Drainage Reports

Abbreveated Water & Sewer Need Reports

Water Study

Wastewater Study

Stormwater Waiver Application

WATER BASIS OF DESIGN REPORT
FOR
PEACOCK

Accepted For:
City of Scottsdale
Water Resources Department
9379 E. San Salvador
Scottsdale, Arizona

By: _____
Date: 7/3/2017

PREPARED FOR

DECO ACQUISITIONS, LLC
8135 E. INDIAN BEND ROAD, SUITE 101
SCOTTSDALE, AZ 85250

PREPARED BY

Vicente Ruiz, P.E.
DAVID EVANS & ASSOCIATES, INC.
4600 E WASHINGTON STREET, SUITE 250
PHOENIX, AZ 85034
(602) 678-5151

JUNE 2017

DEA PROJECT NO. DECO0001

Registered Professional Engineer (CM)
CERTIFICATE NO.
54749
VICENTE
RUIZ
DATE SIGNED 6/13/17
ARIZONA U.S.A.

Exp 6/30/19

DAVID EVANS AND ASSOCIATES INC.

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FOR
PEACOCK

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Exp 6/30/19

A. INTRODUCTION

This basis of design report was completed under a contract with DECO Acquisitions LLC, owner and developer of Peacock, (formerly Safari Phase II). The project will consist of 2 multistory story apartment buildings with 160 units. The water infrastructure that will support this project was built in 2006 as part of the Safari Phase I development. The site is also a part of the development agreement with the adjacent Bluesky Project.

1. Project Location

The Peacock Scottsdale project is located within the northwest quarter of Section 23 of Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian within City of Scottsdale, AZ. The site is approximately 2.08 acres and irregularly shaped. It is generally bound by 72nd Place to the west, existing Safari Drive Phase 1 condominium units to the south, 72nd Way to the east, and Coolidge Street to the north. The area's street system in relationship to the location of the site is illustrated in Appendix A, the project's vicinity map.

2. Site Zoning

The zoning of the Peacock site is discussed in Section C.1 of this report.

3. General Plan

The peacock project will provide strong support for the goals and policies of the City's General Plan. It will be consistent with the Downtown Plan and reflect its vision, goals, and policies. It will support the City's efforts to "boldly look to its metropolitan future" through the development of an urban oasis that brings to life the City's vision for:

- Mixed-use urban neighborhoods
- World class planning, architecture, and design
- Sustainability
- Connectivity and walkability
- Economic vitality, and
- Worldwide recognition as the premier destination in the United States

B. DESIGN DOCUMENTATION

1. Design Procedures

The analysis of the proposed water system was done in compliance with the City of Scottsdale Design Standards & Policies Manual.

The proposed water distribution system will serve the project in accordance with City of Scottsdale design standards and the ADEQ Engineering Bulletin 10.

The estimated Average Day Demand of the Blue Sky Scottsdale project was determined based on the following Average Day Demand values. All of the values below include both inside use and outside use demands.

- Residential Units = 185.3 gallons per unit per day
- Pool = 200 gallons per day (PF = 1)

The Maximum Day Demand was calculated using a factor of 2.0 times the Average Day Demand. The Peak Hour Demand was determined by multiplying the Average Day Demand by 3.5.

2. Software

Water demands were determined using a Microsoft Excel spreadsheet. DEA created a WaterCAD™ model of the proposed water system. WaterCAD is a water distribution system modeling software created by Haestad Methods. To run WaterCAD, a user inputs the water system map, waterline sizes, and demand locations. WaterCAD connects these elements as a system and uses mathematical equations to determine flow directions, flow magnitudes and pressures for the water system modeled.

C. EXISTING CONDITIONS

1. Zoning and Land Use

The site falls under the Downtown Regional Multiple Use Type 2 Land Use designation. The site is currently zoned Downtown Regional Commercial Office, Type 2, Planned Block Development Downtown Overlay (D/RCO-2 PBD DO) with amended development standards.

2. Existing Topography, Vegetation, and Landform Features

Generally, the existing topography slopes in a southeasterly direction at approximately 0.40%, with approximately 1 feet of fall across the property. The site in its existing condition is generally an unimproved dirt lot. The site shares the boundary with existing Safari Drive condominiums Phase 1 located to the south and east of the site. The future Bluesky parcel is located to the west

across 72nd Place. The entrance road also provides access to a commercial development located to the north of the site.

3. Existing Utilities

There is existing water infrastructure located within the adjacent streets as illustrated on the City of Scottsdale Quarter Section map provided in the Appendix. This infrastructure includes an existing 6-inch ACP and an existing 16-inch DIP waterline within Scottsdale Road. There is also an existing 8-inch DIP waterline within Coolidge Street. An 8-inch waterline is located within the northern portion of 72nd Place and connects to the waterline in Coolidge Street. The fire hydrant at the end of this line will be relocated at the end of 72nd Place and another existing hydrant is relocated at the NE of north building as shown on the Concept Water and Sewer Plan. Existing 6 inch stubs for fire are provided along Coolidge, as well as a 4 inch water line.

4. Existing Master Plans or Design Reports

A *Water Basis of Design Report for Safari Drive* was prepared by DEA in 2006 for the Safari Drive condominiums. Phase 1 of Safari Drive has been constructed.

5. Certified Flow Testing

A fire flow test was performed for this project on fire hydrants adjacent to the project site. The results and location of the test are provided in Appendix B.

D. PROPOSED CONDITIONS

1. Site Plan

Exhibit 2 Concept Water and Sewer Plan illustrates the proposed site improvements.

2. Proposed Connections

Exhibit 2 illustrates the proposed connections to the existing system. An existing 4-inch domestic line connected to the existing 8-inch line within Coolidge Street was provided, however, only a 2 inch line would be required based on peak demand. A public hydrant will be relocated closer to the southern residential building. An additional hydrant will be added at the northwest corner of the site, and an existing hydrant at the northeast corner will be adjusted to avoid the new sidewalk ramp, Additionally, two 6-inch fire lines, with a valve on main between, will connect to the existing 8-inch main within Coolidge Street. A booster pump will be provided in the south building to supply pressure to upper floors.

Private water service lines will be installed under landscaping. Backflow prevention assemblies will be installed on private waterlines.

3. Water Zone, Fire Flow, and System Pressures

The Peacock development lies within the City of Scottsdale Water Zone 1-A per the *2008 Integrated Water Master Plan* prepared by Carollo. This zone serves areas with ground elevations from 1250 feet to 1330 feet. The finished floor (FF) elevation of the first levels of the North and East buildings is 1280.8'. The FF elevation of the first level of the Main building is 1280.5'.

The static pressure within the 8-inch waterline in Coolidge is approximately 100 psi based on the flow test performed by FPES. The buildings will incorporate private booster pumps to supply water to the upper floors and will be designed to maintain a minimum residual pressure of 50 psi at the highest finished floor level under normal operating conditions. The building system will maintain a minimum pressure of 20 psi under fire flow conditions.

All buildings on site will be fully sprinkled and will be of construction Type IA based on the *International Building Code*. The garage will be fully sprinkled and will be of Type IB construction.

The *Design Standards and Policies Manual* dictates that the minimum fire flow for high rise structures is 2,500 gpm. Per the *2012 International Fire Code*, the fire flow calculation area of buildings constructed of Type IA or IB construction shall be the greater of the area of the three largest successive floors of the building or the largest floor area of the garage. Additionally, up to a 50% reduction may be taken when the building is supplied with an approved automatic sprinkler system. Based on this information and the table provided in Appendix C, the fire flow for the Peacock development will be 2,500 gpm with a residual pressure of 30 psi.

E. COMPUTATIONS

1. Computer Calculations

A hard copy of the demand calculations and the WaterCAD output for this report has been provided in Appendices D and E.

2. Demand Summary

Table E.2.1 summarizes the water demands for the Peacock project. A detailed demand table that breaks down the values listed below is provided in Appendix D.

TABLE E.2.1 – WATER DEMAND SUMMARY

Phase	Average Day (gpm)	Max Day (gpm)	Peak Hour (gpm)
Peacock (Safari Ph II)	20.7	41.3	72.2

3. Water Modeling Results

Average Day, Max Day, Max Day + FF, and Peak Hour demand scenarios were analyzed for Peacock. The water demand for the Safari Phase II development was modeled at the same location (J-9) that it was originally modeled in the *Water Basis of Design Report for Safari Drive*. This location conforms to the location of the single water service that was proposed for the Safari Phase II project.

The WaterCAD output for the most conservative scenarios (Max Day + FF and Peak Hour) for the proposed water system modeled can be found in Appendix E. This output includes system pressures, pipe velocities, demands, and headloss information for each of the two phases modeled.

All pressures in the model are at street level. The lowest pressure available in the system during the Peak Hour Scenario is 100 psi. Based on the City's criteria requiring 50 psi at the buildings' highest levels, any building requiring water above two stories will require a private booster pump system.

The following table summarizes the expected pressures during the Phase 1 scenario. The pressures range from 47 psi to 100 psi for all scenarios.

TABLE E.3.1 – PHASE 1 PRESSURE SUMMARY

Model Scenario		Min	Max	Ave
Average Day	Pressure (psi)	100	100	100
	Node	Multiple, See Output	Multiple, See Output	-
Max Day	Pressure (psi)	100	100	100
	Node	Multiple, See Output	Multiple, See Output	-
Peak Hour	Pressure (psi)	100	100	100
	Node	Multiple, See Output	Multiple, See Output	-

All nodes pass the Max Day + Fire Flow scenario with all pressures greater than or equal to 30 psi.

All non-fire flow headlosses are less than 10 ft/1000ft. Detailed modeling output has been provided in Appendix E. Based on the modeling results, the existing infrastructure and proposed water line improvements can support the project.

F. SUMMARY

The proposed Peacock water distribution system is illustrated on Exhibit 2. New water services, a new fire line, and a new hydrant will be installed as part of this project. Two existing fire hydrants will be relocated, as well.

The proposed water improvements meet all City of Scottsdale pressure, velocity, and headloss requirements. It is recommended that the Peacock water distribution system improvements be designed as dictated in this report.

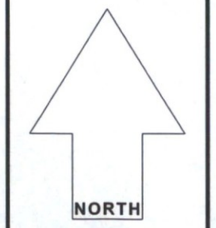
APPENDIX A
CITY OF SCOTTSDALE WATER QUARTER SECTION MAP

ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND. WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS 'CALCULATED' ON THE MAP.

LEGEND:

- Air Release Valve
- Non-potable Air Release Valve
- Blowoff
- Cap
- Cathodic Protection
- Fill Drain
- Fire Hydrant
- Non-GPS Point
- Pressure Reducing Valve
- Pump
- Reducer
- Sample Station
- Water Manhole
- Non-Potable Manhole
- Well
- Valve
- Non-potable Valve
- Vault
- Water Main
- Non-Potable Main
- Fire / Private Main
- Non-Scottsdale Main
- Not found per improvement plans (4)
- Not found per improvement plans and/or G.S. maps (5)
- Found in field no reference (6)
- Map Error Point (7)

VICINITY MAP



NORTH

SCALE: 1" = 100'

0 50 100 200

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

WATER

QUARTER SECTION MAP

18-45

NW 1/4 SEC. 23 T2N R4E

18-44

18-46

N O T I C E

PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY. THE CITY OF SCOTTSDALE MAKES NO WARRANTY AS TO THE ACCURACY OF THE INFORMATION CONTAINED ON THIS PLAN. IT SHOULD NOT BE RELIED UPON WITHOUT FIELD VERIFICATION.

THE CITY OF SCOTTSDALE

APPENDIX B
FIRE HYDRANT FLOW TEST RESULTS

FIRE PROTECTION ENGINEERING SERVICES
4242 W. Topeka Dr. | Glendale, Arizona 85308
P: (623) 587-1844 | F: (623) 587-7992
E-mail: FPES@Cox.Net

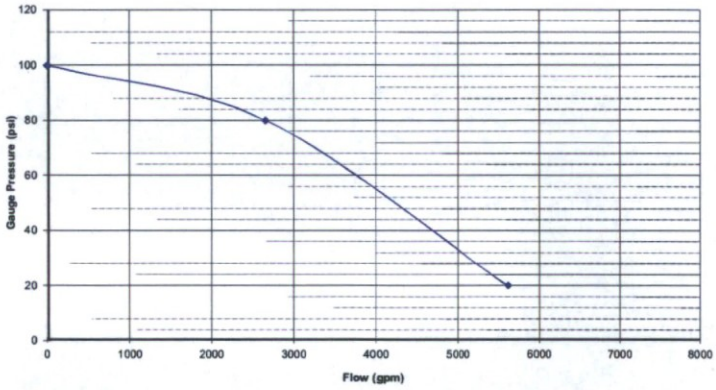
HYDRANT FLOW TEST
SUMMARY REPORT

PROJECT LOCATION: 4733 N. SCOTTSDALE RD.

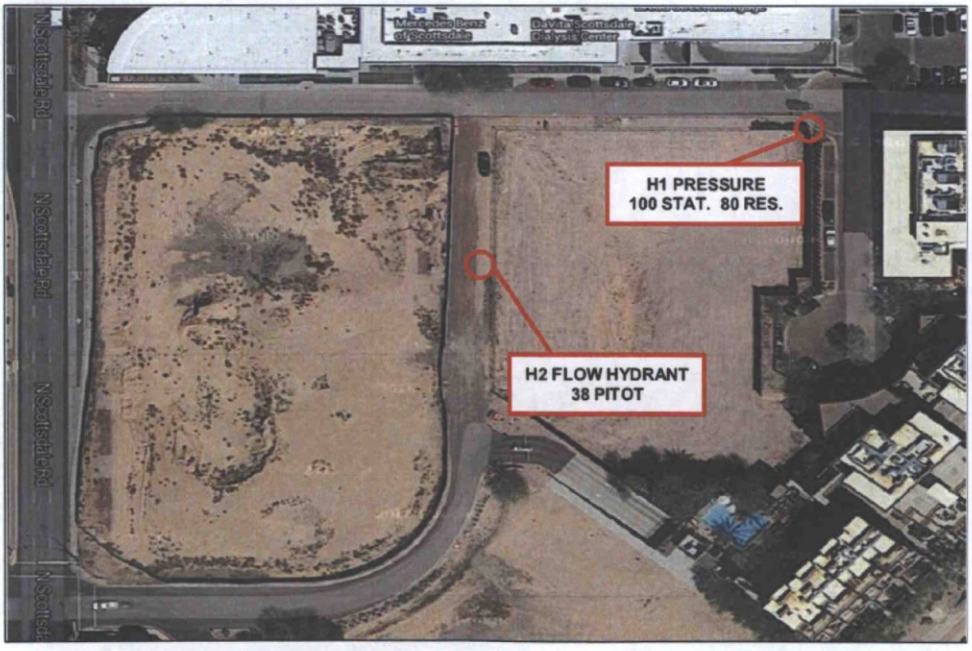
WITNESSED BY: PHIL CIPOLLA, CITY OF SCOTTSDALE - CIVIL INSPECTIONS **DATE:** 03/31/16 **TIME:** 8:20AM

Observed Test Data								
Hydrant Designation	Hydrant Number	Flow Opening	*Static Pressure	*Residual Pressure	Pitot Pressure	**Coefficient	Coefficient Steamer use .83	Flow (GPM)
Pressure; R	Hydrant #1		100	80				
Flow, F1	Hydrant #2	4			38	0.95	0.95	2656
Flow, F2	-	0			0		0	0
							TOTAL:	2656

Note: If steamer connection was used for the flow test (without stream straightener), An additional Coefficient must be used with a factor of .83. *Static and residual pressures must be adjusted for elevation change (+0.0 FT.) to site. **Use .95 Coefficient when stream straightener is utilized



Available flow @ 20 PSI
5615 GPM



ACCEPTED BY: PJ C Gallo DATE: 4/1/16

APPENDIX C
FIRE FLOW CALCULATION TABLE

Fire Flow Node FlexTable: Fire Flow Report

Label	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Pressure (System Lower Limit) (psi)	Pressure (Calculated System Lower Limit) (psi)
J-1	2,500	2,501	2,500	2,501	20	80	20	80	20	80
J-3	2,500	(N/A)	(N/A)	(N/A)	20	(N/A)	20	(N/A)	20	(N/A)
J-4	2,500	(N/A)	(N/A)	(N/A)	20	(N/A)	20	(N/A)	20	(N/A)
J-5	2,500	(N/A)	(N/A)	(N/A)	20	(N/A)	20	(N/A)	20	(N/A)
J-7	2,500	2,501	2,500	2,501	20	34	20	47	20	47
J-9	2,500	(N/A)	(N/A)	(N/A)	20	(N/A)	20	(N/A)	20	(N/A)

APPENDIX D
WATER DEMAND TABLE

WATER DEMANDS

:k Scottsdale

ng	Phase	Land Use and Description	Area Sq. Ft.	Dwellings Served	Average Daily Demand Per Unit (gpd)	Average Daily Demand (gpm)	Max. Day Factor	Maximum Daily Demand (gpm)	Peak Hour Factor	Pea Hou Dema (gpr
	1	Residential Units		160	185.3	20.6	2.0	41.2	3.5	72.
		pool		1	200	0.14	1.0	0.14	1.0	0.1
						20.7		**41.3**		**72.**

APPENDIX E
WATER MODELING OUTPUT

AVG DAY PIPE TABLE

FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)
37	P-2	16	R-1	PMP-1	8.0	130.0	0.000	21	0.13
38	P-3	21	PMP-1	J-1	8.0	130.0	0.220	21	0.13
45	P-5	160	J-1	J-4	8.0	130.0	4.100	21	0.13
49	P-7	29	J-5	J-4	4.0	130.0	0.000	-21	0.53
58	P-8	96	J-4	J-9	8.0	130.0	8.200	0	0.00
59	P-9	249	J-9	J-3	8.0	130.0	1.800	0	0.00
60	P-10	177	J-7	J-9	8.0	130.0	3.200	0	0.00

AVG DAY JUNCTION TABLE

FlexTable: Junction Table

ID	Label	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
34	J-1	0	230.59	100
39	J-3	0	230.59	100
44	J-4	0	230.59	100
47	J-5	21	230.58	100
55	J-7	0	230.59	100
57	J-9	0	230.59	100

MAX DAY + FF PIPE TABLE

FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)
37	P-2	16	R-1	PMP-1	8.0	130.0	0.000	41	0.26
38	P-3	21	PMP-1	J-1	8.0	130.0	0.220	41	0.26
45	P-5	160	J-1	J-4	8.0	130.0	4.100	41	0.26
49	P-7	29	J-5	J-4	4.0	130.0	0.000	-41	1.05
58	P-8	96	J-4	J-9	8.0	130.0	8.200	0	0.00
59	P-9	249	J-9	J-3	8.0	130.0	1.800	0	0.00
60	P-10	177	J-7	J-9	8.0	130.0	3.200	0	0.00

MAX DAY + FF JUNCTION TABLE

FlexTable: Junction Table

Label	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0	230.58	100
J-3	0	230.57	100
J-4	0	230.57	100
J-5	41	230.52	100
J-7	0	230.57	100
J-9	0	230.57	100

PEAK HOUR PIPE TABLE

FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Minor Loss Coefficient (Local)	Flow (gpm)	Velocity (ft/s)
37	P-2	16	R-1	PMP-1	8.0	130.0	0.000	72	0.46
38	P-3	21	PMP-1	J-1	8.0	130.0	0.220	72	0.46
45	P-5	160	J-1	J-4	8.0	130.0	4.100	72	0.46
49	P-7	29	J-5	J-4	4.0	130.0	0.000	-72	1.84
58	P-8	96	J-4	J-9	8.0	130.0	8.200	0	0.00
59	P-9	249	J-9	J-3	8.0	130.0	1.800	0	0.00
60	P-10	177	J-7	J-9	8.0	130.0	3.200	0	0.00

PEAK HOUR JUNCTION TABLE

FlexTable: Junction Table

Label	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	0	230.54	100
J-3	0	230.50	100
J-4	0	230.50	100
J-5	72	230.38	100
J-7	0	230.50	100
J-9	0	230.50	100

FINAL DRAINAGE REPORT

PEACOCK SCOTTSDALE

JUNE 2017
DEA PROJECT NO. DECO0001

DAVID EVANS AND ASSOCIATES INC.

FINAL DRAINAGE REPORT

PEACOCK SCOTTSDALE

JUNE 2017
DEA PROJECT NO. DECO0001

FINAL DRAINAGE REPORT
FOR

PEACOCK SCOTTSDALE

PREPARED FOR

DECO ACQUISITIONS, LLC
8135 E. INDIAN BEND ROAD, SUITE 101
SCOTTSDALE, AZ 85250

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JUNE 2017
DEA PROJECT NO. DECO0001

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FIGURES

1.0 INTRODUCTION

This drainage report has been prepared under a contract with Deco Acquisitions, LLC, owner and developer of the Peacock Scottsdale project in Scottsdale, AZ. The purpose of this report is to provide hydrological and hydraulic analysis, required by the City of Phoenix, to support the site civil improvements for Peacock Scottsdale. Preparation of this report has been done in accordance with the procedures detailed in the *City of Scottsdale Design Standards and Policies Manual* (Reference #1) along with the City of Scottsdale *Supplement to MAG Uniform Standard Specifications For Public Works Construction* (Reference #2) and *Drainage Design Manuals for Maricopa County, Arizona, Volumes I & II* (References #3 and #4).

The proposed Peacock Scottsdale project is north of the Safari Drive development located at Coolidge Street between Scottsdale Road and the Arizona Canal in the City of Scottsdale, Arizona. The site is located within Section 23, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian. Figure 1, Vicinity Map, located in the Appendix A shows the relation of the site to major city streets.

The approved Final Drainage Report for Safari Drive, completed in 2006 by David Evans and Associates, includes drainage analysis of the phase 2 portion of Safari Drive, now described as Peacock Scottsdale. The report is included in Appendix F. This letter will summarize key points and any changes in design intent compared with the Master Drainage Report. This drainage report provides a summary of approved drainage concepts and drainage design detail information in particular to the current project.

The proposed Peacock Scottsdale project is approximately 2.06 acres. The project includes one, 10-story multi-family residential building with underground parking. The residential building consists of 146 units.

2.0 EXISTING DRAINAGE CONDITIONS

The Phase 1 drainage improvements associated with Safari Drive included the 48" storm drain improvements to Coolidge Street and an 8'x6' box culvert along the Arizona Canal. The existing area for the Phase 2 portion of the project is currently an excavated dirt lot at a depth of approximately 12 feet below the adjacent roadway. This was done to provide fill for phase 1 and the adjacent BlueSky project and in preparation of underground parking for Phase 2 improvements.

The FEMA FIRM was updated since the Master Drainage Report was completed. A LOMR prepared by David Evans and Associates was approved and the extent of the Safari Drive phase 2 project is not in a delineated floodplain. The LOMR is included in the Appendix. Finished floors and garage entrances will be 1 foot higher than the drainage outfall location. The site is now considered to be in Zone X.

Zone X is defined as "areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than one square mile; and areas protected by levees from the 100-year flood." A copy of the FIRM panel is provided as Figure 2 Appendix B.

3.0 PROPOSED DRAINAGE PLAN

The proposed drainage plan is presented in four parts: onsite drainage, off-site drainage, retention requirements, and lowest finished floors. The design will follow the *City of Scottsdale Design Standards and Policies Manual* (Reference #1)

3.1 Offsite Drainage Design

The project site is protected from offsite flows by the installation of culverts in Coolidge Street and along the Arizona Canal bank. Storm drain improvements to the west at Fashion Square Mall and in Scottsdale Road also convey offsite flows to the south. The west half of 72nd Place will flow west to the future Bluesky property. Precipitation data updated in NOAA Atlas 14 is lower than the data used in previous reports, adding an additional safety factor. Please see the attached Final Drainage Report for Safari Drive for more information on offsite flows.

3.2 Onsite Drainage Design

The proposed site plan for Peacock differs from the original design layout shown for Phase II of Safari Drive. The extent of the underground garage has increased and the building footprints have changed, but the drainage areas generally match the original design. The Final Drainage report included the majority of the site draining directly into the constructed box culvert in Coolidge Street. The underground parking structures conflict will require some of the storm drain to be relocated to drain to the south. The interim design is to provide the stub at the Blue Sky property and utilize the existing site as a storage basin. The Blue Sky property will then extend the storm drain to a new connection into the 8x6 box culvert along the Arizona Canal that was constructed as part of the Phase 1 improvements. New roof drains for the north building will tie directly into the storm drain stubs in Coolidge. The roof drain for the south building will tie directly into the storm drain stub in 72nd Place. A M.A.G. Std. Det. 537 catch basin is proposed on the east side of 72nd Place. No other offsite drainage improvements are proposed with the Peacock project.

The roundabout at 72nd Way outfalls to the north and into the 48" storm drain pipe in Coolidge Street. This runoff will enter the 48" storm drain pipe via two catch basins.

As noted in the Safari Drive Master Drainage report, the project site has a storage waiver approval from the City of Scottsdale. The culverts installed in Coolidge during construction of Phase 1 improvements provide storage capacity for the site as compensation for raising the elevations of the site from the existing condition. The 100-year 2-hour precipitation depth values used in the Master Drainage Report was 2.82 inches. The latest NOAA atlas 14 data shows a reduced 100-year 2-hour precipitation depth of 2.17 inches. The ultimate outfall is the top of curb at Coolidge (elevation=1280.20) Then flow will continue southeast along the Arizona Canal before entering the box culvert inlet openings.

3.3 Retention Requirements

A storm water storage waiver has been approved by the City of Scottsdale which allows the Peacock Scottsdale project to not retain any storm water runoff onsite. The waiver is for "Riverwalk Square" and the Case Number is 54DR2005. No further storm water treatment will be required. All runoff will be conveyed to the culvert along the Arizona Canal bank, located along the east side of the site.

4.0 HYDROLOGY ANALYSIS

The hydrologic analysis for the Peacock Scottsdale project site is determined using the procedures set in the in the *City of Scottsdale Design Standards and Policies Manual* (Reference #1) along with the City of Scottsdale *Supplement to MAG Uniform Standard Specifications For Public Works Construction* (Reference #2) and *Drainage Design Manuals for Maricopa County, Arizona, Volumes I & II* (References #3 and #4).

$$Q = C_{wt} I A$$

Where:

C_{wt}	= The runoff coefficient relating runoff to rainfall
I	= Average rainfall intensity in inches/hour, lasting for Tc
T_c	= The time of concentration (minutes)
A	= The contributing drainage area in acres (from Exhibit A).

Rational Method is used to calculate the peak flows at each of the concentration points. The 100-year peak flows are used to size curb opening catch basins. A runoff coefficient of 0.95 is used for all drainage areas of the site. See the spreadsheet in Appendix C.

