

## Memo



**Stantec**

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To: Pat Quinn  
JE Fuller/ Hydrology &  
Geomorphology Inc.

From: Mike Gerlach  
Phoenix AZ Office

File: 181300290

Date: March 18, 2013

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**Reference: Elevation Certificate Evaluation**

There is approximately 20 square miles of FEMA floodplains inundating to varying depths more than 10,000 parcels with the **Pinnacle Peak West study area**. Elevation certificates have been prepared for numerous structures within the study area. However, evidence from other, recent projects in the area noted potential discrepancies in elevations referenced in the elevation certificates relative to detailed topographic mapping for the same area.

A potential outcome of the **Pinnacle Peak West Area Drainage Master Study** may be revisions to the effective floodplain limits based on new topographic mapping, new detailed hydrologic data and more sophisticated analytical tools for simulating shallow unconfined flow characteristics. As a result, areas not previously mapped in a flood hazard zone may be identified and property owners within the new flood hazard areas may elect to obtain an elevation certificate. Understanding issues related to benchmarks or other survey data used in preparing elevation certificates will aid in the identification of recommendations from this study.

To identify if there is a potential concern with existing benchmarks, a comparison of elevations referenced on a sample set of elevation certificates is made to the detailed topographic mapping for the study area. The sample set includes elevation certificates from the Cities of Phoenix and Scottsdale. Elevation certificates within unincorporated Maricopa County are not evaluated because of the robust review process that the County employs. The sample set is estimated to account for only about one-percent of elevation certificates within the study area. This estimate is based on the following:

There are more than 3,300 parcels in unincorporated portions of the study area, approximately 1,200 of which are fully or partially within a floodplain (Zone A, AO, AE or FW). Of these, 476 have elevation certificates, approximately 40%. Applying this same percentage to the floodplain parcels in the Cities of Phoenix and Scottsdale, there are potentially 3,550 elevation certificates. Taking 1% of the 3,550 potential elevation certificates would result in approximately 36 evaluation points that could be spread over the 20 square miles of floodplain area.

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**A122.108**

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To identify if there is a potential concern with existing benchmarks, a comparison of elevations referenced on a sample set of elevation certificates is made to the detailed topographic mapping for the study area. The sample set includes elevation certificates from the Cities of Phoenix and Scottsdale. Elevation certificates within unincorporated Maricopa County are not evaluated because of the robust review process that the County employs. The sample set is estimated to account for only about one-percent of elevation certificates within the study area. This estimate is based on the following:

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**Reference: Elevation Certificate Evaluation**

From the parcel databases of the study area, target areas were selected for research of elevation certificates. Elevation certificates are obtained from the following sources:

- City of Phoenix - elevation certificates are maintained by the Floodplain Management Branch. The current point of contact is Myesha Harris. Elevation certificates are organized by street address in hard copy format.
- City of Scottsdale – elevation certificates are available on-line at <https://eservices.scottsdaleaz.gov/eServices/Permits/permitlookup.aspx>. Elevation certificates are searchable by address or parcel number.

From these sources, 36 elevation certificates were obtained. Information from those certificates list is summarized in Table 1. Copies of the elevation certificates for each parcel listed in Table 1 are provided as an attachment. The locations of each elevation certificate are shown in Figure 1.

For each parcel, an elevation is taken from the detailed mapping of the study area that represents and interpretation of the Lowest Adjacent Grade (LAG). These elevations are then compared to the corresponding elevation from the elevation certificate. The elevation for the LAG based on the detailed mapping as well as the difference in elevation for each parcel is listed in Table 2. The difference reflects a datum adjustment from NGVD 29 to NAVD 88 of 1.77 feet for those parcels that list HAG, LAG and finished floor elevations referenced to the NGVD 29 datum. The adjustment value of 1.77 feet is the same value used by the City of Scottsdale for several of the elevation certificates.

The elevation differentials listed in Table 2 range from -4.11 feet to 98.90 feet. The maximum difference in elevation is 98.9 feet. It is highly likely that this difference is simply due to a typographical error on the elevation certificate. Excluding this extreme outlier from the data set, the range is -4.11 to 6.86 with an average difference 0.02 feet. Of the 36 parcels, 25 have a difference of +/- 1.0 feet. Looking at the differences from a spatial perspective (Figure 2), there does not appear to be any obvious pattern other than that all the parcels with the greatest differentials are in the City of Scottsdale. Given the interpretation of selecting a LAG to sample from the detailed mapping, compared to the interpretation by the surveyors in selecting an LAG along with the accuracy of the detailed mapping, the elevations listed in the certificates are reasonable.

