U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expires March 31, 2012

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name Mary Bergen

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
~~11584 Creek Road~~ 11730 Creek Road
City Ojai State CA ZIP Code 93023

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 035-0-050-055

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) Private bridge to single family dwelling Lat 34° 25' 15.62 N

A5. Latitude/Longitude: Lat. ~~34°~~ Long. _____ Horizontal Datum: ☐ NAD 1927 ☑ NAD 1983 long 119° 15' 46.18 W

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number N/A Private Bridge Crossing Datum: WGS 84

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) N/A sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade N/A
- c) Total net area of flood openings in A8.b N/A sq in
- d) Engineered flood openings? ☐ Yes ☒ No

A9. For a building with an attached garage:
- a) Square footage of attached garage N/A sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade N/A
- c) Total net area of flood openings in A9.b N/A sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
Ventura County (Unincorporated Areas) 060413	Ventura County	California

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
~~0611C~~ / 0567 0611C	E	Jan. 20, 2010	Jan. 20, 2010	A	N/A

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) Questa Engineering Corp. (See Attachment)

B11. Indicate elevation datum used for BFE in Item B9: ☐ NGVD 1929 ☒ NAVD 1988 ☐ Other (Describe)

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date N/A ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete. BRIDGE ONLY

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized _____ Vertical Datum 1988 NAVD
Conversion/Comments

Approximate 'A' Zone without BFE requirements

RECEIVED FEB 22 2011

		Check the measurement used.	
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor) _____	☐ feet	☐ meters (Puerto Rico only)
b)	Top of the next higher floor _____	☐ feet	☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (~~V Zones only~~) BRIDGE ONLY 556.43	☑ feet	☐ meters (Puerto Rico only) NAVD 1988
d)	Attached garage (top of slab) (Soffit of bridge) _____	☐ feet	☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments) _____	☐ feet	☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG) _____	☐ feet	☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG) _____	☐ feet	☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support _____	☐ feet	☐ meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.* ☒

√ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

REGISTERED PROFESSIONAL ENGINEER JEFFREY S. MORRIS No. C46005 Exp 12/31/12 CIVIL STATE OF CALIFORNIA

Certifier's Name Jeffrey S. Morris License Number C 46005

Title Civil Engineer Company Name Morris Engineering

Address 6901 Lorene Road City Redwood Valley State CA ZIP Code 95470

Signature [signature] Date 2/15/11 Telephone (707) 485-1133

IMPORTANT: In these spaces, copy the corresponding information from Section A.	For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. ~~11584 Creek Road~~ 11730 Creek Road, Ojai	Policy Number
City Ojai State CA ZIP Code 93023	Company NAIC Number

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments The lowest horizontal structure member (bottom of bridge soffit) for this private residential bridge is 556.43 feet (NAVD 1988 datum) which is 0.06 feet above the 1-ft. freeboard above the calculated BFE which is 555.37 feet (NAVD 1988 Datum). BFE determined by Questa Engineering Corporation (Richmond, CA) in a report dated November 16, 2007 (Attachment).

Signature [signature] Date 2/15/11

☒ Check here if attachments

SECTION E - BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

Not a Building - this is a Private Bridge

For Zones AO and A (without BFE), complete Items E1-E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1-E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
a) Top of bottom floor (including basement, crawlspace, or enclosure) is N/A ☐ feet ☐ meters ☐ above or ☐ below the HAG.
b) Top of bottom floor (including basement, crawlspace, or enclosure) is N/A ☐ feet ☐ meters ☐ above or ☐ below the LAG.

E2. For Building Diagrams 6-9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8-9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is N/A ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E3. Attached garage (top of slab) is N/A ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E4. Top of platform of machinery and/or equipment servicing the building is N/A ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G. N/A (See Section G Comments)

SECTION F - PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. *The statements in Sections A, B, and E are correct to the best of my knowledge.*

Property Owner's or Owner's Authorized Representative's Name
Mary Bergen

Address 11584 Creek Road City Ojai State CA ZIP Code 93023

Signature [signature] Date 2-18-11 Telephone (805) 649-5207

Comments BFE determined by Questa Engineering Corporation (Richmond, CA) in a report dated November 16, 2007. See Attachment.