The above mentioned drainage areas are depicted in Exhibit A, Drainage Map, located in the back pocket. The hydrology analysis is based on the Rational Method following Maricopa County Flood Control's methodology. NOAA-14 precipitation data are used for the analysis. To be more conservative in design, a minimum Time of Concentration of 5 minutes was used for all areas. The results are presented in Appendix C.

5.0 HYDRAULIC ANALYSIS

The hydraulic analysis for this project is determined according to the *Maricopa County Drainage Design Manual, Volume II, Hydraulics* (Reference 3).

Bentley's StormCAD V8i computer software (Reference 4) was utilized to determine the pipe capacity for the 2 year, 10-year and 100-year peak runoff event.

Inlet capacity for the grated inlet catch basins onsite were determined using the following equation:

$$Q = C*A\ (2gd)^{\wedge}0.50$$

Where:

C=Orifice Coefficient=0.67
g=32.2 ft/s^2.
20% clogging factor is used for inlets in sag
50% clogging factor is used for inlets on-grade

Inlet capacity for the grated inlet catch basins onsite were determined using the following equation:

$$L_t=Q_i/(C_wD1.5)$$

Where:

L_i=Length of Curb Opening (ft)
D=0.5' (Depth of Flow)
C_w=Weird Coefficient=3.0
Q=Total Gutter Flow (cfs)

See Appendix D for hydraulic calculations.

A clogging factor of 20% is used for all grate inlets in sag and curb inlets. The maximum ponding depth in the pavement is kept below 6 inches for the 100-year storm event. See Appendix D for hydraulic calculations.

6.0 CONCLUSIONS

Based on the results of this study, it can be concluded that:

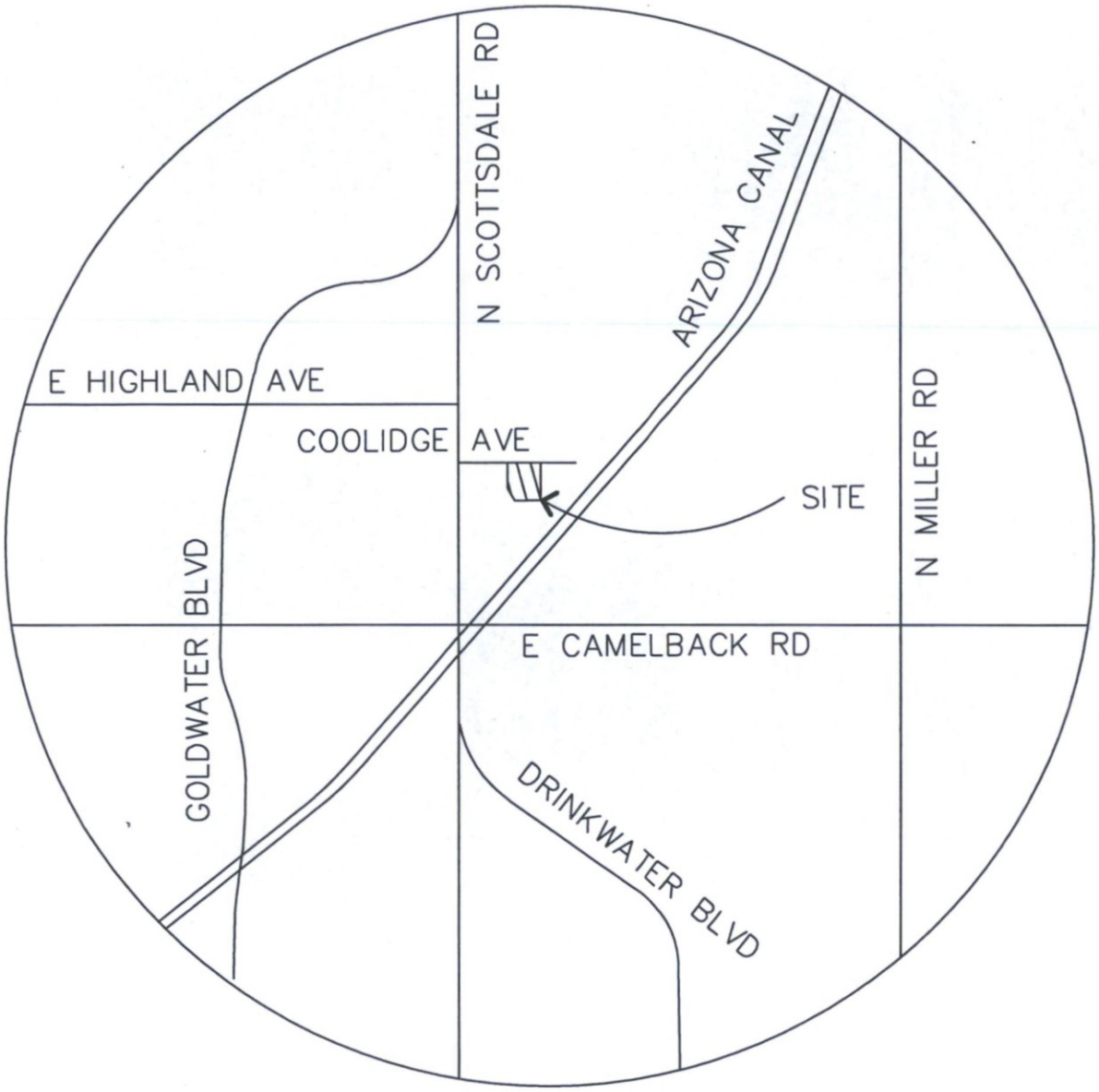
- The Pinnacle Club project will be developed according to the City of Scottsdale Design Standards and Policies Manual.
- The proposed buildings will be free from inundation during a 100-year storm event.
- The site development will convey all storm drain runoff to a culvert along the Arizona Canal bank via storm drain pipes.
- All catch basins and storm drain pipe are designed to carry the 100-year storm event.
- No stormwater quality requirements apply to this project.

7.0 REFERENCES

1. City of Scottsdale Design Standards and Policies Manual, January 2010.
2. City of Scottsdale *Supplement to MAG Uniform Standard Specifications for Public Works Construction, August 20121.*
3. Maricopa County Drainage Design Manual, Hydrology, Flood Control District of Maricopa County, 2013.
4. Maricopa County Drainage Design Manual, Hydraulics, Flood Control District of Maricopa County, 2013.
5. Final Drainage Report for Safari, October 2006 by David Evans and Associates.

APPENDIX A

Vicinity Map



VICINITY MAP
N.T.S.

DATE: DATE: 3/24/2017

SCALE: NTS	EXHIBIT 1 VICINITY MAP	DAVID EVANS AND ASSOCIATES INC.
SHEET 1 OF 1	PEACOCK SCOTTSDALE PHOENIX, AZ	4600 East Washington Street, Suite 250 Phoenix Arizona 85034

APPENDIX B

FEMA FIRM Map

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

METE

NFIP

PANEL 1770L

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1770 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1770	L
PARADISE VALLEY, TOWN OF	040049	1770	L
SCOTTSDALE, CITY OF	045012	1770	L

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

MAP NUMBER
04013C1770L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the base (1-percent-annual-chance) flood discharges computed in the submitted hydrologic analysis. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/Scripts/bfe_main.asp.

LOCAL NEWSPAPER Name: *The Arizona Business Gazette*
Dates: March 13, 2014 and March 20, 2014

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Table 4. Summary of Stillwater Elevations

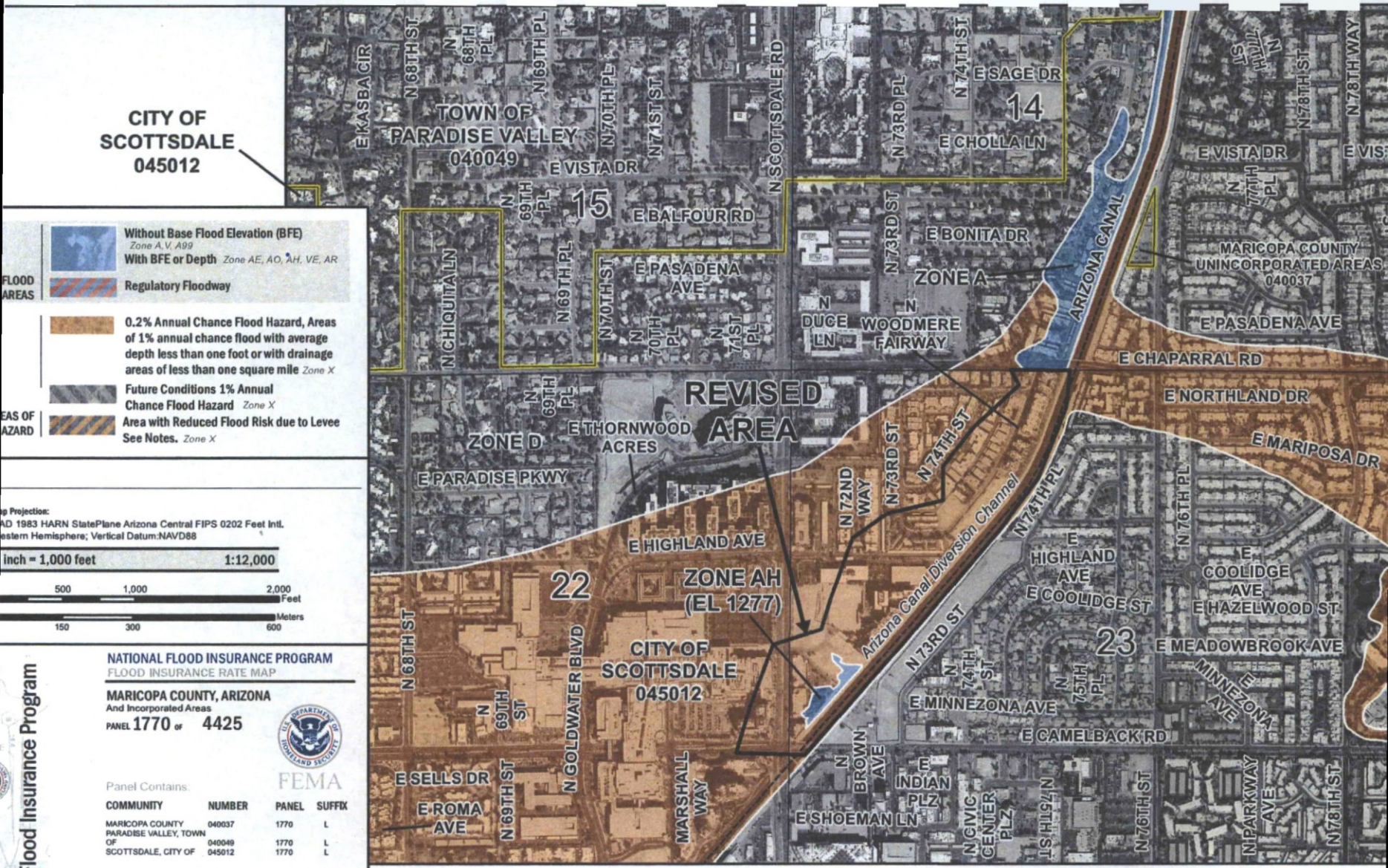
FLOODING SOURCE AND LOCATION	ELEVATIONS (Feet NAVD[1]) 10-PERCENT ANNUAL CHANCE	2-PERCENT ANNUAL CHANCE	1-PERCENT ANNUAL CHANCE	0.2-PERCENT ANNUAL CHANCE
Highline Lateral				
North Watershed West of Priest Road	--[2]	--[2]	1,226.1	--[2]
NE Watershed at West Baseline Road	--[2]	--[2]	1,225.0	--[2]
Central Watershed at Guadalupe Road	--[2]	--[2]	1,225.0	--[2]
South Watershed at West Divot Drive	--[2]	--[2]	1,226.2	--[2]
Ken McDonald Golf Course				
Storm Runoff Pond	--[2]	--[2]	1,180.8	--[2]
Safari Ponding				
Northeast of intersection of North Scottsdale Road and East Camelback Road	--[2]	--[2]	1,276.6	--[2]
Sunny Cove Dam	--[2]	--[2]	2166.4	--[2]
Sunset Dam	--[2]	--[2]	2130.8	--[2]

Revised Data

[1]North American Vertical Datum of 1988

[2]Data Not Available

REVISED TO
REFLECT LOMR
EFFECTIVE: July 18, 2014



FLOOD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway
- 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*

AREAS OF HAZARD

- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*

Map Projection:
NAD 1983 HARN StatePlane Arizona Central FIPS 0202 Feet Intl.
Western Hemisphere; Vertical Datum:NAVD88

1 inch = 1,000 feet 1:12,000

500 1,000 2,000 Feet

150 300 600 Meters

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA
And Incorporated Areas

PANEL 1770 OF 4425

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1770	L
PARADISE VALLEY, TOWN OF	040049	1770	L
SCOTTSDALE, CITY OF	045012	1770	L

REVISED TO REFLECT LOMR EFFECTIVE: July 18, 2014

VERSION NUMBER
1.1.1.0

MAP NUMBER
04013C1770L

MAP REVISED
OCTOBER 16, 2013

NOTE: MAPAREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 2 NORTH, RANGE 4 EAST AND TOWNSHIP 3 NORTH, RANGE 5 EAST.

APPENDIX C

Hydrologic Supporting Documentation

RATIONAL METHOD

Conc. Point	Contributing Areas	Area (ac)	Length (ft)	High Pt. (ft)	Low Pt. (ft)	Slope (ft/ft)	Land Use	k_b	C_2	C_{10}	C_{100}	T_{C2} (min)	T_{C10} (min)	T_{C100} (min)	I_2 (in/hr)	I_{10} (in/hr)	I_{100} (in/hr)	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
CP1A	1	0.25	100	-	-	0.0100	A	0.044	0.95	0.95	0.95	3.6	3.0	2.5	2.89	4.73	7.49	0.7	1.1	1.8
CP2A	2	0.22	146	-	-	0.0100	A	0.044	0.95	0.95	0.95	4.4	3.6	3.1	2.89	4.73	7.49	0.6	1.0	1.6
CP3A	3	0.24	136	-	-	0.0100	A	0.044	0.95	0.95	0.95	4.2	3.5	2.9	2.89	4.73	7.49	0.7	1.1	1.7
CP35A	35	0.96	215	80.95	73.90	0.0328	A	0.040	0.95	0.95	0.95	3.5	2.9	2.4	2.89	4.73	7.49	2.6	4.3	6.8
CP4A	4	0.32	219	80.40	79.41	0.0045	A	0.043	0.95	0.95	0.95	7.1	5.7	4.7	2.61	4.57	7.49	0.8	1.4	2.3
CP10A	10, 9	0.14	105	80.95	79.50	0.0138	A	0.045	0.95	0.95	0.95	3.4	2.8	2.4	2.89	4.73	7.49	0.4	0.6	1.0
CP6A	6	0.18	100	80.95	79.86	0.0109	A	0.045	0.95	0.95	0.95	3.6	2.9	2.5	2.89	4.73	7.49	0.5	0.8	1.3
CP34A	34, 33	0.12	89	80.90	79.50	0.0157	A	0.046	0.95	0.95	0.95	3.0	2.5	2.1	2.89	4.73	7.49	0.3	0.5	0.9

Q=CiA

$Tc = 11.4 * L^{0.5} + K_b{}^{0.52} * S^{-0.31} * i^{-0.38}$

Minimum Tc = 10 minutes

$K_b = -0.00625 * \log_{10} Area^{\square} + 0.04$ $K_b = -0.025 * \log_{10} Area^{\square} + 0.15$ **A** $K_b = -0.030 * \log_{10} Area^{\square} + 0.20$

L= Length

S=Slope

I = intensity at Tc

Location name: Scottsdale, Arizona, USA
Latitude: 33.5054°, Longitude: -111.9247°
Elevation: 1280.46 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.184 (0.154-0.225)	0.241 (0.203-0.294)	0.328 (0.273-0.398)	0.394 (0.327-0.476)	0.484 (0.394-0.582)	0.553 (0.445-0.662)	0.624 (0.493-0.744)	0.696 (0.540-0.830)	0.792 (0.599-0.946)	0.866 (0.642-1.04)
10-min	0.281 (0.235-0.342)	0.367 (0.308-0.448)	0.498 (0.416-0.605)	0.599 (0.497-0.725)	0.736 (0.600-0.885)	0.841 (0.677-1.01)	0.949 (0.750-1.13)	1.06 (0.822-1.26)	1.21 (0.912-1.44)	1.32 (0.977-1.58)
15-min	0.348 (0.291-0.424)	0.455 (0.382-0.555)	0.618 (0.515-0.751)	0.743 (0.616-0.898)	0.912 (0.744-1.10)	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	0.468 (0.392-0.572)	0.612 (0.515-0.747)	0.832 (0.694-1.01)	1.00 (0.829-1.21)	1.23 (1.00-1.48)	1.40 (1.13-1.68)	1.58 (1.25-1.89)	1.77 (1.37-2.11)	2.01 (1.52-2.40)	2.20 (1.63-2.63)
60-min	0.579 (0.485-0.707)	0.757 (0.637-0.925)	1.03 (0.859-1.25)	1.24 (1.03-1.50)	1.52 (1.24-1.83)	1.74 (1.40-2.08)	1.96 (1.55-2.34)	2.19 (1.70-2.61)	2.49 (1.88-2.97)	2.72 (2.02-3.26)
2-hr	0.672 (0.572-0.804)	0.871 (0.741-1.04)	1.16 (0.986-1.39)	1.39 (1.16-1.65)	1.70 (1.40-2.00)	1.93 (1.58-2.28)	2.17 (1.75-2.56)	2.42 (1.91-2.85)	2.75 (2.12-3.24)	3.00 (2.27-3.56)
3-hr	0.735 (0.622-0.886)	0.942 (0.801-1.14)	1.24 (1.04-1.49)	1.47 (1.23-1.76)	1.80 (1.48-2.14)	2.06 (1.68-2.45)	2.33 (1.86-2.77)	2.62 (2.05-3.10)	3.01 (2.29-3.57)	3.33 (2.47-3.95)
6-hr	0.884 (0.764-1.04)	1.12 (0.970-1.32)	1.44 (1.24-1.69)	1.69 (1.44-1.97)	2.03 (1.71-2.36)	2.30 (1.91-2.66)	2.58 (2.11-2.98)	2.86 (2.30-3.32)	3.25 (2.54-3.78)	3.56 (2.72-4.15)
12-hr	0.987 (0.862-1.15)	1.25 (1.09-1.45)	1.58 (1.37-1.83)	1.84 (1.59-2.13)	2.19 (1.87-2.53)	2.46 (2.08-2.83)	2.74 (2.28-3.16)	3.02 (2.48-3.48)	3.40 (2.72-3.94)	3.70 (2.90-4.31)
24-hr	1.17 (1.04-1.33)	1.49 (1.32-1.70)	1.94 (1.71-2.20)	2.28 (2.02-2.59)	2.77 (2.43-3.14)	3.15 (2.74-3.56)	3.55 (3.07-4.01)	3.96 (3.40-4.48)	4.54 (3.85-5.13)	4.99 (4.19-5.66)
2-day	1.27 (1.13-1.44)	1.62 (1.44-1.84)	2.13 (1.89-2.41)	2.54 (2.24-2.87)	3.10 (2.73-3.51)	3.55 (3.10-4.02)	4.03 (3.50-4.56)	4.53 (3.90-5.12)	5.22 (4.44-5.92)	5.78 (4.87-6.57)
3-day	1.34 (1.19-1.52)	1.72 (1.53-1.95)	2.26 (2.00-2.56)	2.70 (2.38-3.05)	3.32 (2.91-3.74)	3.81 (3.32-4.30)	4.34 (3.75-4.90)	4.89 (4.20-5.53)	5.67 (4.81-6.41)	6.29 (5.29-7.14)
4-day	1.42 (1.26-1.61)	1.81 (1.61-2.06)	2.40 (2.12-2.71)	2.87 (2.52-3.23)	3.53 (3.09-3.98)	4.07 (3.54-4.58)	4.64 (4.01-5.23)	5.25 (4.50-5.93)	6.12 (5.17-6.89)	6.82 (5.70-7.70)
7-day	1.58 (1.40-1.79)	2.02 (1.79-2.29)	2.67 (2.35-3.02)	3.19 (2.81-3.61)	3.94 (3.44-4.45)	4.54 (3.94-5.12)	5.17 (4.46-5.84)	5.85 (5.01-6.61)	6.81 (5.75-7.70)	7.58 (6.34-8.59)
10-day	1.71 (1.52-1.94)	2.19 (1.95-2.48)	2.90 (2.56-3.27)	3.46 (3.05-3.90)	4.25 (3.73-4.79)	4.89 (4.26-5.49)	5.57 (4.82-6.25)	6.28 (5.39-7.06)	7.27 (6.17-8.18)	8.07 (6.78-9.10)
20-day	2.11 (1.88-2.37)	2.71 (2.41-3.05)	3.58 (3.18-4.02)	4.24 (3.75-4.75)	5.13 (4.52-5.75)	5.81 (5.10-6.51)	6.50 (5.68-7.29)	7.21 (6.27-8.10)	8.16 (7.03-9.19)	8.89 (7.60-10.0)
30-day	2.46 (2.18-2.77)	3.17 (2.81-3.57)	4.18 (3.70-4.69)	4.95 (4.37-5.54)	5.98 (5.25-6.70)	6.77 (5.93-7.57)	7.58 (6.61-8.48)	8.41 (7.29-9.40)	9.52 (8.20-10.7)	10.4 (8.87-11.6)
45-day	2.85 (2.54-3.20)	3.67 (3.27-4.12)	4.84 (4.31-5.42)	5.70 (5.06-6.39)	6.84 (6.05-7.66)	7.70 (6.79-8.63)	8.56 (7.52-9.61)	9.43 (8.25-10.6)	10.6 (9.18-11.9)	11.4 (9.87-12.9)
60-day	3.15 (2.82-3.52)	4.07 (3.63-4.55)	5.35 (4.78-5.98)	6.28 (5.59-7.02)	7.50 (6.66-8.37)	8.40 (7.43-9.38)	9.30 (8.20-10.4)	10.2 (8.94-11.4)	11.3 (9.90-12.7)	12.2 (10.6-13.7)

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

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

Please refer to NOAA Atlas 14 document for more information.

Location name: Scottsdale, Arizona, USA*
Latitude: 33.5054°, Longitude: -111.9247°
Elevation: 1280.46 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	2.21 (1.85-2.70)	2.89 (2.44-3.53)	3.94 (3.28-4.78)	4.73 (3.92-5.71)	5.81 (4.73-6.98)	6.64 (5.34-7.94)	7.49 (5.92-8.93)	8.35 (6.48-9.96)	9.50 (7.19-11.4)	10.4 (7.70-12.4)
10-min	1.69 (1.41-2.05)	2.20 (1.85-2.69)	2.99 (2.50-3.63)	3.59 (2.98-4.35)	4.42 (3.60-5.31)	5.05 (4.06-6.04)	5.69 (4.50-6.80)	6.35 (4.93-7.57)	7.23 (5.47-8.63)	7.90 (5.86-9.46)
15-min	1.39 (1.16-1.70)	1.82 (1.53-2.22)	2.47 (2.06-3.00)	2.97 (2.46-3.59)	3.65 (2.98-4.39)	4.17 (3.36-4.99)	4.70 (3.72-5.62)	5.25 (4.08-6.26)	5.98 (4.52-7.14)	6.53 (4.84-7.82)
30-min	0.936 (0.784-1.14)	1.22 (1.03-1.49)	1.66 (1.39-2.02)	2.00 (1.66-2.42)	2.46 (2.00-2.96)	2.81 (2.26-3.36)	3.17 (2.50-3.78)	3.53 (2.75-4.21)	4.02 (3.04-4.81)	4.40 (3.26-5.26)
60-min	0.579 (0.485-0.707)	0.757 (0.637-0.925)	1.03 (0.859-1.25)	1.24 (1.03-1.50)	1.52 (1.24-1.83)	1.74 (1.40-2.08)	1.96 (1.55-2.34)	2.19 (1.70-2.61)	2.49 (1.88-2.97)	2.72 (2.02-3.26)
2-hr	0.336 (0.286-0.402)	0.436 (0.370-0.522)	0.582 (0.493-0.694)	0.694 (0.582-0.826)	0.848 (0.702-1.00)	0.964 (0.789-1.14)	1.09 (0.874-1.28)	1.21 (0.956-1.42)	1.37 (1.06-1.62)	1.50 (1.13-1.78)
3-hr	0.245 (0.207-0.295)	0.314 (0.267-0.380)	0.412 (0.348-0.497)	0.490 (0.410-0.587)	0.598 (0.494-0.714)	0.685 (0.558-0.815)	0.776 (0.620-0.922)	0.871 (0.684-1.03)	1.00 (0.763-1.19)	1.11 (0.823-1.32)
6-hr	0.148 (0.128-0.174)	0.187 (0.162-0.220)	0.240 (0.207-0.281)	0.282 (0.241-0.329)	0.339 (0.286-0.394)	0.384 (0.319-0.444)	0.430 (0.352-0.498)	0.478 (0.384-0.555)	0.543 (0.425-0.631)	0.595 (0.454-0.693)
12-hr	0.082 (0.072-0.095)	0.103 (0.090-0.120)	0.131 (0.114-0.152)	0.153 (0.132-0.177)	0.182 (0.155-0.210)	0.204 (0.172-0.235)	0.228 (0.189-0.262)	0.251 (0.206-0.289)	0.282 (0.226-0.327)	0.307 (0.241-0.358)
24-hr	0.049 (0.044-0.056)	0.062 (0.055-0.071)	0.081 (0.071-0.092)	0.095 (0.084-0.108)	0.115 (0.101-0.131)	0.131 (0.114-0.148)	0.148 (0.128-0.167)	0.165 (0.142-0.187)	0.189 (0.160-0.214)	0.208 (0.175-0.236)
2-day	0.026 (0.023-0.030)	0.034 (0.030-0.038)	0.044 (0.039-0.050)	0.053 (0.047-0.060)	0.065 (0.057-0.073)	0.074 (0.065-0.084)	0.084 (0.073-0.095)	0.094 (0.081-0.107)	0.109 (0.093-0.123)	0.120 (0.101-0.137)
3-day	0.019 (0.017-0.021)	0.024 (0.021-0.027)	0.031 (0.028-0.036)	0.038 (0.033-0.042)	0.046 (0.040-0.052)	0.053 (0.046-0.060)	0.060 (0.052-0.068)	0.068 (0.058-0.077)	0.079 (0.067-0.089)	0.087 (0.073-0.099)
4-day	0.015 (0.013-0.017)	0.019 (0.017-0.021)	0.025 (0.022-0.028)	0.030 (0.026-0.034)	0.037 (0.032-0.041)	0.042 (0.037-0.048)	0.048 (0.042-0.055)	0.055 (0.047-0.062)	0.064 (0.054-0.072)	0.071 (0.059-0.080)
7-day	0.009 (0.008-0.011)	0.012 (0.011-0.014)	0.016 (0.014-0.018)	0.019 (0.017-0.022)	0.023 (0.020-0.026)	0.027 (0.023-0.030)	0.031 (0.027-0.035)	0.035 (0.030-0.039)	0.041 (0.034-0.046)	0.045 (0.038-0.051)
10-day	0.007 (0.006-0.008)	0.009 (0.008-0.010)	0.012 (0.011-0.014)	0.014 (0.013-0.016)	0.018 (0.016-0.020)	0.020 (0.018-0.023)	0.023 (0.020-0.026)	0.026 (0.022-0.029)	0.030 (0.026-0.034)	0.034 (0.028-0.038)
20-day	0.004 (0.004-0.005)	0.006 (0.005-0.006)	0.007 (0.007-0.008)	0.009 (0.008-0.010)	0.011 (0.009-0.012)	0.012 (0.011-0.014)	0.014 (0.012-0.015)	0.015 (0.013-0.017)	0.017 (0.015-0.019)	0.019 (0.016-0.021)
30-day	0.003 (0.003-0.004)	0.004 (0.004-0.005)	0.006 (0.005-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.011)	0.011 (0.009-0.012)	0.012 (0.010-0.013)	0.013 (0.011-0.015)	0.014 (0.012-0.016)
45-day	0.003 (0.002-0.003)	0.003 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.006-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.010 (0.009-0.011)	0.011 (0.009-0.012)
60-day	0.002 (0.002-0.002)	0.003 (0.003-0.003)	0.004 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.005-0.007)	0.006 (0.006-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.008 (0.007-0.010)

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

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

Please refer to NOAA Atlas 14 document for more information.

