cfs]  
**Q<sub>50</sub>** = 0.81 [cfs]  
**Q<sub>100</sub>** = 0.94 [cfs]

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET  
RATIONAL METHOD  
Hubbard Engineering  
Project No. 15138**

**Concentration Point ID: DA-12**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	156.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.30	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.90	[ft]
Drainage Area (A)=	0.13	[acres]	Elevation <sub>Difference</sub> :	0.40	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00256	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
Vegetation Cover: <25 [%]  
Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
T<sub>c</sub> = 11.4\*L<sup>0.5</sup>\*K<sub>b</sub><sup>0.52</sup>\*S<sup>-0.31</sup>\*i<sup>-0.38</sup>+Time to Retention

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.045444	6.0	4.44
50	-0.00625	0.04	0.045444	5.0	6.6
100	-0.00625	0.04	0.045444	5.0	7.48

Peak Discharge (Q):

Q = C<sub>i</sub>\*i<sub>i</sub>\*A [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

<b>Q<sub>10</sub></b>	= 0.54	<b>[cfs]</b>
<b>Q<sub>50</sub></b>	= 0.83	<b>[cfs]</b>
<b>Q<sub>100</sub></b>	= 0.96	<b>[cfs]</b>

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET  
RATIONAL METHOD  
Hubbard Engineering  
Project No. 15138**

**Concentration Point ID: DA-13**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	153.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.30	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.90	[ft]
Drainage Area (A)=	0.13	[acres]	Elevation <sub>Difference</sub> :	0.40	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00261	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
Vegetation Cover: <25 [%]  
Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
T<sub>c</sub> = 11.4\*L<sup>0.5</sup>\*K<sub>b</sub><sup>0.52</sup>\*S<sup>-0.31</sup>\*i<sup>-0.38</sup>+Time to Retention

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m = -0.00625
i	[in/hr]	b = 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.045447	6.0	4.44
50	-0.00625	0.04	0.045447	5.0	6.6
100	-0.00625	0.04	0.045447	5.0	7.48

Peak Discharge (Q):  
Q = C<sub>i</sub>\*i<sub>i</sub>\*A [cfs]

A [acres]  
i<sup>3</sup> [in/hr]  
C<sup>1</sup> Runoff Coefficient  
C<sub>10</sub><sup>(3)</sup> = 0.90  
C<sub>50</sub><sup>(3)</sup> = 0.93  
C<sub>100</sub><sup>(3)</sup> = 0.95

**Q<sub>10</sub> = 0.54 [cfs]**  
**Q<sub>50</sub> = 0.83 [cfs]**  
**Q<sub>100</sub> = 0.96 [cfs]**

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-14**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	155.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.30	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.75	[ft]
Drainage Area (A)=	0.14	[acres]	Elevation <sub>Difference</sub> :	0.55	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00355	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.045415	5.0	4.72
50	-0.00625	0.04	0.045415	5.0	6.6
100	-0.00625	0.04	0.045415	4.0	7.48

Peak Discharge (Q):

$Q = C * i * A$  [cfs]

A [acres]  
 i<sup>3</sup> [in/hr]  
 C<sup>1</sup> Runoff Coefficient  
 C<sub>10</sub><sup>(3)</sup> = 0.90  
 C<sub>50</sub><sup>(3)</sup> = 0.93  
 C<sub>100</sub><sup>(3)</sup> = 0.95

**Q<sub>10</sub> = 0.58 [cfs]**  
**Q<sub>50</sub> = 0.83 [cfs]**  
**Q<sub>100</sub> = 0.97 [cfs]**

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-15**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	166.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.30	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.75	[ft]
Drainage Area (A)=	0.10	[acres]	Elevation <sub>Difference</sub> :	0.55	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00331	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.046121	6.0	4.44
50	-0.00625	0.04	0.046121	5.0	6.6
100	-0.00625	0.04	0.046121	5.0	7.48

Peak Discharge (Q):

$Q = C \cdot i \cdot A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

**Q<sub>10</sub>** = 0.42 [cfs]  
**Q<sub>50</sub>** = 0.64 [cfs]  
**Q<sub>100</sub>** = 0.75 [cfs]

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET  
RATIONAL METHOD  
Hubbard Engineering  
Project No. 15138**

**Concentration Point ID: DA-16**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	135.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.00	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	26.90	[ft]
Drainage Area (A)=	0.45	[acres]	Elevation <sub>Difference</sub> :	1.10	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00815	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
Vegetation Cover: <25 [%]  
Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
T<sub>c</sub> = 11.4\*L<sup>0.5</sup>\*K<sub>b</sub><sup>0.52</sup>\*S<sup>-0.31</sup>\*i<sup>-0.38</sup>+Time to Retention

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m = -0.00625
i	[in/hr]	b = 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.042195	4.0	4.72
50	-0.00625	0.04	0.042195	3.0	6.6
100	-0.00625	0.04	0.042195	3.0	7.48

Peak Discharge (Q):

Q = C<sub>i</sub>\*i\*A [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

**Q<sub>10</sub> = 1.89 [cfs]**  
**Q<sub>50</sub> = 2.73 [cfs]**  
**Q<sub>100</sub> = 3.17 [cfs]**

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-17**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	190.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	27.75	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	26.95	[ft]
Drainage Area (A)=	0.16	[acres]	Elevation <sub>Difference</sub> :	0.80	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00421	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency				T <sub>c</sub>	i
[yr]	m	b	K <sub>b</sub>	[min]	[in/hr]
10	-0.00625	0.04	0.045055	6.0	4.44
50	-0.00625	0.04	0.045055	5.0	6.6
100	-0.00625	0.04	0.045055	5.0	7.48

Peak Discharge (Q):  
 $Q = C * i * A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

**Q<sub>10</sub> = 0.62 [cfs]**  
**Q<sub>50</sub> = 0.95 [cfs]**  
**Q<sub>100</sub> = 1.10 [cfs]**

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET  
RATIONAL METHOD  
Hubbard Engineering  
Project No. 15138**

**Concentration Point ID: DA-18**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	183.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	27.50	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	26.85	[ft]
Drainage Area (A)=	0.22	[acres]	Elevation <sub>Difference</sub> :	0.65	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.00355	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
Vegetation Cover: <25 [%]  
Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
T<sub>c</sub> = 11.4\*L<sup>0.5</sup>\*K<sub>b</sub><sup>0.52</sup>\*S<sup>-0.31</sup>\*i<sup>-0.38</sup>+Time to Retention

L	[mi]	K <sub>b</sub> =m Log A + b
S	[ft/mi]	m = -0.00625
i	[in/hr]	b = 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.044054	6.0	4.44
50	-0.00625	0.04	0.044054	5.0	6.6
100	-0.00625	0.04	0.044054	5.0	7.48

Peak Discharge (Q):

Q = C<sub>i</sub>\*i<sub>i</sub>\*A [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

Q <sub>10</sub>	= 0.90	[cfs]
Q <sub>50</sub>	= 1.38	[cfs]
Q <sub>100</sub>	= 1.60	[cfs]

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-19**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	122.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	28.10	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	26.20	[ft]
Drainage Area (A)=	0.21	[acres]	Elevation <sub>Difference</sub> :	1.90	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.01557	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	Kb=m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.044221	3.0	4.72
50	-0.00625	0.04	0.044221	3.0	6.6
100	-0.00625	0.04	0.044221	2.0	7.48

Peak Discharge (Q):

$Q = C * i * A$  [cfs]

A	[acres]
i <sup>3</sup>	[in/hr]
C <sup>1</sup>	Runoff Coefficient
	C <sub>10</sub> <sup>(3)</sup> = 0.90
	C <sub>50</sub> <sup>(3)</sup> = 0.93
	C <sub>100</sub> <sup>(3)</sup> = 0.95

<b>Q<sub>10</sub></b>	=	0.90	<b>[cfs]</b>
<b>Q<sub>50</sub></b>	=	1.30	<b>[cfs]</b>
<b>Q<sub>100</sub></b>	=	1.50	<b>[cfs]</b>

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**HYDROLOGIC DESIGN DATA SHEET**  
**RATIONAL METHOD**  
**Hubbard Engineering**  
**Project No. 15138**

**Concentration Point ID: DA-20**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Location Data**

State: Arizona

County: Maricopa

City of  
 Jurisdiction: Scottsdale

**Design Data**

Design Frequency:	100	[yrs]	Flow Path Length (L)=	75.00	[ft]
Check Frequency:	50	[yrs]	Elevation <sub>Max</sub> :	27.75	[ft]
Check Frequency:	10	[yrs]	Elevation <sub>Min</sub> :	27.00	[ft]
Drainage Area (A)=	0.08	[acres]	Elevation <sub>Difference</sub> :	0.75	[ft]
			Flow Path Slope <sub>Average</sub> (S)=	0.01000	[ft/ft]

**Watershed Characteristics**

Hydrologic Soil Group: --  
 Vegetation Cover: <25 [%]  
 Classification Type: A (Reference, Table 3.1, Page 3-3)

**Rational Method Computations**

Time of Concentration, (T<sub>c</sub>)<sup>(2)</sup>:  
 $T_c = 11.4 * L^{0.5} * K_b^{0.52} * S^{-0.31} * i^{-0.38} + \text{Time to Retention}$

L	[mi]	Kb=m Log A + b
S	[ft/mi]	m= -0.00625
i	[in/hr]	b= 0.04
		A = Area [acres]

Frequency [yr]	m	b	K <sub>b</sub>	T <sub>c</sub> [min]	i [in/hr]
10	-0.00625	0.04	0.046782	3.0	4.72
50	-0.00625	0.04	0.046782	2.0	6.6
100	-0.00625	0.04	0.046782	2.0	7.48

Peak Discharge (Q):  
 $Q = C * i * A$  [cfs]

A [acres]  
 i<sup>3</sup> [in/hr]  
 C<sup>1</sup> Runoff Coefficient  
 C<sub>10</sub><sup>(3)</sup> = 0.90  
 C<sub>50</sub><sup>(3)</sup> = 0.93  
 C<sub>100</sub><sup>(3)</sup> = 0.95

**Q<sub>10</sub> = 0.35 [cfs]**  
**Q<sub>50</sub> = 0.50 [cfs]**  
**Q<sub>100</sub> = 0.58 [cfs]**

**Reference:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology
3. NOAA Atlas 14, Volume, Version 5, Maricopa Station ID 02-5270

**Appendix C**  
*Onsite Hydraulic Calculations*  
Pima Storage

**INLETS SUMMARY SHEET**  
**Summary of Inlets**  
**Hubbard Engineering**  
**15138**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared By:** BAH  
**Revised By:** BAH

**Date:** 10/12/16  
**Date:** 02/08/17

Complete calculations for each concentration point are presented in the attached hydrologic calculation sheets.

$$Q = C_w * P * d^{1.5}$$

Reference 2

**Q=discharge capacity**  
**C<sub>w</sub> = 3.0 weir coefficient**  
**P=inlet perimeter**      **L=length**  
**d=flow depth**

Inlet ID	Q <sub>100</sub>	INLET			P or L (ft)	INLET CAPACITY W / Clogging	CLOGGING FACTOR
		DESCRIPTION	d (ft)	C <sub>w</sub>			
I-1	3.74	30" NYLOPLAST-STD	0.65	3	7.85	6.17	50%
I-2	4.77	2-30" NYLOPLAST-STD	0.5	3	15.7	8.33	50%
I-3	0.59	24" NYLOPLAST-STD	0.25	3	6.28	1.18	50%
I-4	0.50	24" NYLOPLAST-STD	0.25	3	6.28	1.18	50%
I-5	0.49	30" NYLOPLAST-STD	0.15	3	7.85	0.68	50%
I-6	1.64	30" NYLOPLAST-STD	0.15	3	7.85	0.68	50%
I-7A	1.71	30" NYLOPLAST-STD	0.3	3	7.85	1.93	50%
I-7B	1.34	30" NYLOPLAST-STD	0.6	3	7.85	5.47	150%
I-8	0.69	24" NYLOPLAST-STD	0.2	3	6.28	0.84	50%
I-9	1.12	30" NYLOPLAST-STD	0.2	3	7.85	1.05	50%
I-10	0.72	30" NYLOPLAST-STD	0.2	3	7.85	1.05	50%
I-11	0.94	30" NYLOPLAST-STD	0.2	3	7.85	1.05	50%
I-12	0.96	30" NYLOPLAST-STD	0.2	3	7.85	1.05	50%
I-13	0.96	30" NYLOPLAST-STD	0.2	3	7.85	1.05	50%
I-14	0.97	30" NYLOPLAST-STD	0.2	3	7.85	1.05	50%
I-15	0.74	30" NYLOPLAST-STD	0.2	3	7.85	1.05	50%
I-16	3.17	2-Type 'F' Catch Basin	0.25	3	17.5	3.28	50%
I-17	1.04	2-30" NYLOPLAST-STD	0.15	3	15.7	1.37	50%
I-18	1.60	2-30" NYLOPLAST-STD	0.15	3	15.7	1.37	50%
I-19	1.50	30" NYLOPLAST-STD	0.25	3	7.85	1.47	50%
I-20	0.58	2-30" NYLOPLAST-STD	0.15	3	15.7	1.37	50%

**Appendix D**  
Retention Dissipation Calculations  
*Pima Storage*

**HYDRAULIC CALCULATION SHEET**  
**Retention Calculations**  
**Hubbard Engineering**  
**Project No. 15138**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised By:**

**Date:** 10/12/16  
**Date:**

**Purpose:** Evaluate the required and provided retention volumes in order to assess conformance to project criteria.

**Methodology:** Calculate the volume of stormwater required to be retained using City of Scottsdale criteria. Calculate the estimated volume of stormwater retained using retention basin geometry.

**Criteria:** Retain the calculated stormwater run-off for the 100-YEAR 2-HOUR duration storm event.

**References:** 1. Scottsdale Drainage Design Policy  
 2. Drainage Design Manual for Maricopa County, Arizona, Volume II: Hydraulics, September 2003.

**Calculations:** Volume Required =  $C_{Composite} * D / 12 * A$  [ft<sup>3</sup>] (Reference 1)

D = 2.2 [in] (Reference 1)  
 C = 0.45 (Desert landscape) (Reference 1)

$$Composite\ C = (C1 * A1 + C2 * A2 + \dots) / (A1 + A2 + \dots)$$

$$Volume\ Required = Composite\ C * P / 12 * A$$

**Results:**

Identifiers	CALCULATE RETENTION VOLUME REQUIRED		Volume Required	
	Contributory Area	C	[acre-ft]	[ft <sup>3</sup> ]
Area ID	[acres]			
DA-21	0.23	0.45	0.02	820.88
<b>Total Area:</b>	<b>0.23</b>	<b>TOTAL VOLUME REQUIRED:</b>	<b>0.02</b>	<b>820.88</b>

# HYDRAULIC CALCULATION SHEET

**Retention Provided  
Hubbard Engineering  
Project No. 15138**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared By:** BAH  
**Revised By:**

**Date:** 10/12/16  
**Date:**

RETENTION BASINS					
Drainage Area	HW Area ft <sup>2</sup>	Bottom ft <sup>2</sup>	H ft	Volume Provided ft <sup>3</sup>	Drainage Areas contributing to Basins
RB-1	4,550.00	3,100.00	0.85	3,231.60	
				0.00	
<b>Total -&gt;</b>				<b>3,231.60</b>	

4,550.00 <= Total Area @ H.W.'s

$$\text{Volume Provided} = H/3 * (A_{H.W.} + A_{BOTTOM} + (A_{H.W.} * A_{BOTTOM})^{0.5})$$

**HYDRAULIC CALCULATION SHEET**  
**Retention Basin Drain Time Calculations**  
**Hubbard Engineering**  
**Project No. 15138**

**Project Name:** Pima Storage  
**Project No.:** 15138

**Prepared by:** BAH  
**Revised by:**

**Date:** 10/12/16  
**Date:**

**Purpose:** Calculate the number of drywells required to facilitate drainage of the required volume within 36 hours.

**Methodology:** Calculate the number of drywells necessary to drain the retention basin within 36 hours, assuming a drywell infiltration rate of 0.1 cfs.

**Criteria:**

1. Drywell drainage capacity must discharge the retention volume provided within 36 hours.
2. Percolation rates obtained from testing performed on the site will be reduced 50% for use in calculations.

**References:**

1. Scottsdale Drainage Design Policy
2. Flood Control District of Maricopa County Drainage Design Manual, Hydrology

**Calculations:**

$$\text{Number of Drywells Required} = V_{DW} / (\text{Drywell Infiltration Rate} * 3600 * 36 \text{ hours})$$

$$\text{Drywell Infiltration Rate} = 0.1 \quad \text{[cfs]} \quad (\text{Reference 2})$$

**Results:**

Identifiers	Infiltration Drainage Capacity Calculations				V <sub>DW</sub> [ft <sup>3</sup> ]	Number of Drywells Required		
	Retention Basin ID	Volume <sup>(Ref. 1)</sup> Provided [ft <sup>3</sup> ]	Bottom <sup>(Ref. 1)</sup> Area [ft <sup>2</sup> ]	Percolation Rate <sup>(Ref. 2)</sup>			Infiltration Drain Capacity [ft <sup>3</sup> ]	
				Test Location				[ft <sup>3</sup> /hr/ft <sup>2</sup> ]
1	3,232.0	3,100.0	--	0.10	5580.000	0		
			--	0.00	0.000	0		
			--	0.00	0.000	0		
			--	0.00	0.000	0		
<b>Total Number of Drywells =</b>						<b>0</b>		

**Conclusion:** These calculations indicate that the number of drywells required will adequately drain the calculated volume required from the retention basins within the project criteria. However, no percolation test data was available for use in analyzing the performance of the basins. Therefore, only the drywell infiltration rate was used for the determining the number of drywells. These numbers will be revised when the field data becomes available.

Total Vol. = 3,232.0 [ft<sup>3</sup>]  
D.W. Rate = 0.1 cfs  
1347 seconds  
0.4 Hours (with no surface infiltration)

**Appendix E**  
Storm Drain Calculations  
*Pima Storage*

**HYDROLOGIC CALCULATION SHEET  
INFLOW HYDROGRAPH RESULTS  
HUBBARD ENGINEERING  
Project No.: 15138**

Project Name: Pima Storage  
Project No.: 15138

Prepared by: BAH  
Prepared by:

**Purpose:** Determine the inflow hydrograph for the detention basin from the contributing drainage area for a 2-hour duration storm event.

**Methodology:** Inflow hydrograph developed using the 2-hour hypothetical storm distribution developed by the Flood Control District of Maricopa County (Reference 1).