☒ Check here if attachments

SECTION G - COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8 and G9.

G1. ☑ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)

G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.

G3. ☐ The following information (Items G4-G9) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
F 2008-03	05/08/08	02/23/11

G7. This permit has been issued for: ☑ New Construction ☐ Substantial Improvement

G8. Elevation of as-built lowest floor (including basement) of the building: 556.43 ☑ feet ☐ meters (PR) Datum NAVD 1988 bridge soffit.

G9. BFE or (in Zone AO) depth of flooding at the building site: ☐ feet ☐ meters (PR) Datum

G10. Community's design flood elevation 555.37 ☑ feet ☐ meters (PR) Datum NAVD 1988

Local Official's Name Brian Trushinski Title Floodplain Manager

Community Name County of Ventura Telephone (805) 477-1967

Signature [signature] Date 02/23/11

Comments Project is a private bridge crossing. Bottom of soffit is 0.06 feet above the BFE + 1'-0" freeboard. Building materials are flood resistant.

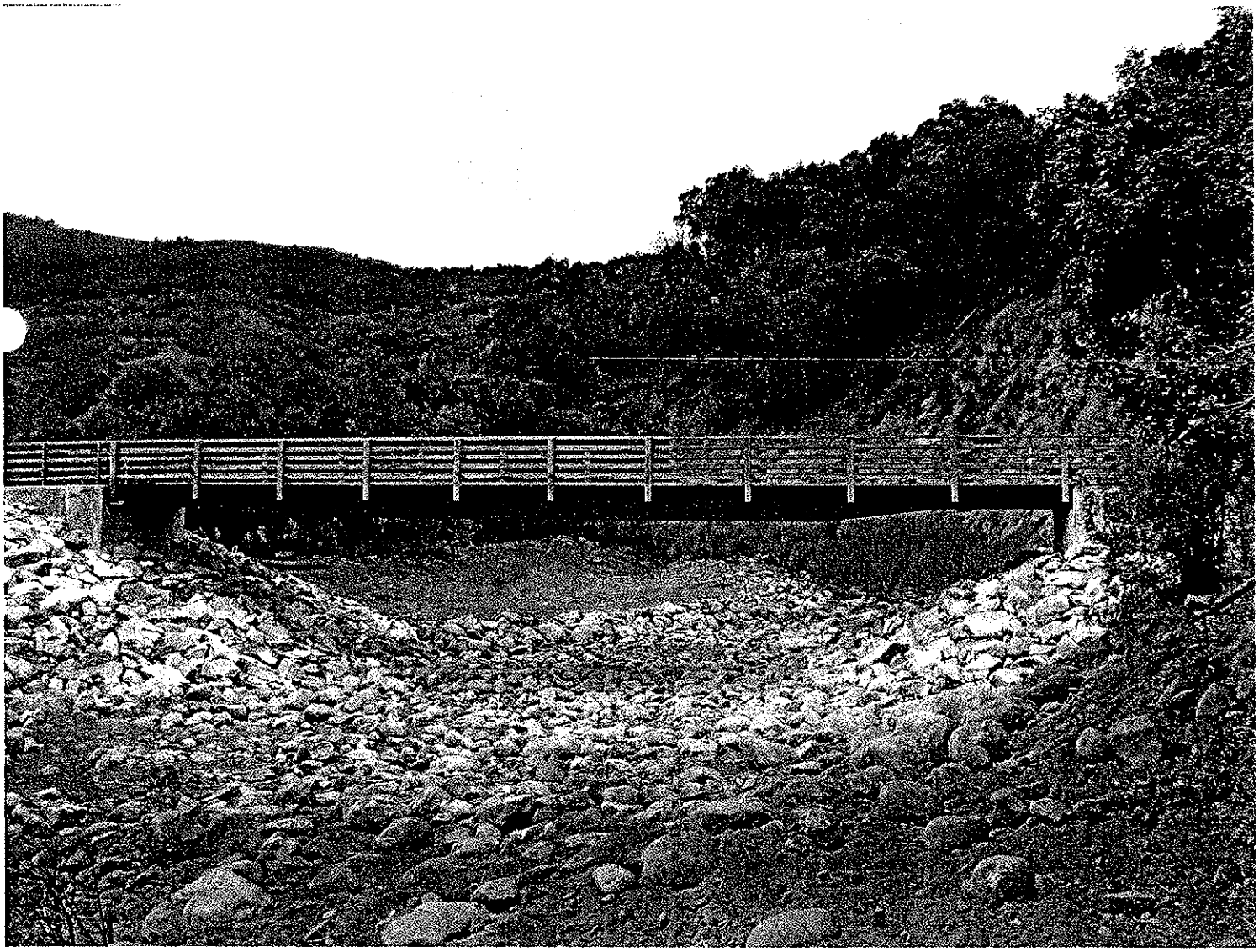
☐ Check here if attachments

Building Photographs

See Instructions for Item A6.

	For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. ~~11584 Creek Road~~ 11730 Creek Road	Policy Number
City Ojai State CA ZIP Code 93023	Company NAIC Number

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least two building photographs below according to the instructions for Item A6. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." If submitting more photographs than will fit on this page, use the Continuation Page, following.



Building Photographs