RATIONAL METHOD

Conc. Point	Contributing Areas	Area (ac)	Σarea (ac)	Length (ft)	High Pt. (ft)	Low Pt. (ft)	Slope (ft/ft)	Land Use	k_b	C_2	C_{10}	C_{100}	T_{C2} (min)	T_{C10} (min)	T_{C100} (min)	I_2 (in/hr)	I_{10} (in/hr)	I_{100} (in/hr)	Q_2 (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
CP2A	2	0.22	0.22	146	-	-	0.0100	A	0.044	0.95	0.95	0.95	4.4	3.6	3.1	2.89	4.73	7.49	0.6	1.0	1.6
CP3A	3	0.24	0.24	136	-	-	0.0100	A	0.044	0.95	0.95	0.95	4.2	3.5	2.9	2.89	4.73	7.49	0.7	1.1	1.7
CP35A	35	0.96	0.96	215	80.95	73.90	0.0328	A	0.040	0.95	0.95	0.95	3.5	2.9	2.4	2.89	4.73	7.49	2.6	4.3	6.8
CP4A	4	0.32	0.32	219	80.40	79.41	0.0045	A	0.043	0.95	0.95	0.95	7.1	5.7	4.7	2.61	4.57	7.49	0.8	1.4	2.3
CP10A	10, 9	0.14	0.14	105	80.95	79.50	0.0138	A	0.045	0.95	0.95	0.95	3.4	2.8	2.4	2.89	4.73	7.49	0.4	0.6	1.0
CP6A	6	0.18	0.18	100	80.95	79.86	0.0109	A	0.045	0.95	0.95	0.95	3.6	2.9	2.5	2.89	4.73	7.49	0.5	0.8	1.3
CP34A	34, 33	0.12	0.12	89	80.90	79.50	0.0157	A	0.046	0.95	0.95	0.95	3.0	2.5	2.1	2.89	4.73	7.49	0.3	0.5	0.9

Q=CiA

$$Tc = 11.4 * L^{0.5} + K_b^{0.52} * S^{-0.31} * i^{-0.38}$$

Minimum Tc = 10 minutes

$K_b = -0.00625 * \log_{10} Area^{\square} + 0.04$ $K_b = -0.025 * \log_{10} Area^{\square} + 0.15$ $K_b = -0.030 * \log_{10} Area^{\square} + 0.20$

L= Length

S=Slope

I = intensity at Tc

Capacity of a catch basin in a Sag operating as an Orifice

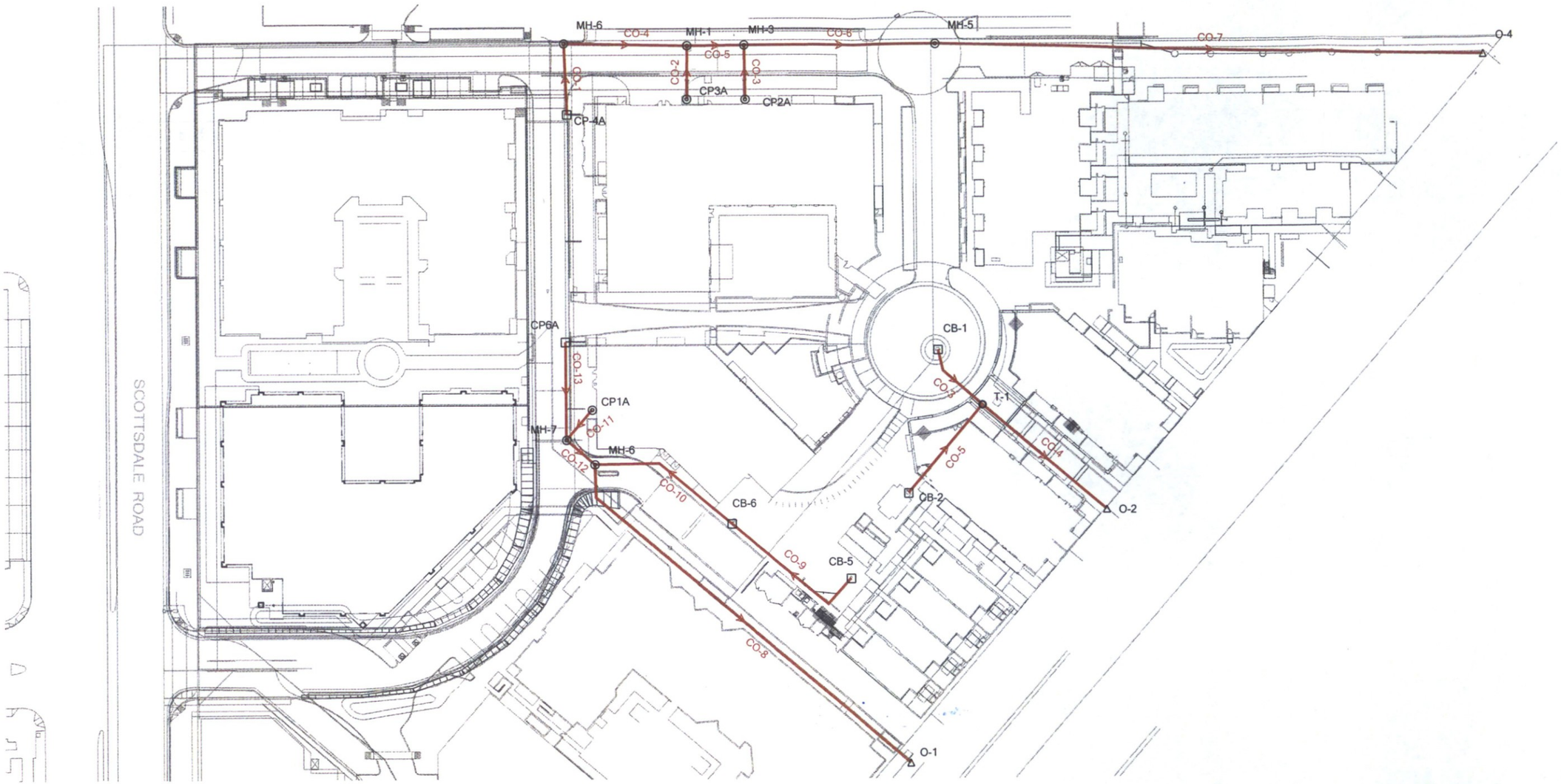
$Q = C\,A\,(2gd)^{0.50}$

C = 0.67 Orifice Coefficient, g=32.2 ft/s^2

Concentration Point	**CP35A**		
High Water at Weir=	79.8		
Rim of Catch Basin=	79.3		
Head on Rim=	0.5		
Total Area of Grate=	2.25		
50% of Open area of the inlet		1.125	sq. ft.
Depth of water ponding on the inlet		0.5	ft.
Capacity of the inlet =		4	cfs

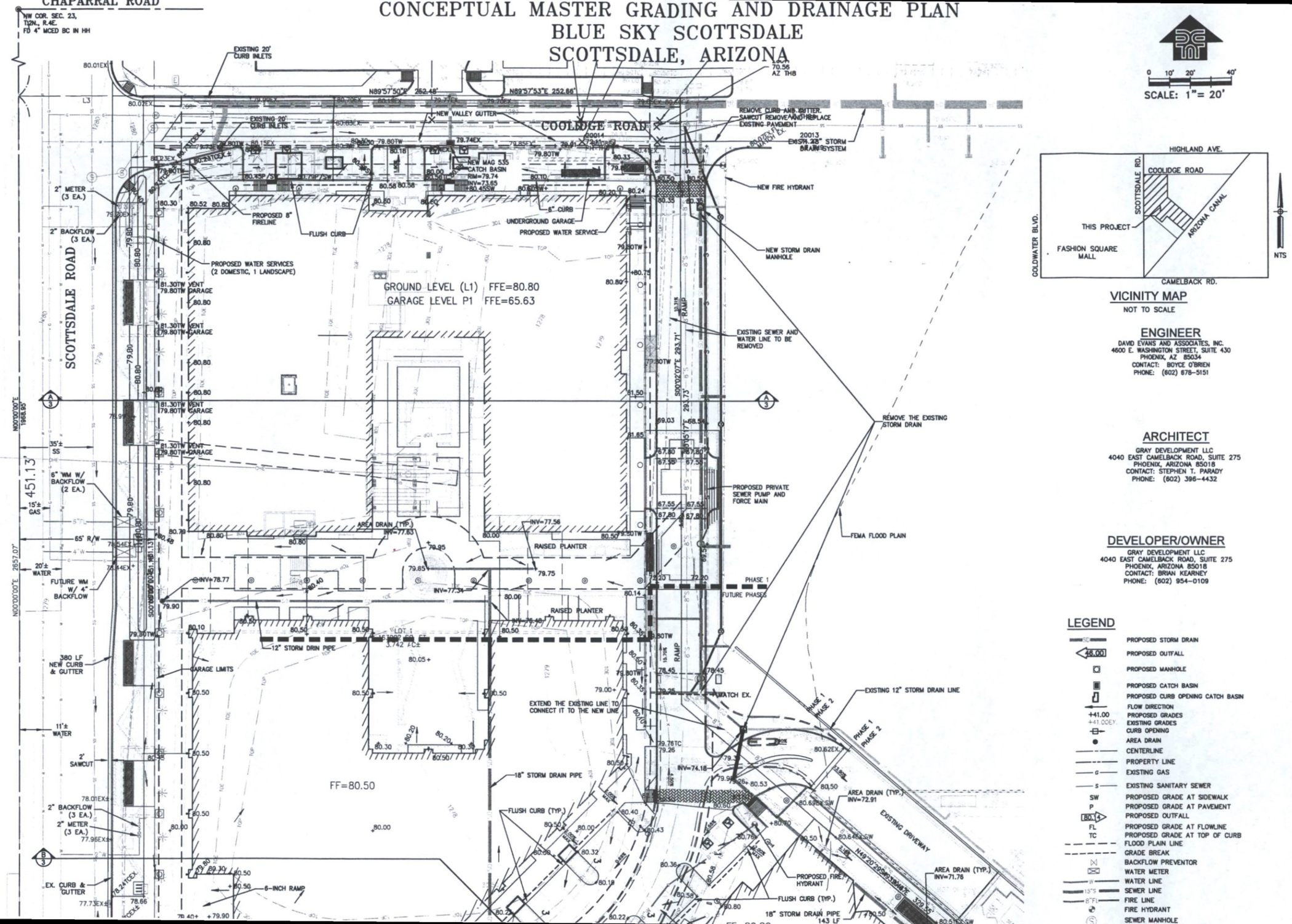
Concentration Point	**CP6A**	**Catch Basin located in Pond 1**	
High Water at Weir=	80.31		
Rim of Catch Basin=	79.81		
Head on Rim=	0.5		
Total Area of Grate=	5.84		
50% of Open area of the inlet		2.92	sq. ft.
Depth of water ponding on the inlet		0.5	ft.
Capacity of the inlet =		11	cfs

Scenario: Base



CONCEPTUAL MASTER GRADING AND DRAINAGE PLAN
BLUE SKY SCOTTSDALE
SCOTTSDALE, ARIZONA

SCALE: 1"= 20'



VICINITY MAP

NOT TO SCALE

ENGINEER

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PHOENIX, ARIZONA 85018
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LEGEND

- PROPOSED STORM DRAIN
- 46.00 PROPOSED OUTFALL
- PROPOSED MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED CURB OPENING CATCH BASIN
- FLOW DIRECTION
- +41.00 PROPOSED GRADES
- +41.00EX. EXISTING GRADES
- CURB OPENING
- AREA DRAIN
- CENTERLINE
- PROPERTY LINE
- G EXISTING GAS
- S EXISTING SANITARY SEWER
- SW PROPOSED GRADE AT SIDEWALK
- P PROPOSED GRADE AT PAVEMENT
- 80.4 PROPOSED OUTFALL
- FL PROPOSED GRADE AT FLOWLINE
- TC PROPOSED GRADE AT TOP OF CURB
- FLOOD PLAIN LINE
- GRADE BREAK
- BACKFLOW PREVENTOR
- WATER METER
- W WATER LINE
- 15"S SEWER LINE
- 8"FI FIRE LINE
- FIRE HYDRANT
- SEWER MANHOLE

PRELIMINARY NOT FOR CONSTRUCTION

DESIGNED BY:	RMD/BHO
DRAWN BY:	RMDI
CHECKED BY:	RYG
DATE:	1/2013

PROJECT MANAGER: BOYCE O'BRIEN

DATE	REVISION

DAVID EVANS AND ASSOCIATES INC.
4600 E. Washington Street, Suite 430
Phoenix, Arizona 85034
Phone: 602.678.5151

CONCEPTUAL
GRADING & DRAINAGE PLAN
BLUE SKY SCOTTSDALE,
SCOTTSDALE, ARIZONA

CASE # 2-4-2010 OS 18-45
DRB CASE # 62-DR-2011
PLAN CHECK # 4984-11

SCALE: 1"=20'

SECTION: 23
TOWNSHIP: 2N
RANGE: 4E

JOB NO.: GRYD0000-0001

MATCH SHEET GD1

SCALE: 1"= 20'

PRELIMINARY NOT FOR CONSTRUCTION

FASHION SQUARE DR.

SCOTTSDALE ROAD

CAMELBACK ROAD

ARIZONA CANAL

CONTINUED BELOW

CONTINUED ABOVE

ARCADIA DAIRY MART REPLATTED BK. 52, PG. 15, M.C.R.

EXISTING RENAISSANCE COMMERCIAL PLAZA EX FF=78.20±

LOT 2 23495 SQ. FT. 0.539 AC±

EXISTING PARKING

FF=80.80

POOL

UNDERGROUND GARAGE

FEMA FLOOD PLAIN

ZONE X
ZONE A

688.20'

65' R/W

PROPOSED 8" SEWERLINE

PROPOSED 8" FIRELINE INV=75.05

PROPOSED SEWER LINE

PROPOSED SEWER SERVICE

24" STORM DRAIN PIPE

12" STORM DRAIN PIPE

18" STORM DRAIN PIPE

EXISTING SEWER LINE

EXISTING SEWER MANHOLE ADJUST RIM PER MAG STD DET 404 INV(N)=64.24 INV(SE)=64.22 INV(W)=64.16

EXISTING SEWER MANHOLE INV(N)=65.68 INV(SE)=65.53

MAG 533-2 CURB INLET INV=75.20, 6' WING

2' SCUPPER

2' CURB OPENING

EX. WATER METER (TYP)

AREA DRAIN (TYP.) INV=70.97

CONNECT TO EXISTING BOX CULVERT INV=64.39± (BOX CULVERT) INV=68.50 (18" SD)

EXIST. INLET

EXISTING BOX CULVERT

CONNECT TO EXISTING BOX CULVERT INV=62.56± (BOX CULVERT) INV=66.56 (24" SD)

AREA DRAIN (TYP)

BANK IMPROVEMENT LIMITS

86.22'

10' WALK

EXISTING TRASH ENCLOSURE

OIL / SAND SEPARATOR

2- 4'x4' CATCH BASINS PER INLET DETAIL ON SHEET 3

126 LF RETAINING WALL (HEIGHT VARIES, 4'-6')

11'± WATER

W1/4 COR. SEC. 23, T2N., R.4E. FD 4" MCED BC IN HH

DESIGNED BY: RMD/BHO
DRAWN BY: RMD
CHECKED BY: RYG
DATE: 1/2013

PROJECT MANAGER: BOYCE O'BRIEN

REVISION | DATE

DAVID EVANS AND ASSOCIATES INC.
4600 E. Washington Street, Suite 430
Phoenix, Arizona 85034
Phone: 602.678.5151

CONCEPTUAL GRADING & DRAINAGE PLAN
BLUE SKY SCOTTSDALE, SCOTTSDALE, ARIZONA

SCALE: 1"=20'

SECTION: 23
TOWNSHP: 2N
RANGE: 4E

JOB NO.: GRYD0000-0001

PLAN CHECK #: 4894-11 DRB CASE #: 52-DR-2011 CASE #: 2-A-2010 05: 18-45

P:\GR\YD0000001\0400CAD\ECI_DRB-CAD\Ec02002_GRY00001.dwg vr Feb 22, 2017 11:45:08am

APPENDIX F

PERTINENT EXCERPTS OF PREVIOUS DRAINAGE REPORTS

FINAL DRAINAGE REPORT

SAFARI DRIVE

OCTOBER 2006
DEA PROJECT NO. MHUL0000-0001

FINAL DRAINAGE REPORT
FOR
SAFARI DRIVE

PREPARED FOR

RIVERWALK SQUARE, LLC
8320 E. HARTFORD DR., SUITE 104
SCOTTSDALE, AZ 85251

PREPARED BY

RAMZI GEORGES, P.E., C.F.M.
DARHMINDER PAUL, E.I.T.
DAVID EVANS AND ASSOCIATES, INC.
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PHOENIX, AZ 85016
(602) 678-5151

OCTOBER 2006
DEA PROJECT NO. MHUL0000-

10/10/06

A.S.R. Revise for date

TABLE OF CONTENTS

1.0 INTRODUCTION

This final drainage report has been prepared under a contract from Riverwalk Square, LLC for the Safari Drive project in Scottsdale. The purpose of this report is to provide hydrologic and hydraulic analyses, required by the City of Scottsdale, to support the Safari Drive improvement plans. Preparation of this report has been done in accordance with the procedures detailed in the *City of Scottsdale Design Standards and Policies Manual* (Reference #1) along with the City of Scottsdale *Supplement to MAG Uniform Standard Specifications For Public Works Construction* (Reference #2) and *Drainage Design Manuals for Maricopa County, Arizona, Volumes I & II* (References #3 and #4).

The proposed Safari Drive project is located northeast of the intersection of Scottsdale Road and Camelback Road, within the City of Scottsdale, Maricopa County, Arizona. The site is located within Section 23, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian.

The project site is bound by a commercial development to the north (Highland Park), undeveloped parcel to the west (east of Scottsdale Road), a commercial development to the south and the Arizona Canal to the east. Access to the site will be provided via two entrances from Scottsdale Road along 72nd Place and Coolidge Street. The project is located within what is considered the Downtown Area of the City's General Plan.

The proposed Safari Drive project site is approximately 5 acres (for Phase 1 and 2). The project is going to be developed in phases. Onsite improvements include the demolition of existing structures, site grading, and construction of the new Safari Drive buildings with associated hardscape and landscaped areas. Offsite improvements include asphalt pavement for portions of the adjacent street sections and a proposed turning lane along Scottsdale Road.

2.0 EXISTING DRAINAGE CONDITIONS

As mentioned in the section above, the site is located east of Scottsdale Road, west of the Arizona Canal and south of Coolidge Street. Through researching several drainage reports, aerial photos and as built information, it was determined that the site was occupied with a resort known as the Safari Hotel and Resort, See Appendix F. The resort site was demolished in 1998 and it was regarded. Aerial photos and field visits show that there are no washes impacting the site.

Offsite runoff that may impact the site is conveyed along western boundary of the Arizona Canal in a southwesterly direction. According to the topography in the area, the general lay of

the land is in a southeasterly direction, towards to the Arizona Canal, where runoff ponds against the canal before it is conveyed through storm drain systems or weirs over the canal. The Arizona Canal is supposed to be drained during major storm events, in addition to a 4-foot of freeboard that would allow the canal to accept additional storm runoff into its system.

The site is located in an area that drains into what is known as Reach 4 of the Flood Control District's side channel drainage system. This storm drain system runs along Camelback Road and outfalls into the Indian Bend Wash and it was installed in the 1980's through coordination with the City of Scottsdale, Flood Control District and the US Army Corps of Engineers. The system was designed to convey the 25 year storm event. There is a series of grated inlet structures (equivalent to two MAG 535 structures) that capture runoff along the western side of the canal and convey runoff into an underground 54 inch storm drain pipe that changes into a 72 inch pipe which outfalls into the storm drain system in Camelback Road. These area drains and the underground storm drain system traverse the eastern boundary of the Safari Drive site. There is also a large grate inlet structure, northeast of Camelback Road and Scottsdale Road intersection, along the western side of the Canal between the two commercial developments south of the safari site that captures runoff that ponds west of the Arizona Canal.

Scottsdale Road is an improved street with curb and gutter that drains in a southerly direction, adjacent to the site, towards Camelback Road. The majority of the runoff along Scottsdale Road is conveyed within the street section of the road and a smaller portion is conveyed into the existing storm drain system, along Scottsdale Road, that outfalls into the main storm drain in Camelback Road.

It is estimated that there is approximately 3,638 cfs that would reach the intersection of Camelback and Scottsdale Road (based on CVL report, Reference 8). The majority of the runoff will weir over the Arizona Canal bank into the canal itself, whish is supposed to convey the runoff. Some of the runoff may spill over Camelback Road in a southerly direction as well.

The current published FEMA Flood Insurance Rate Map (FIRM) for this area is map number 04013C1695H (Effective date is September 30, 2005). Portions of the site were located within zones A and X. Zone A is defined as the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations or depths are shown within this zone. Zone X is defined as "areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from the 100-year flood." A copy of the FIRM panel is provided in Appendix B.

A CLOMR has been filed for Safari Drive project by different firm than DEA, before DEA was contracted to finish the design improvement documents for the project. A copy of the Conditional Letter of Map Revision (CLOMR) Response from FEMA is included in Appendix E of this drainage report. The CLOMR was based on fill and that the proposed finish floor elevations are higher than Arizona Canal bank. The proposed structures should be free from inundation during a 100-yeat storm event. A Letter of Map Revision (LOMR) will be submitted after the project is build and all the design documents have been approved.

3.0 PROPOSED DRAINAGE CONCEPT

The proposed drainage concept is presented in three parts: onsite drainage, off-site drainage, and storage requirements. The hydrologic analysis is summarized in section 4.0 and the hydraulic analysis is summarized in section 5.0. See Exhibit A, located in the back pocket, for an illustration of the proposed drainage concept.

3.1 On-site Drainage Conveyance

The Safari Drive site runoff is mostly generated on the roof, the hardscape and landscape areas surrounding the buildings and the courtyard areas. The runoff generated on the roof is conveyed into roof drains that direct the runoff onsite storm drain system or directly into the 54 inch pipe west of the Arizona Canal. Refer to Exhibit A for a graphical illustration of the proposed onsite drainage.

3.2 Off-site Drainage Conveyance

DEA designers have conducted field visits, reviewed aerial maps and available topography to determine the hydraulic/hydrological conditions of the contributing watershed north of the Safari Drive project site. Runoff that may impact the site could enter the site from the northeastern portion of the site, with runoff being conveyed in a southwesterly direction along the west bank of the Arizona Canal. The second area of offsite runoff that could potentially impact the site is runoff flowing south along Scottsdale Road. In addition to that, runoff concentrating at the intersection of Camelback Road and Scottsdale Road weirs over the Arizona Canal could back into the site if the weir high water elevation over the canal bank is higher than the proposed finished grade elevations onsite.

The first area of investigation was to quantify the offsite runoff along the northeastern portion of the site. Runoff that may impact the site is generated north of Chapparal Road. During field visits it was observed that an 8'x4' concrete box culvert exists underneath Chapparal Road, west of the Arizona Canal. Few feet upstream of the culvert, is a 20.5'x13' grate inlet structure. Runoff from the north captured by the grate inlet is conveyed in an easterly direction through an

approximately what seemed to be a 96" pipe underneath the Arizona Canal. Any runoff that by pass the grate inlet structure (which is not likely) will flow through the 8'x4' culvert, underneath Chaparral Road, in a southerly direction. However, field observations have shown that there are sidewalks extending from hotel buildings, west of the Arizona Canal and south of Chapparal Road, to the Arizona Canal bank. These sidewalks create berms/dam situation along the west side of the canal with 2 -18 inch bleed off pipes underneath these sidewalks. This occurs in 3 different locations upstream of the site.

Each of the 18 inch pipes is estimated to convey a flow amount that is less than what the full 8'x4' concrete box culvert can convey. The runoff that ponds upstream of the sidewalks in excess of the 18 inch pipe conveyance capacity would weir into the Arizona Canal (to the west) and over the sidewalk in a southerly direction. The sidewalks and the canal banks seemed to have the same elevations and it is assumed that 50 percent split will occur at each of the sidewalk locations.

Hydraulic analysis has been conducted for the 8'x4' culvert at Chaparral Road in order to determine the maximum capacity of the culvert and it was found to be 277 cfs. The 277 cfs representing the maximum capacity of the culvert is used at the downstream three sidewalk locations to determine the split flows in each direction. The result was that 200 cfs will spill into the Arizona Canal and the remaining 77 cfs will continue in the southerly towards the Safari Drive project. Refer to Appendix D for detailed split flow analysis data sheets.