**Criteria:** 100-year frequency, 2-hour duration

- References:** 1. Drainage Design Manual for Maricopa County, Arizona, Volume I: Hydrology, August 2013.  
2. Design Standards & Policies Manual City of Scottsdale, January 2010

**Calculations:**  $Q = C \cdot i \cdot A$

Where:

C = Post-Development Composite Runoff Coefficient  
i = Rainfall intensity in inches per hour  
A = Area of contributing sub-basin in acres

<b>PARCEL</b>					
Return Period	A [acres]	C	I [in/hr]	Q [cfs]	Pipe Volume (cf)
100-Year Post	4.16	0.95	7.48	29.84	3,208.00

<b>INFLOW HYDROGRAPH</b>					
Time (min)	Depth (%)	Q/Qp (%)	Q (Post) (cfs)	Volume (Post) (cf)	Volume (Post) - Pipe Volume (cf)
0	0.000	0.000	0.000	0.000	
2	0.002	0.025	0.746	89.520	-3,118.48
4	0.007	0.087	2.596	311.530	-2,896.47
6	0.020	0.160	4.774	572.928	-2,635.07
8	0.036	0.243	7.251	870.134	-2,337.87
10	0.063	0.346	10.325	1238.957	-1,969.04
12	0.096	0.451	13.458	1614.941	-1,593.06
14	0.136	0.576	17.188	2062.541	-1,145.46
16	0.180	0.738	22.022	2642.630	-565.37
18	0.253	0.887	26.468	3176.170	-31.83
20	0.325	1.000	29.840	3580.800	372.80
22	0.400	0.924	27.572	3308.659	100.66
24	0.464	0.839	25.036	3004.291	-203.71
26	0.523	0.756	22.559	2707.085	-500.92
28	0.578	0.678	20.232	2427.782	-780.22
30	0.627	0.604	18.023	2162.803	-1,045.20
32	0.671	0.545	16.263	1951.536	-1,256.46
34	0.707	0.482	14.383	1725.946	-1,482.05
36	0.742	0.424	12.652	1518.259	-1,689.74
38	0.773	0.372	11.100	1332.058	-1,875.94
40	0.799	0.323	9.638	1156.598	-2,051.40
42	0.841	0.241	7.191	862.973	-2,345.03
44	0.875	0.179	5.341	640.963	-2,567.04
46	0.900	0.136	4.058	486.989	-2,721.01
48	0.917	0.102	3.044	365.242	-2,842.76
50	0.932	0.078	2.328	279.302	-2,928.70
52	0.953	0.049	1.462	175.459	-3,032.54
54	0.965	0.030	0.895	107.424	-3,100.58
56	0.973	0.020	0.597	71.616	-3,136.38
58	0.979	0.012	0.358	42.970	-3,165.03
60	0.983	0.008	0.239	28.646	-3,179.35
62	1.000	0.000	0.000	0.000	-3,208.00
<b>TOTAL (CF)=</b>			<b>40,517</b>	<b>238</b>	

**Exhibits**  
*Pima Storage*



CONSTRUCTION NOTES

GRADING NOTES

- 1) CONSTRUCT ASPHALT PAVEMENT 3" AC OVER 6" ABC OVER 12" PREPARED SUBGRADE FOR TRUCK PARKING, MAIN DRIVES & FIRE LANES. ALTERNATIVE PAVEMENT FOR AREAS 6" POCC OVER 12" PREPARED SUBGRADE PER GEOTECHNICAL REPORT DONE BY SPEEDIE AND ASSOCIATES DATED FEBRUARY 18 2017 PROJECT NO 1609825A. SEE DETAILS ON SHEET C12 FOR PAVEMENT CROSS-SECTIONS.
- 3) INSTALL 6" THICK PORTLAND CEMENT CONCRETE OVER 12" PREPARED SUBGRADE PER GEOTECHNICAL REPORT DONE BY SPEEDIE AND ASSOCIATES DATED FEBRUARY 18 2017 PROJECT NO 1609825A.
- 4) INSTALL SINGLE CURB PER M.A.G. STD. DTL. 222 TYPE A.
- 6) CONSTRUCT 3" CURB OPENING SEE DETAIL J ON SHEET C12.
- 11) CONSTRUCT TRASH ENCLOSURE PER COS STD. DTL. 2146-1.
- 13) PROPOSED SITE WALL PER ARCHITECT'S DETAIL ON SHEET S/AB0 AND STRUCTURAL SHEET 14/S11.01.
- 22) PROPOSED SITE FENCE PER ARCHITECT'S DETAIL ON SHEET 20/AB0.

NOTE FROM A CONSTRUCTION STAND POINT THE APPROVAL OF THE CDMR BY FEMA WILL BE BASED ON THE FOLLOWING THE GRADING OF THE SWALE AND THE CONSTRUCTION OF THE RETAINING WALL ALONG THE WEST SIDE OF PIMA RD THE GRADING OF LOT 2 TO PROPOSED FINISHED GRADES GRADING THE EAST AND SOUTH PORTIONS OF LOT 1 ALONG THE PROPOSED FLOODPLAIN DELINEATION LINE SHOWN ON THE PLANS TO FINISHED GRADES

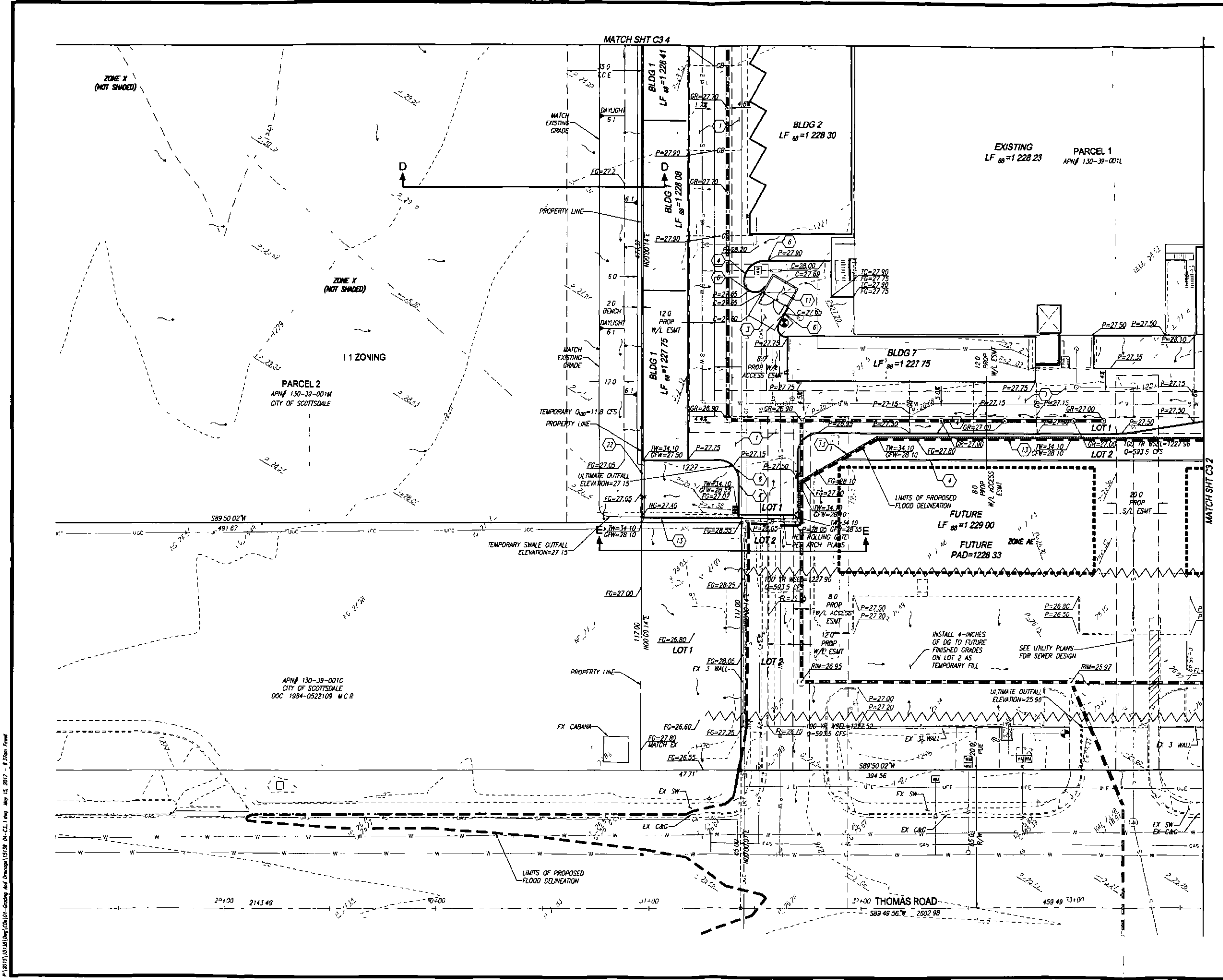
GRADING PLAN SHEET  
PIMA SELF STORAGE

A PORTION OF THE SOUTHWEST QUARTER OF SECTION 28  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No 15138	Date 05/15/2017	Sheet No SHT 05 OF 17
Project Manager B HAMMERSLAND	Project Engineer M WOLF P.E.	C31

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CASE #57-DR-2015 (PLAN CHECK #6995-16-1)



P:\160515\160515.dwg (16-01 - Grading and Drainage) 15138 04-C31.dwg May 15, 2017 - 8:17am Fred

CONSTRUCTION NOTES

GRADING NOTES

- 1) CONSTRUCT ASPHALT PAVEMENT 3 AC OVER 6 ABC OVER 12 PREPARED SUBGRADE FOR TRUCK PARKING MAIN DRIVES & FIRE LANES ALTERNATIVE PAVEMENT FOR AREAS 5 & POOP OVER 12 PREPARED SUBGRADE PER GEOTECHNICAL REPORT DONE BY SPEEDIE AND ASSOCIATES DATED FEBRUARY 18 2017 PROJECT NO 160982SA SEE DETAILS ON SHEET C12 FOR PAVEMENT CROSS-SECTIONS
- 2) CONSTRUCT ASPHALT PAVEMENT 2 AC OVER 4 ABC OVER 12 PREPARED SUBGRADE FOR PARKING SPACES ALTERNATIVE PAVEMENT OPTION 6 POOP OVER 12 PREPARED SUBGRADE PER GEOTECHNICAL REPORT DONE BY SPEEDIE AND ASSOCIATES DATED FEBRUARY 18 2017 PROJECT NO 160982SA SEE DETAILS ON SHEET C12 FOR PAVEMENT CROSS-SECTIONS
- 4) INSTALL SINGLE CURB PER M.A.G. STD. DTL. 222 TYPE A
- 5) INSTALL CURB AND GUTTER PER M.A.G. STD. DTL. 220-1 TYPE A
- 6) CONSTRUCT 3 CURB OPENING SEE DETAIL 3 ON SHEET C12
- 8) CONSTRUCT CONCRETE SIDEWALK PER M.A.G. STD. DTL. 230 WIDTH VARIES REFER TO PLAN
- 9) PROPOSED CROSSWALK REFER TO ARCHITECT'S PLAN FOR DETAILS
- 10) CONSTRUCT SIDEWALK RAMP PER DETAIL 4 ON SHEET C12
- 12a) INSTALL 3-6 GROUTED RIP RAP DEPTH=1 GREY COLOR NATIVE STONE
- 12b) INSTALL 3-6 RIP RAP DEPTH=1 GREY COLOR NATIVE STONE
- 13) PROPOSED SITE WALL PER ARCHITECT'S DETAIL ON SHEET 5/AB0 AND STRUCTURAL SHEET 14/51101
- 14) CONSTRUCT RETAINING WALL PER STRUCTURAL DETAIL 9 ON STRUCTURAL SHEET 51102
- 19) SAWCUT 2 ASPHALT REMOVE AND REPLACE PER COS STD DTL 2200
- 20) INSTALL 6 VALLEY GUTTER AND WOODEN APRON PER COS STD DTL 2240
- 21) INSTALL CURB RAMP PER M.A.G. STD. DTL. 235-1 MODIFY PER PLAN

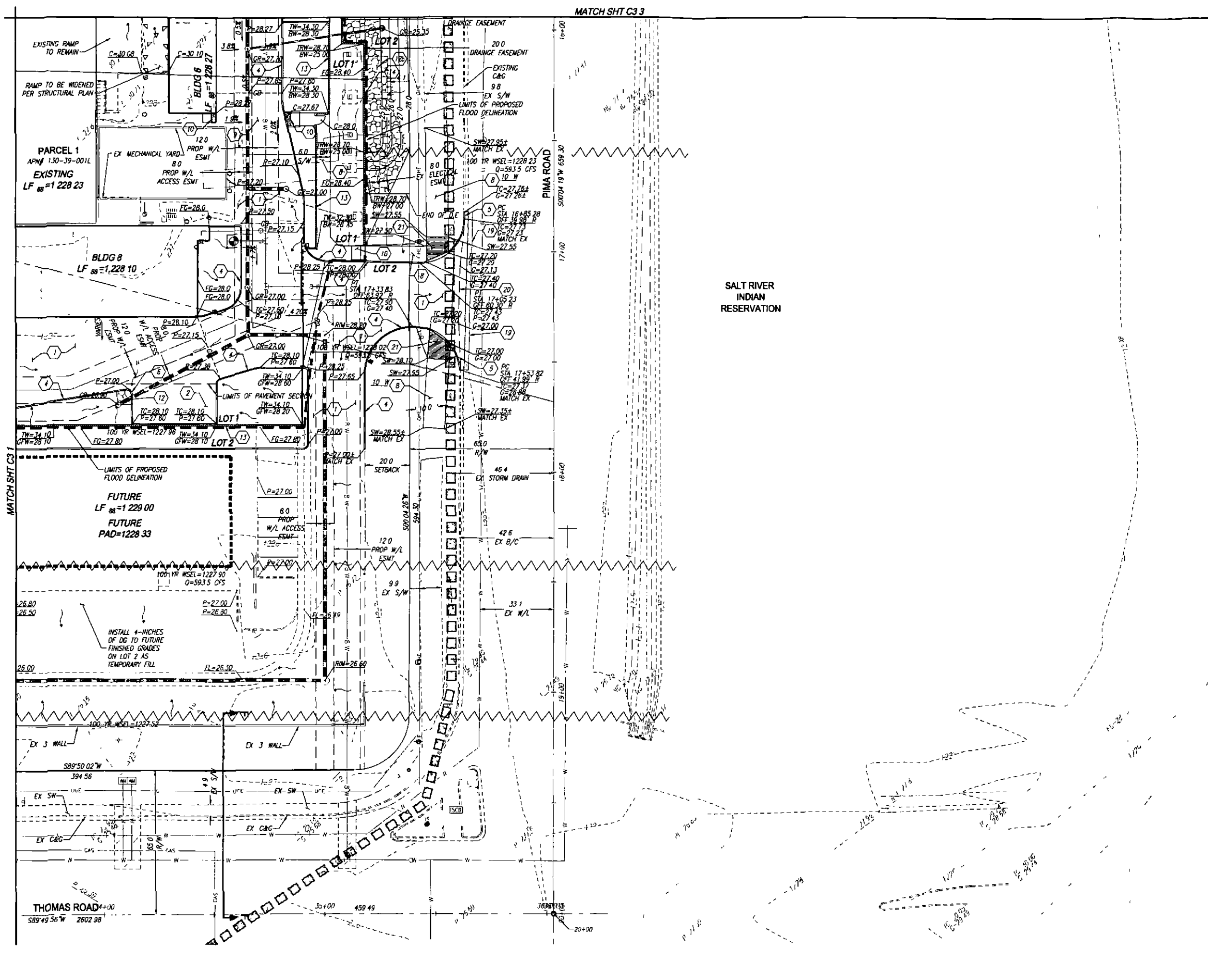
NOTE  
FROM A CONSTRUCTION STAND POINT THE APPROVAL OF THE CLOMR BY FEMA WILL BE BASED ON THE FOLLOWING THE GRADING OF THE SWALE AND THE CONSTRUCTION OF THE RETAINING WALL ALONG THE WEST SIDE OF PIMA RD THE GRADING OF LOT 2 TO PROPOSED FINISHED GRADES GRADING THE EAST AND SOUTH PORTIONS OF LOT 1 ALONG THE PROPOSED FLOODPLAIN DELINEATION LINE SHOWN ON THE PLANS TO FINISHED GRADES

GRADING PLAN SHEET  
PIMA SELF STORAGE

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MEZQUITA, MARICOPA COUNTY, ARIZONA

Project No 1513B	Date 05/15/2017	Sheet No SHT 06 OF 17
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF P.E.	C32

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P:\2015\1513B\Drawings\1513B-05-C3-2.dwg, May 15, 2017, 9:57am, P:\2015\1513B\Drawings\1513B-05-C3-2.dwg, May 15, 2017, 9:57am, P:\2015\1513B\Drawings\1513B-05-C3-2.dwg, May 15, 2017, 9:57am, P:\2015\1513B\Drawings\1513B-05-C3-2.dwg, May 15, 2017, 9:57am

CASE #57-DR-2015 (PLAN CHECK #6995-16-1)

**CONSTRUCTION NOTES**  
**GRADING NOTES**

- 1) CONSTRUCT ASPHALT PAVEMENT 3 AC OVER 6 ABC OVER 12 PREPARED SUBGRADE FOR TRUCK PARKING MAIN DRIVES & FIRE LANES ALTERNATIVE PAVEMENT FOR AREAS 6 PCCP OVER 12 PREPARED SUBGRADE PER GEOTECHNICAL REPORT DONE BY SPEEDIE AND ASSOCIATES DATED FEBRUARY 18 2017 PROJECT NO 1609825A. SEE DETAILS ON SHEET C12 FOR PAVEMENT CROSS-SECTIONS
- 4) INSTALL SINGLE CURB PER M.A.G. STD. DTL. 222 TYPE A
- 5) INSTALL CURB AND GUTTER PER M.A.G. STD. DTL. 220-1 TYPE A
- 7) CONSTRUCT SIDEWALK SCUPPER PER M.A.G. STD. DTL. 206 WIDTH=6
- 8) CONSTRUCT CONCRETE SIDEWALK PER M.A.G. STD. DTL. 230 WIDTH VARIES REFER TO PLAN
- 120) INSTALL 3-6 GRADED RIP RAP DEPTH=1 GREY COLOR MATHE STONE
- 120) INSTALL 3-6 RIP RAP DEPTH=1 GREY COLOR MATHE STONE
- 14) CONSTRUCT RETAINING WALL PER STRUCTURAL DETAIL 9 ON STRUCTURAL SHEET S11.02
- 15) GRADE SWALE/BASIN PER PLAN
- 17) GRADE DETENTION BASIN PER PLAN
- 19) SAWCUT 2 ASPHALT REMOVE AND REPLACE PER COS STD. DTL. 2200
- 20) INSTALL 6 VALLEY GUTTER AND MODIFIED APRON PER COS STD. DTL. 2240
- 21) INSTALL CURB RAMP PER M.A.G. STD. DTL. 235-1 MODIFY PER PLAN

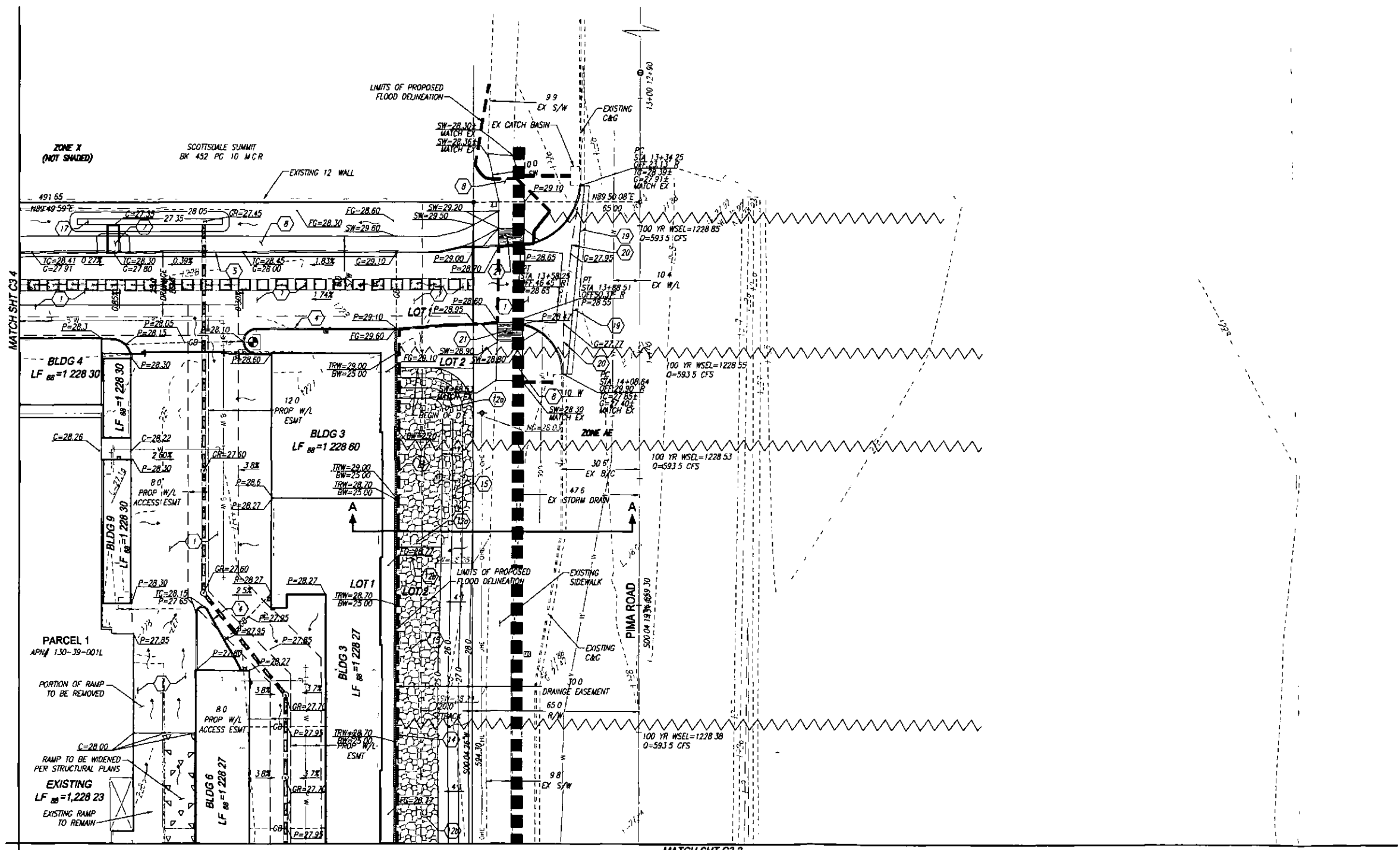
NOTE  
FROM A CONSTRUCTION STAND POINT THE APPROVAL OF THE CLOMR BY F.E.M.A. WILL BE BASED ON THE FOLLOWING: THE GRADING OF THE SWALE AND THE CONSTRUCTION OF THE RETAINING WALL ALONG THE WEST SIDE OF PIMA RD. THE GRADING OF LOT 2 TO PROPOSED FINISHED GRADES. GRADING THE EAST AND SOUTH PORTIONS OF LOT 1 ALONG THE PROPOSED FLOODPLAIN DELINEATION LINE SHOWN ON THE PLANS TO FINISHED GRADES.