Continuation Page

	For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. ~~1584 Creek Road~~ 11730 Creek Road	Policy Number
City Ojai State CA ZIP Code 93023	Company NAIC Number

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View."

Survey Monument Data Sheet

County of Ventura -- Public Works Agency

Date Revised: 3/6/1997 Printed: 6/17/2008

VCPID	974	Stamping	49-13 RM 1 1986
Designation	49-13 RM 1	Magnetic	NO
NGSPID		Special Control	VCBN (LBN)
Alias		Specific Setting	WALL
Search Northing	337450	Character	VENTURA COUNTY BRASS DISK
Search Easting	1617730	Vicinity	OAK VIEW

Visit Date	Ground to Mark	Visit By Description	Condition Description
01-Jan-86	3	VENTURA COUNTY	ESTABLISHED
01-Jan-92	3	VENTURA COUNTY	GOOD

Visit Date	To Reach
01-Jan-86	3.2 MILE NORTHEASTERLY ALONG CREEK ROAD FROM ITS INTERSECTION WITH HIGHWAY 33, 25.0 FEET WESTERLY FROM THE CENTER OF CREEK ROAD, 15.0 FEET SOUTHERLY FROM NORTHERLY END OF WALL.

Ortho Height (meters)	Ortho Datum	Ortho Epoch	Ortho Order Class	Survey Date
546.30' 166.514	NAVD 88	VEN CO ADJ PUB 1992	2ND-I	1/1/1992
543.75' 165.736	NGVD 29	SCRP PUB 1980	1ST	1/1/1986

WARNING!!!

In Ventura County there is a variable difference of approximately 3/4 meter between the National Geodetic Vertical Datum of 1929 (NGVD' 29) and the North American Vertical Datum of 1988 (NAVD'88)

2.55' DIFFERENCE

NAVD 88 IS 2.55' HIGHER THAN NGVD 29

BRIDGE SOFFIT ELEV. 553.88 (NGVD 1929)
+ 2.55
556.43 (NAVD 1988)

556.43'
-555.37'
1.06'

SOFFIT 0.06'

ABOVE 1-FT FREEBOARD

BFE = 552.82' (NGVD 1929)
QUESTA REPORT DATED 11/16/2007
= 555.37 (NAVD 1988)

Civil, Environmental & Water Resources

QUESTA ENGINEERING CORP.