In addition to the flow calculated above, the existing 54-inch/72 inch storm drain system east of the site will receive runoff from the development north of site. The majority of the runoff generated in the subdivision and the commercial development upstream of the site is bounded by Chapparal Road to the north, Scottsdale Road to the west, the Arizona Canal to the east and the Safari Drive project northern boundary to the south. The runoff outfalls to the channel northeast of the corner of the Safari project site. The Rational method was used to determine the flow and 140 cfs was estimated to be the peak flow that combines with the 77 cfs mentioned above. Thus, the total flow that enters at the northeastern portion of the site is 217 cfs (within the concrete channel, west of the Arizona Canal).

A FlowMaster (Reference 7) was used to determine the high water elevation, using the 217 cfs. An earthen channel, west of the canal and above the 54 inch pipe, was modeled to check the high water elevation in the channel using the 217 cfs. The modeling did not take into account the 54 inch pipe and the high water elevation at the upstream portion of the site was found to be 77.2 which is 3.7 feet lower than the proposed finish floor elevations onsite.

Several drainage reports have quantified the runoff flowing south along Scottsdale Road. Based on the Final Drainage Report prepared by CVL (Reference #8), the flow along

Scottsdale Road is in the vicinity of the project 378 cfs. This flow is approximately consistent with flow quantified DMJM (Reference 9). FlowMaster program was used to determine if the street flow depth can be contained in the street without spilling into the Safari Drive project. The calculations have shown that ponding above the gutter elevation of 1.2 feet. Hence, the entrances and future frontage along Scottsdale Road are and will be elevated to 1.2 feet from the gutter elevation, thus creating a berm minimizing the possibility of the street runoff from entering the site.

The contributing drainage areas to Scottsdale Road extend all the way to the mountains west of Invergordon Road. The majority of the runoff from the mountains will flow in a southeasterly direction towards Scottsdale Road and Camelback Road. Gold Water Boulevard acts as a ridge line because of its elevated topography in some locations, deep dip locations in others and the existing development as well. Any runoff from the mountains that reaches Camelback Road from the north will flow in an easterly direction along Camelback Road, while breaching south into the north-south streets such as 66th Street, 68th Street, Goldwater Boulevard and Scottsdale Road. The CVL report, mentioned earlier, has quantified that approximately 3,638 cfs will reach Scottsdale Road and Camelback Road intersection, where it will then spill into Arizona Canal. From several conversations with different agencies, it is believed that the Arizona Canal is maintained in such a way that it is capable of conveying the additional 3,638 cfs without breaching in a southeasterly direction. Although, the 3,638 cfs seems overly conservative and is questionable because of the hydraulic conditions of Camelback Road (mentioned above), DEA modeled the weir along the Arizona Canal based on that flow. The high water ponding elevation along the Arizona Canal bank canal was determined to be 1280.30, which is 0.65 feet below the lowest proposed finish floor elevation of 1280.95. This indicates that the proposed buildings will not be flooded during the 100-year design storm event.

As mentioned earlier, the Arizona Canal causes ponding along the west side of its bank. An older drainage report that was produced by the Corps of engineers has accounted for inlets west of the canal to reduce or bleedoff the amount ponding that was occurring west of the Arizona Canal. Hence, the Safari project provided a passage for the runoff from Scottsdale Road (approximately 70 cfs) into the inlets along the west side of the canal or the existing 54 inch, west of the canal. This is partially accomplished by adding two 20 foot catch basins on both side of Coolidge Street, east of Scottsdale Road. The two catch basins convey captured runoff into a 48 inch diameter pipe flowing in the easterly direction towards the Arizona Canal that connects into the 54 inch storm drain pipe. The remainder of the flow along Scottsdale Road will continue along its historic path towards Camelback Road and ponds along the west side of the Arizona Canal and enters the inlets that were designed by the Army Corps of engineers or the revised inlets with equal or greater capacity.

3.3 Storage Requirements

Historically, the proposed Safari site used to be a commercial resort with many buildings and associated parking, landscape and hardscape areas. The resort was known as the Safari Hotel and Resort and it did not seem to have onsite retention.

The proposed Safari project has retention waiver that is included in Appendix E. Portions of the site drain through roof drains directly into the existing 54 inch west of the Arizona Canal (which will be replaced with a proposed 8x6 concrete culvert). Also, portions of the site that are surrounding the onsite buildings, along the eastern portion of the site, sheet flow into the landscape area, west of the Arizona Canal. Portions of the site that drain into catch basins onsite will be retained in underground conveyance pipes located at the northeastern portion of the site and along Coolidge Street.

City of Scottsdale requires that runoff generated during a 100-year, 2-hour storm event within the project site to be stored onsite. The required storage volume for the project site is estimated as follows:

$$V_R = C_{wt} * (P / 12) * A$$

Where: V_R = Calculated volume in acre-ft or ft^3
C_{wt} = Weighted Runoff coefficient
P = Rainfall depth in inches (2.82 inches)
A = Drainage area in acres

The proposed site plan allocates some open space for storage. Basins have maximum 4 to 1 side slopes. The volume required is calculated based on a weighted "C" coefficient and 2.82 inches of rainfall. See Exhibit A in back pocket of this report for proposed storage layout.

Summary of Storage Requirements
Table 3.2

Basin Label	Estimated Volume Required ft^3	Estimated Volume Provided ft^3	Excess/Shortage ft^3
Basin 1	1,533	802	-731, overflow to Storage Pipe
Basin 2	456	554	98,
Pipe Storage	32,190	32,229	39

The underground CMP storage pipes will bleedoff in 36 hrs through conveyance pipes into the drainage system west of the Arizona Canal.

Refer to Appendix D that shows detailed volume calculations for the site fill placement. Based on these calculations, the proposed improvements for the site (including the offsite box culvert) have excess capacity of approximately 18 thousand cubic feet. Hence, the site development has provided more than the compensatory volume for the fill that has been placed onsite to keep the finish floors from flooding during a 100-year storm event.

4.0 HYDROLOGIC ANALYSIS

The hydrologic analysis for this report has been prepared using City of Scottsdale's *Supplement to MAG Uniform Standard Specifications for Public Works Construction* and the *Drainage Design Manuals for Maricopa County, Arizona, Volume I Hydrology*. Peak flows were computed using the Rational Method. The project site was divided into several drainage areas, to determine peak flows at catch basins and inlet structures. These drainage areas are illustrated in Exhibit A, along with the location of their respective concentration points.

The following establishes the Rational Method equation and the basic input data required:

$$Q = C_{wt} * I * A$$

Where: Q = Peak discharge in cubic feet per second
C_{wt} = Weighted runoff coefficient
I = Rainfall intensity in inches per hour
A = Drainage area in acres

A summary for the peak flows for the 10-year (Q_{10}) and 100-year (Q_{100}) storm events for the developed onsite drainage conditions are shown on the next page in Table 4.1. Appendix D contains detailed calculation sheets that establish the input data and estimated peak flow values for the developed conditions.

Summary of Peak Flows
Table 4.1

Area Label	Q_{100} (cfs)	Q_{100} (cfs)
1	0	0
2	0	1
3	0	1
4	0	0
5	1	3
6.1	1	2
6	1	1
7	0	0
8	0	0
9	0	0
10	0	0
11	1	1
12.1	0	1
12	1	2
13	1	1
14	3	6
15	1	2
16	0	0
17	0	1
18	0	0
19	0	1
20	1	1
21	1	1
22	0	1
23	0	1
24	0	1
25	0	1
26	0	1
27	1	1
28	0	1
29	0	1
30	1	1
31	1	2
32	0	1
33	1	1

- "0" value stands for Peak flow of less than 0.5 cfs.

5.0 HYDRAULIC ANALYSIS

The hydraulic analyses of the proposed storm water management facilities are based on the City of Scottsdale's *Supplement to MAG Uniform Standard Specifications for Public Works Construction* and the *Drainage Design Manuals for Maricopa County, Arizona, Volume II Hydraulics*.

StormCAD (Reference #6), a Haestad computer program, has been utilized to analyze the curb inlets and the drainage pipes. The hydraulic grade line was kept below the ponding depth that is caused by the inlet capacities at different locations onsite. Refer to Appendix D for detailed input and output data sheets.

FlowMaster (Reference #7), a Haestad computer program, has been utilized to analyze the hydraulic capacity for the adjacent street section and channels to determine the 100-year high water surface elevations based on the determined offsite runoff. FlowMaster analysis is based on Manning's equation. Refer to Appendix D for detailed input and output data sheets.

Scottsdale Road has a half street capacity adjacent to the site of approximately 160 cfs. The remainder of the 189 cfs (half the 378 cfs mentioned previously) will weir into the Safari Drive site. To compensate for not allowing the 29 cfs from entering the site, two catch basins are proposed along Coolidge Road that captures approximately 70 cfs from the street flow in Scottsdale Road.

The 8'x6' culvert was designed for runoff generated during a 100-year storm event using the Rational method. The tailwater condition was used as the weir elevation during the 100-year 24 hour storm event. For a lesser storm, the worst case scenario was used by assuming that the tailwater is at the ground elevation. However, the storm drain can be assumed to be designed for the 25-24 hour storm event because it is the capacity of the downstream receiving system (although the culvert has excess hydraulic capacity)..

The existing inlets capacity along the western portion of the Arizona Canal will be replaced with new inlets. The new inlets have capacity equal or greater than the existing inlet capacity. Refer to Appendix D for hydraulic calculations of the proposed inlets.

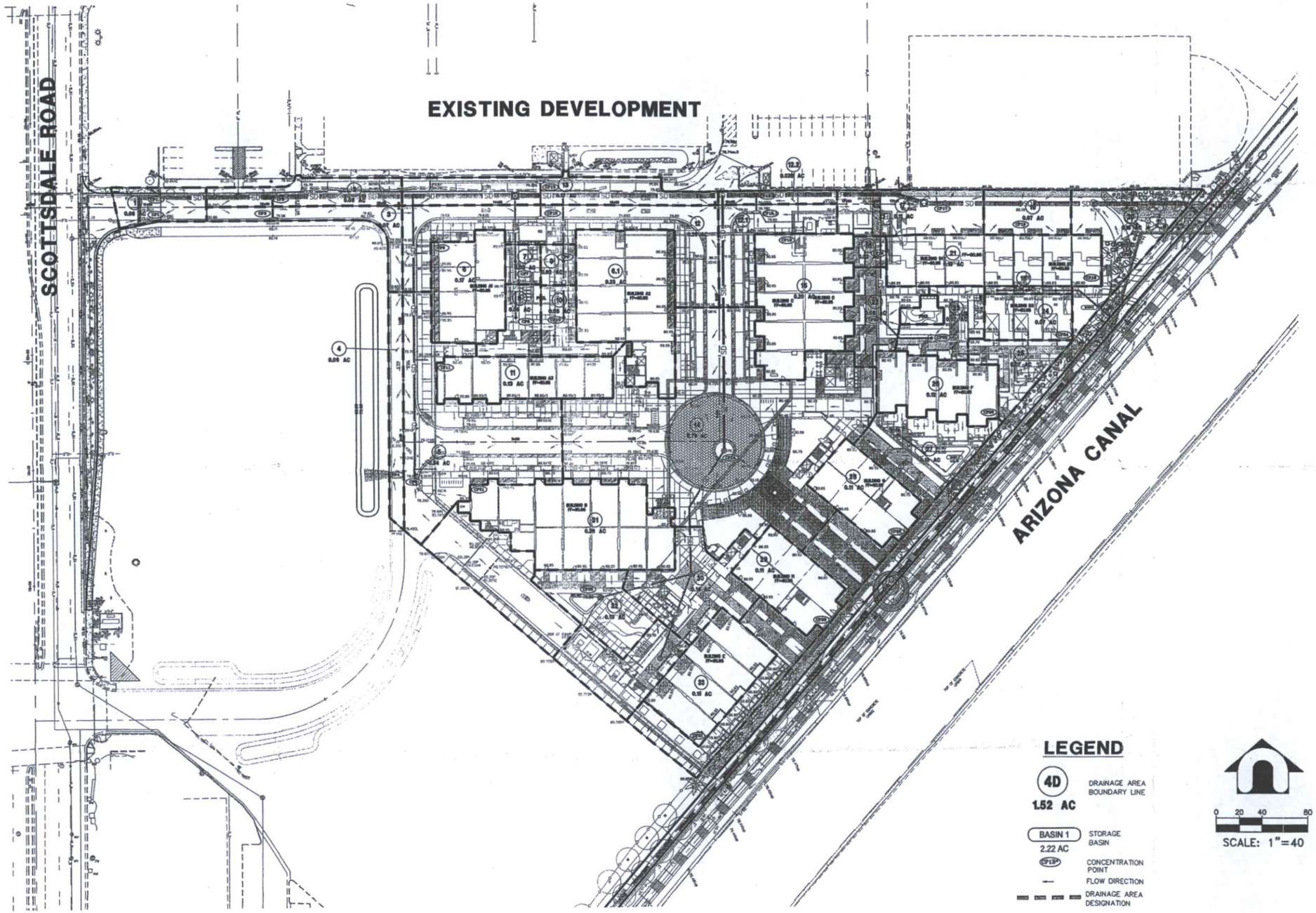
6.0 CONCLUSIONS

Based on the results of this study, it can be concluded that:

- The site is developed according to the City of Scottsdale Design Standards and Policies Manual.
- The proposed buildings will should be free from inundation during a 100-year storm event.
- Although the site retains the majority of the runoff generated onsite, the site has a retention waiver and portion of the site will direct discharge into the conveyance system along the western side of the Arizona Canal.
- The ultimate outfall is located at the southeast corner of the project site maintaining the historic outfall condition.

7.0 REFERENCES

1. City of Scottsdale Design Standards and Policies Manual, December 1999
2. City of Scottsdale *Supplement to MAG Uniform Standard Specifications for Public Works Construction, October 2003.*
3. *Drainage Design Manuals for Maricopa County, Arizona, Volume I, Hydrology*, April 2002.
4. *Drainage Design Manuals for Maricopa County, Arizona, Volume II, Hydraulics*, April 2002.
5. City of Scottsdale Stormwater Master Plan and Management Program, KVL, 1994.
6. StormCAD Version 5.06.007, Haestad Methods, Inc. 2005.
7. FlowMaster Version 7.0005, Haestad Methods, Inc. 2005.
8. *Drainage Report Scottsdale Riverwalk Center Hotel* prepared by CVL dated April 9, 1999. Revised March 28, 2001.
9. *Master Drainage Report Scottsdale Portales* prepared by DMJM dated April 13, 1999.
10. Drainage Report For Safari Drive prepared by Pentacor dated 2-7-06.
11. CulvertMaster a Bently program V3.1, dated 2006.



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Floor & Associates
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Second Floor
Phoenix, AZ 85004

MEP ENGINEER
Flack & Kurtz
1417 Fourth Avenue, Suite 400
Seattle, WA 98101-2260

SAFARI DRIVE
SCOTTSDALE ARIZONA

VANGUARD PROPERTIES

PHASE 1 & 2 IMPROVEMENT PLANS

EXHIBIT A ONSITE DRAINAGE MAP

DATE	
DRAWN	06-21-2006
DESIGNER	DHPA
CHECKED	RYG
DEA PROJ. #	MHUL-0001

PLAN CHECK # 4812-05-2 DRB CASE # 45 DR 2005 ZONING CASE # 85-ZN-1992 # 4 & 85-AZ-1992 # 5

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N.T.S

DAVID EVANS AND ASSOCIATES INC.
4600 E Washington Street, Suite 250
Phoenix Arizona 85034
Phone: 602.678.5151

91 LOTS - 45' x 115' AVERAGE

WASTEWATER BASIS OF DESIGN REPORT
FOR
PEACOCK

Accepted For:
City of Scottsdale
Water Resources Department
9379 E. San Salvador
Scottsdale, Arizona

By: _____
Date: 7/20/2017

PREPARED FOR

DECO ACQUISITIONS, LLC
8135 E. INDIAN BEND ROAD, SUITE 101
SCOTTSDALE, AZ 85250

PREPARED BY

Vicente Ruiz, P.E.
DAVID EVANS & ASSOCIATES, INC.
4600 E WASHINGTON STREET, SUITE 250
PHOENIX, AZ 85034
(602) 678-5151

Exp 6/30/17

JULY 2017

DEA PROJECT NO. DECO0001

DAVID EVANS AND ASSOCIATES INC.

TABLE OF CONTENTS

Registered Professional Engineer (Civil) CERTIFICATE NO. 54749 VICENTE RUIZ DATE SIGNED 6/1/19 ARIZONA U.S.A.

Exp 6/30/19

A. INTRODUCTION

This basis of design report was completed under a contract with DECO Acquisitions LLC, owner and developer of Peacock, (formerly Safari Phase II). The project will consist of 2 multistory story apartment buildings with 160 units. The wastewater infrastructure that will support this project was built in 2006 as part of the Safari Phase I development. The site is also a part of the development agreement with the adjacent Bluesky Project.

1. Project Location

The Peacock Scottsdale project is located within the northwest quarter of Section 23 of Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian within City of Scottsdale, AZ. The site is approximately 2.08 acres and irregularly shaped. It is generally bound by 72nd Place to the west, existing Safari Drive Phase 1 condominium units to the south, 72nd Way to the east, and Coolidge Street to the north. The area's street system in relationship to the location of the site is illustrated in Appendix A, the project's vicinity map.

2. Site Zoning

The zoning of the Peacock is D-RCO-2 with PBD and DO overlays.

3. General Plan

The Peacock project is located within what is considered the Downtown Core Area of the City of Scottsdale General Plan and it will reflect the plan's vision, goals, and policies.

B. DESIGN DOCUMENTATION

1. Design Procedures

The analysis of the proposed wastewater collection system was done in compliance with the City of Scottsdale Design Standards & Policies Manual. The proposed wastewater collection system will serve the project in accordance with City of Scottsdale design standards and the ADEQ Engineering Bulletin 10.

The estimated Average Day Sewer Design Flows for the Peacock project were determined based on Figure 7.1-2 of the Design Standards and Policy Manual and are as follows:

- High Density Condominium = 140 gallons per DU per day (PF = 4.5)

2. Software

Wastewater generation was determined using a Microsoft Excel spreadsheet. DEA prepared FlowMaster™ calculations for the proposed wastewater collection system. FlowMaster is a pipe modeling software created by Bentley and Haestad Methods.

C. EXISTING CONDITIONS

1. Zoning and Land Use

The site is currently zoned D-RCO-2. This district is intended to provide for use of multiple-family residential and allow a high density of population.

2. Existing Topography, Vegetation, and Landform Features

Generally, the existing topography slopes in a southeasterly direction at approximately 0.30%, with approximately 1 foot of fall across the property. The site in its existing condition is generally a cleared dirt lot.

3. Existing Utilities

There is an existing 8-inch PVC sewer line located in Coolidge that takes discharge east to a 15 inch sewer line in Scottsdale Road as illustrated on the City of Scottsdale Quarter Section map provided in the Appendix. Existing 6" sewer stubs are provided off the 8 inch main to the project site. Private sewer mains are located in 72nd Way and 72nd Place that serves the Safari Phase I development.

4. Existing Master Plans or Design Reports

A *Wastewater Basis of Design Report for Safari Drive* was prepared by DEA in 2006 for the Safari Drive condominiums. Phase 1 of Safari Drive has been constructed. The phase II portion of the Safari site has been submitted for DRB submittal in a few iterations and has been previously reviewed by the City of Scottsdale. The Bluesky development has also submitted the BOD twice and is included in the appendix of this report as is shows that the intent of Bluesky is in agreement with the current proposed Water and Sewer Concept plan for Peacock.

D. PROPOSED CONDITIONS

1. Site Plan

The proposed site improvements are illustrated on Exhibit 2.

2. Proposed Connections

All of the sewer connections to the existing system are illustrated on Exhibit 2. The new buildings will be served by an existing 6-inch sewer service connection to the existing 8-inch VCP line in Coolidge for the north building, and another existing 6 inch service connection in 72nd Pl that connected to the private 8 inch main that connected to the 8 inch main in Coolidge.

3. Maintenance Responsibilities

The maintenance responsibilities of the Peacock development are that of any typical residential development in the area. The private sewer line will be owned, operated and maintained by the owner as part of the development agreement. Any future relocation of the sewer near Bluesky is the responsibility of Bluesky per the latest agreement.

E. COMPUTATIONS

1. Calculations

The wastewater collection system improvements required to serve the development is illustrated on Exhibit 2.

Table E.1.1 summarizes the wastewater flows for Peacock. Detailed sanitary sewer calculations for the projected wastewater generation and the FlowMaster output for the proposed sewer services are provided in Appendices B and C, respectively. The peak flows are based on peaking factors as set forth in the City of Scottsdale Design Standards & Policies Manual. A maximum slope of 15% was assumed for all private sewer service connections.

TABLE E.1.1 – WASTEWATER GENERATION SUMMARY

ADWF (gpd)	Peak Flow (gpd)	Peak Flow (gpm)
22,400	100,800	70

The downstream impacts to the existing wastewater system due to the proposed improvements were not analyzed in this study.

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The construction of Peacock project will utilize existing connections to the City's existing sewer infrastructure as indicated in this report. The proposed wastewater collection system detailed in

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WASTEWATER BASIS OF DESIGN REPORT
FOR
PEACOCK

PREPARED FOR

DECO ACQUISITIONS, LLC
8135 E. INDIAN BEND ROAD, SUITE 101
SCOTTSDALE, AZ 85250

PREPARED BY

Vicente Ruiz, P.E.
DAVID EVANS & ASSOCIATES, INC.
4600 E WASHINGTON STREET, SUITE 250
PHOENIX, AZ 85034
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3rd Resp 7/20/2017

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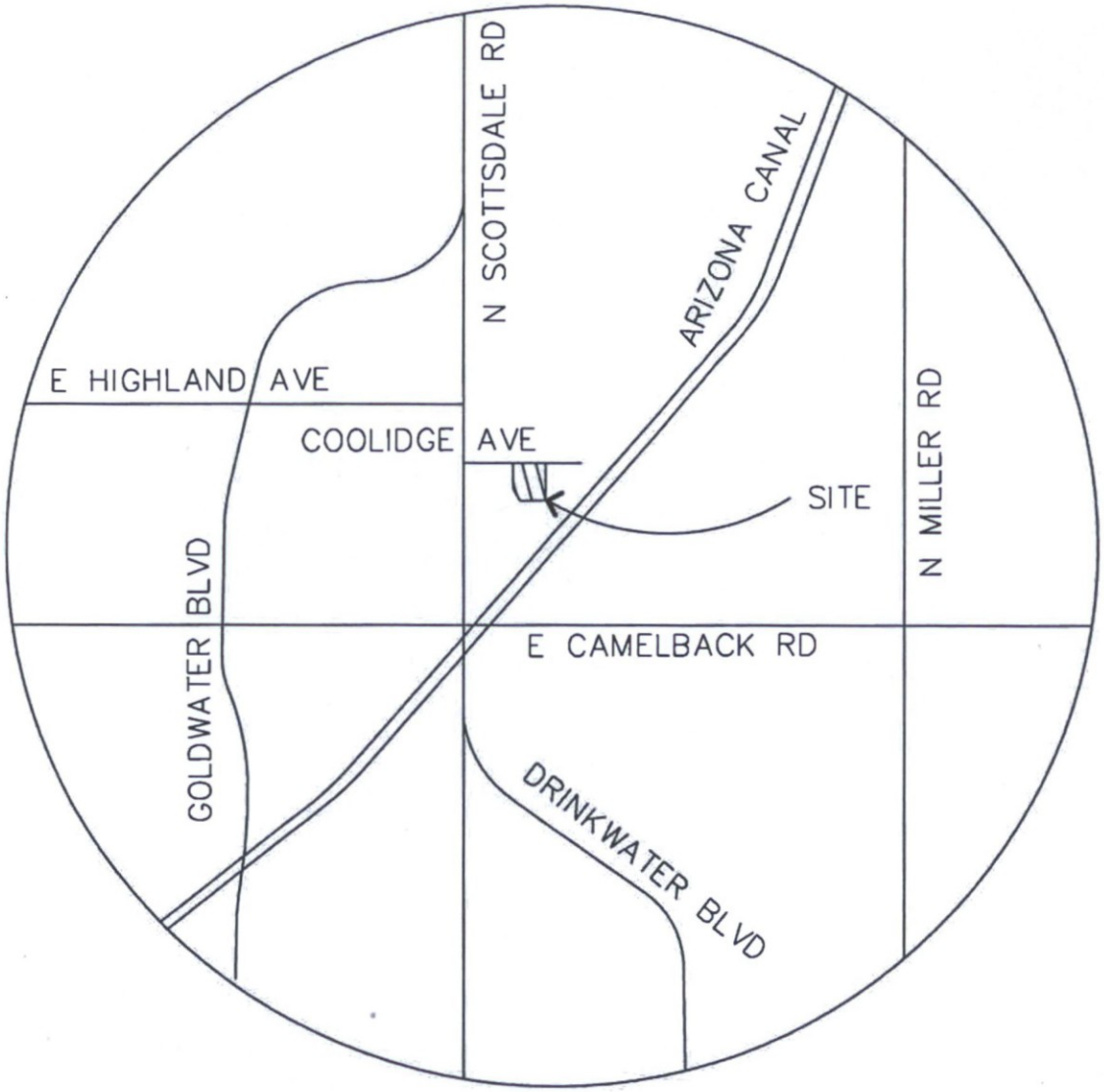
APPENDIX A
VICINITY MAP



VICINITY MAP
N.T.S.