**GRADING PLAN SHEET**  
**PIMA SELF STORAGE**

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No 15138	Date 05/15/2017	Sheet No. SHT 07 OF 17
Project Manager B HAMMERSLAND	Project Engineer M WOLF P.E.	C33

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P:\2015\15138\Drawings\15138-06-CL.dwg May 15, 2017 - 8:35am Fred

CASE #57-DR-2015 (PLAN CHECK #6995-16-1)

CONSTRUCTION NOTES

GRADING NOTES:

- 1 CONSTRUCT ASPHALT PAVEMENT, 3" AC OVER 6" ABC OVER 12" PREPARED SUBGRADE FOR TRUCK PARKING, MAIN DRIVES, & FIRE LANES. ALTERNATIVE PAVEMENT FOR AREAS 6" PCP OVER 12" PREPARED SUBGRADE PER GEOTECHNICAL REPORT DONE BY "SPEEDIE AND ASSOCIATES" DATED FEBRUARY 18, 2017 PROJECT NO. 1609825A. SEE DETAILS ON SHEET C1.2 FOR PAVEMENT CROSS-SECTIONS.
- 2 CONSTRUCT ASPHALT PAVEMENT, 2" AC OVER 4" ABC OVER 12" PREPARED SUBGRADE FOR PARKING SPACES. ALTERNATIVE PAVEMENT OPTION 6" PCP OVER 12" PREPARED SUBGRADE PER GEOTECHNICAL REPORT DONE BY "SPEEDIE AND ASSOCIATES" DATED FEBRUARY 18, 2017 PROJECT NO. 1609825A. SEE DETAILS ON SHEET C1.2 FOR PAVEMENT CROSS-SECTIONS.
- 4 INSTALL SINGLE CURB PER M.A.G. STD. DTL. 222 TYPE 'A'.
- 5 INSTALL CURB AND GUTTER PER M.A.G. STD. DTL. 220-1 TYPE 'A'.
- 7 CONSTRUCT SIDEWALK SCUPPER PER M.A.G. STD. DTL. 206 WIDTH=6'.
- 9 PROPOSED CROSSWALK. REFER TO ARCHITECT'S PLAN FOR DETAILS.
- 10 CONSTRUCT SIDEWALK RAMP PER DETAIL 4 ON SHEET C1.2.
- 12a INSTALL 3"-6" GROUTED RIP RAP, DEPTH = 1'. GRAY COLOR. NATIVE STONE.
- 13 PROPOSED SITE WALL PER ARCHITECT'S DETAIL ON SHEET 5/48.0 AND STRUCTURAL SHEET 14/511.01.
- 16 GRADE SWALE PER PLAN.
- 17 GRADE DETENTION BASIN PER PLAN.
- 18 CONSTRUCT CONCRETE RAMP PER DETAIL ON SHEET C3.4.

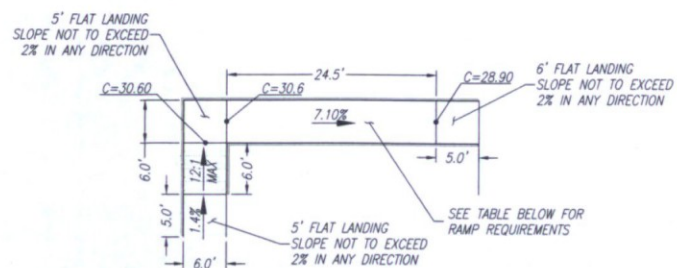


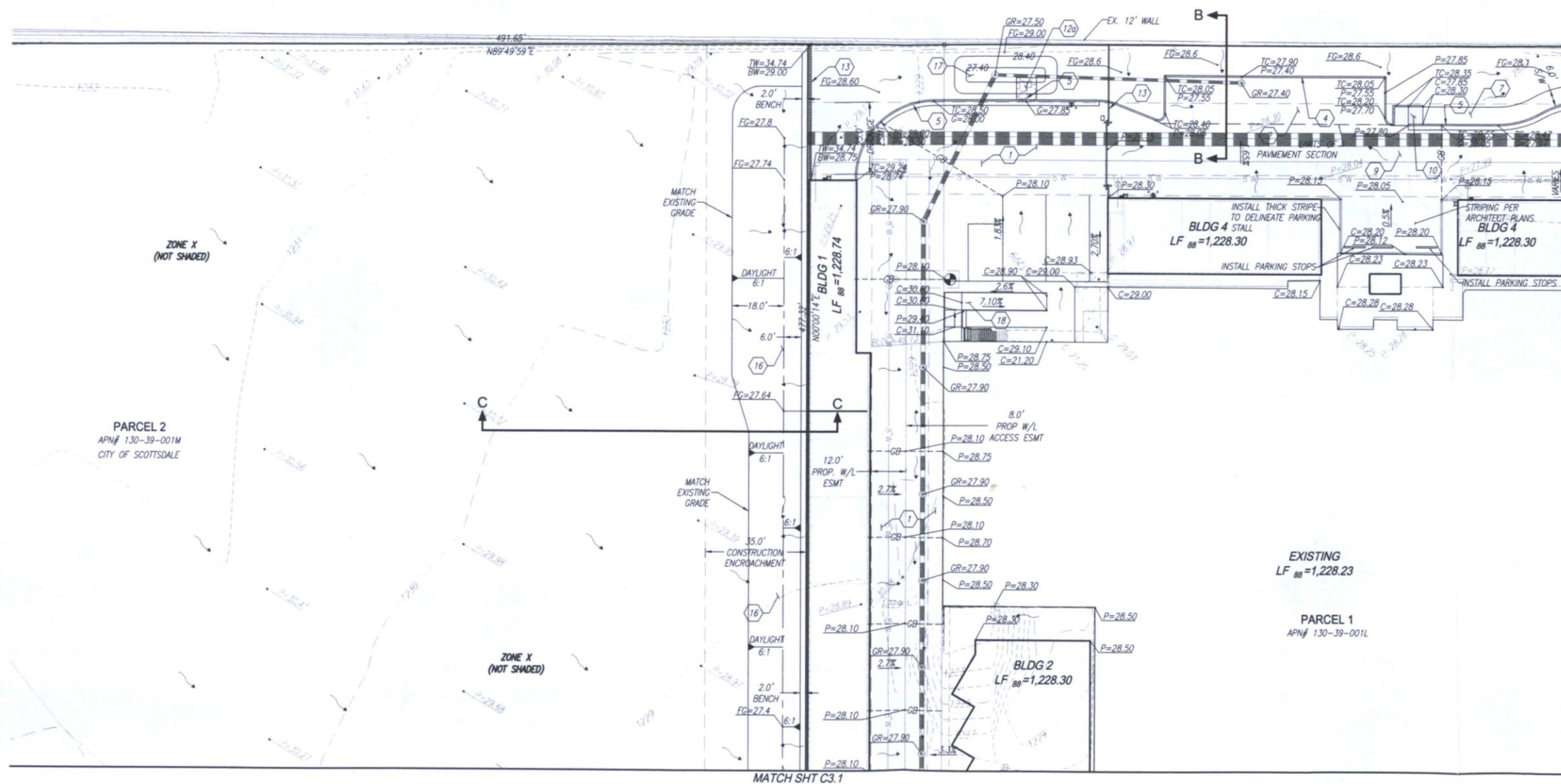
TABLE: SIDEWALK RAMP DESIGN CRITERIA

SLOPE	MAX RISE	MAX HORIZONTAL PROJECTION
1:12 TO < 1:16	30 INCHES	30 FEET
1:16 TO < 1:20	30 INCHES	40 FEET

ADA RAMP GRADING CRITERIA DETAIL

SCALE: 1"=10'

SCOTTSDALE SUMMIT  
BK. 452, PG. 10, M.C.R.



811  
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1.800.STAKE.IT  
602.263.1100

30929  
MICHAEL S. WOLF  
REGISTERED PROFESSIONAL ENGINEER  
STATE OF ARIZONA

GRADING PLAN SHEET  
PIMA SELF STORAGE

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No. 15138	Date 05/15/2017	Sheet No. SHT: 08 OF 17
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C3.4

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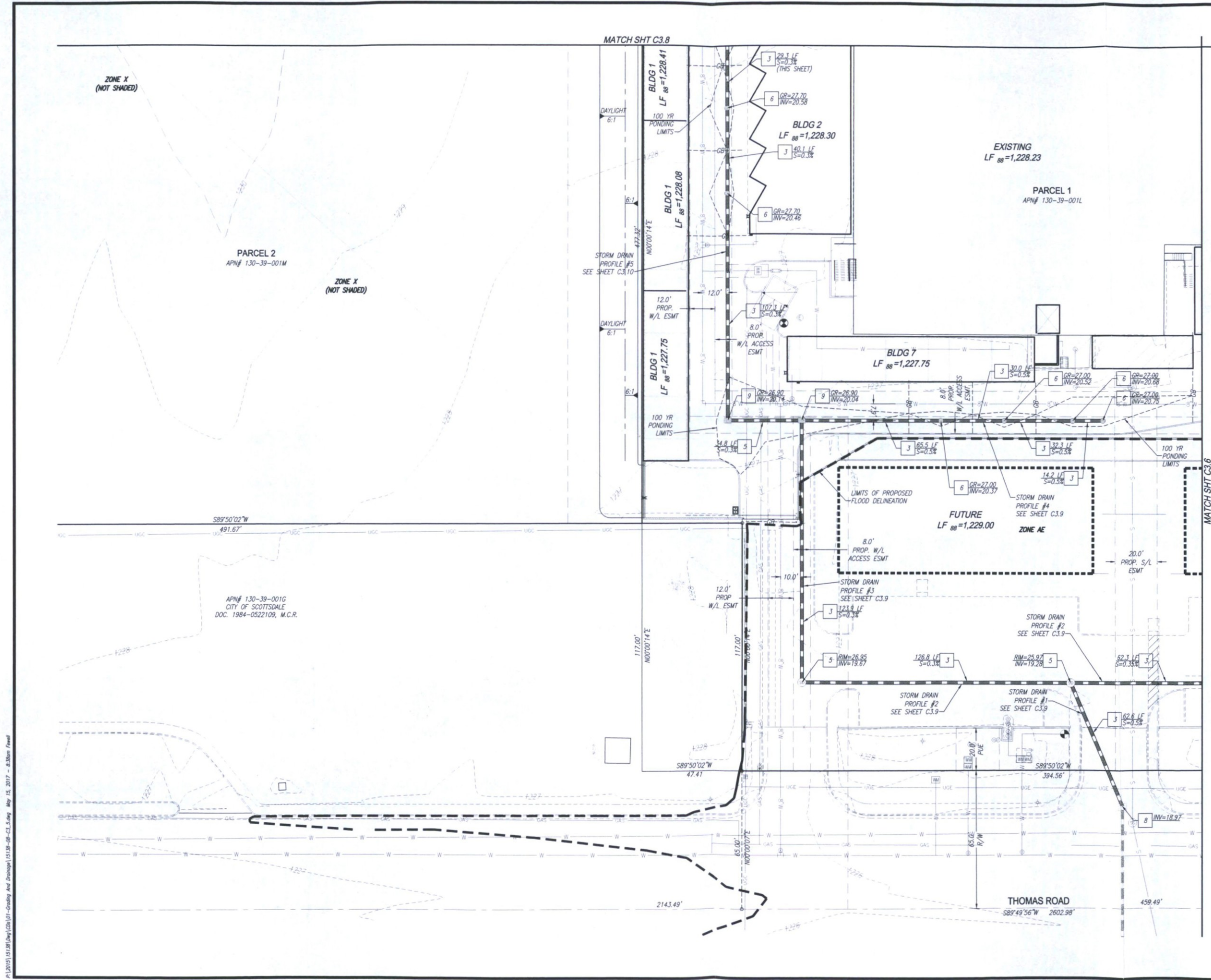
CASE #57-DR-2015 (PLAN CHECK #6995-16-1)

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CONSTRUCTION NOTES

STORM DRAIN NOTES:

- 3 INSTALL 18" HDPE STORM DRAIN PIPE. LENGTH AND SLOPE PER PLAN.
- 5 INSTALL 12" NYLOPLAST POLYPROPYLENE STORM DRAIN RISER WITH STANDARD 30" STANDARD ASSEMBLY.
- 6 INSTALL 12" NYLOPLAST POLYPROPYLENE STORM DRAIN RISER WITH STANDARD 30" GRATE ASSEMBLY.
- 8 CONNECT TO EXISTING. SIZE AND INVERT PER PLANS.
- 9 INSTALL TYPE 'F' CATCH BASIN PER M.A.G. STD. DTL. 535.



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38923  
MICHAEL S. WOLF  
Professional Engineer  
P.E. No. 38923  
Arizona State Board of Professional Engineers and Architects

Scale: 0 20 40 feet

**STORM DRAIN PLAN  
PIMA SELF STORAGE**

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No. 15138	Date 05/15/2017	Sheet No. SHT. 09 OF 17
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C3.5

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Ph: 480.952.3313

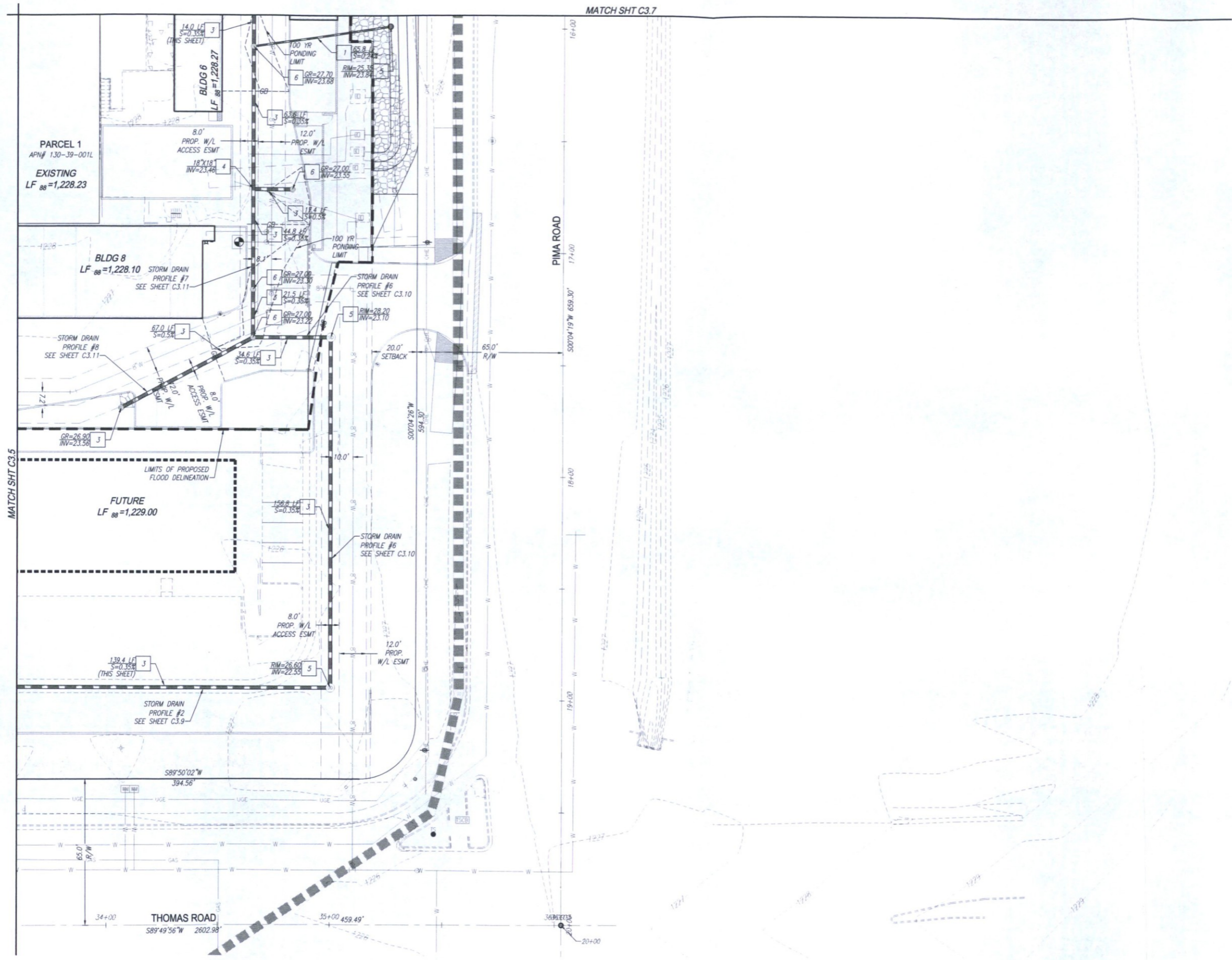
CASE #57-DR-2015 (PLAN CHECK #6995-16-1)

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CONSTRUCTION NOTES

STORM DRAIN NOTES:

- 1 INSTALL 8" HDPE STORM DRAIN PIPE, LENGTH AND SLOPE PER PLAN.
- 3 INSTALL 18" HDPE STORM DRAIN PIPE, LENGTH AND SLOPE PER PLAN.
- 4 INSTALL HDPE STORM DRAIN TEE, SIZE PER PLAN.
- 5 INSTALL 12" NYLOPLAST POLYPROPYLENE STORM DRAIN RISER WITH STANDARD 30" STANDARD ASSEMBLY.
- 6 INSTALL 12" NYLOPLAST POLYPROPYLENE STORM DRAIN RISER WITH STANDARD 30" GRATE ASSEMBLY.