TECHNICAL MEMORANDUM

Date: November 16, 2007

Subject: Base Flood Elevation Determination for Lions Canyon Creek at 11584 Creek Road, Ojai, California

To: Mary Bergen

From: Sydney Temple P.E. Questa Engineering Corporation

Introduction

This memo discusses the hydrologic and hydraulic analysis for base flood elevation determination for the bridge design on Lions Canyon Creek in Ojai, California. The following sections describe 1) determination of the BFE, 2) the hydraulic model and assumptions used, 3) the modeled proposed bridge configuration, and 4) water surface elevations for the proposed bridge configuration.

Two design constraints exist based on state and county regulations:

- 1 foot of freeboard above the 100-year water surface elevation is required for the low chord (bottom) of the bridge deck, and
- the bridge must be able to facilitate use by a fire truck.

BFE Determination

The Ventura County Floodplain Manager determined that the site is located in a FEMA-determined 100-year floodplain, with a designation of "Approximate Zone 'A' Area," meaning that FEMA has not calculated the 100-year water surface elevation, known as the "Base Flood Elevation," or BFE. As such, the property owner is required to retain a civil engineer to use FEMA-established base flood elevation methodologies to calculate the BFE for the site.

The FEMA Technical Bulletin 265 (July 1995) "Managing Floodplain Development in Approximate Zone A Areas" was followed to determine the BFE for the site. The Discharge-Drainage Area Relationships method resulted in the highest 100-year peak flow, and was used to provide a conservative analysis of BFE for the proposed site. The two other methods used to estimate BFE are also shown below for comparison.

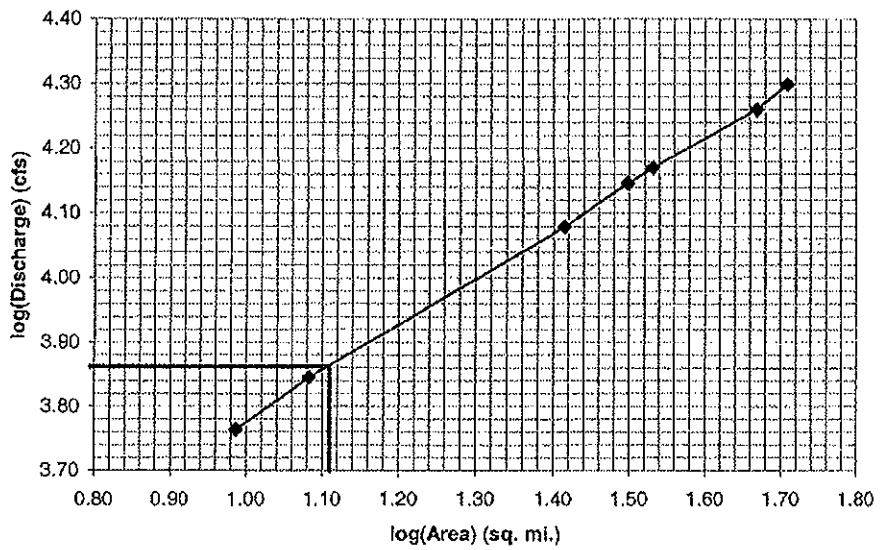
Discharge-Drainage Area Relationships

A discharge-drainage area relationship was plotted from San Antonio Creek 100-year flow rates and corresponding drainage areas (Flood Insurance Study, Ventura County, Unincorporated Areas, FEMA, 1997). Table 1 shows the discharges and areas for the San Antonio Creek watershed from the FEMA studies, which are plotted on a log-log plot, shown on Figure 1. This method results in a 100-year peak flow rate of 7,278 cfs.