DATE: DATE: 3/24/2017

SCALE: NTS	EXHIBIT 1 VICINITY MAP	DAVID EVANS AND ASSOCIATES INC.
SHEET 1 OF 1	PEACOCK SCOTTSDALE PHOENIX, AZ	4600 East Washington Street, Suite 250 Phoenix Arizona 85034 Phone: 602.678.5151

APPENDIX B
WASTEWATER GENERATION CALCULATIONS

WASTEWATER GENERATION SUMMARY

Peacock Scottsdale

Building ID	Line Contribution	Land Use	Area (ft^2)	Seats	Dwelling Units (DU)	Persons / DU	Population / Equivalent Population	Unit Wastewater Flow (GPD)	Average Daily Flow (GPD)	Peak Factor	Peak Flow (GPD)
Main		Residential	-	-	160	2.5	400	140	22,400	4.5	100,800
Courtyard		Landcape	4,588								
		TOTAL (GPD)							**22,400**		**100,800**
		TOTAL (GPM)							**16**		**70**

Existing Safari Drive Phase 1 (26 DU's)

Building ID	Line Contribution	Land Use	Area (ft^2)	Seats	Dwelling Units (DU)	Persons / DU	Population / Equivalent Population	Unit Wastewater Flow (GPD)	Average Daily Flow (GPD)	Peak Factor	Peak Flow (GPD)
Existing Units		26 DU FROM SAFARI PHASE 1	-	-	26	2.5	65	140	3,640	4.5	16,380
		TOTAL (GPD)							**3,640**		**16,380**
		TOTAL (GPM)							**3**		**11**

APPENDIX C
FLOWMASTER MODELING CALCULATIONS

Worksheet for 8 inch pipe at 0.65d/D

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00670	ft/ft
Diameter	8.00	in
Discharge	336.00	gal/min

Results

Normal Depth	5.20	in
Flow Area	0.24	ft^2
Wetted Perimeter	1.25	ft
Hydraulic Radius	2.31	in
Top Width	0.64	ft
Critical Depth	0.41	ft
Percent Full	65.0	%
Critical Slope	0.00795	ft/ft
Velocity	3.11	ft/s
Velocity Head	0.15	ft
Specific Energy	0.58	ft
Froude Number	0.89	
Maximum Discharge	1.06	ft^3/s
Discharge Full	0.99	ft^3/s
Slope Full	0.00384	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	in
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	in
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	65.04	%
Downstream Velocity	Infinity	ft/s

Worksheet for 8 inch pipe at 0.65d/D

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	5.20	in
Critical Depth	0.41	ft
Channel Slope	0.00670	ft/ft
Critical Slope	0.00795	ft/ft

APPENDIX D
PREVIOUS BOD
Safari Phase I
Bluesky

WASTEWATER DESIGN REPORT

SAFARI DRIVE

MAY 2006

DEA PROJECT NO. MHUL0000-0001

DAVID EVANS AND ASSOCIATES INC.

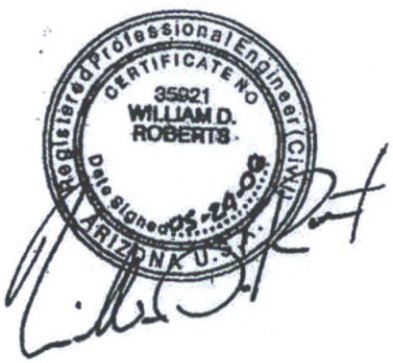
WASTEWATER BASIS OF DESIGN REPORT
FOR
SAFARI DRIVE

PREPARED FOR

RIVERWALK SQUARE, LLC
8320 E. HARTFORD DR., SUITE 104
SCOTTSDALE, AZ 85251

PREPARED BY

WILLIAM D. ROBERTS, P.E.
AND
PAUL PAL, E.I.T.
DAVID EVANS & ASSOCIATES, INC.
2141 EAST HIGHLAND AVE., SUITE 200
PHOENIX, AZ 85016
(602) 678-5151



1ST SUBMITTAL
MAY 2006

DEA PROJECT NO. MHUL0000-0001

TABLE OF CONTENTS

A. INTRODUCTION

1. General

This basis of design report was completed under a contract with Riverwalk Square, LLC. This proposed project consists of ten, 3 to 5 story residential condominium buildings with 205 units to be built in 2 consecutive phases on a portion of the old Safari Motel site in Scottsdale Arizona.

2. Purpose

The purpose of this basis of design report is to analyze the performance of the proposed sewer lines and the downstream impacts on the existing City of Scottsdale wastewater collection system due to the construction of the Safari Drive Project.

3. Project Location

The proposed Safari Drive project is located northeast of the intersection of Scottsdale Road and Camelback Road, within the City of Scottsdale, Maricopa County, Arizona. The site is located within Section 23, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian. The site encompasses 4.86 acres of cleared land, and is bounded by commercial office space to the north, vacant property to the west (which abuts Scottsdale Road), the Arcadia Country Mart to the south, and the Arizona Canal to the east.

4. Site Zoning

The project site falls within the "Downtown Area" of the City's General Plan and is currently zoned RC0-2. Proposed zoning will be for RHD2, or Residential High Density.

5. Topography

The existing topography slopes to the southeast at approximately 1.2%, with approximately 4 foot of fall across the property, see Appendix D. This project lies largely within Flood Zone "A" of the FEMA map number 04013C1695H, as revised September 30th of 2005.

B. DESIGN DOCUMENTATION

1. Design Procedures

The analysis of the proposed and existing sewer system was done in compliance with Chapter 7 – Wastewater of the City of Scottsdale 2004 Update of the Design Standards & Policies Manual (Reference 2) as well as the existing *Wastewater System Master Plan* prepared by KVL Consultants, Inc. in September of 2001 (Reference 1).

The proposed wastewater conveyance systems and facilities will serve the project in accordance with City of Scottsdale design standards and the ADEQ Aquifer Protection Permit Rules (Reference 3).

The estimated average wastewater generation of the Safari Drive project was determined based on published City of Scottsdale average flows of (100 gallons per capita per day) per Chapter 7 – Wastewater of the City of Scottsdale 2004 Update of the Design Standards & Policies Manual (Reference 2).

The peak daily flow was then added to the values outlined by the existing City of Scottsdale *Wastewater System Master Plan.* The flow was traced down the entire length of the system until it ultimately reached the limits of Scottsdale's wastewater collection system.

2. Software

Flows were determined using a Microsoft Excel© 97 spreadsheet. This spreadsheet was also used to analyze the system modeled in the *Wastewater System Master Plan* with the expected flows caused by the construction of the Safari Drive project using Manning's Equation for open channel flow.

C. EXISTING CONDITIONS

1. Zoning and Land Use

The Project falls within the "Downtown Area" of the City's General Plan and is currently zoned RC0-2. Proposed zoning will be for RHD2, or Residential High Density. The project lies just outside Downtown Scottsdale's "Distinctive Districts" of the Fashion Square District, and the Entertainment District.

2. Existing Topography, Vegetation, and Landform Features

The existing topography slopes to the southeast at approximately 1.2%, with approximately 4 foot of fall across the property, see Exhibit D.

The project site is bound by a commercial development to the north (Highland Park), undeveloped parcel to the west (east of Scottsdale Road), a commercial development to the south and the Arizona Canal to the east. Access to the site will be provided via two entrances from Scottsdale Road along 72nd Place and Coolidge Street. The project is located within what is considered the Downtown Area of the City's General Plan.

3. Existing Utilities

The COS sewer quarter section maps for this project have been provided in Appendix C.

The Scottsdale Road corridor west of the proposed development is serviced by a 10" VCP sanitary sewer line that flows south. The City of Scottsdale recently installed a 15" PVC sanitary sewer pipe along the east side of Scottsdale Road to provide relief capacity to the 10" sewer line between Highland and Camelback.

The 15" sewer (slope = 0.0031 ft/ft) was also constructed to provide service connections to new development east of Scottsdale Road. Safari Drive Project will connect to this line using a new manhole approximately 1,035 feet north of the Scottsdale and Camelback intersection.

The 10" sewer line and the parallel 15" sewer line converge at the northeast corner of Camelback and Scottsdale Roads into a 12" line. The 12" line crosses the Arizona Central Project Canal and continues east along the north side at Camelback Road. According to the City of Scottsdale Wastewater Model Update and Study, Region Flow Projections by KVL Consultants, Inc. dated September 2001, there is an available peak capacity of 0.35 cfs (0.22mgd) for this reach of 12" pipe between Scottsdale Road and 75th Street. The Safari Drive project will generate flow of no more than 0.317 cfs (0.205mgd), therefore there is capacity to accommodate this development flows. Based on DEA's experience on the W-Hotel Project, there are some existing deficiencies within the City's system along its Miller Road trunk line. These existing bottlenecks are not a result of the Safari Drive Project. The City of Scottsdale's Water Resource Department is aware of these locations and is currently budgeting for and planning solutions to them.

4. Existing Master Plans and Design Reports

This is the first basis of design report prepared for the Safari Drive Project.

5. Certified Flow Testing

No certified flow tests were conducted specifically for this project.

D. PROPOSED CONDITIONS

1. Site Plan

Construction plans that illustrate the project area and its proposed sewer improvements have been substituted for the required site plan. These plans have been included in Appendix A.

2. Connections to the City's Wastewater System

The project's proposed single connection to the City's existing system is illustrated on the construction plans provided in Appendix A. The connection will be done using a new manhole at the intersection of Scottsdale Road and Coolidge Street.

3. Maintenance Responsibilities

The City of Scottsdale will be responsible for maintaining the Safari Drive project sewer lines. There will be 20' wide sewer easements provided on site. No onsite wastewater pumping stations are required for the project.

E. COMPUTATIONS

1. Computer Calculations

A hard copy of the calculations for this report has been provided in Appendix B. Table E.1.1 summarizes the wastewater flows for the Safari Drive Project. A detailed sanitary sewer design table that breaks down the values listed below is provided in Appendix B. The manhole numbers listed in the design table correspond with the construction plans in Appendix A. The peak waste water flows are based on a peaking factor in accordance with City of Scottsdale design standards (Reference 2) and the City of Scottsdale Water Resources Non-Residential Development Fee Packet (Reference 6).

TABLE E.1.1 – WASTEWATER FLOW SUMMARY

Development	mgd		
	Wastewater Flow		
	ADWF	Peaking Factor	Peak Daily Flow
Safari Drive	0.051	4.0	0.205

Each new sewer line was sized with a maximum d/D ratio, or capacity, of no more than 65% full during the ultimate peak flow condition. Table E.1.2 summarizes the percent capacity results for the collection system immediately surrounding the Safari Drive Project.

TABLE E.1.2 – PERCENT CAPACITY SUMMARY

Ave. % Capacity	Minimum % Capacity	Minimum % Cap. Run	Maximum % Capacity	Maximum % Cap. Run
22.9	14.61	7 to 8 & 6 to 7	41.66	2 to 1

The City requires a minimum full flow velocity of 2.5 ft/s and a maximum velocity of 10.0 ft/s at the estimated peak flow. These velocities are represented by the "Full Flow Velocity" and "Peak Daily Flow Velocity" columns in the design tables. The onsite system's full flow velocities range between 2.9 and 3.5 ft/sec and its peak flow velocities range between 1.3 and 2.3 ft/sec.

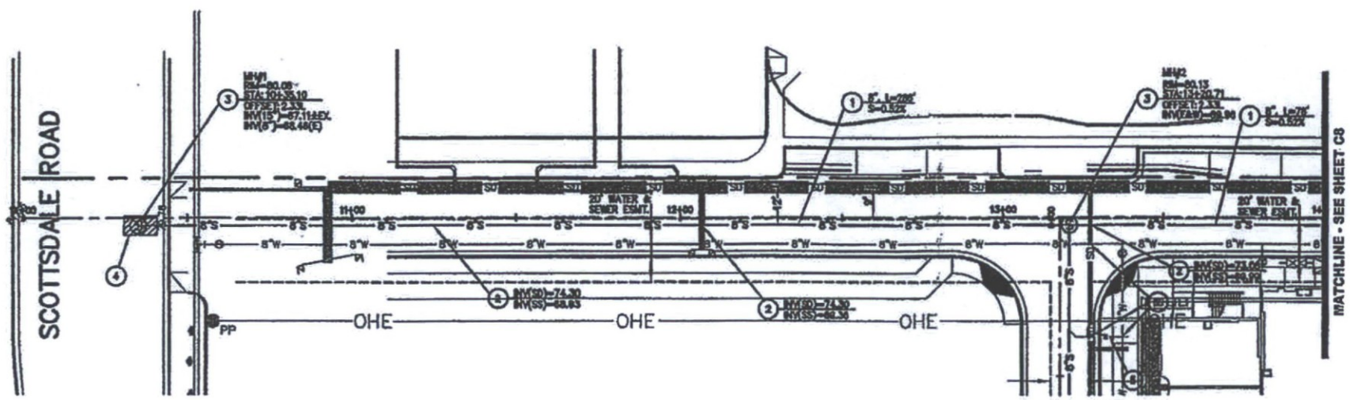
F. SUMMARY

1. An 8" sewer pipe is adequate to handle all flows generated by the Safari Drive project.
2. The existing offsite sewer system will convey the project's flows.

G. REFERENCES

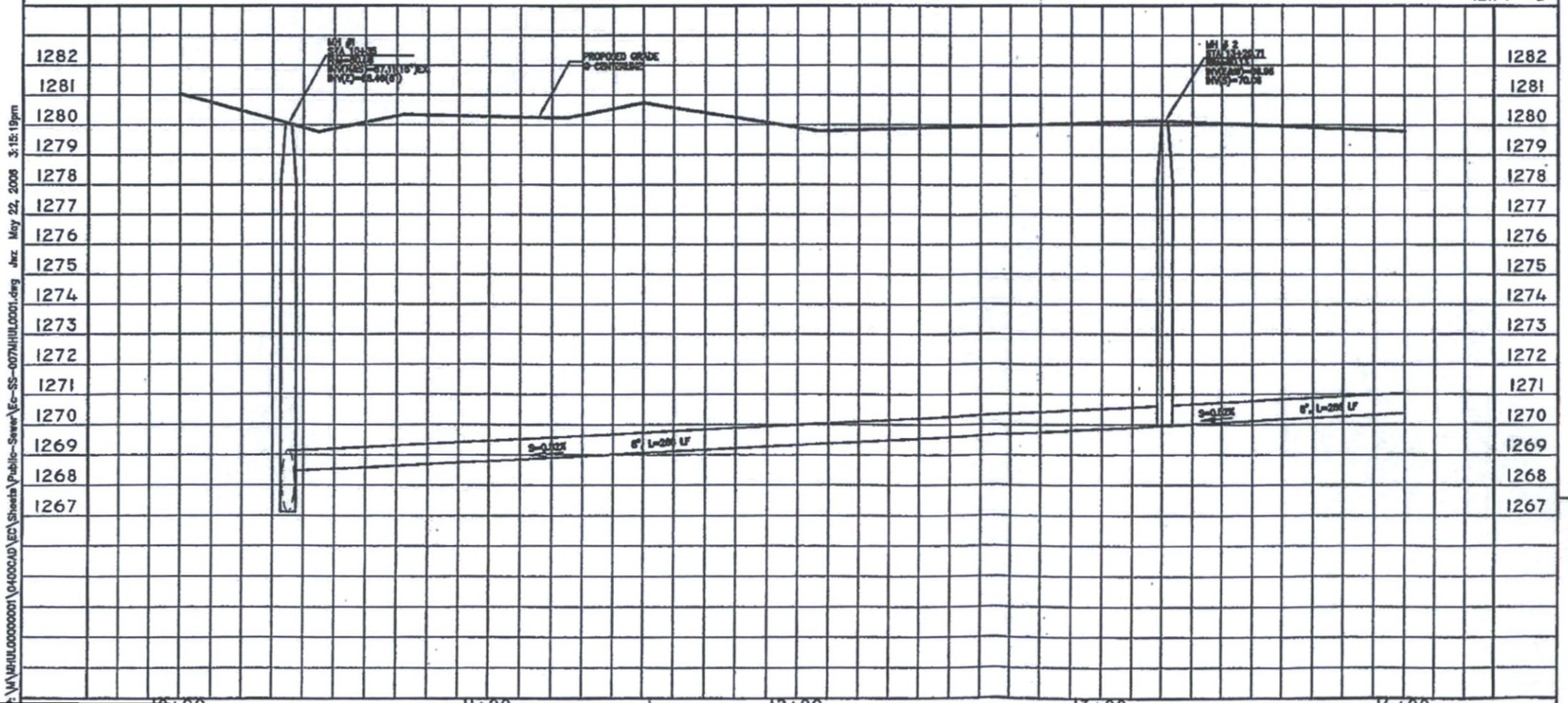
1. *Wastewater Master Plan,* by KVL Consultants, Inc., September 2001.
2. *City of Scottsdale Design Standards & Policies Manual – 2004 Update*, City of Scottsdale, AZ, 2004.
3. *ADEQ Aquifer Protection Permit Rules,* R18-9, March 2001 by ADEQ.
4. Excel 97, by Microsoft Corporation.
5. *The General Plan*, City of Scottsdale, 2001.
6. *City of Scottsdale Water Resources Non-Residential Development Fee Packet*, City of Scottsdale, June 2003.

APPENDIX A
SAFARI DRIVE SEWER AND WATER PLAN



COOLIDGE STREET

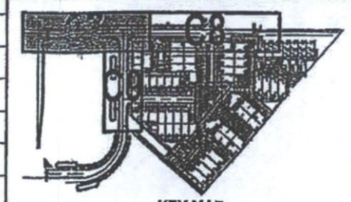
HORIZ 1" = 20'
VERT 1" = 2'



SEWER CONSTRUCTION NOTES

1. INSTALL PVC (SDR-35) SANITARY SEWER LINE. SIZE, LENGTH & INVERT PER PLAN.
2. CONTRACTOR TO PROVIDE 24" MIN. VERTICAL SEPARATION BETWEEN PIPES. IF LESS THAN 24" AND/OR SEWER ON TOP, ENCASE PER MAG STD. DTL. 404. (1' MIN. SEPARATION).
3. INSTALL 4.0' DIA LINED PRE-CAST CONCRETE SEWER MANHOLE (NO STEPS), FRAME AND COVER (WITH SEWER LOGO) PER MAG STD DET'S 420-1 (TYPE 'A'), 420-2, AND 424.
4. SAWCUT REMOVE & REPLACE EX. PAVEMENT PER COS STD DET#2330.
5. SEE PRIVATE SEWER PLANS.

SCALE: 1"=20'



KEY MAP

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Phoenix Arizona 85016
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IN COOPERATION WITH:

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206.682.5692 fax

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Phoenix, AZ 85004

MEP ENGINEER
Flack & Kurtz
1417 Fourth Avenue, Suite 400
Seattle, WA 98101-2260

SAFARI DRIVE
SCOTTSDALE ARIZONA
VANGUARD CITYHOMES

1	VE ADDENDUM 1 05-12-06

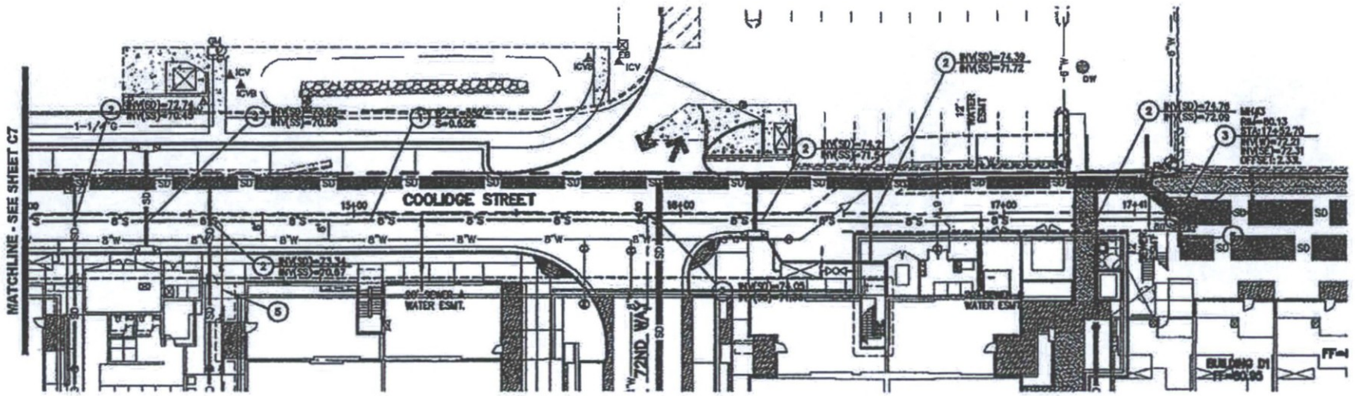
PLAN CHECK # 4812-05-2 DRB CASE # 45 DR 2005 ZONING CASE # 5-ZN-1992 #4 & 6-AZ-1992 # 5

PHASE 1 & 2 IMPROVEMENT PLANS - SITE

PUBLIC SEWER LINE PLANS

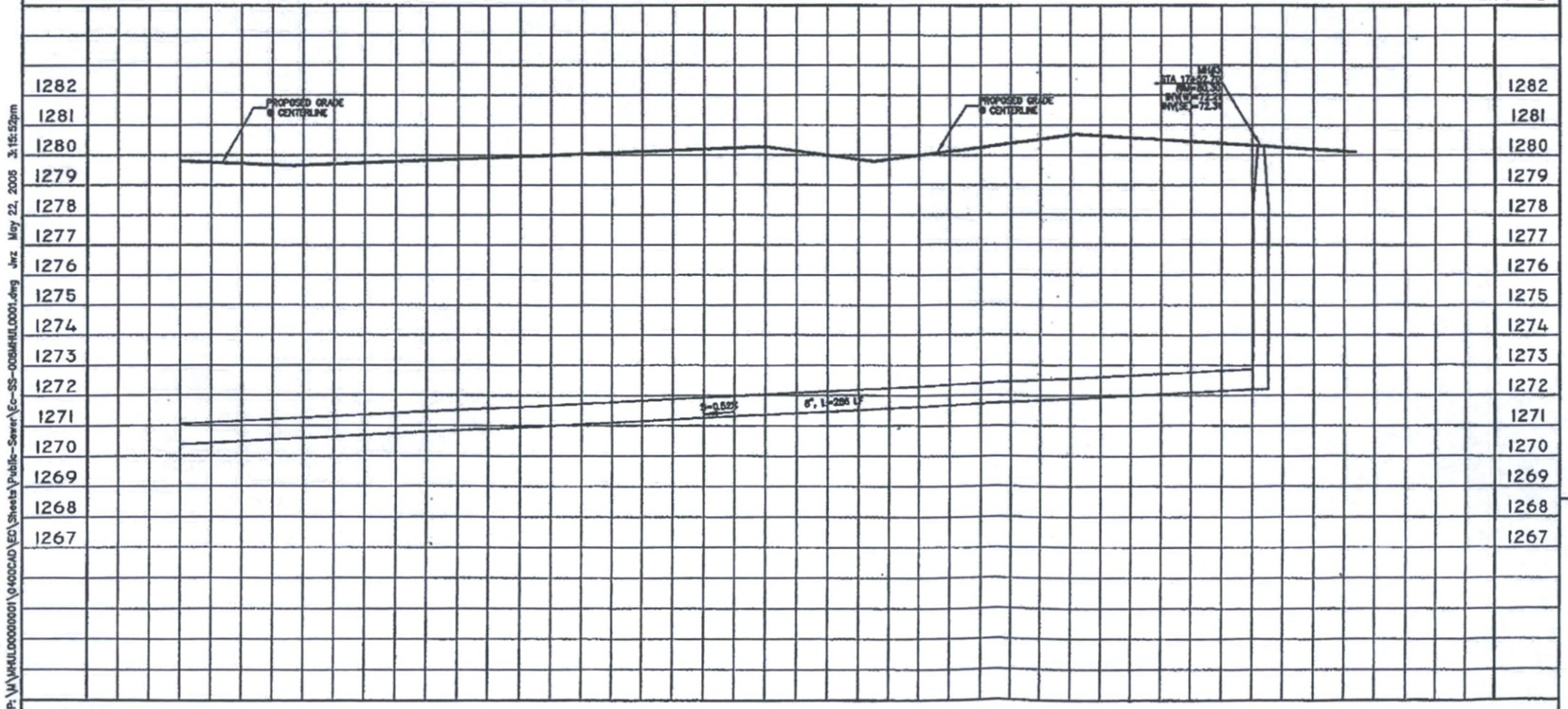
DATE	
DRAWN	05-12-2006
DESIGNER	BHPA
CHECKED	BHD/MSA
DEA PROJ. #	MHUL-0001

SHEET C7 OF 18



COOLIDGE STREET

HORIZ 1" = 20'
VERT 1" = 2'



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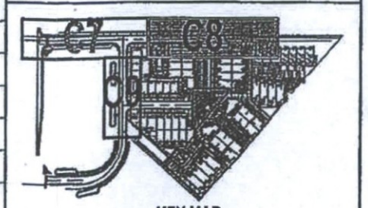
3. INSTALL 4.0' DIA LINED PRE-CAST CONCRETE SEWER MANHOLE (NO STEPS), FRAME AND COVER (WITH SEWER LOGO) PER MAG STD DET'S 420-1 (TYPE 'A'), 420-2, AND 424.
4. SAWCUT REMOVE & REPLACE EX. PAVEMENT PER COS STD DET#2200.
5. SEE PRIVATE SEWER PLANS.

SCALE: 1"=20'



KEY MAP

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206.682.5992 fax

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MEP ENGINEER
Flack & Kurtz
1417 Fourth Avenue, Suite 400
Seattle, WA 98101-2250

SAFARI DRIVE
SCOTTSDALE ARIZONA
VANGUARD CITY HOMES

Δ	
	VE ADDENDUM 1 05-12-06

PHASE 1 & 2 IMPROVEMENT PLANS - SITE

PUBLIC SEWER LINE PLANS

DATE	
DRAWN	05-12-2006
DESIGNER	DHFA
CHECKED	JBH0/MSA
DEA PROJ. #	MRUL-0001

SHEET C8 OF 18

PLAN CHECK # 46124-05-2 DRB CASE # 45 DR 2005 ZONING CASE # 65-ZN-1992 # 4 & 18-AZ-1992 # 5

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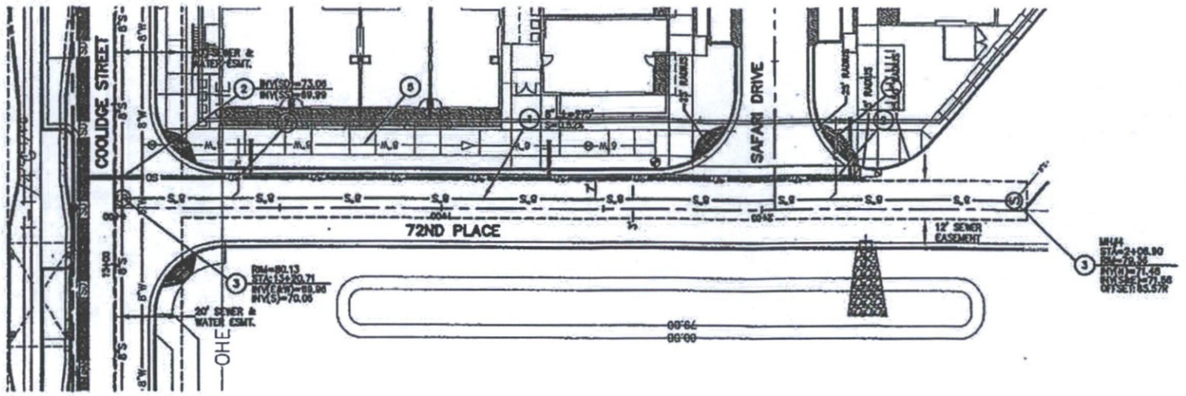

72ND PLACE

HORIZ 1" = 20'
VERT 1" = 2'

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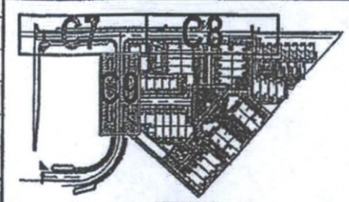
2. CONTRACTOR TO PROVIDE 24" MIN. VERTICAL SEPARATION BETWEEN PIPES. IF LESS THAN 24" AND/OR SEWER ON TOP, ENCASE PER MAG STD. DTL. 404. (1" MIN. SEPARATION).
3. INSTALL 4.0' DIA LINED PRE-CAST CONCRETE SEWER MANHOLE (NO STEPS), FRAME AND COVER (WITH SEWER LOGO) PER MAG STD DET'S 420-1 (TYPE 'A'), 420-2, AND 424.
4. SAWCUT REMOVE & REPLACE EX. PAVEMENT PER COS STD DET.#2200.
5. SEE PRIVATE SEWER PLANS.