811  
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602.263.1100

38928 MICHAEL S. WOLF  
Professional Engineer  
No. 12006 L.P. No. 12006

Scale: 0 20 40 feet

**STORM DRAIN PLAN  
PIMA SELF STORAGE**

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No. 15138	Date 05/15/2017	Sheet No. SHT: 10 OF 17
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C3.6

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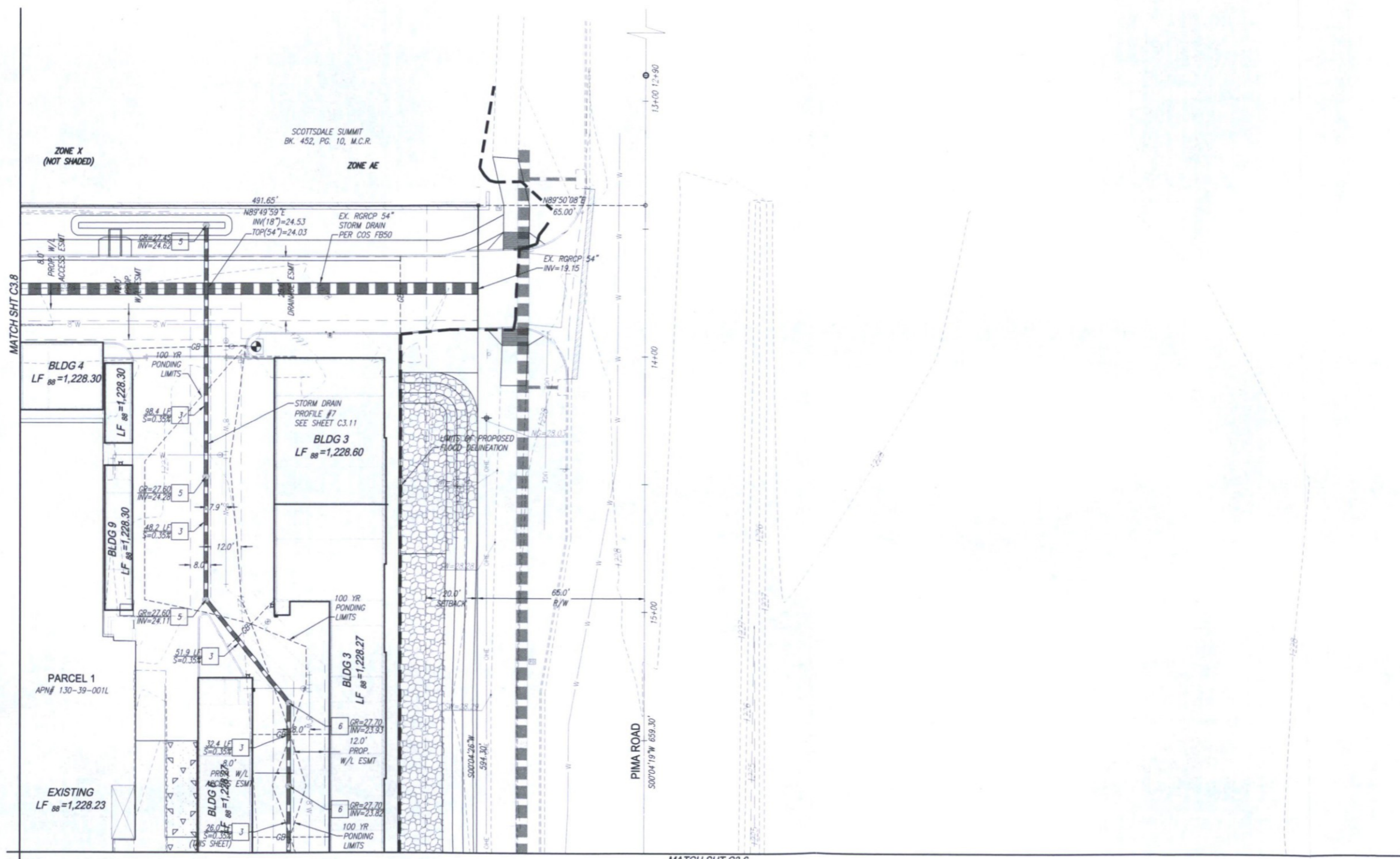
CASE #57-DR-2015 (PLAN CHECK #6995-16-1)

P:\2015\15138\DWG\15138-09-CL.dwg May 15, 2017 - 8:38am Freefall

CONSTRUCTION NOTES

STORM DRAIN NOTES:

- 3 INSTALL 18" HDPE STORM DRAIN PIPE. LENGTH AND SLOPE PER PLAN.
- 5 INSTALL 12" NYLOPLAST POLYPROPYLENE STORM DRAIN RISER WITH STANDARD 30" STANDARD ASSEMBLY.
- 6 INSTALL 12" NYLOPLAST POLYPROPYLENE STORM DRAIN RISER WITH STANDARD 30" GRATE ASSEMBLY.



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602.263.1100

38929  
MICHAEL S. WOLF  
Professional Engineer  
P.E. No. 10000  
Arizona State Board of Professional Engineers and Land Surveyors

Scale: 0 20 40 feet

**STORM DRAIN PLAN**  
**PIMA SELF STORAGE**  
A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No. 15138	Date 05/15/2017	Sheet No. SHT. 11 OF 17
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C3.7

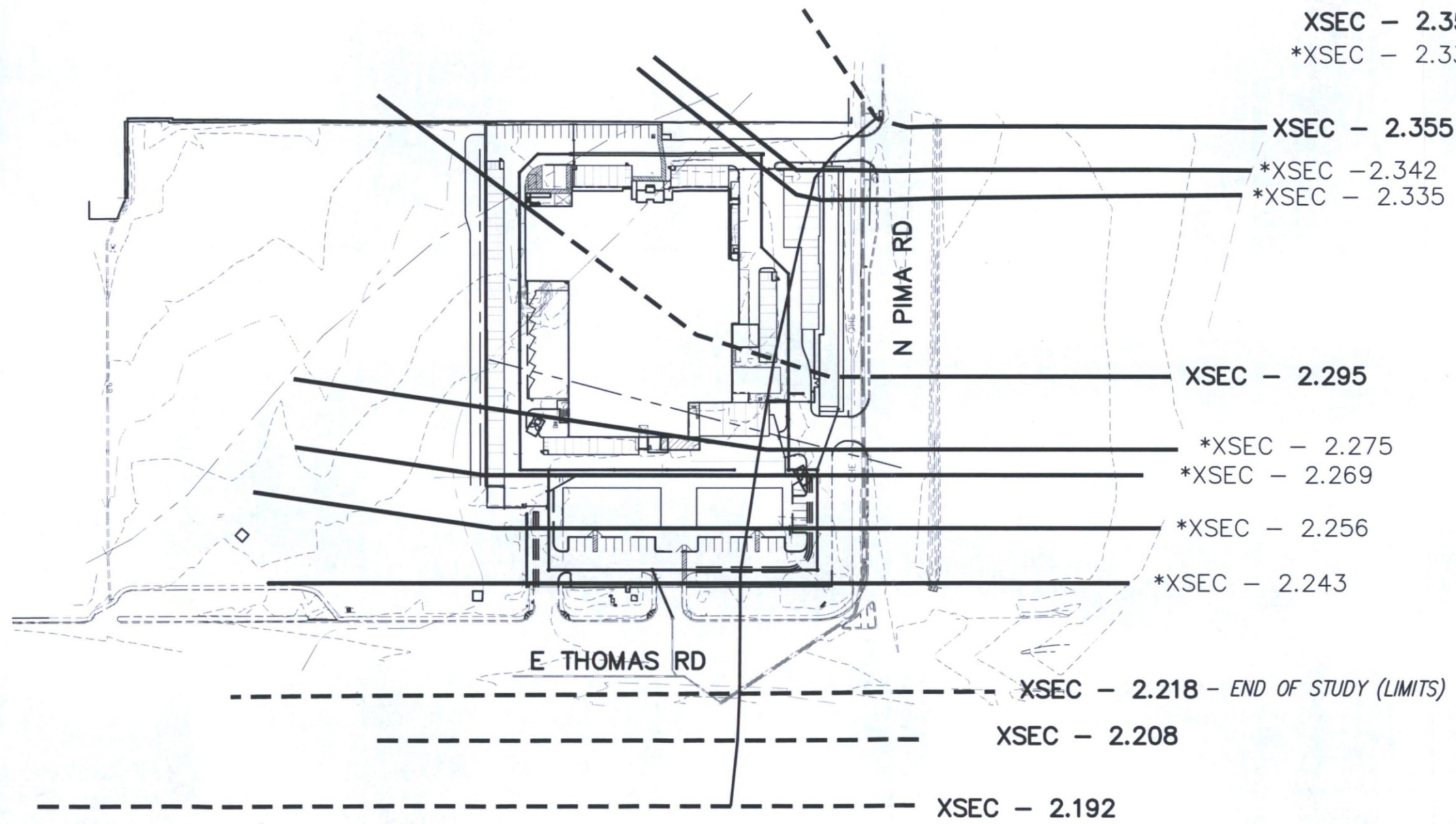
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Ph: 480.952.3313

CASE #57-DR-2015 (PLAN CHECK #6995-16-1)



# LEGEND

- EXISTING CROSS SECTIONS
- ADDITIONAL/EXTENDED CROSS SECTIONS
- XSEC - 2.355 EXISTING CROSS SECTIONS
- \*XSEC - 2.335 ADDITONAL CROSS SECTIONS



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Proj. No. 15138	Date 3/30/16
Sht: 1 of 1	

**HEC-RAS CROSS SECTIONS  
EXHIBIT 3  
PIMA STORAGE**

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Suite 12000  
Mesa, AZ 85210  
Ph: 480.892.3313



NOAA Atlas 14, Volume 1, Version 5  
 Location name: Scottsdale, Arizona, USA\*  
 Latitude: 33.4814°, Longitude: -111.8926°  
 Elevation: 1226.83 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 & aerals](#)

**PF tabular**

<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.184 (0.154-0.224)	0.240 (0.202-0.293)	0.327 (0.273-0.396)	0.393 (0.326-0.474)	0.482 (0.394-0.580)	0.552 (0.445-0.660)	0.623 (0.493-0.743)	0.695 (0.541-0.828)	0.792 (0.600-0.944)	0.866 (0.643-1.03)
10-min	0.280 (0.234-0.341)	0.366 (0.308-0.446)	0.497 (0.415-0.603)	0.598 (0.496-0.722)	0.735 (0.599-0.882)	0.840 (0.677-1.00)	0.948 (0.750-1.13)	1.06 (0.823-1.26)	1.21 (0.913-1.44)	1.32 (0.979-1.57)
15-min	0.347 (0.290-0.422)	0.453 (0.382-0.553)	0.616 (0.515-0.748)	0.741 (0.615-0.895)	0.910 (0.743-1.09)	1.04 (0.839-1.25)	1.18 (0.929-1.40)	1.31 (1.02-1.56)	1.49 (1.13-1.78)	1.63 (1.21-1.95)
30-min	0.467 (0.391-0.569)	0.611 (0.514-0.744)	0.829 (0.693-1.01)	0.998 (0.828-1.21)	1.23 (1.00-1.47)	1.40 (1.13-1.68)	1.58 (1.25-1.89)	1.77 (1.37-2.10)	2.01 (1.52-2.40)	2.20 (1.63-2.63)
60-min	0.578 (0.484-0.704)	0.756 (0.636-0.921)	1.03 (0.858-1.25)	1.24 (1.02-1.49)	1.52 (1.24-1.82)	1.74 (1.40-2.08)	1.96 (1.55-2.34)	2.19 (1.70-2.60)	2.49 (1.89-2.97)	2.72 (2.02-3.25)
2-hr	0.670 (0.570-0.799)	0.866 (0.738-1.04)	1.16 (0.984-1.38)	1.38 (1.16-1.65)	1.69 (1.40-2.00)	1.92 (1.58-2.27)	2.17 (1.75-2.56)	2.41 (1.91-2.84)	2.74 (2.12-3.23)	3.00 (2.27-3.56)
3-hr	0.729 (0.619-0.879)	0.935 (0.796-1.13)	1.23 (1.04-1.48)	1.46 (1.23-1.75)	1.79 (1.48-2.13)	2.05 (1.67-2.43)	2.32 (1.85-2.75)	2.60 (2.05-3.08)	2.99 (2.28-3.55)	3.31 (2.46-3.93)
6-hr	0.876 (0.759-1.03)	1.11 (0.965-1.31)	1.42 (1.23-1.67)	1.67 (1.43-1.96)	2.01 (1.70-2.34)	2.28 (1.90-2.64)	2.56 (2.10-2.96)	2.84 (2.28-3.30)	3.23 (2.53-3.76)	3.54 (2.71-4.13)
12-hr	0.977 (0.855-1.13)	1.23 (1.08-1.43)	1.56 (1.36-1.81)	1.82 (1.58-2.10)	2.17 (1.86-2.50)	2.44 (2.07-2.80)	2.71 (2.27-3.12)	2.99 (2.46-3.44)	3.37 (2.70-3.89)	3.66 (2.89-4.26)
24-hr	1.15 (1.03-1.29)	1.46 (1.32-1.64)	1.89 (1.70-2.12)	2.24 (2.00-2.50)	2.71 (2.41-3.02)	3.08 (2.72-3.43)	3.47 (3.04-3.87)	3.87 (3.37-4.32)	4.43 (3.81-4.94)	4.87 (4.15-5.45)
2-day	1.25 (1.12-1.40)	1.59 (1.43-1.79)	2.09 (1.87-2.34)	2.49 (2.22-2.78)	3.04 (2.70-3.40)	3.48 (3.07-3.89)	3.95 (3.46-4.42)	4.43 (3.86-4.96)	5.11 (4.40-5.74)	5.66 (4.82-6.36)
3-day	1.32 (1.18-1.48)	1.69 (1.51-1.89)	2.22 (1.98-2.48)	2.64 (2.36-2.95)	3.24 (2.88-3.62)	3.72 (3.28-4.15)	4.23 (3.71-4.73)	4.77 (4.14-5.33)	5.53 (4.74-6.18)	6.14 (5.21-6.89)
4-day	1.39 (1.25-1.56)	1.78 (1.59-1.99)	2.34 (2.09-2.62)	2.79 (2.49-3.12)	3.44 (3.05-3.84)	3.96 (3.49-4.42)	4.52 (3.95-5.04)	5.11 (4.43-5.70)	5.94 (5.08-6.63)	6.62 (5.60-7.41)
7-day	1.54 (1.38-1.72)	1.96 (1.76-2.20)	2.59 (2.32-2.90)	3.10 (2.76-3.46)	3.81 (3.38-4.26)	4.39 (3.87-4.89)	5.00 (4.37-5.58)	5.65 (4.90-6.31)	6.56 (5.62-7.34)	7.30 (6.18-8.18)
10-day	1.67 (1.50-1.87)	2.14 (1.92-2.40)	2.82 (2.53-3.15)	3.37 (3.01-3.76)	4.14 (3.67-4.60)	4.75 (4.19-5.28)	5.40 (4.74-6.01)	6.09 (5.29-6.78)	7.05 (6.05-7.85)	7.82 (6.64-8.72)
20-day	2.06 (1.85-2.29)	2.64 (2.37-2.94)	3.49 (3.13-3.88)	4.13 (3.69-4.59)	4.98 (4.44-5.54)	5.64 (5.01-6.27)	6.31 (5.58-7.02)	6.99 (6.14-7.79)	7.91 (6.88-8.82)	8.61 (7.43-9.62)
30-day	2.40 (2.15-2.67)	3.09 (2.77-3.43)	4.06 (3.65-4.51)	4.80 (4.30-5.33)	5.80 (5.17-6.43)	6.57 (5.83-7.27)	7.35 (6.49-8.13)	8.14 (7.15-9.02)	9.21 (8.03-10.2)	10.0 (8.68-11.2)
45-day	2.78 (2.51-3.10)	3.59 (3.23-3.99)	4.72 (4.25-5.24)	5.56 (4.99-6.17)	6.67 (5.96-7.39)	7.50 (6.68-8.31)	8.33 (7.39-9.24)	9.16 (8.09-10.2)	10.3 (8.99-11.4)	11.1 (9.66-12.4)
60-day	3.08 (2.79-3.42)	3.98 (3.59-4.40)	5.23 (4.71-5.78)	6.13 (5.51-6.78)	7.31 (6.56-8.08)	8.18 (7.31-9.05)	9.06 (8.06-10.0)	9.91 (8.78-11.0)	11.0 (9.71-12.2)	11.8 (10.4-13.2)

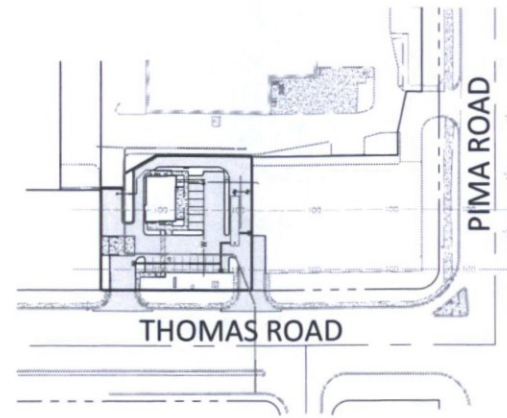
<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration 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.

[Back to Top](#)

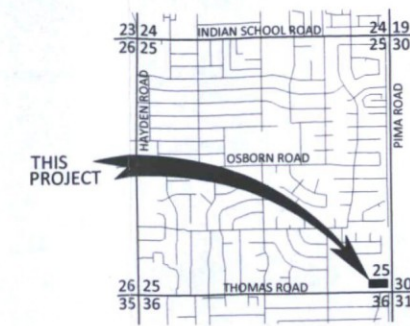
**PF graphical**

# PRELIMINARY IMPROVEMENT PLAN for BLACK ROCK COFFEE

8700 EAST THOMAS ROAD SCOTTSDALE, ARIZONA  
A PORTION SOUTHEAST QUARTER OF SECTION 25, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE  
GILA AND SALT RIVER MERIDIAN MARICOPA COUNTY, ARIZONA



PROJECT OVERVIEW



IN THE SE 1/4 OF THE SE 1/4 OF SECTION 25,  
T. 2 N., R. 4 E., G. & S. R. M.,  
CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA

LOCATION MAP

LEGEND

---	RIGHT-OF-WAY	⊙	NEW SEWER CLEANOUT
---	PROJECT BOUNDARY LINE	⊙	NEW WATER VALVE
---	OTHER PARCEL LINE	W	NEW WATER METER
---	ROADWAY CENTERLINE	BF	NEW BACKFLOW PREVENTER
---	FLOW-LINE	α	NEW FIRE CONNECTION
---	EXISTING EASEMENT	⊙	NEW FIRE BACKFLOW PREVENTER
---	EXISTING CONTOUR	⊙	NEW DRYWELL
---	NEW CONTOUR	+	NEW SIGN
---	EXISTING CONCRETE	⊙	NEW SITE LIGHT
---	EXISTING WALL	⊙	SURVEY MONUMENT AS NOTED
---	NEW ASPHALT	⊙	SPOT ELEV. (EXIST. GRADE)
---	NEW CONCRETE	⊙	SPOT ELEV. (NEW GRADE)
---	NEW WALL	(R)	RIGHT-OF-WAY
---	EXISTING CURB	(M)	RECORDED VALUE
---	NEW CURB	R	MEASURED VALUE
---	NEW PAINT STRIPE	P	RADIUS
---	EXISTING UNDERGROUND ELECTRIC	C	PAVEMENT (ASPHALT)
---	EXISTING SEWER LINE	FG	CONCRETE
---	EXISTING WATER LINE	LP	TOP OF CURB
---	EXISTING GAS LINE	HP	FINISHED GRADE
---	NEW STORM DRAIN PIPE	GB	LOW POINT
---	NEW UNDERGROUND ELECTRIC	FFE	HIGH POINT
---	NEW COMMUNICATION LINE	FFP	GRADE BREAK
---	NEW SEWER LINE	R	FINISHED FLOOR ELEVATION
---	NEW WATER LINE	I	FINISHED PAD ELEVATION
---	NEW FIRE SERVICE	L	RIM
⊙	EXISTING SEWER MANHOLE	S	INVERT
⊙	EXISTING WATER VALVE		LENGTH
W	EXISTING WATER METER		SLOPE
BF	EXISTING BACKFLOW PREVENTER		
α	EXISTING FIRE HYDRANT		
⊙	EXISTING FIRE CONNECTION		
⊙	EXISTING STORM DRAIN MANHOLE		
+	EXISTING SIGN		
⊙	EXISTING SITE LIGHT		
⊙	EXISTING STREET LIGHT		
U	EXISTING UNKNOWN UTILITY		