**STANTEC CONSULTING SERVICES INC.**

Mike Gerlach, PE  
Associate - Water Resources  
mike.gerlach@stantec.com

Attachment: Elevation Certificates

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Table 1 - Elevation Certificate Summary Data

APN	Address	FIRM Zone	City	Adjacent Grade		Finished Floor	Datum	Benchmark
				Highest	Lowest			
212-12-224	4271 E Maya Way	AO	Phoenix	---	1766.00	1767.00	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
212-12-691	4102 E Maya Way	AO	Phoenix	---	1741.00	1742.00	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
212-12-231	4237 E Maya Way	AO	Phoenix	---	1759.20	1760.30	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
212-12-186	4290 E Maya Way	AO	Phoenix	---	1772.00	1772.50	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
212-12-467	4562 E Bajada Rd	AO	Phoenix	---	1801.60	1802.30	NGVD 29	Brass Cap @ int. of Pinnacle Vista & Tatum - EL = 1824.31
212-09-427	26442 N 43rd Pl	AO	Phoenix	---	1758.40	1759.40	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
212-09-436	26422 N 43rd Pl	AO	Phoenix	---	1750.80	1751.80	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
212-09-450	26254 N 43rd Pl	AO	Phoenix	---	1740.40	1741.40	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
212-09-411	26228 N 43rd Pl	AO	Phoenix	---	1735.40	1736.40	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
212-09-404	25832 N 43rd Pl	AO	Phoenix	---	1728.40	1729.40	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
211-42-413	4907 E Roy Rogers Rd	AO	Phoenix	---	1867.00	1868.00	NGVD 29	Brass Cap @ Cor. Sec. 6, T.4N., R.4E - EL = 1800.83
215-09-397	7165 E Mayo Blvd	AO	Phoenix	1585.18	1583.98	1584.65	NGVD 29	Brass Cap @ Tatum & Cave Creek - EL = 1834.85
211-40-183	4515 E Dale LN	AO	Phoenix	1837.76	1837.44	1838.02	NGVD 29	
212-18-053	4502 E Blue Sky Dr	AO	Phoenix	---	1816.00	1817.11	NGVD 29	
211-42-628A	5015 E Peak View Rd	AO	Phoenix	---	1886.00	1887.00	NGVD 29	Brass Cap @ int. of Tatum and Dynamite - EL = 1845.72
212-18-130	27603 N 46th St	AO	Phoenix	---	1825.20	1825.22	NGVD 29	
212-06-083	7408 E Christmas Cholla Dr	AO	Scottsdale	1931.30	1931.24	1932.04	NGVD 29	
212-11-083	5886 E Blue Sky Dr	AO	Scottsdale	1964.91	1964.90	1966.01	NGVD 29	
212-08-306	26500 N 82nd St	AO	Scottsdale	2123.70	2123.60	2124.20	NAVD 88	
212-17-027	6246 E Bent Tree Dr	AO	Scottsdale	1980.85	1980.80	1981.45	NGVD 29	
212-31-208	7357 E Whistling Wind Wy	AO	Scottsdale	1731.87	1731.90	1732.77	NGVD 29	
212-36-866	7756 E Overlook Dr	AO	Scottsdale	1780.48	1780.50	1781.28	NGVD 29	
216-51-016	7486 E Sonoran Tr	AO	Scottsdale	2253.80	2253.70	2254.00	NAVD 88	
216-68-100G	6627 E Morning Vista Ln	AO	Scottsdale	2088.88	2088.88	2089.58	NAVD 88	
216-67-056	7510 E Davis Dr	AO	Scottsdale	---	2182.00	2183.10	NAVD 88	Brass Cap @int. of Scottsdale and Montgomery - EL = 2194.22
216-68-053D	29119 N 71st Pl	AO	Scottsdale	2139.56	2139.56	2140.06	NAVD 88	
215-08-002H	7677 E Princess Bl	AO	Scottsdale	1562.28	1562.18	1562.88	NAVD 88	
212-46-207	20121 N 76Th St	AO	Scottsdale	1668.78	1668.78	1669.58	NAVD 88	
212-36-273	7708 E Thunderhawk Rd	AO	Scottsdale	---	1725.00	1725.76	NGVD 29	
212-02-916	22340 N 77Th St	AO	Scottsdale	---	1814.20	1815.06	NGVD 29	
212-04-005	7960 E Parkview Ln	AO	Scottsdale	1971.28	1971.28	1971.88	NAVD 88	
212-08-075	25636 N Ranch Gate Rd	AO	Scottsdale	2073.64	2073.04	2074.14	NAVD 88	