SCALE: 1"=20'



KEY MAP

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Floor & Associates
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MEP ENGINEER
Flack & Kurtz
1417 Fourth Avenue, Suite 400
Seattle, WA 98101-2260

SAFARI DRIVE
SCOTTSDALE ARIZONA

VANGUARD CITYHOME

1	05-12-06
	1ST ADDENDUM

PHASE 1 & 2 IMPROVEMENT PLANS - SITE

PUBLIC SEWER LINE PLANS

DATE
DRAWN 05-12-2006
DESIGNER BHPA
CHECKED BHD/MSA
DEA PROJ. # MHUL-0001

SHEET C9 OF 18

PLAN CHECK # 4612-09-2 DRB CASE # 45 DR 2005 ZONING CASE # 85-DR-1992 #4 & 85-AZ-1992 #5

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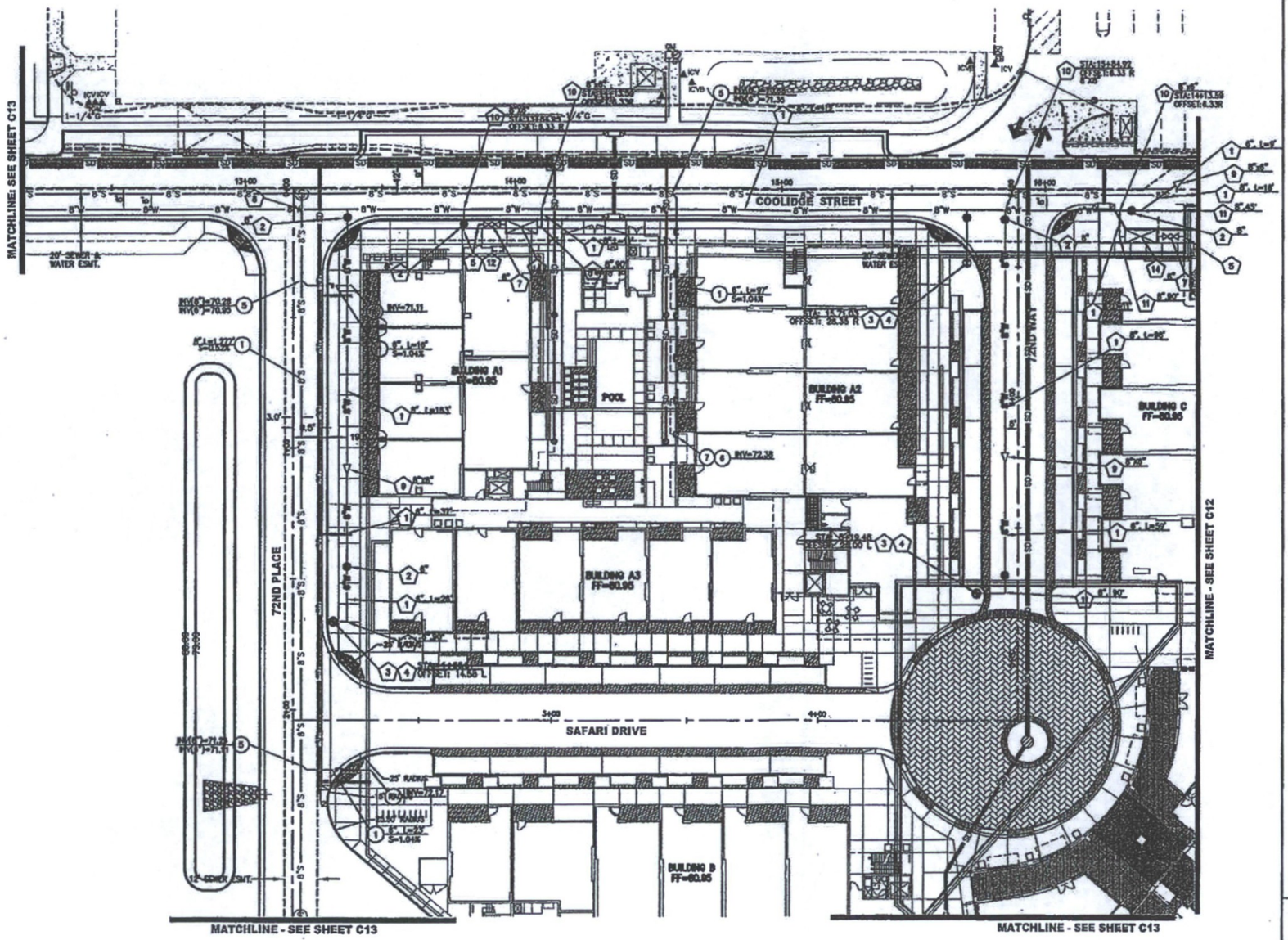


WATER CONSTRUCTION NOTES

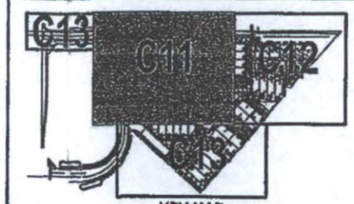
1. INSTALL DUCTILE IRON PIPE (D.I.P)– CLASS 350 WATERLINE, JOINT RESTRAINT PER MAG STD 303–1 #2 IN POLY WRAP. SIZE & LENGTH PER PLANS.
2. INSTALL GATE VALVE W/ VALVE BOX AND COVER PER MAG STD DET 391–1 TYPE ("C"). SIZE PER PLAN.
3. INSTALL NEW FIRE HYDRANT ASSEMBLY PER MAG STD DET 360 AND COS STD DET 2368.
4. INSTALL PAVEMENT MARKERS FOR FIRE HYDRANT PER COS STD. DTL.#2363.
5. INSTALL WATERLINE CAP PER MAG STD DET 390 TYPE A. SIZE PER PLAN. CONTRACTOR SHALL MARK STUB OUT LOCATION WITH 2x4 PAINTED BLUE.
6. INSTALL STAINLESS STEEL TAPPING SLEEVE AND VALVE W/ VALVE BOX AND COVER PER MAG STD DET'S 391–1 TYPE ("C") & 340. SIZE PER PLAN. CONTRACTOR SHALL ADJUST PROPOSED VERTICAL AND HORIZONTAL WATERLINE ALIGNMENT AS REQUIRED TO TIE INTO EXISTING WATERLINE.
7. INSTALL REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY PER COS STD DTL# 2353. SIZE PER PLAN.
8. CONTRACTOR TO PROVIDE 24" MIN. VERTICAL SEPARATION BETWEEN PIPES, U.N.O.
9. INSTALL DIP REDUCER, SIZE PER PLAN. INSTALL PER 700 CURRENT STANDARDS FOR RESTRAINED JOINTS.
10. INSTALL DIP TEE , SIZE PER PLAN. INSTALL PER COS CURRENT STANDARDS SIZE PER PLAN.
11. INSTALL DIP BEND, SIZE AND ANGLE PER PLAN. INSTALL PER COS CURRENT STANDARDS FOR RESTRAINED JOINTS.
12. REFER TO PLUMBING PLANS FOR CONTINUATION.
13. CONNECT PROPOSED 8" WATER LINE TO EXISTING 8" WATERLINE.
14. INSTALL 8" WATER METER WITH VAULT PER CITY OF SCOTTSDALE (C.O.S) STD DET 2345–1.

SEWER CONSTRUCTION NOTES

1. INSTALL PVC (SDR–35) SANITARY SEWER LINE. SIZE, LENGTH & INVERT PER PLAN.
2. CONTRACTOR TO PROVIDE 24" MIN. VERTICAL SEPARATION BETWEEN PIPES. IF LESS THAN 24" AND/OR SEWER ON TOP. ENCASE PER MAG STD. DTL. 404. (1" MIN. SEPARATION).
3. NOT USED
5. INSTALL SEWER BUILDING CONNECTION PER COS STD DET #2440.
6. REFER TO PLUMBING PLANS FOR CONTINUATION OF SEWER.
7. INSTALL SEWER CLEANOUT PER MAG STD DTL. 441.
8. CONNECT TO EXISTING SEWER LINE. REMOVE AND DISPOSE CAP IN ACCORDANCE WITH MAG SPEC. CONTRACTOR TO FIELD VERIFY VERTICAL & HORIZONTAL LOCATION PRIOR TO CONSTRUCTION.
9. SAWCUT REMOVE & REPLACE EX. PAVEMENT PER COS STD DET#2200.
10. INSTALL SEWERLINE CAP PER MAG SPECIFICATIONS. SIZE PER PLAN.

0 10' 20' 40'

SCALE: 1"=20'



KEY MAP

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IN COOPERATION WITH:

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SAFARI DRIVE
SCOTTSDALE ARIZONA

VANGUARD CITYHOME

△	
1	VE ADDENDUM 1 05-12-06

PHASE 1 & 2 IMPROVEMENT PLANS - SITE

ONSITE SEWER & WATER LINE PLANS

DATE	05-12-2006
DRAWN	DMPA
DESIGNER	DMPA
CHECKED	RMD/MSA
DEA PROJ. #	MHAL-0001

SHEET C11 OF 18

PLAN CHECK # 4812-05-2 DRB CASE # 45-DR-2005 ZONING CASE # 65-ZN-1992 #4 & 65-AZ-1992 #5

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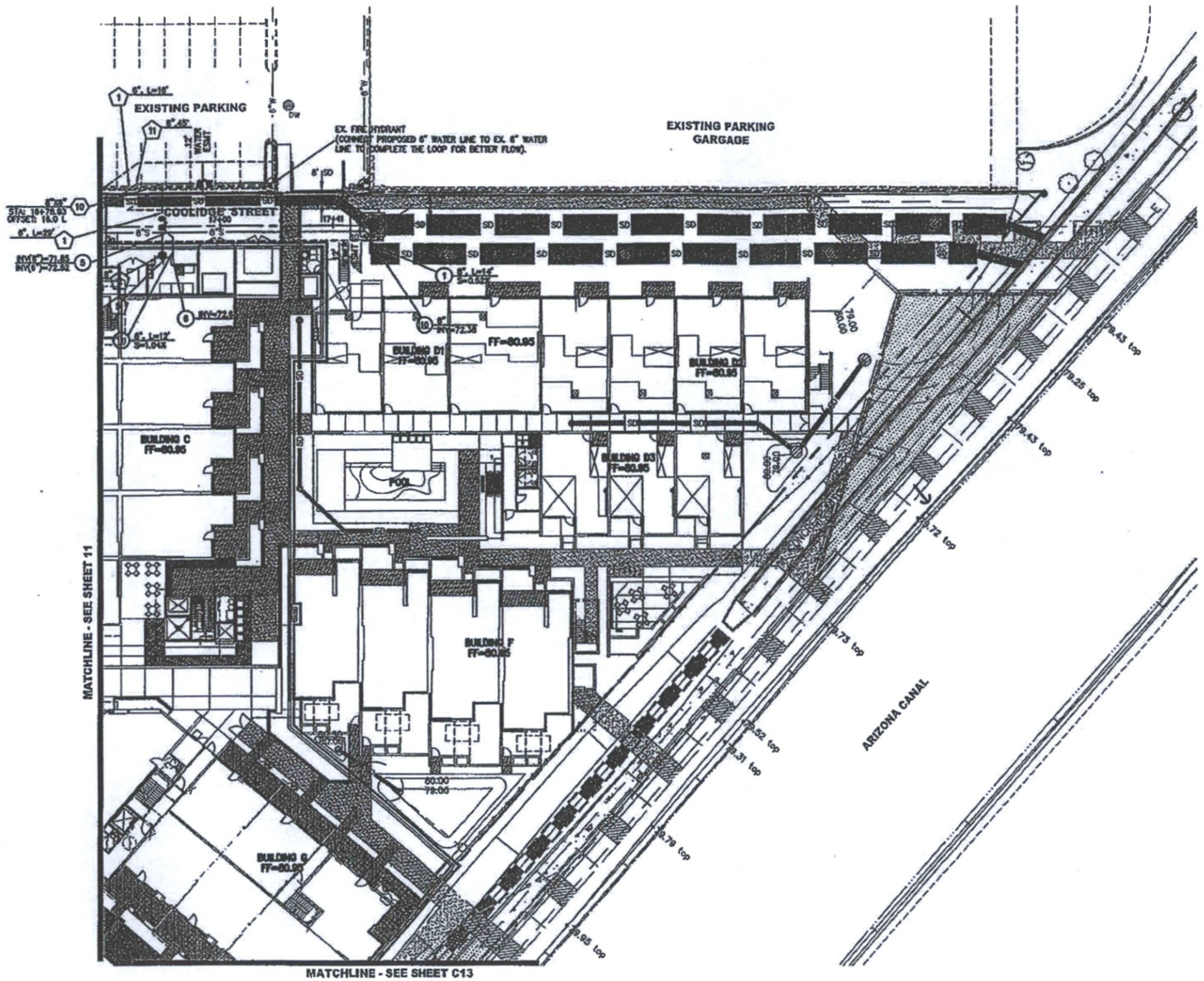

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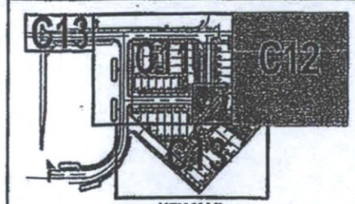
2. INSTALL GATE VALVE W/ VALVE BOX AND COVER PER MAG STD DET 391–1 TYPE ("C"). SIZE PER PLAN.
3. INSTALL NEW FIRE HYDRANT ASSEMBLY PER MAG STD DET 360 AND COS STD DET 2346.
4. INSTALL PAVEMENT MARKERS FOR FIRE HYDRANT PER COS STD. DTL.#2363.
5. INSTALL WATERLINE CAP PER MAG STD DET 390 TYPE A. SIZE PER PLAN. CONTRACTOR SHALL MARK STUB OUT LOCATION WITH 2x4 PAINTED BLUE.
6. INSTALL STAINLESS STEEL TAPPING SLEEVE AND VALVE W/ VALVE BOX AND COVER PER MAG STD DET'S 391–1 TYPE ("C") & 340. SIZE PER PLAN. CONTRACTOR SHALL ADJUST PROPOSED VERTICAL AND HORIZONTAL WATERLINE ALIGNMENT AS REQUIRED TO TIE INTO EXISTING WATERLINE.
7. INSTALL REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY PER COS STD DTL.# 2353. SIZE PER PLAN.
8. CONTRACTOR TO PROVIDE 24" MIN. VERTICAL SEPARATION BETWEEN PIPES, U.N.O.
9. INSTALL DIP REDUCER, SIZE PER PLAN. INSTALL PER TOG CURRENT STANDARDS FOR RESTRAINED JOINTS.
10. INSTALL DIP TEE , SIZE PER PLAN. INSTALL PER COS CURRENT STANDARDS SIZE PER PLAN.
11. INSTALL DIP BEND. SIZE AND ANGLE PER PLAN. INSTALL PER COS CURRENT STANDARDS FOR RESTRAINED JOINTS.
12. REFER TO PLUMBING PLANS FOR CONTINUATION.
13. CONNECT PROPOSED 8" WATER LINE TO EXISTING 8" WATERLINE.
14. INSTALL 6" WATER METER WITH VAULT PER CITY OF SCOTTSDALE (C.O.S) STD DET 2345–1.

SEWER CONSTRUCTION NOTES

1. INSTALL PVC (SDR–35) SANITARY SEWER LINE. SIZE, LENGTH & INVERT PER PLAN.
2. CONTRACTOR TO PROVIDE 24" MIN. VERTICAL SEPARATION BETWEEN PIPES. 8" LESS THAN 24" AND/OR SEWER ON TOP. ENCASE PER MAG STD. DTL. 404. (1" MIN. SEPARATION).
3. NOT USED
4. INSTALL SEWER BUILDING CONNECTION PER COS STD DET #2440.
5. REFER TO PLUMBING PLANS FOR CONTINUATION OF SEWER.
6. INSTALL SEWER CLEANOUT PER MAG STD DTL. 441.
7. CONNECT TO EXISTING SEWER LINE. REMOVE AND DISPOSE CAP IN ACCORDANCE WITH MAG SPECS. CONTRACTOR TO FIELD VERIFY VERTICAL & HORIZONTAL LOCATION PRIOR TO CONSTRUCTION.
8. SAWCUT REMOVE & REPLACE EX. PAVEMENT PER COS STD DET#2200.
9. INSTALL SEWERLINE CAP PER MAG SPECIFICATIONS. SIZE PER PLAN.

0 10' 20' 40'
SCALE: 1"=20'



KEY MAP

DAVID EVANS AND ASSOCIATES INC.
2141 East Highland Ave.
Suite 200
Phoenix Arizona 85016
Phone: 602.678.5151

IN COOPERATION WITH:

[redacted]

ARCHITECTURE AND PLANNING
71 COLUMBIA - SIXTH FLOOR
SEATTLE, WA. 98104
206.682.9537
206.682.5972 fax

LANDSCAPE
Floor & Associates
1425 North First Street
Second Floor
Phoenix, AZ 85004

MEP ENGINEER
Rack & Kurtz
1417 Fourth Avenue, Suite 400
Seattle, WA 98101-2260

SAFARI DRIVE
SCOTTSDALE ARIZONA

VANGUARD CITYHOMES

Δ	
1	VE ADDENDUM 1 05–12–06

PHASE 1 & 2 IMPROVEMENT PLANS - SITE

ONSITE SEWER & WATER LINE PLANS

DATE	
DRAWN	05–12–2006
DESIGNER	DHFA
CHECKED	EHG/MSA
DEA PROJ. #	MHUL–0001

SHEET C12 OF 18

PLAN CHECK # 4812-05-2 DRB CASE # 45-DR-2005 ZONING CASE # 85-ZN-1992 #4 & 88-AZ-1992 #5

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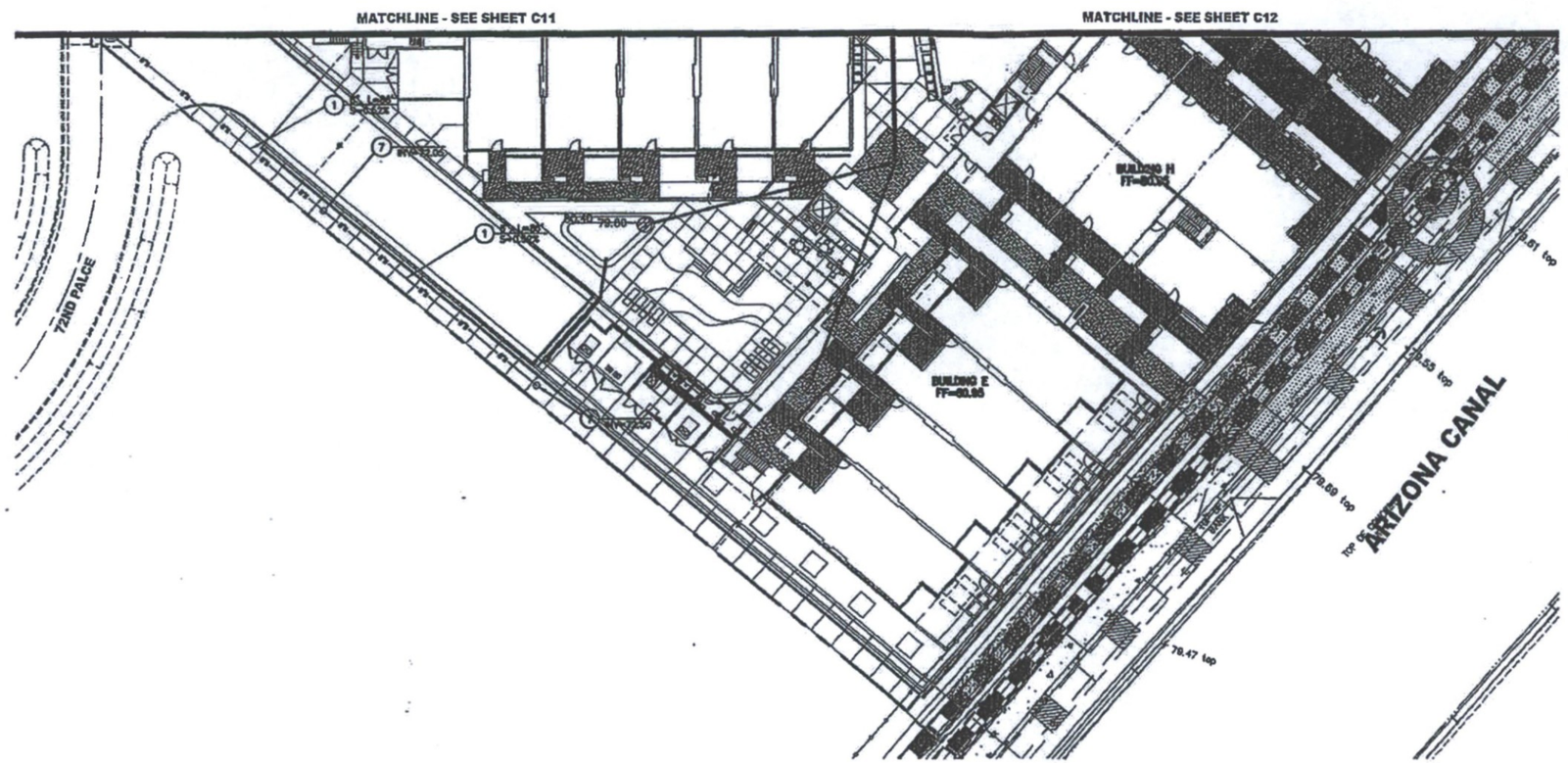
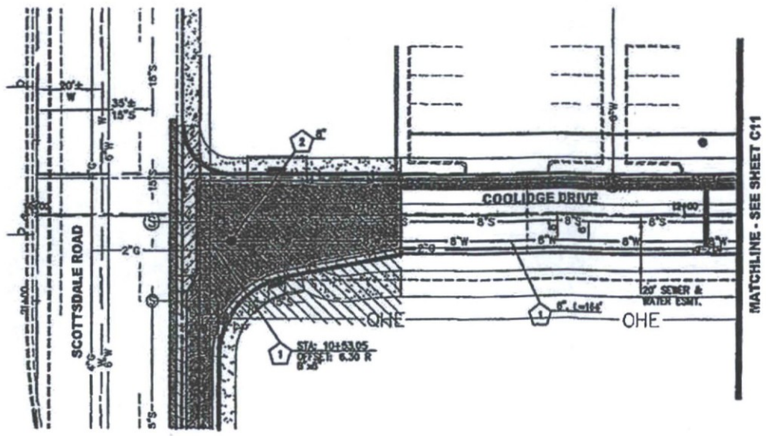




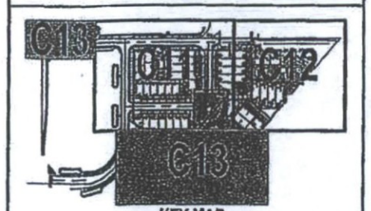
WATER CONSTRUCTION NOTES

1. INSTALL DUCTILE IRON PIPE (D.I.P.)- CLASS 350 WATERLINE, JOINT RESTRAINT PER MAG STD 303-1 &2 W POLY WRAP. SIZE & LENGTH PER PLANS.
2. INSTALL GATE VALVE W/ VALVE BOX AND COVER PER MAG STD DET 391-1 TYPE ('C'). SIZE PER PLAN.
3. INSTALL NEW FIRE HYDRANT ASSEMBLY PER MAG STD DET 360 AND COS STD DET 2366.
4. INSTALL PAVEMENT MARKERS FOR FIRE HYDRANT PER COS STD. DTL.#2363.
5. INSTALL WATERLINE CAP PER MAG STD DET 380 TYPE A. SIZE PER PLAN. CONTRACTOR SHALL MARK STUB OUT LOCATION WITH 2x4 PAINTED BLUE.
6. INSTALL STAINLESS STEEL TAPPING SLEEVE AND VALVE W/ VALVE BOX AND COVER PER MAG STD DET'S 381-1 TYPE ('C') & 340. SIZE PER PLAN. CONTRACTOR SHALL ADJUST PROPOSED VERTICAL AND HORIZONTAL WATERLINE ALIGNMENT AS REQUIRED TO TIE INTO EXISTING WATERLINE.
7. INSTALL REDUCED PRESSURE BACKFLOW PREVENTION ASSEMBLY PER COS STD DTL# 2353. SIZE PER PLAN.
8. CONTRACTOR TO PROVIDE 24" MIN. VERTICAL SEPARATION BETWEEN PIPES, U.N.O.
9. INSTALL DIP REDUCER, SIZE PER PLAN. INSTALL PER TOD CURRENT STANDARDS FOR RESTRAINED JOINTS.
10. INSTALL DIP TEE . SIZE PER PLAN. INSTALL PER COS CURRENT STANDARDS SIZE PER PLAN.
11. INSTALL DIP BEND. SIZE AND ANGLE PER PLAN. INSTALL PER COS CURRENT STANDARDS FOR RESTRAINED JOINTS.
12. REFER TO PLUMBING PLANS FOR CONTINUATION.
13. CONNECT PROPOSED 8" WATER LINE TO EXISTING 8" WATERLINE.
14. INSTALL 8" WATER METER WITH VAULT PER CITY OF SCOTTSDALE (C.O.S) STD DET 2345-1.

SEWER CONSTRUCTION NOTES

1. INSTALL PVC (SDR-35) SANITARY SEWER LINE. SIZE, LENGTH & INVERT PER PLAN.
2. CONTRACTOR TO PROVIDE 24" MIN. VERTICAL SEPARATION BETWEEN PIPES. IF LESS THAN 24" AND/OR SEWER ON TOP, ENCASE PER MAG STD. DTL. 404. (1' MIN. SEPARATION).
3. NOT USED
5. INSTALL SEWER BUILDING CONNECTION PER COS STD DET #2440.
6. REFER TO PLUMBING PLANS FOR CONTINUATION OF SEWER.
7. INSTALL SEWER CLEANOUT PER MAG STD DTL. 441.
8. CONNECT TO EXISTING SEWER LINE, REMOVE AND DISPOSE CAP IN ACCORDANCE WITH MAG SPEC. CONTRACTOR TO FIELD VERIFY VERTICAL & HORIZONTAL LOCATION PRIOR TO CONSTRUCTION.
9. SAWCUT REMOVE & REPLACE EX. PAVEMENT PER COS STD DET#2200.
10. INSTALL SEWERLINE CAP PER MAG SPECIFICATIONS. SIZE PER PLAN.