UTILITIES

WATER: CITY OF SCOTTSDALE  
SEWER: CITY OF SCOTTSDALE  
ELECTRIC: SALT RIVER PROJECT  
GAS: SOUTHWEST GAS  
TELEPHONE: CENTURY LINK  
CABLE: COX COMMUNICATIONS

OWNER

SIMONCRE  
6900 EAST 2ND STREET  
SCOTTSDALE, ARIZONA 85251  
PH: 480-745-1956  
ATTN: DAN BISWAS

CIVIL ENGINEER

CYPRESS CIVIL DEVELOPMENT  
4450 NORTH 12TH STREET, #228  
PHOENIX, ARIZONA 85014  
PH: 623-282-2498  
ATTN: DERICK SCHUMACHER/JEFF HUNT

ARCHITECT

ARCHITECTURE &  
ENGINEERING SOLUTIONS LLC  
4020 NORTH 20TH STREET #308  
PHOENIX, ARIZONA 85016  
PH: 602-241-3335  
ATTN: MARTIN P. FLOOD

SHEET INDEX

- COVER SHEET
- GRADING AND DRAINAGE PLAN
- ONSITE UTILITY PLAN

PROJECT INFORMATION

- PROJECT DESCRIPTION:**  
THE PROJECT CONSISTS OF THE CONSTRUCTION OF A NEW FREE-STANDING DRIVE-THRU RESTAURANT WITH ALL PARKING, GRADING & DRAINAGE AND UTILITY REQUIREMENTS. THE SITE IMPROVEMENTS CONSIST OF THE RECONSTRUCTION OF THE ENTRY DRIVE ONTO THOMAS ROAD, LIMITED RE-PAVING ON THE ONSITE, THE INSTALLATION OF A NEW SCREEN WALL.
- ADDRESS:**  
8700 EAST THOMAS ROAD  
SCOTTSDALE, ARIZONA 85251  
**APN:** 130-39-100
- ZONING:** I-1
- SITE AREA:** 26,134 SF (0.60 AC)

SURVEY NOTES

- THE SURVEY FOR THIS PROJECT WAS PERFORMED BY:  
SUPERIOR SURVEYING SERVICES, INC.  
2122 WEST LONE CACTUS DRIVE, SUITE 11  
PHOENIX, ARIZONA 85027  
PH: 623-869-0223  
CONTACT: DAVID S. KLEIN, R.L.S.
- THE BASIS OF BEARINGS FOR THIS PROJECT IS THE MONUMENT LINE OF PIMA ROAD, ALSO BEING THE EAST LINE OF THE SOUTHEAST QUARTER OF SECTION 25, USING A BEARING OF S 00°04'25" W, PER FINAL PLAT OF SCOTTSDALE SUMMIT, RECORDED IN BOOK 42 OF MAPS, PAGE 10, MARICOPA COUNTY RECORDS.
- THE BASIS OF ELEVATION FOR THIS PROJECT IS THE CITY OF SCOTTSDALE POINT NO. 4254 REBAR IN 4" DEEP POT HOLE (DOWN 0.4') MARKING THE INTERSECTION OF OSBORN ROAD AND 84TH STREET HAVING AN ELEVATION OF 1238.13' (NAVD88).

BENCHMARK

THE BENCHMARK USED FOR THIS PLAN IS THE CITY OF SCOTTSDALE POINT NO. 4254 REBAR IN 4" DEEP POT HOLE (DOWN 0.4') MARKING THE INTERSECTION OF OSBORN ROAD AND 84TH STREET HAVING AN ELEVATION OF 1238.13' (NAVD88).

LEGAL DESCRIPTION

LOT 1B, OF PIMA SELF STORAGE, ACCORDING TO THE PLAT OF RECORD IN THE OFFICE OF THE COUNTY RECORDER OF MARICOPA COUNTY, ARIZONA, RECORDED IN BOOK 1371 OF MAPS, PAGE 43.

PROJECT RETENTION

THE REQUIRED RETENTION VOLUME IS EQUAL TO THE 100-YR, 2-HR DESIGN STORM VOLUME.

RETENTION VOLUME:  
VOLUME [AC-FT] = C x (P [IN] / 12) x AREA [AC]  
PROPOSED CONDITION 100-YR, 2-HR:  
V = 0.95 x (2.17/12) x 26,134 = 4,490 CU.FT.

PROVIDED:  
TOTAL PROVIDED VOLUME = 4,553 CU.FT. VIA 58 LF OF 120" CMP RETENTION TANK.

DRYWELL CALCULATIONS

DRYWELL DISSIPATION RATE = 0.1CFS  
TIME [SEC] = VOLUME [CF] / RATE [CFS]  
t = 4,490 / 0.1 = 44,900 SEC = 12.5 HOURS

DRAINAGE STATEMENT

- SITE IS IN A SPECIAL FLOOD HAZARD AREA - YES
- OFFSITE FLOWS AFFECT THIS SITE - YES, FEMA FLOODPLAIN
- RETENTION PROVIDED IS 100-YR, 2-HR
- EXTREME STORM OUTFALLS THE SITE AT THE SOUTHEAST CORNER AT THE ELEVATION OF 1225.46

FLOODPLAIN INFORMATION

ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP PANEL NUMBER 04013C2235L, DATED OCTOBER 16, 2013 THE PARCEL IS LOCATED IN THE ZONE AE FLOODPLAIN, WHICH IS DEFINED REGULATORY FLOODPLAIN AREAS WITH KNOWN BASE FLOOD ELEVATIONS.



THESE PLANS ARE PRELIMINARY AND ARE NOT FOR CONSTRUCTION OR RECORDING.



4450 north 12th street, #228  
phoenix, arizona 85014  
p: 623.282.2498  
e: jphunt@cypresscivil.com

CYPRESS PROJECT NO: 18.043



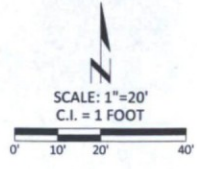
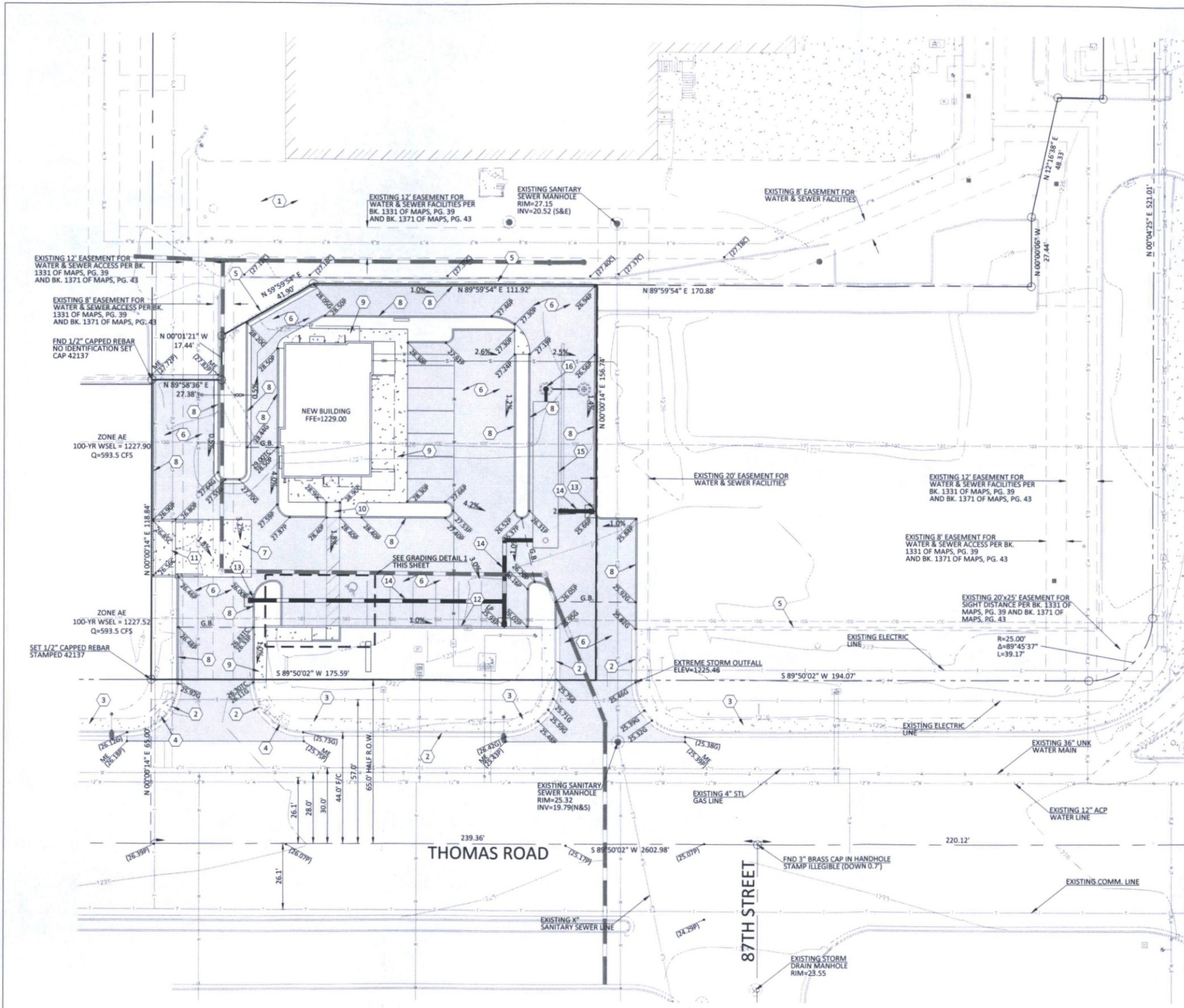
NO.	DATE	REVISION

**PRELIMINARY IMPROVEMENT PLAN for  
BLACK ROCK COFFEE - SCOTTSDALE**  
 8700 EAST THOMAS ROAD SCOTTSDALE, ARIZONA  
 COVER

**OWNER**  
SIMONCRE  
6900 EAST 2ND STREET  
SCOTTSDALE, ARIZONA 85251  
ATTN: DAN BISWAS  
PH: 480-745-1956

**SITE ADDRESS**  
8700 EAST THOMAS ROAD  
CITY, ARIZONA 85251  
APN: 130-39-100

SHEET NUMBER



- KEYNOTES**
- 1 EXISTING ASPHALT TO REMAIN.
  - 2 EXISTING CURB TO REMAIN.
  - 3 EXISTING CONCRETE SIDEWALK TO REMAIN.
  - 4 EXISTING ACCESSIBLE RAMP TO REMAIN.
  - 5 EXISTING MASONRY SCREEN WALL TO REMAIN.
  - 6 NEW ASPHALT PAVEMENT.
  - 7 NEW CONCRETE PAVEMENT.
  - 8 NEW CONCRETE VERTICAL CURB.
  - 9 NEW CONCRETE SIDEWALK.
  - 10 NEW ACCESSIBLE ACCESS RAMP.
  - 11 NEW TRASH ENCLOSURE.
  - 12 NEW MASONRY SCREEN WALL.
  - 13 NEW STORM DRAIN INLET.
  - 14 NEW STORM DRAIN PIPE.
  - 15 NEW 120" DIAMETER CMP UNDERGROUND STORMWATER RETENTION CHAMBER. LENGTH=58 LINEAR FEET VOLUME=4,553 CUBIC FEET
  - 16 NEW DUAL CHAMBER DRYWELL.

**CYPRESS CIVIL DEVELOPMENT**  
 Strength - Sustainability  
 4450 north 12th street, #228  
 phoenix, arizona 85014  
 p: 623.282.2498  
 e: jphunt@cypresscivil.com



NO.	DATE	REVISION

**PRELIMINARY IMPROVEMENT PLAN for  
 BLACK ROCK COFFEE - SCOTTSDALE**  
 8700 EAST THOMAS ROAD SCOTTSDALE, ARIZONA  
 grading and drainage plan

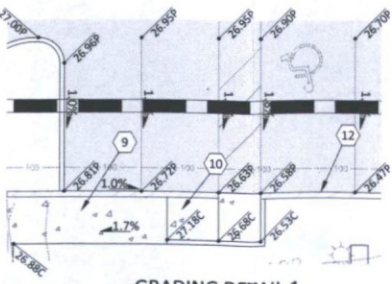
**OWNER**  
 SIMONCRE  
 6900 EAST 2ND STREET  
 SCOTTSDALE, ARIZONA 85251  
 ATTN: DAN BISWAS  
 PH: 480-745-1956

**SITE ADDRESS**  
 8700 EAST THOMAS ROAD  
 CITY, ARIZONA 85251  
 APN: 130-39-100

**SHEET NUMBER**

**PIMA ROAD**  
 S 00°04'25" W 2637.20'  
 (BASIS OF BEARINGS)

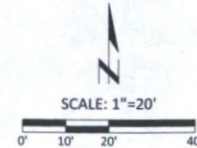
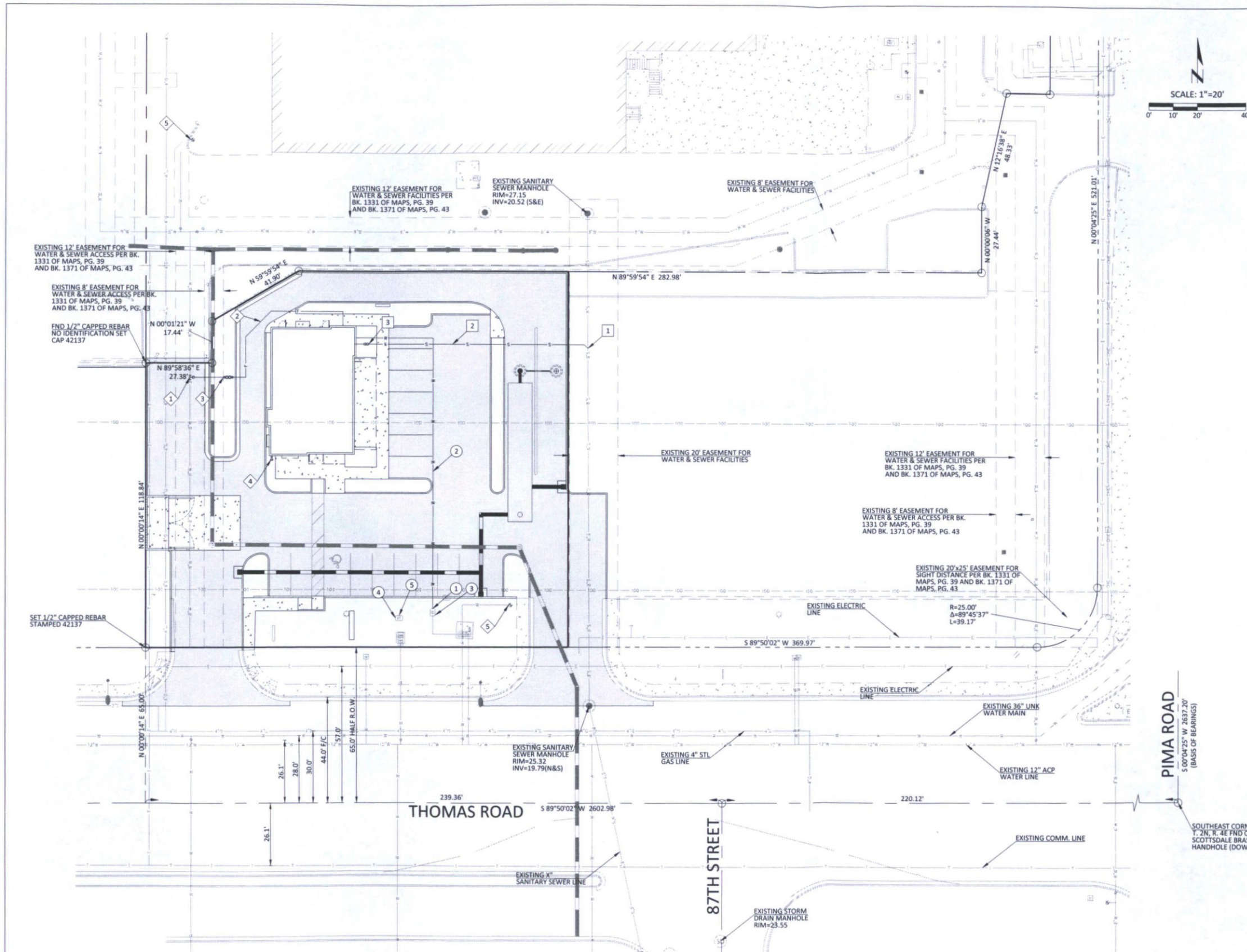
SOUTHEAST CORNER SECTION 25,  
 T. 2N, R. 4E FND CITY OF  
 SCOTTSDALE BRASS CAP IN  
 HANDHOLE (DOWN 0.7')



**GRADING DETAIL 1**  
 1"=10'



THESE PLANS ARE PRELIMINARY AND ARE NOT FOR CONSTRUCTION OR RECORDING.



- PRIVATE WATER KEYNOTES**
- 1 CONNECT TO EXISTING METER AND BACKFLOW PREVENTER FOR DOMESTIC WATER SERVICE.
  - 2 NEW 1-1/2\"/>
- PRIVATE FIRE LINE KEYNOTES**
- 1 CONNECT TO EXISTING 8\"/>
- PRIVATE SEWER KEYNOTES**
- 1 CONNECT TO EXISTING 8\"/>

**CYPRESS CIVIL DEVELOPMENT**  
 Strength - Sustainability  
 4450 north 12th street, #228  
 phoenix, arizona 85014  
 p: 623.282.2498  
 e: jphunt@cypresscivil.com  
 CYPRESS PROJECT NO: 18.043



NO.	DATE	REVISION

**PRELIMINARY IMPROVEMENT PLAN for  
 BLACK ROCK COFFEE - SCOTTSDALE**  
 8700 EAST THOMAS ROAD SCOTTSDALE, ARIZONA  
 onsite utility plan

**OWNER**  
 SIMONCRE  
 6900 EAST 2ND STREET  
 SCOTTSDALE, ARIZONA 85251  
 ATTN: DAN BISWAS  
 PH: 480-745-1956

**SITE ADDRESS**  
 8700 EAST THOMAS ROAD  
 CITY, ARIZONA 85251  
 APN: 130-39-100

**SHEET NUMBER**



THESE PLANS ARE PRELIMINARY AND ARE NOT FOR CONSTRUCTION OR RECORDING.

# WATER & SEWER DESIGN REPORT FOR BLACK ROCK COFFEE - SCOTTSDALE

Scottsdale, Arizona

03 August 2018

## DEVELOPER

SimonCRE  
6900 East 2<sup>nd</sup> Street  
Scottsdale, Arizona 85251

## SITE ADDRESS

8700 East Thomas Road  
Scottsdale, Arizona 85251

PREPARED BY

**CYPRESS**  
CIVIL DEVELOPMENT

strength + sustainability

4450 north 12<sup>th</sup> street, #228

phoenix, arizona 85014

CYPRESS # 18.043



**8-UP-2018**  
**08/16/18**

## **PROJECT DESCRIPTION AND LOCATION**

The Project is known as “Black Rock Coffee - Scottsdale” and is located at 8700 East Thomas in Scottsdale, Arizona (see Appendix A for Location Map). The Project site occupies approximately 0.60 acres and is currently a parking lot supporting a building and use that has recently been re-developed, rendering the parking lot use obsolete. The Project has street frontage and access to Thomas Road, via existing driveway locations. To the west is Pima Park, to the north is a new storage facility, and to the east is vacant land being prepared for future development.

The proposed project consists of the construction of a single story, drive-thru coffee shop with the required paved parking, utility, and drainage improvements.