Table 1 - Elevation Certificate Summary Data

APN	Address	FIRM Zone	City	Adjacent Grade		Finished Floor	Datum	Benchmark
				Highest	Lowest			
216-71-171	28652 N 92nd Pl	AO	Scottsdale	2359.80	2359.80	2360.31	NAVD 88	
212-04-277	24138 N 76th Pl	AO	Scottsdale	1934.60	1935.50	1935.73	NAVD 88	
216-52-138	8522 E Leaning Rock Rd	AO	Scottsdale	2423.06	2421.56	2423.56	NAVD 88	
216-52-020	8124 E Lone Mountain Rd	AO	Scottsdale	2229.30	2229.93	2230.03	NAVD 88	

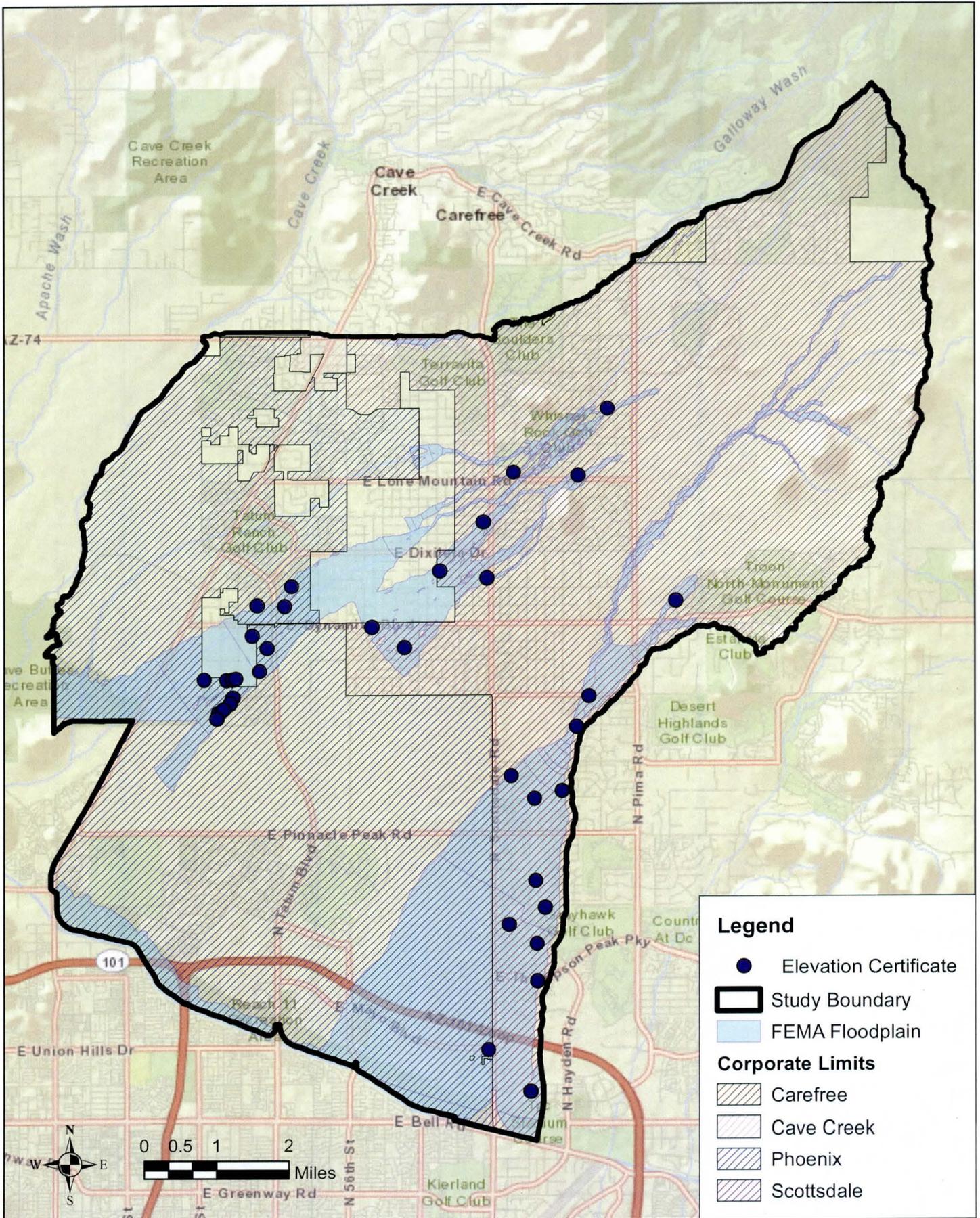
Table 2 - Elevation Differential

APN	Address	City	Adjacent Grade		Finished Floor	EL Cert. Datum	LAG Mapping	Elevation Difference
			Highest	Lowest				
212-12-224	4271 E Maya Way	Phoenix	---	1766.00	1767.00	NGVD 29	1767.94	0.17
212-12-691	4102 E Maya Way	Phoenix	---	1741.00	1742.00	NGVD 29	1743.43	0.66
212-12-231	4237 E Maya Way	Phoenix	---	1759.20	1760.30	NGVD 29	1761.15	0.18
212-12-186	4290 E Maya Way	Phoenix	---	1772.00	1772.50	NGVD 29	1773.33	-0.44
212-12-467	4562 E Bajada Rd	Phoenix	---	1801.60	1802.30	NGVD 29	1803.28	-0.09
212-09-427	26442 N 43rd Pl	Phoenix	---	1758.40	1759.40	NGVD 29	1760.05	-0.12
212-09-436	26422 N 43rd Pl	Phoenix	---	1750.80	1751.80	NGVD 29	1752.40	-0.17
212-09-450	26254 N 43rd Pl	Phoenix	---	1740.40	1741.40	NGVD 29	1741.70	-0.47
212-09-411	26228 N 43rd Pl	Phoenix	---	1735.40	1736.40	NGVD 29	1737.43	0.26
212-09-404	25832 N 43rd Pl	Phoenix	---	1728.40	1729.40	NGVD 29	1730.90	0.73
211-42-413	4907 E Roy Rogers Rd	Phoenix	---	1867.00	1868.00	NGVD 29	1868.51	-0.26
215-09-397	7165 E Mayo Blvd	Phoenix	1585.18	1583.98	1584.65	NGVD 29	1585.98	0.23
211-40-183	4515 E Dale LN	Phoenix	1837.76	1837.44	1838.02	NGVD 29	1838.78	-0.43