0 10' 20' 40'
SCALE: 1"=20'



KEY MAP

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SAFARI DRIVE
SCOTTSDALE ARIZONA

VANGUARD CITY HOME

4	VE ADDENDUM 1	05-12-06

PHASE 1 & 2 IMPROVEMENT PLANS - SITE

DATE	05-12-2006
DRAWN	DHPA
DESIGNER	DHPA
CHECKED	BHO/MSA
DEA PROJ. #	MHL-0001

SHEET C13 OF 18

PLAN CHECK # 4612-05-2 DRB CASE # 45-DR-2005 ZONING CASE # 65-ZN-1992 #4 & 85-AZ-1992 #5

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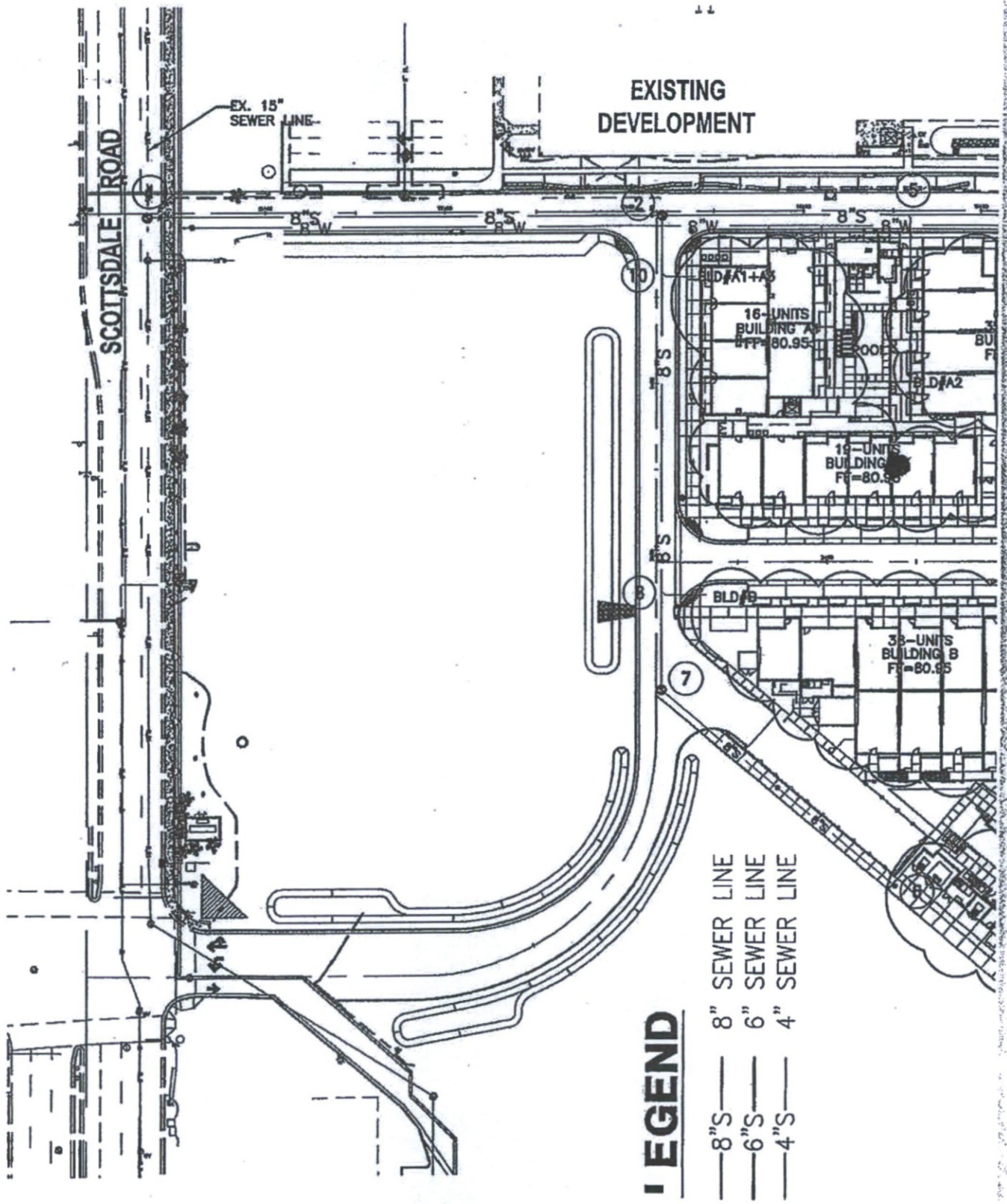


APPENDIX
SANITARY SEWER D

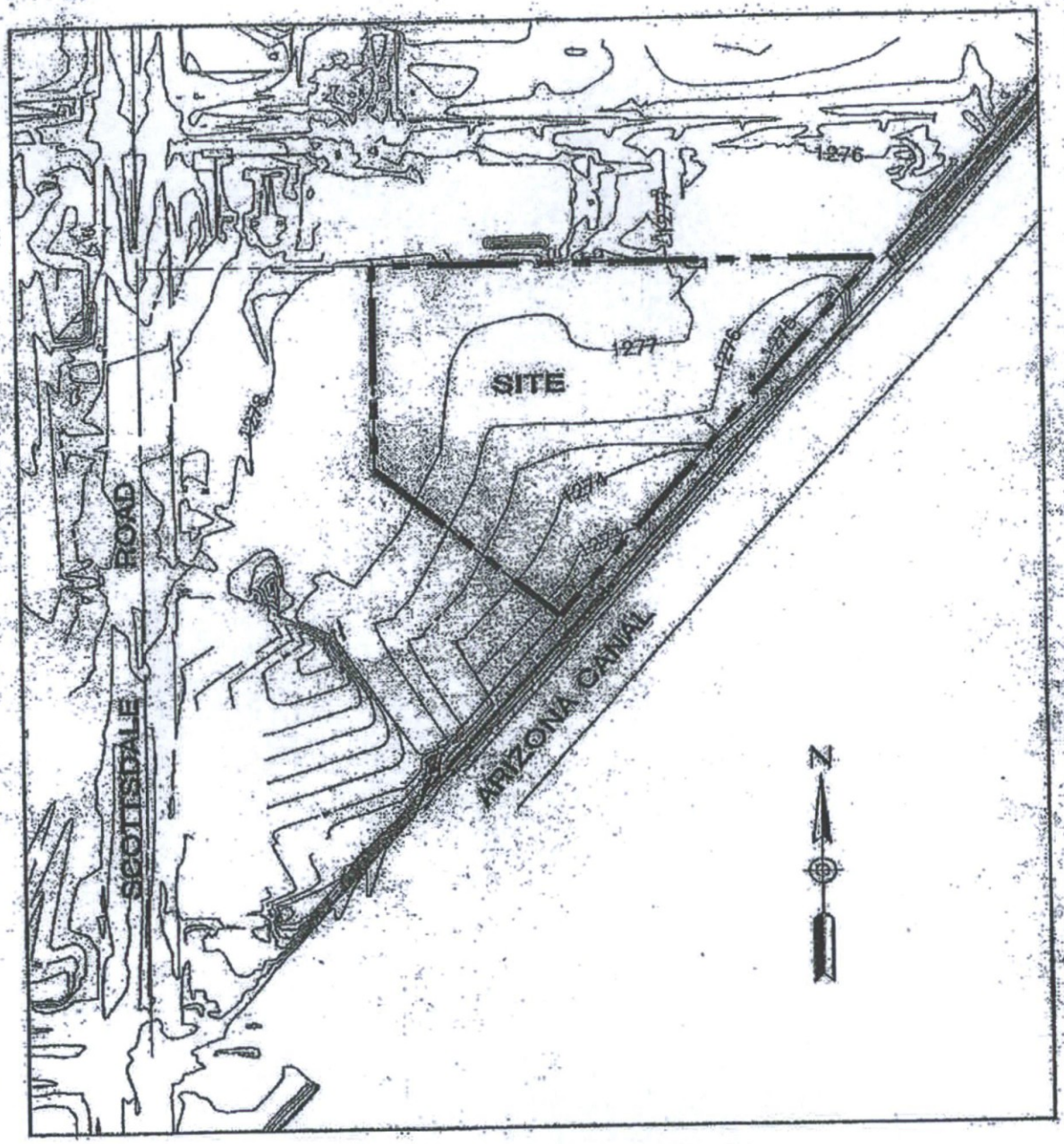
SAFARI DRIVE
ULTIMATE SANITARY SEWER SYSTEM

May, 2006

Upstream MH	Down-Stream MH	Development / Flow Notes	Area Served (sq ft)	DU	Person/DU	Population	Rooms	Ave. Gal per (sq ft, Capita or Rooms) per day	ADWF (mgd)	Peak Factor	PDF (mgd)	Cum. PDF (mgd)	Upstream MH Drop	Upstream MH Invert (ft)	Proposed Grade Upstream (ft)	Upstream Depth	Upstream Cover	In line MH Drop (ft)	Down-Stream MH Invert (ft)	Proposed Grade Down-Stream	Down-Stream Depth	Down-Stream Cover	Length (ft)	Slope (ft/ft)	Diameter (in.)	% Cap.	Peak Daily Flow Velocity (fps)	Full Flow Velocity (fps)
BLD#D	3	Residential		47	2.5	118		100.0	0.012	4.0	0.047	0.047	0	73.38	80.00	8.80	8.13	0.00	72.31	80.00	7.69	7.02	12.50	0.0052	8	19.51	1.5	2.9
3	4	Flow from Line BLD D - 3							0.012	4.0	0.047	0.047	0.1	72.21	80.00	10.68	10.01	0.00	71.85	89.69	17.84	17.17	71.90	0.0052	8	19.51	1.5	2.9
BLD#C	4	Residential		24	2.5	60		100.0	0.006	4.0	0.024	0.024	0	72.65	80.30	8.46	8.13	0.00	72.52	80.00	7.48	7.15	10.00	0.0200	4	25.05	2.2	3.5
4	5	Flow From Line 3-4							0.012	4.0	0.047	0.047																
		Flow From Line BLD C-4							0.006	4.0	0.024	0.071	0	71.85	80.69	8.84	8.17	0.00	70.68	79.65	8.97	8.30	221.00	0.0052	8	23.94	1.7	2.9
BLD#A2	5	Residential		35	2.5	88		100.0	0.009	4.0	0.035	0.035	0	72.38	80.50	8.63	8.13	0.00	71.35	79.65	8.30	7.80	92.00	0.0104	6	20.75	1.8	3.3
5	2	Flow From Line 4-5							0.018	4.0	0.071	0.071																
		Flow From Line BLD A2-5							0.009	4.0	0.035	0.106	0	70.68	79.65	8.97	8.30	0.00	69.96	80.14	10.18	9.51	139.00	0.0052	8	29.34	1.9	2.9
6	7	Residential		26	2.5	65		100.0	0.007	4.0	0.026	0.026	0	72.50	80.10	8.80	8.13	0.00	71.80	79.40	7.80	7.13	173.00	0.0052	8	14.61	1.3	2.9
7	8	Flow From Line 6-7							0.007	4.0	0.026	0.026	0.1	71.50	79.40	8.80	8.13	0.00	71.22	79.30	8.08	7.41	55.00	0.0052	8	14.61	1.3	2.9
BLD#B	8	Residential		38	2.5	95		100.0	0.010	4.0	0.038	0.038	0	72.15	79.80	8.63	8.13	0.00	71.89	79.30	7.41	6.91	25.00	0.0104	6	21.62	1.9	3.3
8	10	Flow From Line 7-8							0.007	4.0	0.026	0.026																
		Flow From Line 9-8							0.010	4.0	0.038	0.064	0	71.22	79.30	8.08	7.41	0.00	70.25	80.24	9.99	9.32	185.00	0.0052	8	22.74	1.7	2.9
BLD-A1&A3	10	Residential		35	2.5	88		100.0	0.009	4.0	0.035	0.035	0	71.11	80.50	8.80	8.13	0.00	70.92	80.24	9.32	8.65	19.00	0.0052	8	16.87	1.4	2.9
10	2	Flow From Line 8-10							0.016	4.0	0.064	0.064																
		Flow From Line BLD A1&A3-10							0.009	4.0	0.035	0.099	0	70.25	80.24	9.99	9.32	0.00	70.06	80.14	10.08	9.41	35.00	0.0052	8	28.35	1.9	2.9
2	1	Flow From Line 5-2							0.027	4.0	0.106	0.106																
		Flow From Line 10-2							0.025	4.0	0.099	0.205	0.1	69.96	80.14	10.18	9.51	0.00	68.46	80.06	11.60	10.93	285.00	0.0052	8	41.66	2.3	2.9
		TOTAL=		205																								

APPENDIX C
SEWER QUARTER SECTION MAP

APPENDIX D
TOPOGRAPHIC MAP



TOPOGRAPHIC MAP

SCALE: 1"=200'

WASTE WATER AND WATER SYSTEM CONCEPTUAL DESIGN REPORT
Safari Drive Phase II

Date: April 27, 2012

The Safari Drive Phase II project is located within the northwest quarter of Section 23 of Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian within City of Scottsdale, AZ. The site is approximately 1.5 acres and irregularly shaped. It is generally bound by 72nd Place to the west, existing Safari Drive Phase 1 condominium units to the south, 72nd Way to the east, and Coolidge Street to the north. The area's street system in relationship to the location of the site is illustrated in Exhibit 1, the project's vicinity map. The project will consist of multistory story apartment buildings. The site data/calculations are shown on attached calculation worksheet under Appendix A.

The estimated Average Day Sewer Design Flows of the project were determined based on the following values.

- Residential Units = 140 gallons per DU per day (PF = 4.5) High
- Pool Backwash = 200 gallons per day (PF = 1)

what is max surge in gpm?

Total Peak Daily Flow:

Total Peak Daily Flow from Safari Drive Phase 2 = 70 gpm
Total Peak Daily Flow from Existing Safari Drive Phase 1 = 11 gpm

Proposed Sewer Connections:

All of the proposed sewer lines will be private; the proposed sewerlines from the building will be connected to the existing 6-inch sewer stubs at the property line, which was constructed as a part of Safari phase 1. Exhibit 2 illustrates the proposed connections to the existing system.

Safari Phase 1 Sewer (26 DU's):

A portion of the existing public line in 72nd Way will be removed in order to construct the ramp for the underground parking structure. A public abandonment will be required in order to remove this sewer. The flow from the existing 26 DUs in Safari Phase I that currently utilize this sewer will be rerouted through the Safari Phase 2 garage and connect to the existing sewer along the Coolidge Street as shown on attached Exhibit 2. A Pump (see under Appendix C, Pump Specs.) will be installed in the existing manhole and a 2" forcemain will be used to convey the sewage outside the garage wall into 6" sewer cleanout and which will connect to existing sewer manhole within Coolidge Street with 6" sewerline. Exhibit 2 illustrates the proposed layout.

Printed: 4/24/2012

WASTEWATER GENERATION SUMMARY

Safari Drive Phase 2

Building ID	Line Contribution	Land Use	Area (ft^2)	Seats	Dwelling Units (DU)	Persons / DU	Population / Equivalent Population	Unit Wastewater Flow (GPD)	Average Daily Flow (GPD)	Peak Factor	Peak Flow (GPD)
Main		Residential	-	-	159	2.5	398	140	22,260	4.5	100,170
		Pool Backwash							200	1.0	200
		TOTAL (GPD)							**22,460**		**100,370**
		TOTAL (GPM)							**16**		**70**

Existing Safari Drive Phase 1 (26 DU's)

Building ID	Line Contribution	Land Use	Area (ft^2)	Seats	Dwelling Units (DU)	Persons / DU	Population / Equivalent Population	Unit Wastewater Flow (GPD)	Average Daily Flow (GPD)	Peak Factor	Peak Flow (GPD)
Existing Units		26 DU FROM SAFARI PHASE 1	-	-	26	2.5	65	140	3,640	4.5	16,380
		TOTAL (GPD)							**3,640**		**16,380**
		TOTAL (GPM)							**3**		**11**

COOLIDGE AVENUE

SCOTTSDALE ROAD

72ND WAY

FASHION SQUARE DRIVE

4" Meter

2" Meter

NORTH

2-4" Meter

2" Meter

MAIN

New hydrant.

EXISTING WATERLINE TO BE REMOVED IN ORDER TO CONSTRUCT BELOW GRADE PARKING STRUCTURE. EXISTING HYDRANT TO BE RELOCATED TO INTERSECTION OF COOLIDGE AVENUE AND 72ND WAY.

FUTURE
SAFARI PHASE II
(NOT A PART)

This needs to be resolved. Don't want fire line routed thru ...

New hydrant

EXISTING
SAFARI
PHASE I

EXISTING
SAFARI
PHASE I

PHASE 1
PHASE 2

PHASE 1
PHASE 2

EAST

ARIZONA CANAL

LEGEND

- BLUESKY PHASE 1 BUILDING
- BLUESKY PHASE 2 BUILDING
- XX — PROPOSED BUILDING DESIGNATION
- 2" WATERLINE
- 4" WATERLINE
- 6" WATERLINE
- 8" WATERLINE
- 16" WATERLINE

NOTES:

1. EXISTING WATERLINES ARE DASHED
2. ALL PROPOSED WATER IMPROVEMENTS WILL BE CONSTRUCTED WITH PHASE 1

DRAWN BY: ZJCP

CHECKED BY:

DATE: 10/10/2011

BY	REVISION	DATE

DAVID EVANS AND ASSOCIATES inc.
4600 East Washington Street, Suite 430
Phoenix Arizona 85034
Phone: 602.678.5151

EXHIBIT 2
SCOTTSDALE BLUESKY
WATER DISTRIBUTION SYSTEM IMPROVEMENTS
SCOTTSDALE, ARIZONA

SCALE: NTS

SECTION: 23
TWNSHP: 2N
RANGE: 4E

SHEET 1 OF 1

JOB NO.: GRYD0000-0001

18-4

MARTIN
(019-03)
1281.92
0+45
N.F.
N.F.
15ft
1277.22
1+30
N.F.
N.F.
1271.00 N
1271.00 E
1271.00 W
(4725)
1275.97
1268.14 NE
1268.14 W
TRACT
ON
E 1281.78
2+27
1280.24
1265.98 W
1265.98 N
1265.98 E
10" VCP
SCOTTSDALE
15" TYP UNK
35ft
15ft
1279.83
3+85
1280.13
1270.06 E
1269.96 W
1280.12
2+61
8" PVC
8" PVC
1280.10
3+36
1280.30
1272.27 W
SAFARI
(1017-40), (1071-07) & (1120-45)
SCOTTSDALE
(1202-50)
N.F.
N.F.
1278.59
0+27
1279.27
0+15
N.F.
N.F.
N.F.
N.F.
1280.35
3+29
(4735)
(4745)
DRIVE I
(4743)
(4747)
(4741)
(4733)
(4739)
CONDOMINIUM
36ft
278.75
+85
N.F.
N.F.
1278.14
1+87
N.F.
N.F.
1277.62
1+98
15" PVC
1278.42
1264.22 NW
1264.25 S
1278.20
2+12
N.F.
N.F.
1
(4605)
2
(4575)
ARCADIA
(052-15)
1276.97
1+95
BLUESKY
CANAL
1+52
15
(4624)
1272.91
4+14
0+10
15
(4616)
1271.60
1264.48 NE
1264.48 SW
4+06
14
(4608)
2+55
2+44
CHEZ
FRED
(229-35)
(4542)
8" VCP
CONDOMINIUMS
(4538)
0+19
0+73
1270.00
1260.89 E
1273.11
OLIV
(187-09
TRAC
"A"
VIEW
(4601
X-2 X-3 X-4 X-5

2011-12
4/2/12
1st cb

DAVID EVANS
AND ASSOCIATES INC.

April 26th, 2012

Accepted as a conceptual analysis

City of Scottsdale
Water Resources Administration
9379 E. San Salvador
Scottsdale, AZ 85258

Mr. Doug Mann
City of Scottsdale
Water and Wastewater Management
Scottsdale, AZ 85004

Doug Mann MAY 8, 2012

RE: **Conceptual Design Report for Water and Wastewater for Safari II**
DEA Project No.: STRS0000-0001

Detailed Basis Read prior to submittal of improvement plans.

Dear Mr. Mann,

This technical memorandum is an summary of the *Water and Wastewater Analysis for Safari Phase II*. This portion of the project is bounded by Coolidge to the north, Scottsdale Road to the West, the existing Sarafi I project to the east, and the proposed BlueSky project to the south. The Safari project site is located within Section 23, Township 2 North, Range 4 East of the Salt River and Gila River Base and Meridian.

General

This conceptual design report analysis was completed for ST Residential. The proposed development will include approximately 1.5 acres of property at build out with 159 residential condominium units. The tallest structure on the site will be 10-stories.

The purpose of this analysis is to size and locate the on-site water and wastewater distribution and collection systems for the proposed development. These facilities will serve the site in accordance with the City of Scottsdale Design Guidelines, the ADEQ Aquifer Protection Permit Rules (R18-9-E301), ADEQ Engineering Bulletin No. 10, and typical engineering standards. This addendum addresses the on-site water distribution and sanitary sewer collection systems only and does not contain any off-site analyses.

Report with does not Address this

Existing Sewerline from Safari Phase I

Based on the possibility that a ramp may be constructed as part of the adjacent BlueSky development, that ramp would impact an existing 8" sewerline that was originally constructed as a public sewerline. In such an event, this sewerline would either be drained to a sump at the bottom of the ramp and pumped up into the existing gravity system in Coolidge through the balance of the ramp; or, the grinder pump would be installed in the existing manhole at the south end of the proposed ramp and sewer flows would be redirected through the garage within a pressurized 2" force main. In any scenario, there is a reasonable solution for redirecting this flow into a public system without crossing another property line.

Preferred by City

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: February 27, 2013

TO: Gray Development, LLC
404 E Camelback Road, Suite 275
Phoenix, AZ 85018

FROM: David Holman

SUBJECT: **Wastewater Basis of Design Report - Addendum No. 2**

PROJECT: GRYD00000001 – Blue Sky Scottsdale

COPIES:

Expires 03/31/2014

This memorandum addends the *Wastewater Basis of Design Report for Blue Sky Scottsdale* by DEA. This addendum provides revised information regarding the proposed intermediate sewer system to be installed as the project is developed.

The following shall be added to the referenced sections of the BOD.

SECTION D, PROPOSED CONDITIONS

1. **SITE PLAN**
   Exhibit 2, illustrating the proposed site improvements, has been revised, 2/2013. Revisions to the exhibit have been clouded and reference Add. No.2.

2. **PROPOSED CONNECTIONS:**

   An interim 8-inch gravity sewer line will be installed from a new manhole east of 72nd Way and will reroute existing sewer flow to the existing 15-inch sewer main located to the southwest. The interim gravity sewer line will be installed to maintain existing service for portions of the existing gravity system in conflict with the proposed underground parking garage structure. This interim gravity sewer line will consist of one new manhole and approximately 260 lf of temporary 8-inch pipe. The new manhole will be converted to serve as the wet well for the ultimate private pump station. The interim sewer line will remain in service until the completion and acceptance of the ultimate sewer facilities at which time all temporary interim sewer improvements shall be removed.

ADDENDUM NO. 2 TO WASTEWATER BOD

Attachment A: Exhibit 2 - Wastewater Collection System (Revised 2/27/2013)

COOLIDGE STREET

EX. SSMH
INV E=1268.37
INV SW=1268.27 (8")

EX. SSMH
INV N=1266.76
INV W=1267.26
INV S=1266.64

EX. SSMH
INV NE=1268.05
INV W=1267.52

PROPOSED GARAGE

NORTH

MAIN

EAST

PHASE 1
PHASE 2

FORCE MAIN

EX. SSMH
INV E=1269.98
INV S=1269.98
INV W=1269.88

ULTIMATE PRIVATE FORCE MAIN (MOUNTED TO EAST FACE OF STRUCTURE WALL)

FUTURE SAFARI PHASE II (NOT A PART)

EXISTING SAFARI PHASE I

EXISTING SAFARI PHASE I

PROPOSED ULTIMATE PRIVATE PUMP & FORCE MAIN

72ND WAY

SCOTTSDALE ROAD

FASHION SQUARE DRIVE

INTERIM 8" GRAVITY SEWER

PROPOSED REALIGNMENT OF EX. 15" SEWER

10' MIN

EX. SSMH
INV NW=1264.22
INV S=1264.25

EX. SSMH
INV N=1265.68
INV SE=1265.53

PROPOSED GARAGE

SALE PARCEL UNDER SEPARATE ORB APPLICATION

ARIZONA CANAL

10'W5' BOX CULVERT

(10") (15") (8")

NOTES:
1. MAINTAIN A MINIMUM CLEARANCE OF 10' BETWEEN THE PROPOSED 15-INCH SEWER LINE REALINGMENT AND PROPOSED UNDERGROUND PARKING GARAGE.
2. PORTIONS OF THE EXISTING GRAVITY SEWER LINE WITHIN 72ND WAY SHALL BE REMOVED AND ABANDONED IN ORDER TO CONSTRUCT UNDERGROUND PARKING GARAGE. THE EXISTING FLOW TO BE REROUTED THROUGH A PUMP AND FORCE MAIN SYSTEM TO THE EXISTING MANHOLE IN COOLIDGE STREET.
3. THE PROPOSED ULTIMATE PUMP AND FORCE MAIN SHALL BE PRIVATELY OWNED AND OPERATED. THIS PUMP AND FORCE MAIN WILL SERVE SAFARI PHASE I AND WILL

LEGEND

- BLUE SKY PHASE 1 BUILDING
- BLUE SKY PHASE 2 BUILDING
- EXISTING PUBLIC SEWER TO BE ABANDONED
- DEMO EXISTING PRIVATE SEWER
- PROPOSED BUILDING DESIGNATION (XX)
- EXISTING PUBLIC SEWER LINE
- PROPOSED PUBLIC SEWER LINE
- EXISTING PRIVATE SEWER LINE
- PROPOSED PRIVATE SEWER LINE
- INTERIM 8" GRAVITY SEWER
- PROPERTY LINE
- EXISTING MANHOLE
- EXISTING CLEANOUT
- CONCENTRATION POINT (SEE FLOWMASTER OUTPUT)

DRAWN BY: DEA
CHECKED BY:
DATE: 02/2013

BY	REVISION	DATE
DCHO	REVISIONS PER BOD ADD. NO.1.	1/31/2013
DCHO	REVISIONS PER BOD ADD. NO.2.	2/27/2013

DAVID EVANS AND ASSOCIATES inc.
4600 East Washington Street, Suite 430
Phoenix Arizona 85034
Phone: 602.678.5151

EXHIBIT 2
BLUE SKY SCOTTSDALE
WASTEWATER COLLECTION SYSTEM
SCOTTSDALE, ARIZONA

SCALE: NTS
SECTION: 23
TWNSHP: 2N
RANGE: 4E
SHEET 1 OF 1

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APPENDIX E
Development Agreements

RELEASE AGREEMENT

This Release Agreement (this "**Agreement**") is made and entered into as of March 31, 2011 between Safari Drive Marketing, LLC, a Delaware limited liability company ("**Safari**"), Sonoran Desert Land Investors, LLC, an Arizona limited liability company ("**Sonoran**") and GDG Enterprises, LLC, an Arizona limited liability company ("**Gray**"). Safari, Sonoran and Gray are sometimes referred to in this Agreement individually as a "**Party**" and collectively as the "**Parties**" and Sonoran and Gray are sometime collectively referred to in this Agreement as the "**Gray Entities**".