## **WATER SYSTEM DESIGN**

The Development installed extensive potable water infrastructure as a part of the initial construction. There is an existing 8-inch water main in the access drive to the west of and north of the project and there is an existing fire hydrant located at the southeast corner of the Project, as well as northwest of the project on the adjacent storage site development.

The Project shall install a new 1-1/2-inch service and connect to an existing meter and backflow preventer along the south side of the site for domestic service. The Project shall also connect to a separate existing meter and backflow preventer for landscape irrigation. The existing services connect to the existing 12” ACP water main in Thomas Road. The Project shall also connect a new 6-inch fire line to the existing 8-inch water main running through the west side of the Project within a public utility easement. All water facilities are designed in accordance with Arizona Department of Environmental Quality (ADEQ), the International Plumbing Code, and City of Peoria Water and Wastewater Design Standards and Specifications.

As previously stated, the domestic water distribution shall consist of a 1-1/2-inch meter and backflow preventer and 1-1/2” water distribution line. The table below lists the domestic water demands for the building:

<b>TYPE</b>	<b>QUANTITY</b>	<b>WFSU/FIXTURE</b>	<b>TOTAL WFSU</b>
WATER CLOSET (TANK)	2	5	10
LAVATORY	4	2	8
JANITOR’S SINK	1	4	4
HAND SINK	8	2	16
BEVERAGE FAUCETS	14	1	14
DOUBLE SINK	4	3	12
TRIPLE SINK	1	4	4
		<b>TOTAL</b>	<b>68</b>

The project is designed to have a water supply fixture unit count of 68 which converts to approximately 31.2 GPM. Conservative estimates of the available pressure would ensure that a minimum of 40 PSI is available at the service connection. The project has approximately 150 linear feet of 1-1/2-inch distribution pipe. Per the International Plumbing Code, Table E201.1, the maximum WFSU based on the above parameters and a 1-1/2 inch meter and 1-1/2" distribution line is 151; thus the expected maximum 68 WFSU is acceptable. Further, per City of Scottsdale DPSM Chapter 6, Figure 6-1.4, safe maximum capacity of a 1-1/2 inch meter is 100 GPM; thus the expected 31.2 GPM is acceptable.

The project is designed with a 6-inch fire line to provide the building with automatic fire suppression water. The design of the automatic fire suppression was not complete at the time of this report and will likely be completed as a deferred submittal once a contractor is selected. That said, the 6-inch fire line is able to provide the building with 880 gallons per minute of flow at 10 feet per second velocity in the pipe. This is expected to be adequate fire flow for a 1,887 square foot building.

**WASTEWATER SYSTEM DESIGN**

The Development installed extensive sanitary sewer infrastructure as a part of the initial construction. There is an existing 8-inch sewer main that cuts through the property along the east boundary of the Project.

The Project improvement shall include a single 4-inch sanitary waste line from the proposed building to the existing 8-inch main, located as previously described. The table below summarizes the wastewater fixture units of the building:

TYPE	QUANTITY	DFU/FIXTURE	TOTAL DFU
WATER CLOSET (TANK)	2	4	8
LAVATORY	4	1	4
JANITOR'S SINK	1	3	3
KITCHEN SINK	4	2	8
SERVICE SINK	4	3	12
		<b>TOTAL</b>	<b>35</b>

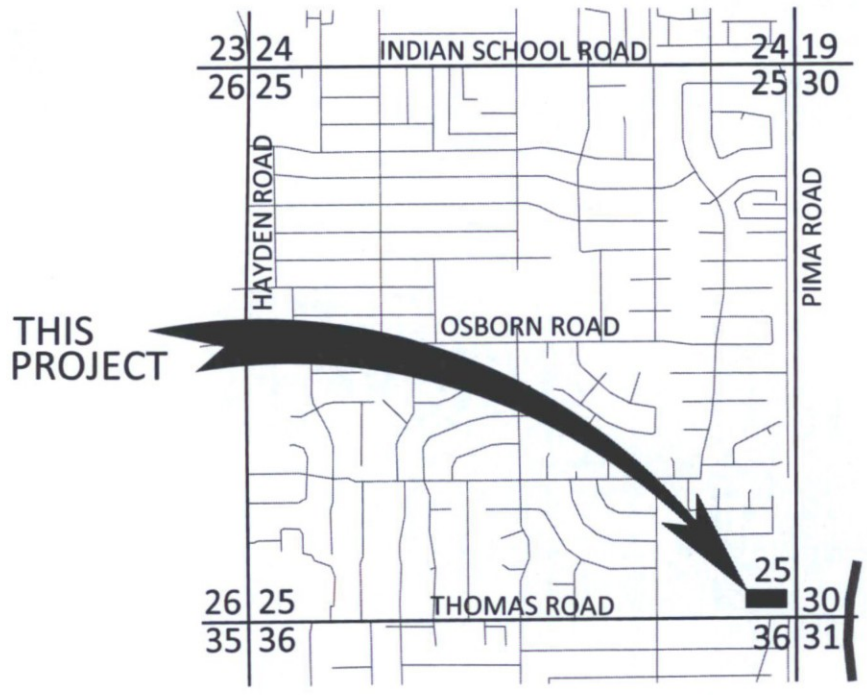
The Project's anticipated drainage fixture unit count is 35 and is designed with a 4-inch sewer line with a minimum slope of 2.0% (1/4" per foot). Per the International Plumbing Code, Table

710.1(1), the maximum DFU based on the above parameters is 216; thus the expected maximum 35 DFU is acceptable.

### **CONCLUSION**

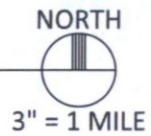
CYPRESS respectfully submits this report as the Water & Wastewater Design Report for the proposed Black Rock Coffee - Scottsdale Project. The proposed water and wastewater systems are designed in accordance with ADEQ, the International Plumbing Code, and City of Cottonwood Standards and Specifications.

**APPENDIX A**  
**(Location Map + Preliminary Improvement Plans + Utility**  
**Plans for Storage Facility)**



IN THE SE 1/4 OF THE SE 1/4 OF SECTION 25,  
 T. 2 N., R. 4 E., G.&S.R.M.,  
 CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA

**LOCATION MAP**



**SCOTTSDALE GENERAL NOTES**

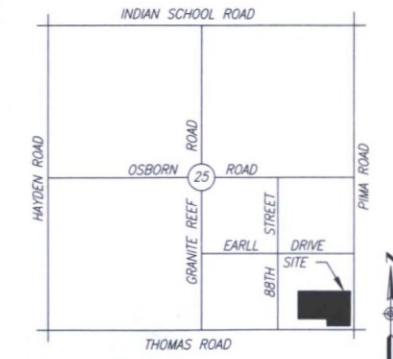
- ALL CONSTRUCTION IN THE PUBLIC RIGHTS-OF-WAY OR IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION AS AMENDED BY THE LATEST VERSION OF THE CITY OF SCOTTSDALE SUPPLEMENTAL STANDARD SPECIFICATIONS AND SUPPLEMENTAL STANDARD DETAILS. IF THERE IS A CONFLICT, THE CITY'S SUPPLEMENTAL STANDARD DETAILS WILL GOVERN.
- THE CITY ONLY APPROVES THE SCOPE, NOT THE DETAIL, OF ENGINEERING DESIGNS; THEREFORE, IF CONSTRUCTION QUANTITIES ARE SHOWN ON THESE PLANS, THEY ARE NOT VERIFIED BY THE CITY.
- THE APPROVAL OF PLANS IS VALID FOR SIX (6) MONTHS. IF AN ENCROACHMENT PERMIT FOR THE CONSTRUCTIONS HAS NOT BEEN ISSUED WITHIN SIX MONTHS, THE PLANS MUST BE RESUBMITTED TO THE CITY FOR REAPPROVAL.
- A PUBLIC WORKS INSPECTOR WILL INSPECT ALL WORKS WITHIN THE CITY OF SCOTTSDALE RIGHTS-OF-WAY AND IN EASEMENTS. NOTIFY INSPECTOR'S SERVICES 24 HOURS PRIOR TO THE BEGINNING CONSTRUCTION BY CALLING 480-312-5750.
- WHENEVER EXCAVATION IS NECESSARY, CALL THE BLUE STAKE CENTER, 602-263-1100, TWO WORKING DAYS BEFORE EXCAVATION BEGINS. THE CENTER WILL SEE THAT THE LOCATION OF THE UNDERGROUND UTILITY LINES IS IDENTIFIED FOR THE PROJECT. CALL "COLLECT" IF NECESSARY.
- ENCROACHMENT PERMITS ARE REQUIRED FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY AND EASEMENTS GRANTED FOR PUBLIC PURPOSES. AN ENCROACHMENT PERMIT WILL BE ISSUED BY THE CITY ONLY AFTER THE REGISTRANT HAS PAID A BASE FEE PLUS A FEE FOR INSPECTION SERVICES. COPIES OF ALL PERMITS MUST BE RETAINED ON-SITE AND BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS WILL RESULT IN IMMEDIATE SUSPENSION OF ALL WORK UNTIL THE PROPER PERMIT DOCUMENTATION IS OBTAINED.
- ALL EXCAVATION AND GRADING IS NOT IN THE PUBLIC RIGHTS-OF-WAY OR NOT IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO CHAPTER 70, EXCAVATION AND GRADING, OF THE LATEST EDITION OF THE UNIFORM BUILDING CODE PREPARED BY THE INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS. A PERMIT FOR THIS GRADING MUST BE SECURED FROM THE CITY FOR A FEE ESTABLISHED BY THE UNIFORM BUILDING CODE.

**HUBBARD ENGINEERING GENERAL NOTES**

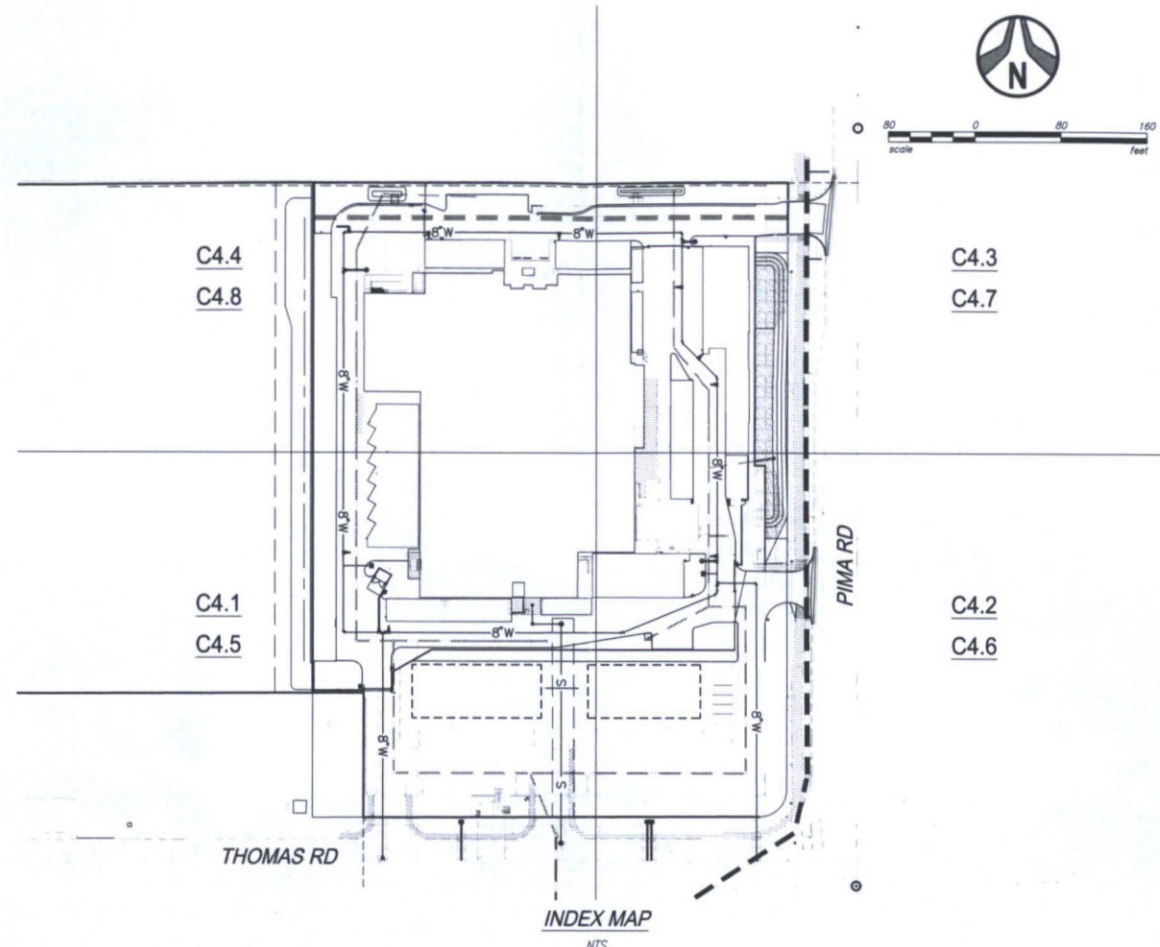
- THE PLANS PREPARED FOR THIS PROJECT PRESENT A DESCRIPTION OF THE WORK TO BE ACCOMPLISHED. THE CONTRACTOR SHALL VISIT THE PROJECT SITE AND DETERMINE, FROM HIS OWN INSPECTION, THE CONDITIONS UNDER WHICH IT IS TO BE PERFORMED. THE CONTRACTOR, BY MAKING HIS BID, REPRESENTS THAT HE HAS VISITED THE SITE AND FAMILIARIZED HIMSELF WITH LOCAL CONDITIONS, THE TYPE OF WORK TO BE PERFORMED, EVALUATED THE DIFFICULTY OF PERFORMING THE REQUIRED TASKS, AND THE LABOR, EQUIPMENT AND MATERIAL THAT ARE REQUIRED TO PROVIDE A COMPLETE PROJECT.
- A THOROUGH ATTEMPT HAS BEEN MADE TO SHOW THE LOCATIONS OF ALL UNDERGROUND OBSTRUCTIONS AND UTILITY LINES IN THE WORK AREA; HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO OBSTRUCTIONS AND UTILITY LINES ENCOUNTERED DURING CONSTRUCTION AND SHALL DETERMINE THE EXACT LOCATION OF SAID UTILITIES IN ADVANCE OF TRENCHING. THE ENGINEER WILL NOT GUARANTEE ANY ELEVATIONS OR LOCATIONS OF EXISTING UNDER-GROUND UTILITIES SHOWN ON THESE PLANS.
- MYLAR PLAN SHEETS FOR AS-BUILTS MAY BE PURCHASED FROM HUBBARD ENGINEERING. THE COST OF THIS ITEM SHALL BE INCLUDED IN THE CONTRACTOR'S BID.
- ALL HANDICAP ACCESS RAMPS, PARKING STALLS, AND DELINEATED WALKWAYS SHALL BE CONSTRUCTED AND MARKED IN ACCORDANCE WITH CURRENT FEDERAL AND/OR LOCAL A.D.A. STANDARDS AND REQUIREMENTS. THE CONTRACTOR SHALL COORDINATE WITH THE LOCAL AUTHORITIES PRIOR TO CONSTRUCTING AND/OR STRIPING TO CONFIRM CURRENT REQUIREMENTS. SLOPES WITHIN THE LIMITS OF HANDICAPPED PARKING SPACES SHALL NOT EXCEED 2% IN ANY DIRECTION.
- ALL SLOPES HIGHER THAN ONE (1) FOOT AND STEEPER THAN 20:1, UNLESS LINED WITH TURF, SHALL BE COMPACTED AND TESTED PER MAG SPECIFICATION 215. WE RECOMMEND RE-COMPACTION PER MAG SPECIFICATION 215 AFTER INSTALLATION OF IRRIGATION LINES, AND WE RECOMMEND STABILIZATION OF DECOMPOSED GRANITE.
- UNLESS SPECIALLY NOTED OTHERWISE, THESE PLANS SHOULD BE USED FOR HORIZONTAL AND VERTICAL LAYOUT OF CIVIL ELEMENTS ONLY. (TYPICALLY WATER, FIRE, SEWER AND STORM DRAIN LINES, VALVES, FIRE HYDRANTS, MANHOLES, CATCH BASINS, HEADWALLS, DRYWELLS, ETC.). FOR ALL OTHER HORIZONTAL LAYOUT (BUILDINGS, CURBS, WALKS, ETC.) SEE ARCHITECT'S PLAN.

# UTILITY IMPROVEMENTS FOR PIMA SELF STORAGE SCOTTSDALE, AZ.

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 24, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA



**VICINITY MAP**  
T2N, R4E, SEC 25  
N.T.S.



**OWNER**  
WENTWORTH PROPERTY COMPANY  
2701 E. CAMELBACK RD. SUITE #185  
PHOENIX, AZ, 85961  
PHONE: (602) 296-0000  
CONTACT: JARED LANGENHUIZEN

**ARCHITECT**  
RKA ARCHITECTS, INC.  
1201 S. ALMA SCHOOL RD.  
PHOENIX, AZ, 85016  
PHONE: (602) 955-3900  
CONTACT: ROBERT KUBICEK

**PARCEL ACREAGE**  
LOT 1  
182,463 SQ. FT. 4.1888 AC +/-  
LOT 2  
74,869 SQ. FT. 1.7188 AC +/-  
TOTAL AREA=257,333 SQ. FT. 5.9075 AC +/-

**REFERENCE DOCUMENTS**  
"SCOTTSDALE SUMMIT" AS RECORDED IN BOOK 452, PAGE 10, M.C.R.  
SPECIAL WARRANTY DEED, AS RECORDED IN DOC. 2015-0356409, M.C.R.

**ESTIMATED PUBLIC QUANTITIES**

WATER	QUANTITY	UNIT
1. 8"x8" CUT-IN TEE, VALVE, BOX & COVER (M.A.G. 391-1 TYPE 'C')	2	EA
2. 6" D.I.P. CLASS 350 (M.A.G. 610)	151.9	LF
3. 8" D.I.P. CLASS 350 (M.A.G. 610)	1,908.0	LF
4. 6" VALVE, BOX & COVER (M.A.G. 391-1 TYPE 'C')	13	EA
5. 8" VALVE, BOX & COVER (M.A.G. 391-1 TYPE 'C')	3	EA
6. 6" WATER LINE BEND	2	EA
7. 8" WATER LINE BEND	9	EA
8. 8"x8" WATER LINE TEE	12	EA
9. 8"x8" WATER LINE TEE	2	EA
10. 1" WATER METER (C.O.S. 2330 & M.A.G. 230)	5	EA
11. SAWCUT, REMOVE AND REPLACE PAVEMENT	130	SY
12. FIRE HYDRANT (M.A.G. 360 & C.O.S. 2366)	4	EA
13. 1" TYPE K COPPER WATER LINE	144	LF

SEWER	QUANTITY	UNIT
1. 48" SANITARY SEWER MANHOLE (M.A.G. 420-1 & 424)	2	EA
2. 8" SDR-35 SEWER LINE (M.A.G. 615 AND 743)	205.8	LF
3. SAWCUT, REMOVE AND REPLACE PAVEMENT	26	SY

**CIVIL ENGINEER**  
HUBBARD ENGINEERING  
1201 S. ALMA SCHOOL RD. SUITE #12000  
MESA, AZ 85204  
PHONE: (480) 892-3313  
CONTACT: SHAWN D. HANRAHAN

**SURVEY**  
HUBBARD ENGINEERING  
1201 S. ALMA SCHOOL RD. SUITE #12000  
MESA, AZ 85210  
PHONE: (480) 892-3313  
FAX: (480) 892-7051  
CONTACT: ADRIAN BURCHAM, PLS

**SHEET INDEX**  
SHT C1.1 COVER SHEET, QTY, & NOTES  
SHT C4.1-C4.4 PUBLIC UTILITY PLAN SHEETS  
SHT C4.5-C4.8 PRIVATE UTILITY PLAN SHEETS  
SHT C4.9 PUBLIC SEWER PLAN AND PROFILE

**UTILITIES**  
WATER & SEWER CITY OF SCOTTSDALE  
ELECTRIC SRP  
TELEPHONE CENTRYLINK  
GAS SOUTHWEST GAS  
CABLE T.V. COX COMMUNICATIONS

LEGEND		
PROPOSED	DESCRIPTION	EXISTING
D	FIRE DEPARTMENT CONNECTION	
---	EASEMENT LINE	---
---	LOT LINE	---
---	UGT UNDERGROUND TELEPHONE LINE	
---	OHE OVERHEAD ELECTRIC LINE	
---	UGE UNDERGROUND ELECTRIC LINE	
F	FIRE LINE	
GAS	NATURAL GAS LINE	
S	SEWER LINE (FLOW DIR SHOWN)	
---	SEWER SERVICE LINE	
---	STORM DRAIN	---
---	WATER MAIN	
---	WATER SERVICE LINE	
---	CONC CURB (AND GUTTER)	
ASPHALT	ASPHALT PAVEMENT	
CONCRETE	CONCRETE PAVEMENT	
CONCRETE	CONCRETE SIDEWALK	
S	SANITARY MANHOLE	
D	STORM DRAIN MANHOLE	
□	CATCH BASIN	
⊕	FIRE HYDRANT	
⊗	WATER VALVE	
⊙	WATER METER	
SPOT	SPOT ELEVATION	
TC=84.35	TC=TOP OF CURB	
G=83.55	G=GUTTER	
	P=PAVEMENT	
	SW=SIDEWALK	
	C=CONCRETE	

**REQUIRED AS-BUILT CERTIFICATION**  
AS-BUILT CONSTRUCTION PLANS FOR POTABLE WATER, SANITARY SEWER AND RECLAIMED WATER (IF APPLICABLE), THE ENGINEER'S CERTIFICATION OF COUNTY ENVIRONMENTAL SERVICES DEPARTMENT HAVE BEEN COMPLETED.