212-18-053	4502 E Blue Sky Dr	Phoenix	---	1816.00	1817.11	NGVD 29	1816.44	-1.33
211-42-628A	5015 E Peak View Rd	Phoenix	---	1886.00	1887.00	NGVD 29	1888.00	0.23
212-18-130	27603 N 46th St	Phoenix	---	1825.20	1825.22	NGVD 29	1825.98	-0.99
212-06-083	7408 E Christmas Cholla Dr	Scottsdale	1931.30	1931.24	1932.04	NGVD 29	1933.06	0.05
212-11-083	5886 E Blue Sky Dr	Scottsdale	1964.91	1964.90	1966.01	NGVD 29	1966.98	0.31
212-08-306	26500 N 82nd St	Scottsdale	2123.70	2123.60	2124.20	NAVD 88	2127.34	3.74
212-17-027	6246 E Bent Tree Dr	Scottsdale	1980.85	1980.80	1981.45	NGVD 29	1981.90	-0.67
212-31-208	7357 E Whistling Wind Wy	Scottsdale	1731.87	1731.90	1732.77	NGVD 29	1734.08	0.40
212-36-866	7756 E Overlook Dr	Scottsdale	1780.48	1780.50	1781.28	NGVD 29	1782.36	0.09
216-51-016	7486 E Sonoran Tr	Scottsdale	2253.80	2253.70	2254.00	NAVD 88	2252.03	-1.67
216-68-100G	6627 E Morning Vista Ln	Scottsdale	2088.88	2088.88	2089.58	NAVD 88	2087.38	-1.50
216-67-056	7510 E Davis Dr	Scottsdale	---	2182.00	2183.10	NAVD 88	2185.65	3.65
216-68-053D	29119 N 71st Pl	Scottsdale	2139.56	2139.56	2140.06	NAVD 88	2138.49	-1.07
215-08-002H	7677 E Princess Bl	Scottsdale	1562.28	1562.18	1562.88	NAVD 88	1558.07	-4.11
212-46-207	20121 N 76Th St	Scottsdale	1668.78	1668.78	1669.58	NAVD 88	1675.64	6.86
212-36-273	7708 E Thunderhawk Rd	Scottsdale	---	1725.00	1725.76	NGVD 29	1726.56	-0.21
212-02-916	22340 N 77Th St	Scottsdale	---	1814.20	1815.06	NGVD 29	1815.59	-0.38
212-04-005	7960 E Parkview Ln	Scottsdale	1971.28	1971.28	1971.88	NAVD 88	1970.90	-0.38
212-08-075	25636 N Ranch Gate Rd	Scottsdale	2073.64	2073.04	2074.14	NAVD 88	2071.22	-1.82