Table 1. FEMA Summary of Discharges and Drainage Areas for San Antonio Creek Watershed

	Drainage Area (sq. mi.)	log(Area)	Discharge (cfs)	log(Discharge)
	9.7	0.99	5,800	3.76
	12.1	1.08	7,000	3.85
	26	1.41	12,000	4.08
	31.5	1.50	14,000	4.15
	34	1.53	14,800	4.17
	46.7	1.67	18,200	4.26
	51.2	1.71	19,900	4.30
Proposed Site	12.92	1.11	**7,278**	3.86

Figure 1. San Antonio Creek Discharge-Drainage Area Relationship



Regression Equations

The 100-year peak flow rate was also estimated using the California regression equations found in "Nationwide summary of U.S. Geological Survey regional regression equations for estimating magnitude and frequency of floods for ungaged sites," (U.S. Geological Survey Water-Resources Investigations Report 94-4002, 1993).

$$Q100 = 1.95\ A^{0.83}\ P^{1.87}$$

where:
Q100 = the 100-year peak flow rate
A = drainage area (sq. mi.)
P = mean annual precipitation (in.)

Table 2. Regression Equation Results

Area (sq. mi.)	Mean Annual Precipitation (in.)	Q100 (cfs)
12.92	21	4,840

Using regression equations, the estimated 100-year peak flow rate is 4,840 cfs.

Log-Pearson, Type III Analysis of 50-year Gage Data

The 100-year peak flow rate was also estimated by analyzing 50 years of stream gage data for San Antonio Creek using a log-Pearson, Type III analysis. The Log-Pearson calculations are shown in Appendix A The peak discharges for San Antonio Creek were then scaled, by drainage area, to find appropriate discharges for Lion's Canyon Creek. The watershed area for San Antonio Creek at the gage location is 34 square miles; the watershed area for Lion's Canyon Creek at the bridge site is 12.92 square miles. Thus, the San Antonio Creek discharges must be scaled by 38% to determine Lion's Canyon Creek discharges. The 100-year peak flow rate for the bridge site estimated from the Log-Pearson, Type III analysis is 5,580 cfs.

Table 3. Log-Pearson, Type III Results

Recurrence Interval (years)	San Antonio Creek Peak Flow Rates (cfs)	Lion's Canyon Creek Peak Flow Rates Scaled from San Antonio Creek Flows (cfs)
1	8	3
2	345	131
5	1,340	509
10	2,725	1,035
25	5,807	2,206
50	9,467	3,598
100	14,684	**5,580**
200	21,980	8,352

Thus, 7,278 cfs, the highest 100-year peak flow rate estimated from the discharge-drainage area relationship of the FEMA methodologies, was used to determine base flood elevations at the project site.

Hydraulic Model

A hydraulic model was used to simulate the response of the existing channel geometry with the proposed bridge configurations. HEC-RAS (Hydrologic Engineering Center River Analysis System version 3.1, 2002) was used to predict the hydraulic response of the proposed structure. In order to run a hydraulic model the channel geometry and the discharge for the design storms need to be specified. Surveyed channel topography was used to generate cross-section geometry data for the model. Overall 18 cross-sections spaced 50 to 100 feet apart were used. Roughness coefficients were (Manning's n value) assigned a value of 0.043 in the channel and 0.05 for overbank flows. These values were selected from the publication "Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains" (USGS WSP-2339). For each modeled design storm, boundary conditions are necessary at the upstream and downstream ends of the river system. This analysis used a "Normal Depth" boundary condition at the upstream and downstream boundaries. This requires an energy slope to be used in calculating normal depth (Manning's equation) at each cross-section for each profile. Since the energy slope was unknown, the average slope of the channel bottom was used (S=0.023).

Proposed Bridge Modeling Results

The bridge proposed for the site is an 85-ft span "rail-road" bridge that uses railroad components for the bridge deck. The longitudinal width is 14 ft, and the elevation of the low chord is 553.82 ft (NGVD29).