**WATER APPROVAL:**  
REGISTERED CIVIL ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_  
MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPT. \_\_\_\_\_ DATE \_\_\_\_\_

**SEWER APPROVAL:**  
REGISTERED CIVIL ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_  
MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPT. \_\_\_\_\_ DATE \_\_\_\_\_

**ENGINEER'S STATEMENT**  
THE ENGINEER OF RECORD ON THESE PLANS HAS RECEIVED A COPY OF THE APPROVED STIPULATIONS FOR THIS PROJECT AND HAS DESIGNED THESE PLANS IN CONFORMANCE WITH THE APPROVED STIPULATIONS.

**AS-BUILT CERTIFICATION**  
I HEREBY CERTIFY THAT THE "RECORD DRAWING" MEASUREMENTS AS SHOWN HEREON WERE MADE UNDER MY SUPERVISION OR AS NOTED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

REGISTERED CIVIL ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_  
REGISTRATION NUMBER \_\_\_\_\_

**NO CONFLICT SIGNATURE BLOCK**

UTILITY	UTILITY COMPANY	NAME OF COMPANY REP.	PHONE NUMBER	DATE SENT
ELECTRIC	SALT RIVER PROJECT (POWER)	MAIN ADMINISTRATIVE DESK	602-236-8026	12/02/2016
TELEPHONE	COX COMMUNICATIONS	TMC	623-328-4073	12/02/2016
NATURAL GAS	SOUTHWEST GAS	MARCUS WATANABE	480-730-3855	12/02/2016
CABLE TV	CENTURY LINK	ELM LOCATING	623-780-3350	12/02/2016

**ENGINEER'S CERTIFICATION**  
I, \_\_\_\_\_, AS THE ENGINEER OF RECORD FOR THIS DEVELOPMENT, HEREBY CERTIFY THAT ALL UTILITY COMPANIES LISTED ABOVE HAVE BEEN PROVIDED FINAL IMPROVEMENT PLANS FOR REVIEW, AND THAT ALL CONFLICTS IDENTIFIED BY THE UTILITIES HAVE BEEN RESOLVED. IN ADDITION, "NO CONFLICT" FORMS HAVE BEEN OBTAINED FROM EACH UTILITY COMPANY AND ARE INCLUDED IN THIS SUBMITTAL.

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

**FLOOD INSURANCE RATE MAP (FIRM) INFORMATION**

COMMUNITY NUMBER	PANEL NUMBER (PANEL DATE)	SUFFIX	DATE OF FIRM (INDEX DATE)	FIRM ZONE	BASE FLOOD ELEVATION (IN AD ZONE, USE DEPTH)
04013	2235 OCT 16, 2013	L	OCT 16, 2013	AE	

ZONE "AE" IS DEFINED AS "BASE FLOOD ELEVATIONS DETERMINED, 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."

**CITY OF SCOTTSDALE APPROVAL**

DELTA 1 REVISIONS ~ 01/27/2015	
PAVING	TRAFFIC
G & D	PLANNING
W & S	FIRE
RET. WALLS	
ENGINEERING COORDINATION MGR. (OR DESIGNEE)	DATE

1201 S. Alma School Rd.  
Mesa, AZ 85210  
Ph: 480.892.3313  
www.hubbardengineering.com

**HUBBARD ENGINEERING**

**COVER SHEET**  
PIMA SELF STORAGE  
A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25 TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA

Date: 05/15/2017  
Project No: 15138  
Project Mgr: B. HAMMERSLAND  
Project Eng: M. WOLF, P.E.

Professional Engineer  
MICHAEL S. WOLF  
No. 38929  
Exp. 12/31/16  
P.E. No. 15138

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SHT: 01 OF 10  
C1.1

CASE #57-DR-2015 (PLAN CHECK #6995-16-2)

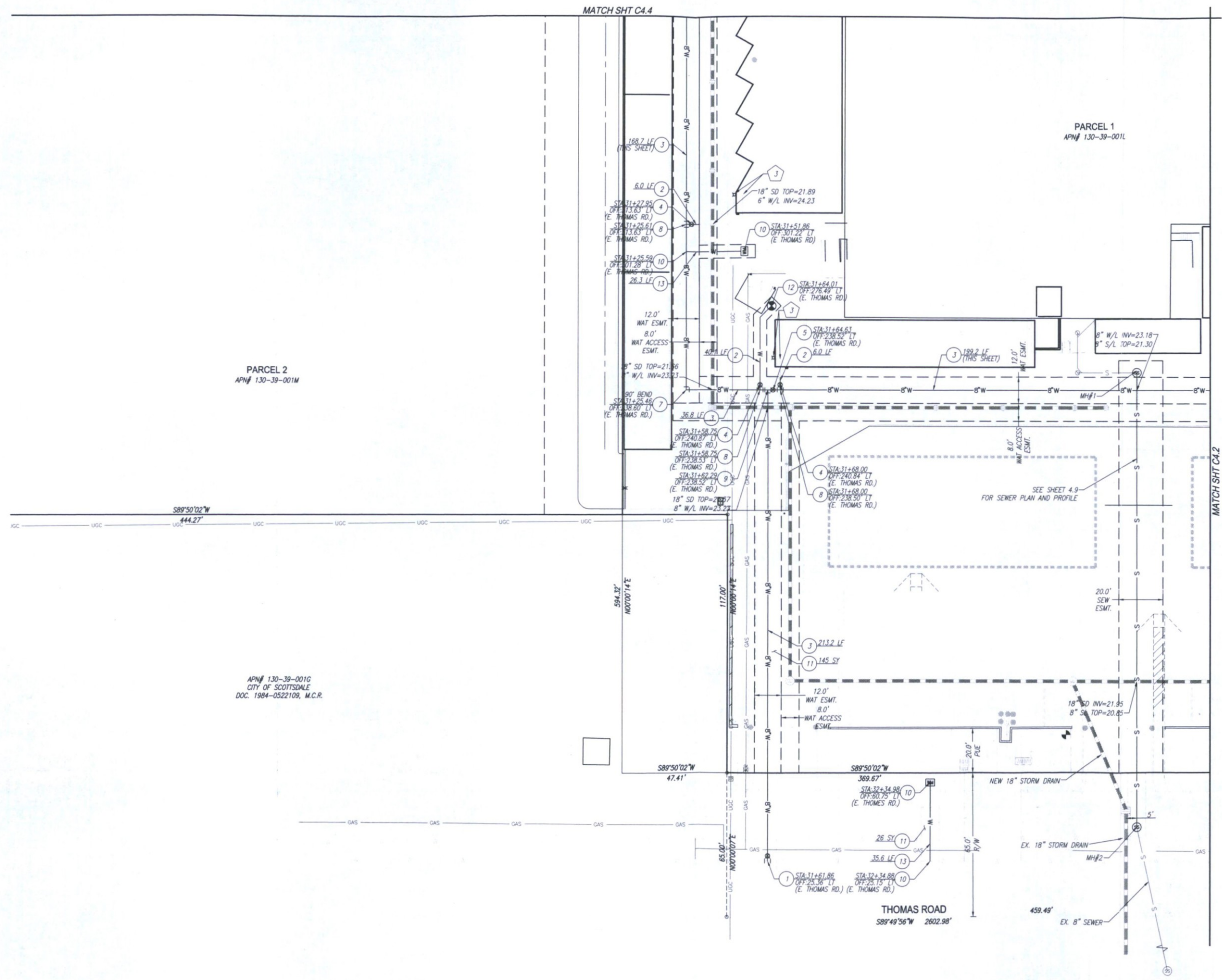
CONSTRUCTION NOTES

PUBLIC WATER NOTES:

- 1 FIELD LOCATE 8" WATERLINE AND INSTALL 8"x8" CUT-IN TEE, VALVE, BOX & COVER PER M.A.G. STD. DTL. 391-1, TYPE "C", D.I.P. CLASS 350 POLY-WRAPPED, JOINT RESTRAINT PER M.A.G. STD. DTL. 303-1 & 303-2.
- 2 INSTALL 6" D.I.P. CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610, MECHANICAL RESTRAINT JOINTS PER M.A.G. STD. DTL. 303-1, 303-2 WITH MIN. 3" COVER, LENGTH AS NOTED.
- 3 INSTALL 8" D.I.P. CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610, MECHANICAL RESTRAINT JOINTS PER M.A.G. STD. DTL. 303-1, 303-2 WITH MIN. 3" COVER, LENGTH AS NOTED.
- 4 INSTALL 6" VALVE, BOX, & COVER PER M.A.G. STD. DTL. 391-1, TYPE "C" D.I.P. CLASS 350 POLY-WRAPPED.
- 5 INSTALL 8" VALVE, BOX, & COVER PER M.A.G. STD. DTL. 391-1, TYPE "C" D.I.P. CLASS 350 POLY-WRAPPED.
- 7 INSTALL 8" WATERLINE BEND, D.I.P. CLASS 350 POLY-WRAPPED WITH MEGALUG SERIES 1100 MECHANICAL RESTRAINT JOINT OR APPROVED EQUAL, ANGLE AS NOTED.
- 8 INSTALL 8"x6" TEE, CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610, MECHANICAL RESTRAINT PER M.A.G. STD. DTL. 303-1 & 303-2.
- 9 INSTALL 8"x8" TEE, CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610, MECHANICAL RESTRAINT PER M.A.G. STD. DTL. 303-1 & 303-2.
- 10 INSTALL 1" WATER METER PER C.O.S. STD. DTL. 2330 WITH BOX PER M.A.G. STD. DTL. 320. ALL METERS TO BE INSTALLED BY C.O.S. AFTER VERIFICATION OF SIZE AND PAYMENT OF ALL FEES.
- 11 SAWCUT AND REMOVE EXISTING ASPHALT, CONCRETE CURB AND GUTTER AS NECESSARY FOR INSTALLATION OF WATER LINE, REPLACE IN LIKE KIND.
- 12 INSTALL FIRE HYDRANT ASSEMBLY PER M.A.G. STD. DTL. 360, WITH CONCRETE COLLAR PER C.O.S. STD. DTL. 2366.
- 13 INSTALL 1" COPPER WATER LINE.

FIRELINE NOTES:

- 3 INSTALL FIRE SPRINKLER RISER AND WALLMOUNT FDC PER COS STD. DTL. 2369.



811  
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602.263.1100

Professional Engineer  
MICHAEL S. WOLF  
Arizona, U.S.A.  
No. 38929

Scale: 1" = 40'

**PUBLIC UTILITY PLAN SHEET  
PIMA SELF STORAGE**

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No. 15138	Date 05/15/2017	Sheet No. SHT: 02 OF 10
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C4.1

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CASE #57-DR-2015 (PLAN CHECK #6995-16-1)


# CONSTRUCTION NOTES

## PUBLIC WATER NOTES:


- 1 FIELD LOCATE 8" WATERLINE AND INSTALL 8"x8" CUT-IN TEE, VALVE, BOX & COVER PER M.A.G. STD. DTL. 391-1, TYPE "C" D.I.P. CLASS 350 POLY-WRAPPED, JOINT RESTRAINT PER M.A.G. STD. DTL. 303-1 & 303-2.
- 3 INSTALL 8" D.I.P. CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610, MECHANICAL RESTRAINT JOINTS PER M.A.G. STD. DTL. 303-1, 303-2 WITH MIN. 3" COVER, LENGTH AS NOTED.
- 4 INSTALL 8" VALVE, BOX, & COVER PER M.A.G. STD. DTL. 391-1, TYPE "C" D.I.P. CLASS 350 POLY-WRAPPED.
- 5 INSTALL 8" VALVE, BOX, & COVER PER M.A.G. STD. DTL. 391-1, TYPE "C" D.I.P. CLASS 350 POLY-WRAPPED.
- 7 INSTALL 8" WATERLINE BEND, D.I.P. CLASS 350 POLY-WRAPPED WITH METALLIC SERIES 1100 MECHANICAL RESTRAINT JOINT OR APPROVED EQUAL ANGLE AS NOTED.
- 8 INSTALL 8"x6" TEE, CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610, MECHANICAL RESTRAINT PER M.A.G. STD. DTL. 303-1 & 303-2.
- 10 INSTALL 1" WATER METER PER C.O.S. STD. DTL. 2330 WITH BOX PER M.A.G. STD. DTL. 320, ALL METERS TO BE INSTALLED BY C.O.S. AFTER VERIFICATION OF SIZE AND PAYMENT OF ALL FEES.
- 11 SAWCUT AND REMOVE EXISTING ASPHALT, CONCRETE CURB AND GUTTER AS NECESSARY FOR INSTALLATION OF WATER LINE. REPLACE IN LIKE KIND.
- 12 INSTALL FIRE HYDRANT ASSEMBLY PER M.A.G. STD. DTL. 360, WITH CONCRETE COLLAR PER C.O.S. STD. DTL. 2366.
- 13 INSTALL 1" COPPER WATER LINE.
- 15 INSTALL 1" LANDSCAPE WATER METER PER C.O.S. STD. DTL. 2330 WITH BOX PER M.A.G. STD. DTL. 320, ALL METERS TO BE INSTALLED BY C.O.S. AFTER VERIFICATION OF SIZE AND PAYMENT OF ALL FEES.

## FIRELINE NOTES:

- 3 INSTALL FIRE SPRINKLER RISER AND WALLMOUNT FDC PER C.O.S. STD. DTL. 2369.



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38929  
MICHAEL S. WOLF  
Professional Engineer  
Arizona State License #10171

### GRADING PLAN SHEET PIMA SELF STORAGE

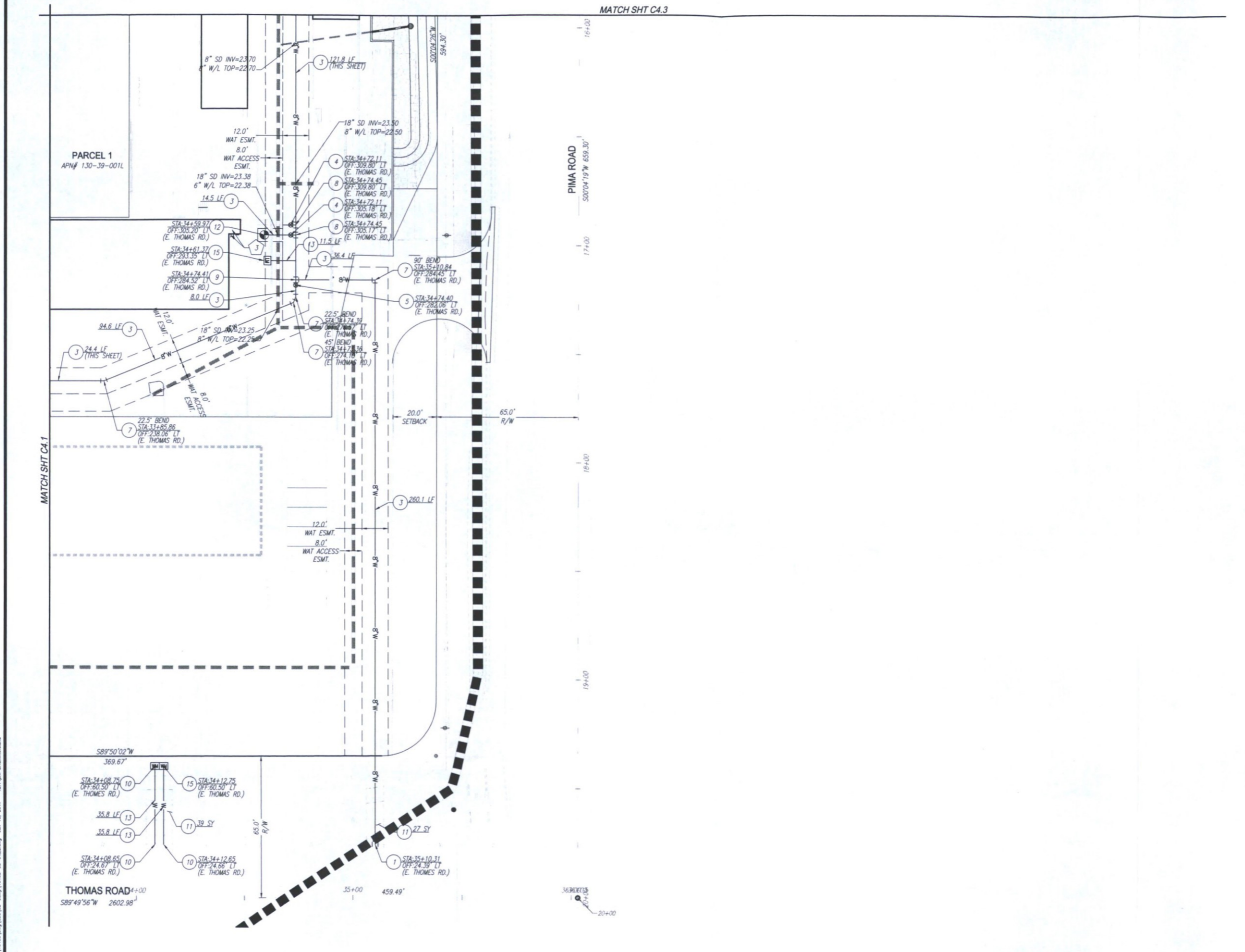
A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No. 15138	Date 05/15/2017	Sheet No. SHT: 03 OF 10
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C4.2



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CASE #57-DR-2015 (PLAN CHECK #6995-16-1)





CONSTRUCTION NOTES

PRIVATE WATER NOTES:

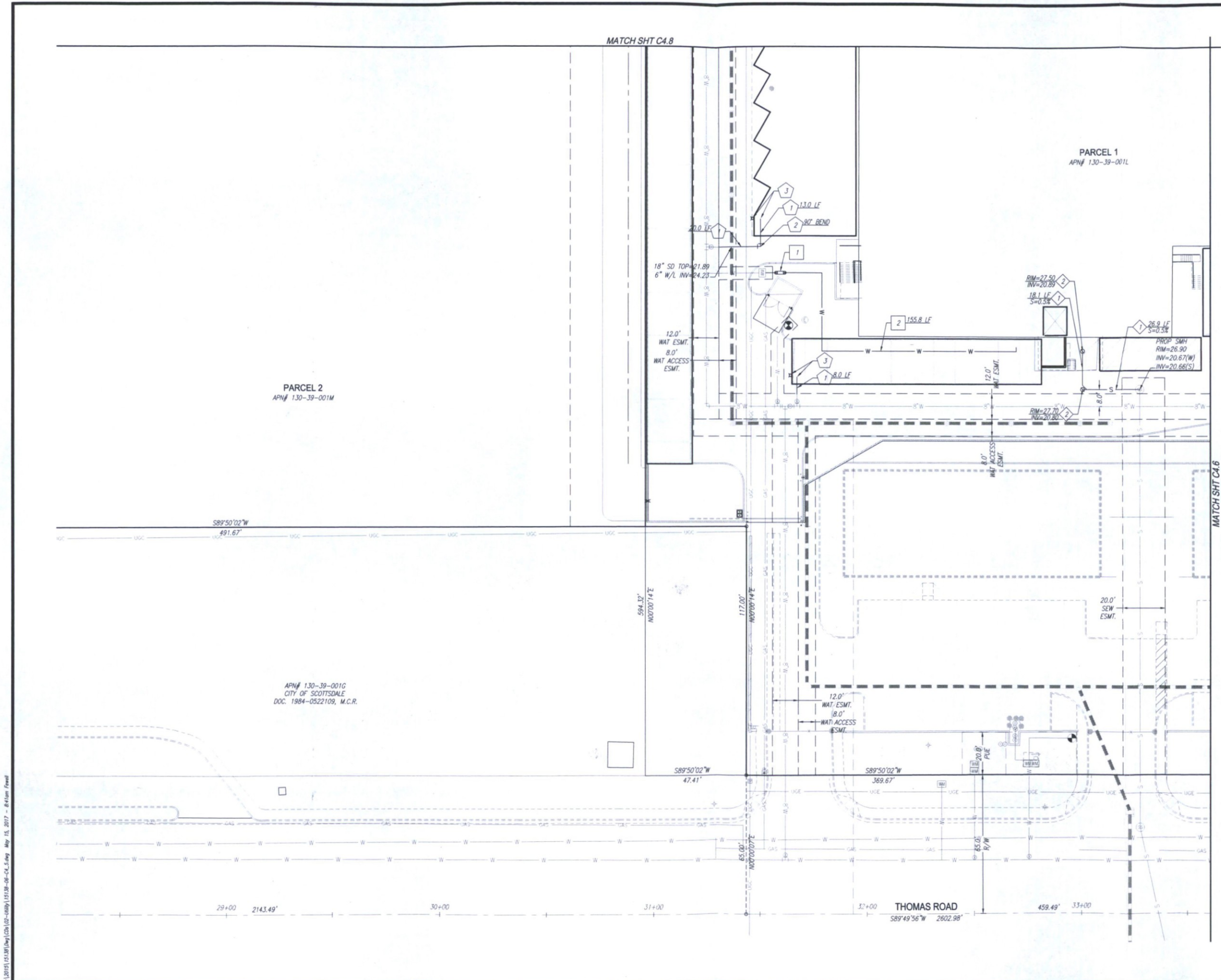
- 1 INSTALL 1" BACKFLOW PREVENTION ASSEMBLY PER C.O.S. STD. D.T. 2352.
- 2 INSTALL 1" C-900 WATER SERVICE. LENGTH AS NOTED.

FIRELINE NOTES:

- 1 INSTALL 6" D.I.P. CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610. MECHANICAL RESTRAINT JOINTS PER M.A.G. STD. D.T. 303-1, 303-2 WITH MIN. 3" COVER. LENGTH AS NOTED.
- 2 INSTALL WATERLINE BEND, D.I.P. CLASS 350 POLY-WRAPPED WITH MEGALUG SERIES T100 MECHANICAL RESTRAINT JOINT OR APPROVED EQUAL. SIZE AND ANGLE AS NOTED.
- 3 INSTALL FIRE SPRINKLER RISER AND WALLMOUNT FDC PER COS STD. D.T. 2369.

PRIVATE SANITARY SEWER NOTES:

- 1 INSTALL 8" SDR 35 SANITARY SEWER PIPE PER M.A.G. STD. SPEC. 615 AND 743. LENGTH AND SLOPE AS NOTED.
- 2 INSTALL 8" SEWER CLEANOUT PER MAG STD DTL 441.
- 3 CONNECT TO EXISTING 8" SEWER SERVICE. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING 8" SERVICE. INVERT AT NOTED.



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PRIVATE UTILITY PLAN SHEET  
PIMA SELF STORAGE

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

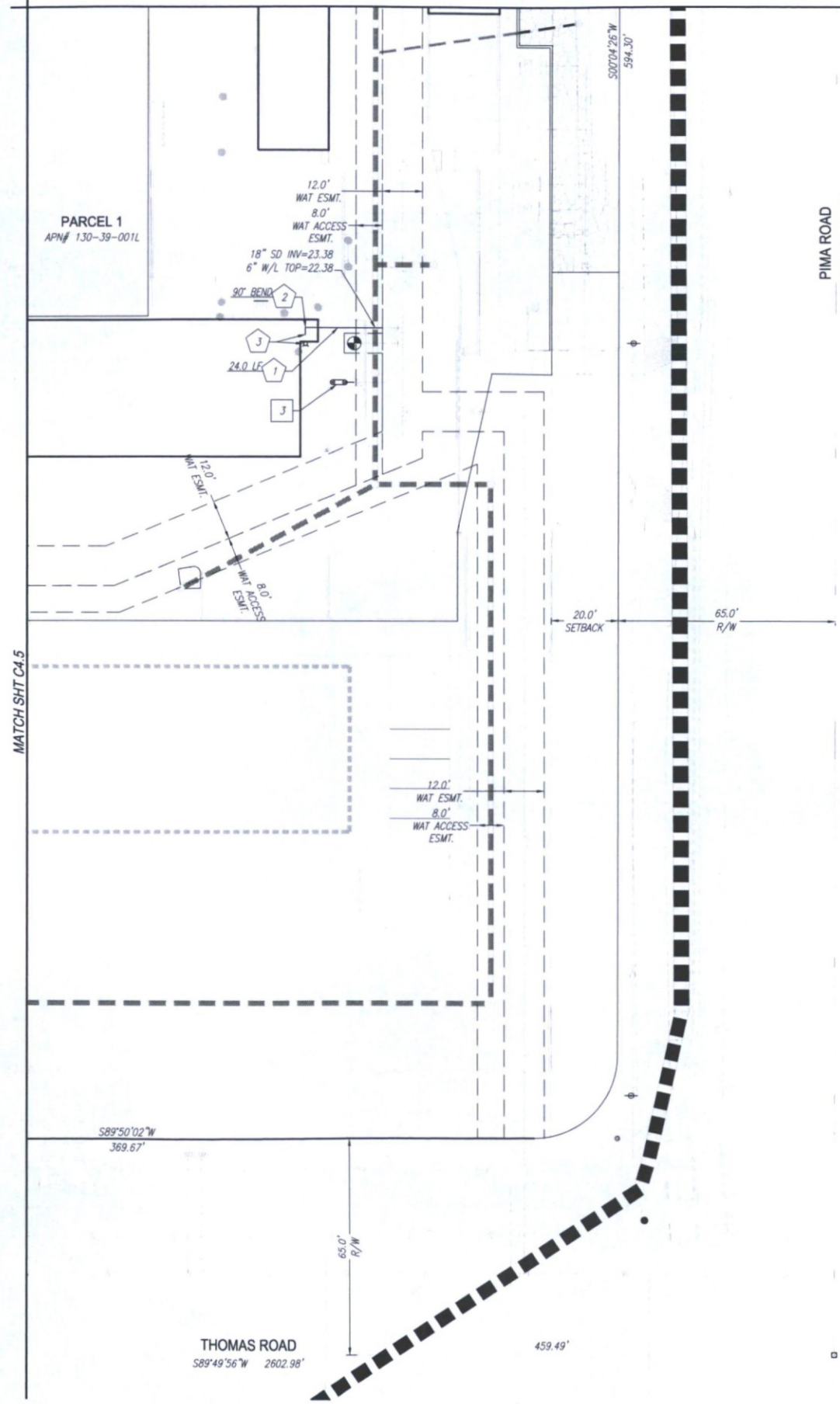
Project No. 15138	Date 05/15/2017	Sheet No. SHT: 06 OF 10
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C4.5

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CASE #57-DR-2015 (PLAN CHECK #6995-16-1)

MATCH SHT C4.7



PIMA ROAD  
500704'19" W 659.30'

PARCEL 1  
APN# 130-39-001L

MATCH SHT C4.5

S89°50'02" W  
369.67'

THOMAS ROAD  
S89°49'56" W 2602.98'

459.49'

12.0'  
WAT ESMT.  
8.0'  
WAT ACCESS  
ESMT.

20.0'  
SETBACK

65.0'  
R/W

### CONSTRUCTION NOTES

#### PRIVATE WATER NOTES:

- 3 INSTALL 1" BACKFLOW PREVENTION ASSEMBLY PER C.O.S. STD. DTL. 2352. REFER TO LANDSCAPE PLANS FOR CONTINUATION.

#### FIRELINE NOTES:

- 1 INSTALL 6" D.I.P. CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610. MECHANICAL RESTRAINT JOINTS PER M.A.G. STD. DTL. 303-1, 303-2 WITH MIN. 3" COVER. LENGTH AS NOTED.
- 2 INSTALL WATERLINE BEND, D.I.P. CLASS 350 POLY-WRAPPED WITH MEGALUG SERIES 1100 MECHANICAL RESTRAINT JOINT OR APPROVED EQUAL. SIZE AND ANGLE AS NOTED.
- 3 INSTALL FIRE SPRINKLER RISER AND WALLMOUNT FDC PER COS STD. DTL. 2369.



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Scale: 0 20 40 feet

### PRIVATE UTILITY PLAN SHEET PIMA SELF STORAGE

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No. 15138	Date 05/15/2017	Sheet No. SHT: 07 OF 10
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Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C4.6
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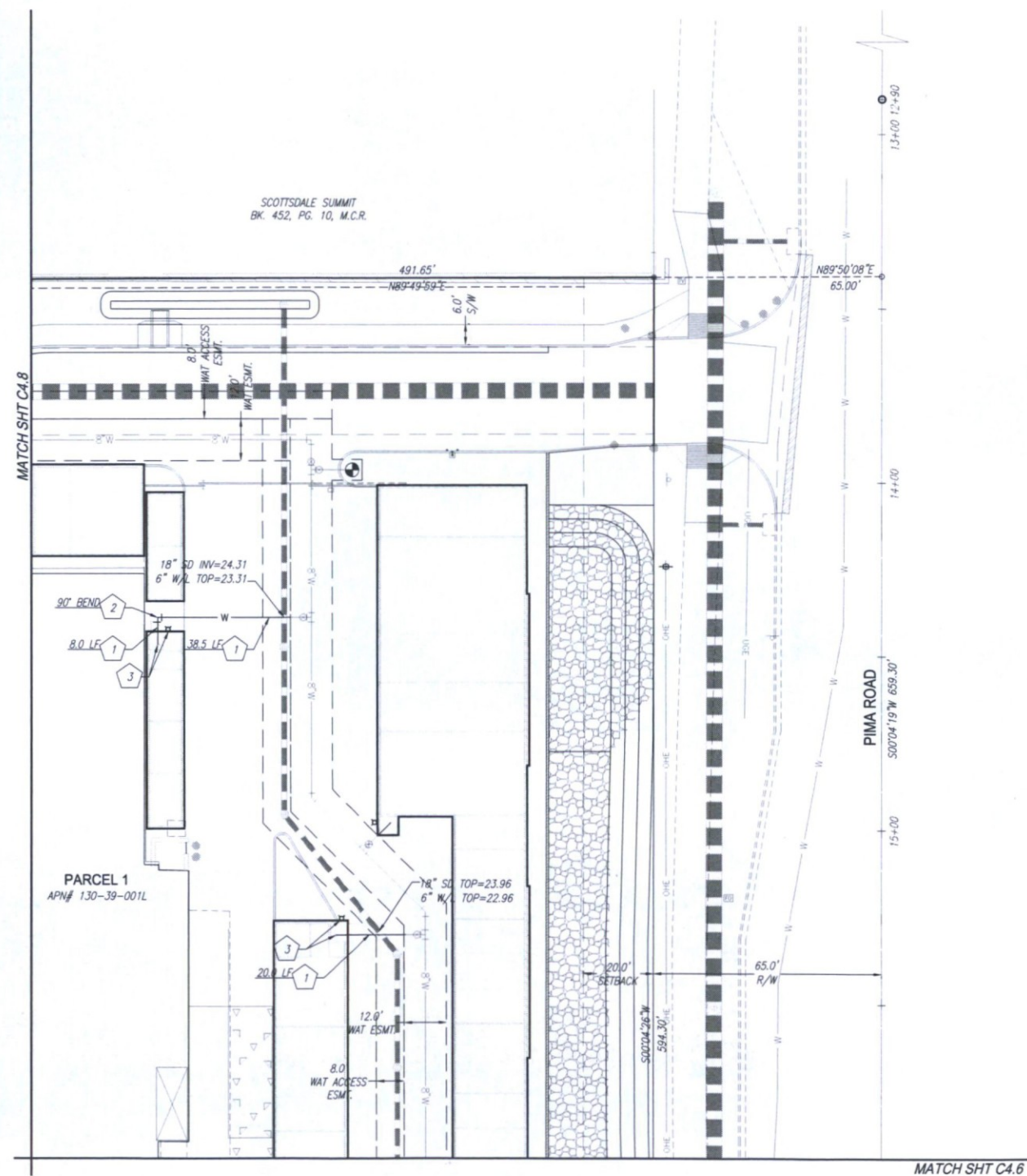
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Ph: 480.952.3313

CASE #57-DR-2015 (PLAN CHECK #6995-16-1)

CONSTRUCTION NOTES

FIRELINE NOTES:

- 1 INSTALL 6" D.I.P. CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610 MECHANICAL RESTRAINT JOINTS PER M.A.G. STD. DTL. 303-1, 303-2 WITH MIN. 3" COVER. LENGTH AS NOTED.
- 2 INSTALL WATERLINE BEND, D.I.P. CLASS 350 POLY-WRAPPED WITH MEGALUG SERIES 1100 MECHANICAL RESTRAINT JOINT OR APPROVED EQUAL. SIZE AND ANGLE AS NOTED.
- 3 INSTALL FIRE SPRINKLER RISER AND WALLMOUNT FDC PER COS STD. DTL. 2369.



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602.263.1100

38925  
MICHAEL S. WOLF  
Professional Engineer  
Arizona

**PRIVATE UTILITY PLAN SHEET**  
**PIMA SELF STORAGE**

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No. 15138	Date 05/15/2017	Sheet No. SHT: 08 OF 10
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C4.7

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P:\2015\15138\Draw\15138-08-C4.7.dwg May 15, 2017 - 8:42am Fennel

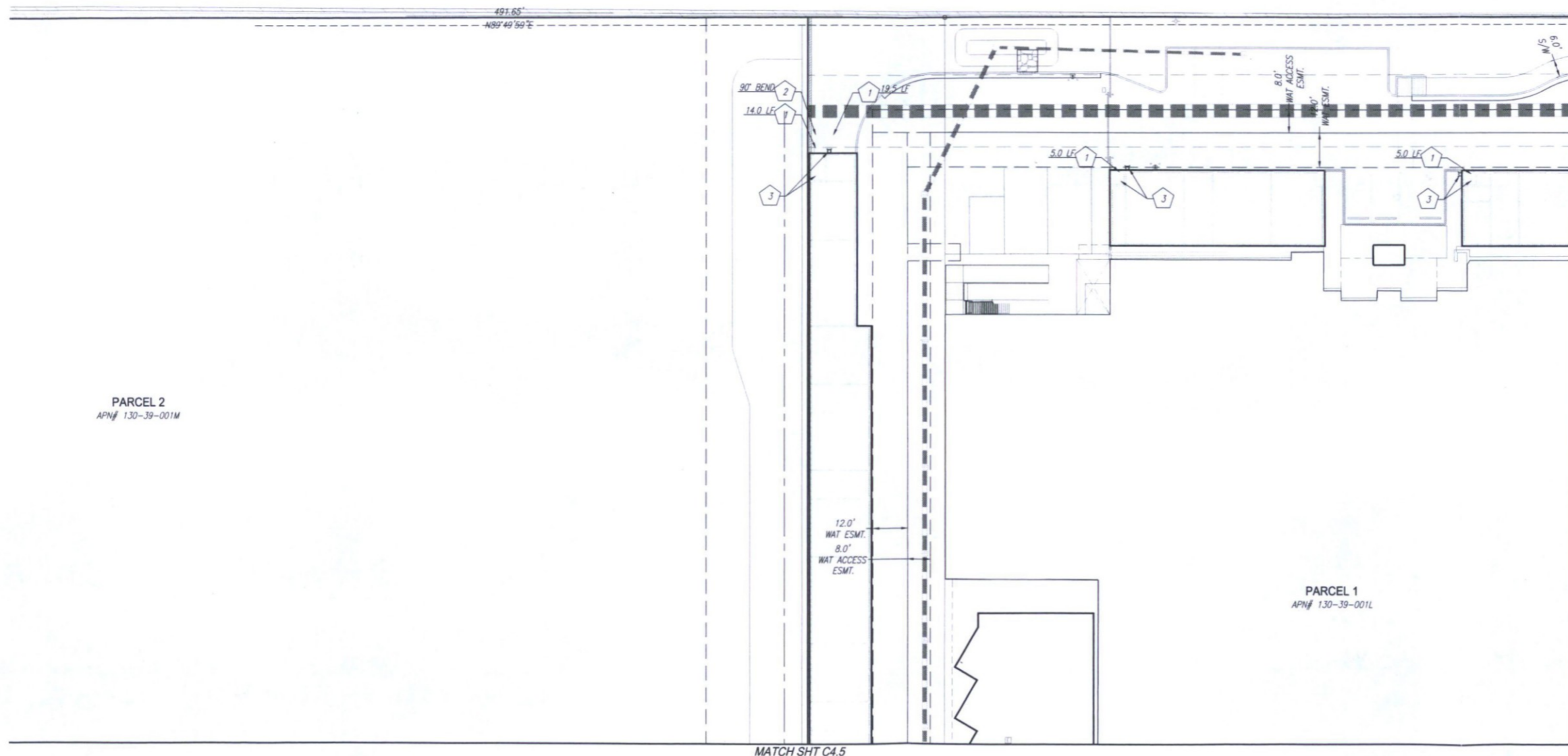
CASE #57-DR-2015 (PLAN CHECK #6995-16-1)

CONSTRUCTION NOTES

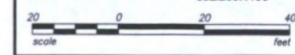
FIRELINE NOTES:

- 1 INSTALL 6" D.I.P. CLASS 350 POLY-WRAPPED PER M.A.G. STD. SPEC. 610 MECHANICAL RESTRAINT JOINTS PER M.A.G. STD. DTL. 303-1, 303-2 WITH MIN. 3" COVER. LENGTH AS NOTED.
- 2 INSTALL WATERLINE BEND, D.I.P. CLASS 350 POLY-WRAPPED WITH MEGALUG SERIES 1100 MECHANICAL RESTRAINT JOINT OR APPROVED EQUAL. SIZE AND ANGLE AS NOTED.
- 3 INSTALL FIRE SPRINKLER RISER AND WALLMOUNT FDC PER COS STD. DTL. 2369.

SCOTTSDALE SUMMIT  
BK. 452, PG. 10, M.C.R.



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PIMA SELF STORAGE

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 25  
TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER  
MERIDIAN, MARICOPA COUNTY, ARIZONA

Project No. 15138	Date 05/15/2017	Sheet No. SHT: 09 OF 10
Project Manager B. HAMMERSLAND	Project Engineer M. WOLF, P.E.	C4.8

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CASE #57-DR-2015 (PLAN CHECK #6995-16-1)