Table 2 - Elevation Differential

APN	Address	City	Adjacent Grade		Finished Floor	EL Cert. Datum	LAG Mapping	Elevation Difference
			Highest	Lowest				
216-71-171	28652 N 92nd Pl	Scottsdale	2359.80	2359.80	2360.31	NAVD 88	2360.34	0.54
212-04-277	24138 N 76th Pl	Scottsdale	1934.60	1935.50	1935.73	NAVD 88	1935.47	-0.03
216-52-138	8522 E Leaning Rock Rd	Scottsdale	2423.06	2421.56	2423.56	NAVD 88	2420.17	-1.39
216-52-020	8124 E Lone Mountain Rd	Scottsdale	2229.30	2229.93	2230.03	NAVD 88	2328.83	98.90

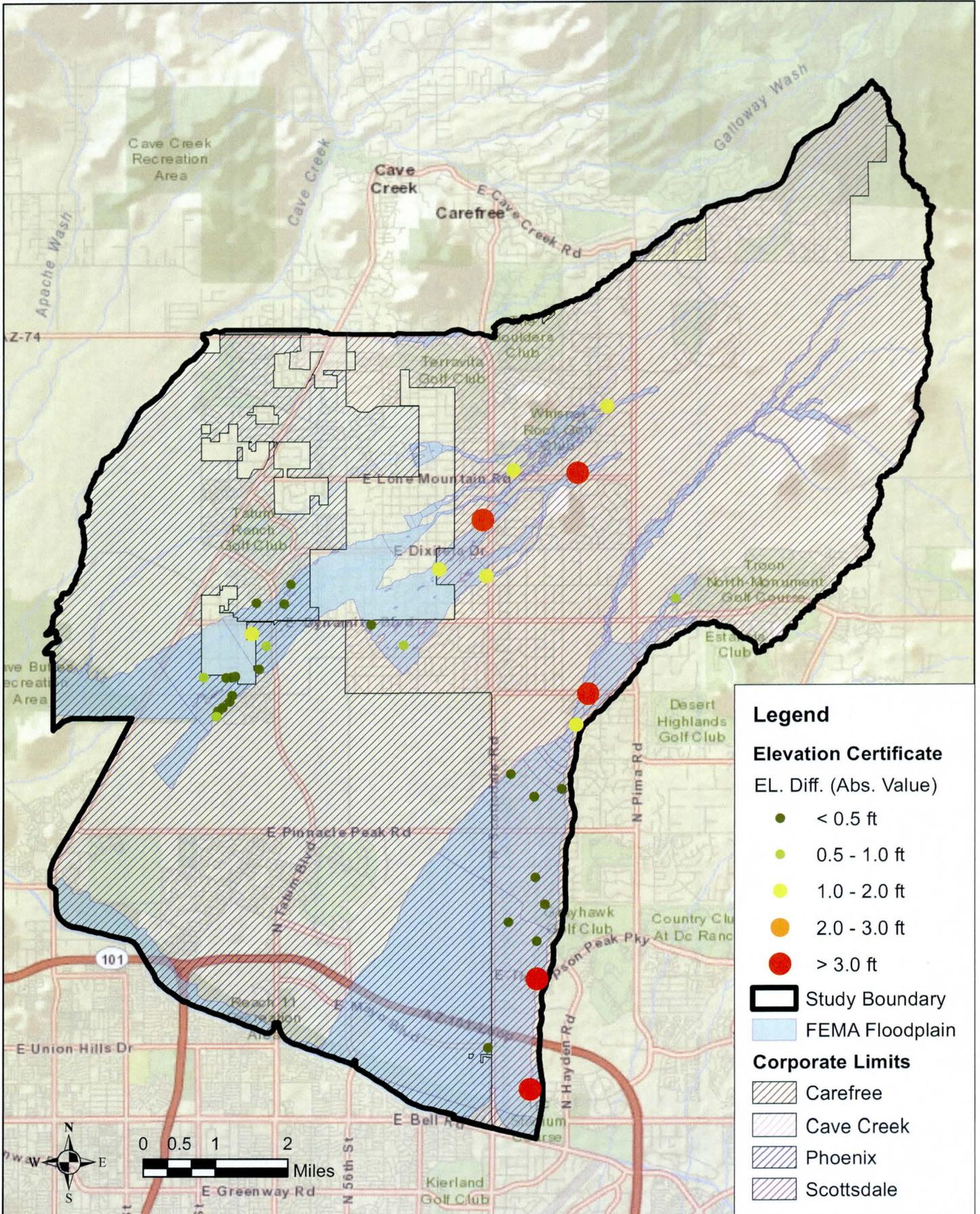
Figure 1 - Elevation Certificate Locations