RECITALS

A. Sonoran has submitted to the City of Scottsdale, Arizona (the "**City**") for approval, a proposed Zoning Map Amendment, proposed Amended Site Development Standards and an Infill Incentive District Request, Case Nos. 65-ZN-1192#7/2-II-2010 (together, the "**Blue Sky Application**") for the Blue Sky Apartment Project located at 4605 North Scottsdale Road, Scottsdale, Arizona (the "**Blue Sky Project**"). On March 25, 2011, Sonoran submitted to the City two variations/options of the Blue Sky Application, which variations/options are referred to in this Agreement as "**Blue Sky Project-A**" and "**Blue Sky Project-B**". The Parties expect that if the City approves the Blue Sky Application, it will either approve Blue Sky Project-A or Blue Sky Project-B, but not both.

B. Gray is the manager and member of Sonoran.

C. Safari has submitted to the City for approval, a proposed Zoning Map Amendment, proposed Amended Site Development Standards and an Infill Incentive District Request, Case Nos. 65-ZN-1192#8/1-II-2011 (together, the "**Safari Application**") for a project located at 4611 North Scottsdale Road, Scottsdale, Arizona (the "**Safari Project**").

D. On August 6, 2010, Safari filed with the City a legal protest to the Blue Sky Application pursuant to Scottsdale Zoning Ordinance Section 1.706 and a protest pursuant to Scottsdale Zoning Ordinance Section 1.304; such protests were affirmed in a letter dated February 3, 2011 filed with the City (collectively, the "**Protests**").

E. Safari is willing to withdraw the Protests and provide consent to certain aspects of the Blue Sky Project, subject to and in accordance with the further terms, covenants and provisions of this Agreement.

F. The Gray Entities are willing to consent to certain aspects of the Safari Project, subject to and in accordance with the further terms, covenants and provisions of this Agreement.

NOW, THEREFORE, in consideration of the foregoing Recitals, the mutual agreements, covenants and promises contained in this Agreement and other good and valuable considerations, the receipt, sufficiency an validity of which are hereby acknowledged, Sonoran and the Gray Entities agree as follows:

1. Withdrawal of Protests. Within one (1) business day following the full execution of this Agreement, Safari shall formally withdraw the Protests (the "**Withdrawal**").

2. Release of Claims. Effective immediately upon Safari's delivery of the Withdrawal to the City, Safari and the Gray Entities, and their respective heirs, successors, representatives, assigns, members, managers, affiliates, parents, shareholders, officers, directors and related entities hereby waive, release and forever discharge the other and any and all of their respective present and former officers, employees, members, managers, consultants, contractors, subcontractors, suppliers, servants, agents, directors, shareholders, sureties, advisers, attorneys, consultants, insurers, subsidiaries, parents, affiliates, heirs, successors and assigns (the "**Released Parties**"), for, from and against, all present claims, demands, suits, legal and administrative proceedings and from all liabilities, claims, losses, causes of actions, charges, fines, penalties, damages, costs or expenses (including reasonable attorney's fees and costs) of whatever character, nature and kind, whether to person or property, whether by direct or derivative action and whether known or unknown, suspected or unsuspected, latent or patent and arising out of or in any way connected with the filing of the Protests, any alleged violation of the Joint Development Agreement dated as of January 20, 2005, originally between PALS Land, Inc. and Riverwalk Square, LLC (the "**JDA**"), including paragraph 1.61 thereof, any subsequent actions taken prior to and including the date of this Agreement in support of the Protests or in opposition to the Blue Sky Application, specifically including claims alleged in a letter dated on or about September 9, 2010 from Michael D. Kibler, Esq. to Safari's legal counsel. The Release set forth in this paragraph 2 does not, however, apply to any actions of the Parties after the date of this Agreement.

3. Blue Sky Approved Matters. As noted in Recital A, Sonoran has submitted to the City two variations/options for the Blue Sky Project—Blue Sky Project-A and Blue Sky Project-B. Attached to this Agreement as Exhibit "A" is the conceptual site plan for the Blue Sky Project-A (the "**Blue Sky Site Plan-A**"). The Blue Sky Site Plan-A identifies the size and location of the fitness center component and the retail component of the Blue Sky Project-A. Attached to this Agreement as Exhibit "A-1" are the conceptual elevations for the Blue Sky Project-A (the "**Blue Sky Elevations-A**"). Attached to this agreement as Exhibit "A-2" are the proposed building heights for the Blue Sky Project-A (the "**Blue Sky Building Heights-A**"). Attached to this Agreement as Exhibit "A-3" is a schedule setting forth the floor area ratio (*i.e.*, FAR) and unit count for the Blue Sky Project-A (the "**Blue Sky Density Calculations-A**"). Attached to this Agreement as Exhibit "B" is the conceptual site plan for the Blue Sky Project-B (the "**Blue Sky Site Plan-B**"). The Blue Sky Site Plan-B identifies the size and location of the fitness center component and the retail component of the Blue Sky Project-B. Attached to this Agreement as Exhibit "B-1" are the conceptual elevations for the Blue Sky Project-B (the "**Blue Sky Elevations-B**"). Attached to this agreement as Exhibit "B-2" are the proposed building heights for the Blue Sky Project-B (the "**Blue Sky Building Heights-B**"). Attached to this Agreement as Exhibit "B-3" is a schedule setting forth the floor area ratio (*i.e.*, FAR) and unit count for the Blue Sky Project-B (the "**Blue Sky Density Calculations-B**"). By its execution of this Agreement, Safari acknowledges that it approves the Blue Sky Site Plan-A, the Blue Sky Elevations-A, the Blue Sky Building Heights-A and the Blue Sky Density Calculations-A, the Blue Sky Site Plan-B, the Blue Sky Elevations-B, the Blue Sky Building Heights-B and the Blue Sky Density Calculations-B. The Parties agree that, as used in this Agreement, the term "**Blue Sky Approved Matters**" shall mean, with respect to the Blue Sky Project, a project that (i) does not exceed the Blue Sky Building Heights-A and the Blue Sky Density Calculations-A, or, if applicable, the Blue Sky Building Heights-B and the Blue Sky Density Calculations-B and, (ii)

materially complies with the Blue Sky Site Plan-A and the Blue Sky Elevations-A, or, if applicable, the Blue Sky Site Plan-B and the Blue Sky Elevations-B. Provided that the Blue Sky Project complies with the Blue Sky Approved Matters (as defined in the immediately preceding sentence), then Safari (a) shall file no protests to the Blue Sky Application, (b) shall not submit to the City verbal or written opposition to the Blue Sky Project, and (c) shall not file or publicly support any appeal or referendum of the Blue Sky Application.

4. Safari Approved Matters. Attached to this Agreement as Exhibit "C" is the conceptual site plan for the Safari Project (the "**Safari Site Plan**"). Attached to this Agreement as Exhibit "C-1" are the conceptual elevations for the Safari Project (the "**Safari Elevations**"). Attached to this agreement as Exhibit "C-2" are the proposed building heights for the Safari Project (the "**Safari Building Heights**"). Attached to this Agreement as Exhibit "C-3" is a schedule setting forth the floor area ratio (*i.e.*, FAR) and unit count for the Safari Project (the "**Safari Density Calculations**"). By its execution of this Agreement, the Gray Entities acknowledge that they approve the Safari Site Plan, the Safari Elevations, the Safari Building Heights and the Safari Density Calculations. The Parties agree that as used in this Agreement, the term "**Safari Approved Matters**" shall mean, with respect to the Safari Project, a project that (i) does not exceed the Safari Building Heights and the Safari Density Calculations, and (ii) materially complies with the Safari Site Plan and the Safari Elevations. Provided that the Safari Project complies with the Safari Approved Matters (as defined in the immediately preceding sentence), then the Gray Entities (a) shall file no protests to the Safari Application, (b) shall not submit to the City verbal or written opposition to the Safari Project, and (c) shall not file or publicly support any appeal or referendum of the Safari Application.

5. Conceptual Ramp Design. Attached to this Agreement as Exhibit "D" is the conceptual design for the ramp roadway between the Safari Project and the Blue Sky Project providing access to an underground parking garage to serve the Safari Project and the Blue Sky Project (the "**Conceptual Ramp Design**"). By their execution of this Agreement, Safari and the Gray Entities acknowledge that they each approve the Conceptual Ramp Design and that they will not submit to the City verbal or written opposition to the Conceptual Ramp Design. The Parties acknowledge and agree that as between Safari and the Gray Entities, the Gray Entities shall be solely responsible for the costs of designing and constructing the ramp roadway between the Safari Project and the Blue Sky Project, including modifications to the entrance to the existing underground parking structure on the Safari Property, as well as all associated landscaping, paving, directional signage, drainage and other appurtenances situated within a five foot (5') wide area parallel to the roadway and associated walls as depicted on Exhibit "D".

6. Modifications to Approved Matters. The Gray Entities shall not modify the Blue Sky Approved Matters and/or the Conceptual Ramp Design without the prior written consent of Safari, which consent Safari may grant or withhold in its sole and absolute discretion notwithstanding any provision of this Agreement, the JDA and/or any other agreement, document or instrument pertaining to the real property underlying the Blue Sky Project and/or the property underlying the Safari Project to the contrary. If the Gray Entities modify the Blue Sky Approved Matters (for either Blue Sky Project-A and/or Blue Sky Project-B) and/or the Conceptual Ramp Design and such modifications(s) is (are) not acceptable to Safari, in the exercise by Safari of its sole and absolute discretion, Safari may, in its sole discretion, exercise any right or remedy available to Safari at law, in equity and/or under this Agreement (subject,

however, to the provisions of Section 9, below) and may submit to the City written or verbal opposition to the modifications(s) to the Blue Sky Approved Matters and/or the Conceptual Ramp Design, as the case may be, and, to the extent it has the legal right to do so, Safari may file legal protests pursuant to Scottsdale Zoning Ordinance Section 1.706 and/or Scottsdale Zoning Ordinance Section 1.304. Similarly, Safari shall not modify the Safari Approved Matters without the prior written consent of the Gray Entities, which consent the Gray Entities may grant or withhold in their sole and absolute discretion notwithstanding any provision of this Agreement, the JDA and/or any other agreement, document or instrument pertaining to the real property underlying the Blue Sky Project and/or the property underlying the Safari Project to the contrary. If Safari modifies the Safari Approved Matters and such modification(s) is (are) not acceptable to the Gray Entities, in the exercise by the Gray Entities of their sole and absolute discretion, the Gray Entities may, in their sole discretion, exercise any right or remedy available to the Gray Entities at law, in equity and/or under this Agreement (subject, however, to the provisions of Section 9 below) and may submit to the City written or verbal opposition to the modification(s) to the Safari Approved Matters and/or the Conceptual Ramp Design, as the case may be, and, to the extent they have the legal right to do so, the Gray Entities may file legal protests pursuant to Scottsdale Zoning Ordinance Section 1.706 and/or Scottsdale Zoning Ordinance Section 1.304. Notwithstanding the provisions of this paragraph 6 to the contrary, the right of the Gray Entities to approve modifications to the Safari Approved Matters and/or the Conceptual Ramp Design, as the case may be, shall be of no further force and effect from and after the date that the Gray Entities are not either (a) the contract purchaser of the real property underlying the Blue Sky Project, or (b) the fee owner of the real property underlying the Blue Sky Project.

7. Required Future Approvals. Safari and the Gray Entities acknowledge that the approvals each has granted to the other with respect to the Blue Sky Project and the Safari Project in this Agreement are expressly limited to the Blue Sky Approved Matters, the Safari Approved Matters and the Conceptual Ramp Design, each as expressly described in this Agreement and that future approvals will be required from the Parties in order for the Blue Sky Project and the Safari Project to be developed. Such approvals include, but are not limited to: (i) an approved circulation plan for pedestrian and vehicular traffic between the Safari Project and the Blue Sky Project, including roadway and walkway designs, (ii) the final design for the ramp roadway (including height and slope) between the Safari Project and the Blue Sky Project, including modifications to the entrance to an existing underground parking structure on the Safari Property, as well as associated landscaping, paving, directional signage, drainage and other appurtenances, and (iii) the identification and execution of easements (e.g., access, utilities, signage, drainage, parking, lateral support and the like) that are required for the development Blue Sky Project and the Safari Project (collectively, the "**Future Approvals**"). Notwithstanding any provision of this Agreement, the JDA and/or any other agreement, document or instrument pertaining to the real property underlying the Blue Sky Project and/or the property underlying the Safari Project, the Parties acknowledge and agree that each has the right to evaluate the Future Approvals in its sole, absolute and unfettered discretion and that none of the Parties are required to grant or consent to the Future Approvals unless such Future Approvals, in form and substance, are acceptable to the Parties in their sole, absolute and unfettered discretion. Notwithstanding the provisions of this paragraph 7 to the contrary, the Gray Entities shall have no right to participate in the Future Approvals if the Gray Entities are

not either (a) the contract purchaser of the real property underlying the Blue Sky Project, or (b) the fee owner of the real property underlying the Blue Sky Project.

8. Disclaimer. **THE PARTIES ACKNOWLEDGE AND AGREE THAT EACH OF THE PARTIES IS SOPHISTICATED AND EXPERIENCED IN COMMERCIAL REAL ESTATE TRANSACTIONS AND HAS BEEN REPRESENTED BY COMPETENT LEGAL COUNSEL IN CONNECTION WITH THE PREPARATION, NEGOTIATION AND EXECUTION OF THIS AGREEMENT. AS REFERENCED IN SECTION 10 BELOW, THE PARTIES INTEND THAT THIS AGREEMENT CONSTITUTE THE ENTIRE AGREEMENT OF THE PARTIES AND THAT THIS AGREEMENT NOT BE DEEMED TO INCLUDE, BY IMPLICATION OR OTHERWISE, ANY TERM, COVENANT, CONDITION OR PROVISION NOT EXPRESSLY SET FORTH IN THIS AGREEMENT. AS SUCH, THE PARTIES EACH HEREBY WAIVE AND DISCLAIM ANY COVENANT OR OBLIGATION OF GOOD FAITH AND FAIR DEALING THAT MAY BE IMPLIED IN THIS AGREEMENT AND EACH OF THE PARTIES ACKNOWLEDGE AND AGREE THAT NO PARTY HAS ANY OBLIGATION TO BARGAIN IN GOOD FAITH OR IN ANY WAY OTHER THAN AT ARMS LENGTH. NO PARTY MAY REASONABLY RELY ON ANY PROMISE INCONSISTENT WITH THE PROVISIONS OF THIS SECTION. THE SECTION SUPERSEDES ANY OTHER CONFLICTING LANGUAGE CONTAINED IN THIS AGREEMENT WHICH MAY IMPLY THE EXISTENCE OF A COVENANT OF GOOD FAITH AND FAIR DEALING.**

9. Dispute Resolution.

(a) Binding Arbitration. All disagreements between the Parties as to the interpretation, construction or application of any term or provision of this Agreement, or as to any Party's rights, obligations, duties or liabilities with respect to any provision of this Agreement, or as to any tortuous or allegedly tortuous conduct of any Party vis-à-vis another Party, shall be resolved by binding arbitration pursuant to the rules of the American Arbitration Association ("**AAA**") applicable to commercial disputes, as modified by the provisions of this Section 9. In the event that a Party believes that a dispute exists as to any issue that is subject to arbitration hereunder, such Party may send to the other Party a notice describing the disputed issues (the "**Dispute Notice**"). In the event the issue in dispute shall not be resolved by mutual agreement within five (5) days after the giving of the Dispute Notice, then any Party may initiate the arbitration process by notifying the other Party of its intent to submit such dispute to binding arbitration ("**Arbitration Notice**"). In no event shall a Dispute Notice be delivered after the date when institution of legal or equitable proceedings based on the matter in question would be barred by any applicable statute of limitations.

(b) Appointment of Arbitrators. Within five (5) days after a Party receives an Arbitration Notice, the Parties will attempt to select a mutually acceptable arbitrator, any such arbitrator to have at least ten (10) years experience as a judge or arbitrator in the State of Arizona. If the Parties cannot agree upon a single arbitrator, then within ten (10) days of the date a Party receives an Arbitration Notice, each Party must select an arbitrator who is a licensed professional or has substantial experience in the subject matter of the dispute unaffiliated with the selecting Party and possessing the requisite experience in commercial/mixed use development matters. The two (2) arbitrators selected will then have five (5) days to select a

third arbitrator who shall be a lawyer with substantial experience in commercial/mixed development matters. If the two (2) original arbitrators are unable to agree upon the appointment of a third arbitrator, then any Party may request that the AAA appoint a third arbitrator. Except for arbitrators who are licensed professionals with substantial experience in the subject matter of a particular dispute, all arbitrators chosen hereunder shall be members in good standing of the AAA and chosen from panels or lists designated by the AAA. In the event of an arbitration, each of the Parties shall be obligated to act promptly and expeditiously to resolve such matter as soon as possible and in all events within thirty (30) days after the appointment of the last arbitrator to be appointed as provided herein. All arbitration proceedings shall take place at Safari's attorneys' office in Arizona, and shall be conducted under the Commercial Arbitration Rules of the AAA (except to the extent such rules are modified by this Section 9). All proceedings involving the Parties in an arbitration proceeding shall be reported by a certified court reporter and written transcripts of the proceedings shall be prepared and made available to the Parties.

(c) Failure to Select Arbitrator. If an Party fails or refuses to act within the time periods above set forth to participate in an effort to select a mutually acceptable arbitrator or, if a single arbitrator is not agreed upon, to select an arbitrator, such Party shall be deemed to have approved the arbitrator selected by the other Party.

(d) The Award. Judgment upon any award rendered by the arbitrator(s) shall be final and may be entered in the Court (as defined in Section 22). The terms of this Section 9 shall be specifically enforceable under applicable law in the Court.

(e) Attorneys' Fees. The prevailing, as determined by the arbitrator(s), Party shall be awarded reasonable attorneys' fees, expert and non-expert witness costs and expenses, and other costs and expenses incurred in connection with the arbitration, as determined by the arbitrator(s) unless the arbitrator(s), for good cause, determine(s) otherwise. A post-arbitration proceeding to determine attorneys' fees and costs, if needed, shall be held within seven (7) days of notice of the award if the award does not so provide. Costs and fees of the arbitrator(s) (including the cost of the record of transcripts of the arbitration) shall be borne by the non-prevailing Party or Parties, as determined by the arbitrator(s) unless the arbitrator(s) for good cause determines otherwise. Costs and fees, if any, payable in advance shall be advanced equally by the Parties, subject to ultimate payment by the non-prevailing Party in accordance with the preceding sentence.

(f) Right to Provisional Remedies. No provision of this Section 9 shall limit the right of any Party to seek any provisional or ancillary remedies (including injunctive relief and specific performance) from a court of competent jurisdiction before, after, or during the pendency of any arbitration proceeding. The institution and maintenance of any remedy permitted above shall not constitute a waiver of the rights to submit any controversy or claim to arbitration. The statute of limitations, estoppel, waiver, laches, and similar doctrines which would otherwise be applicable in any action brought by a Party shall be applicable in any arbitration proceeding. Notwithstanding any provision of this Agreement to the contrary, the arbitrator(s) shall not have the power to grant or award consequential, special, punitive or exemplary damages.

(g) Expeditious Proceedings. It is the intention of the Parties that all arbitration proceedings be conducted as expeditiously as reasonably possible in keeping with fairness and with a minimum of legal formalities. Therefore, and unless the arbitrator(s) determine otherwise, the Parties have agreed that: (i) the rules of evidence shall not apply to any arbitration proceeding, except that notwithstanding the foregoing, the attorney/client privilege and work product protection shall be applicable in all arbitration proceedings; and, (ii) only limited discovery should be allowed in an arbitration proceeding. Unless otherwise ordered by the arbitrator(s) on a showing of substantial need, each side shall be limited to one document production request and one deposition and such discovery shall be complete within ten (10) days following appointment of the arbitrator(s). In addition the parties shall exchange the names, qualifications and a narrative report stating the opinion and basis therefor of any expert who may be called at least ten (10) days prior to the start of the arbitration.

(h) Scheduling. In furtherance of the intent of the Parties expressed above, and unless modified by the arbitrator(s) upon a showing of good cause, all arbitration proceedings shall proceed upon the following schedule: (i) as soon as possible and in all events within fifteen (15) days after selection of the arbitrator(s), the Parties shall conduct a pre-arbitration conference at which a schedule of pre-arbitration discovery shall be set, all pre-arbitration motions scheduled and any other necessary pre-arbitration matters decided; (ii) all discovery allowed by the arbitrator(s) shall be completed within five (5) days following the pre-arbitration conference; (iii) all pre-arbitration motions shall be filed and briefed so that they may be heard no later than ten (10) days following the discovery cut-off; (iv) the arbitration shall be scheduled to commence no later than ten (10) days after the decision on all pre-arbitration motions but in all event no later than forty five (45) days following the service of the notice of arbitration; and (v) the arbitrator(s) shall render his, her or their written decision (including any and all findings of fact and conclusions of law) within five (5) days following the submission of the matter. The Parties intend the foregoing schedule to be an outside maximum timetable, and nothing herein shall prevent the arbitrator(s) from ordering a shorter timetable if he, she or they conclude that the same is warranted by the circumstances of any particular arbitration proceeding.

10. Entire Agreement. This Agreement contains all of the agreements, representations and warranties of the Parties to this Agreement and supersedes all other discussions, understandings or agreements with respect to the Protests, the Withdrawal, the Blue Sky Approved Matters, the Safari Approved Matters, the Conceptual Ramp Design and the Future Approvals.

11. Exhibits a Part of this Agreement. All exhibits referred to in the Agreement and attached to this Agreement are incorporated into this Agreement by reference and are hereby made a part of this Agreement.

12. Notices. All notices shall be made in writing and shall be delivered personally (including delivery by hand or by express or courier service), expenses prepaid, with request for receipt or other proof of delivery or by certified or registered mail, postage prepaid, return receipt requested, to the address of the other Party. Any such notice shall be deemed given on the date on which it is actually delivered to the other Party's or Parties' address as evidenced, if necessary, by the proof of delivery, the request for return receipt or other receipt. Any Party may

change its address by giving notice of such change to the other Parties in accordance with the provisions of this section.

Gray Entities:	c/o Gray Development 4040 East Camelback Road Suite 275 Phoenix, Arizona 85018 Attention: Brian Kearney
With a copy to:	Kutak Rock, LLP 8601 North Scottsdale Road, Third Floor Scottsdale, Arizona 85253 Attention: Brian Jordan
Safari:	Safari Drive Marketing, LLC c/o ST Residential 175 West Jackson Boulevard, Suite 540 Chicago, Illinois 60604 Attention: Joel Solomon General Counsel
With a copy to:	Mariscal, Weeks, McIntyre & Friedlander, P.A. 2901 North Central Avenue, Suite 200 Phoenix, Arizona 85012 Attention: David L. Lansky, Esq.

13. Captions and Pronouns. The captions and headings contained in this Agreement are for reference purposes only and shall not in any way affect the meaning or interpretation of this Agreement.

14. Governing Law. This Agreement shall be governed by, construed and enforced in accordance with the internal laws of the State of Arizona, without regard to conflict of laws principles.

15. Counterparts. This Agreement may be executed and delivered in multiple counterparts, and each counterpart so delivered which bears the original signature of a Party hereto shall be binding as to such Party, and all counterparts shall together constitute one original and the same instrument. Electronic signatures shall be as effective as original signatures.

16. Provisions Severable. Each provision of this Agreement shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Agreement be deemed to be prohibited by or invalid under applicable law, such provision shall be ineffective only to the extent of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of this Agreement.

17. Successors and Assigns. This Agreement, together with its benefits and subject to its burdens, shall be binding upon and extend and inure to the benefit of the Parties to this Agreement, their successors and assigns.

18. No Waiver. The waiver by one Party of the performance of any covenant or condition under this Agreement shall not invalidate this Agreement, nor shall it be considered to be a waiver by such Party of any other covenant or condition under this Agreement. The waiver by either or all Parties of the time for performing any act shall not constitute a waiver of the time for performing any other act or an identical act required to be performed at a later time. The exercise of any remedy provided by law and the provisions of this Agreement for any remedy shall not exclude other remedies unless they are expressly excluded in this Agreement.

19. Construction. As used in this Agreement, the masculine, feminine or neuter gender and the singular or plural numbers shall each be deemed to include the other whenever the context so indicates. This Agreement shall be construed as a whole and in accordance with its fair meaning and without regard to any presumption or other rule requiring construction against the Party preparing this Agreement or any part of this Agreement.

20. No Partnership; Third Parties. Nothing contained in this Agreement shall create any owner-contractor, contractor-contractor, employer-employee, partnership or joint venture relationship between or among Safari and the Gray Entities. No term or provision of this Agreement is intended to, nor shall it be for the benefit of any person, firm, organization or corporation not a Party, and no such other person, firm, organization or corporation shall have any right or cause of action hereunder.

21. Good Standing; Authority. The Parties hereby represent and warrant to one another as follows: (i) each of the Parties is duly formed and validly existing under the laws of its state of organization; and (ii) the individuals executing this Agreement on behalf of the respective Parties are authorized and empowered to bind the Parties on whose behalf each such individual is signing.

22. Jurisdiction and Venue. In regard to any litigation which may arise in regard to this Agreement, subject to the provisions of Section 9, the Parties shall and do hereby submit solely to the jurisdiction of and the Parties hereby agree that the proper venue shall be solely in the Superior Court of Maricopa County, Arizona (the "Court").