**Legend**

- Elevation Certificate
  - ▭ Study Boundary
  - FEMA Floodplain
- Corporate Limits**
- ▨ Carefree
  - ▩ Cave Creek
  - ▧ Phoenix
  - ▦ Scottsdale

Figure 2 - Elevation Differential



**Legend**

**Elevation Certificate**  
 EL. Diff. (Abs. Value)

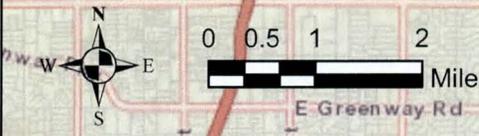
- < 0.5 ft
- 0.5 - 1.0 ft
- 1.0 - 2.0 ft
- 2.0 - 3.0 ft
- > 3.0 ft

**Study Boundary**  
 Study Boundary

**FEMA Floodplain**  
 FEMA Floodplain

**Corporate Limits**

- Carefree
- Cave Creek
- Phoenix
- Scottsdale



## Memo



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JE Fuller / Hydrology &  
Geomorphology

From: Mike Gerlach  
Phoenix AZ Office

File: 181300290

Date: June 14, 2013

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**Reference: Pinnacle Peak West – ADMS: Elevation Certificate Evaluation  
Comment Response**

The following are responses to comments from the Flood Control District of Maricopa County (District) regarding the Elevation Certificate Evaluation prepared by Stantec. Comments provided the District are reproduced herein with the Stantec response immediately following in an italicized font. All comments are in regard to the data presented in Table 1 of the evaluation document.

1. All of the Cave Creek properties are listed in Table 1 as Phoenix. Shouldn't they be listed as Cave Creek.

*I noticed this as well that in the actual elevation certificate, the City associated with the parcel address is shown as Cave Creek. However, the address according to the current parcel database is clearly within the City of Phoenix corporate limits as shown in Figure 1. No change is made.*

2. 4707 E. Roy Rogers Lane – change benchmark to BC at intersection of Tatum & Peak View Rd 1864.23 ft.

*The benchmark is changed to Brass Cap @ Tatum & Cave Creek, EL = 1834.85. This is the correct benchmark per the elevation certificate provided as an attachment to the document. No change is made.*

3. 4515 E Dale Lane – Change highest adjacent grade to 1837.78 ft. Add BC at intersection of Tatum & Peak View Rd 1864.23 ft.

*Table 1 is changed.*

4. 7165 E Mayo Blvd – Change benchmark to BC at intersection of 64<sup>th</sup> St & Mayo Blvd 1573.26

*Benchmark is changed to match the elevation certificate which states chiseled square on curb at int. of 64<sup>th</sup> and Mayo – EL = 1573.253.*

One Team. Infinite Solutions.

**Reference: Pinnacle Peak West – ADMS: Elevation Certificate Evaluation Comment Response**

5. 4502 E Blue Sky Dr – Change LAG to 1964.9 ft and change FF to 1966.01 ft

*There are two parcels on Blue Sky Drive. One is in Phoenix with a street address of 4502 and the other is in Scottsdale with a street address of 5886. The data listed for each is correct.*

6. 5105 E Peak View Rd – Change benchmark to BC at intersection of Tatum and Cave Creek 1834.85 ft.

*Table 1 is changed.*

7. 27603 N 46<sup>th</sup> St – Add BC at intersection of Tatum and Dynamite 1845.72.

*Table 1 is changed.*

8. 7408 E Christmas Cholla Rd – Change LAG to 1931.3 ft

*Table 1 is changed.*

9. 7510 E Davis Dr – Change typo from Montomery to Montgomery.

*Table 1 is changed.*

10. 8124 E Lone Mountain Rd – Change LAG to 2229.3 ft.

*Table 1 is changed.*

**STANTEC CONSULTING SERVICES INC.**

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