Figure 2. Base Flood Elevations (100-year Water Surface Elevation) at RS 5+00

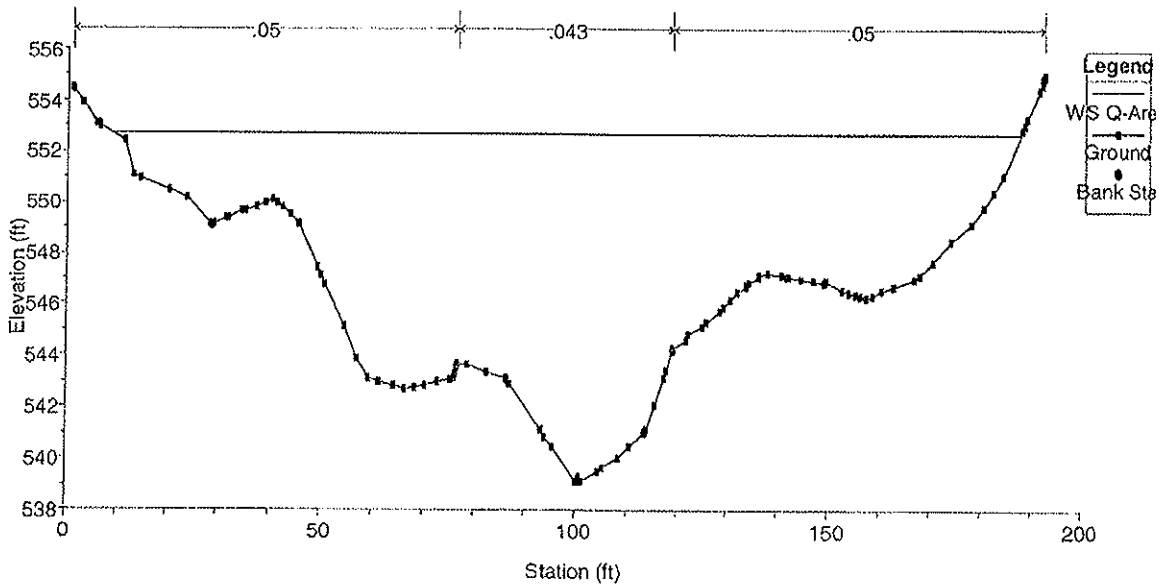


Figure 2 shows that the estimated existing BFE for the site is 552.75 ft, which provides the 1-ft required freeboard below the bridge low chord. The BFE was taken from the cross-section at RS 5+00, 2 feet upstream of the proposed bridge, to adequately capture the backwater effects of the proposed bridge. Figure 3 shows the longitudinal profile of the channel.

Figure 3. Longitudinal Profile of the Project Reach showing 100-year Water Surface Elevations.

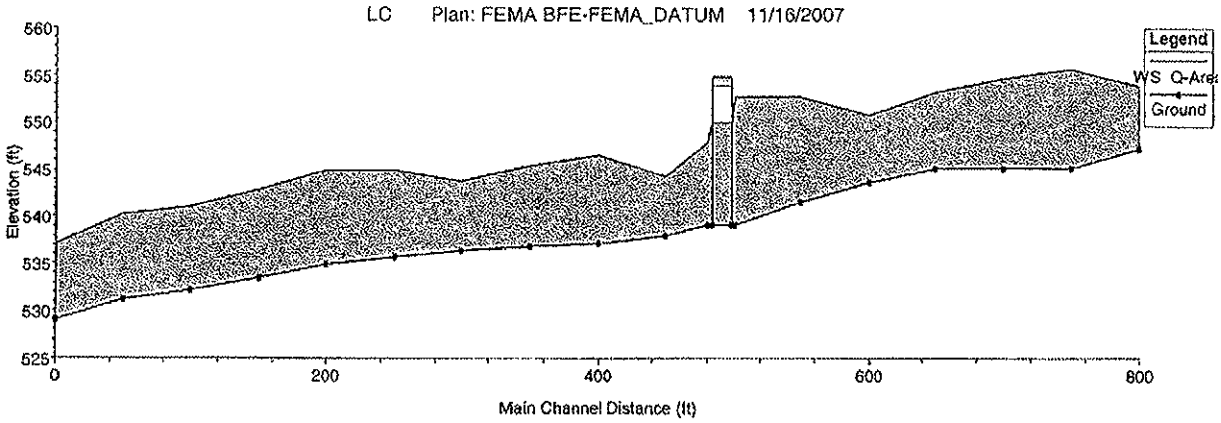
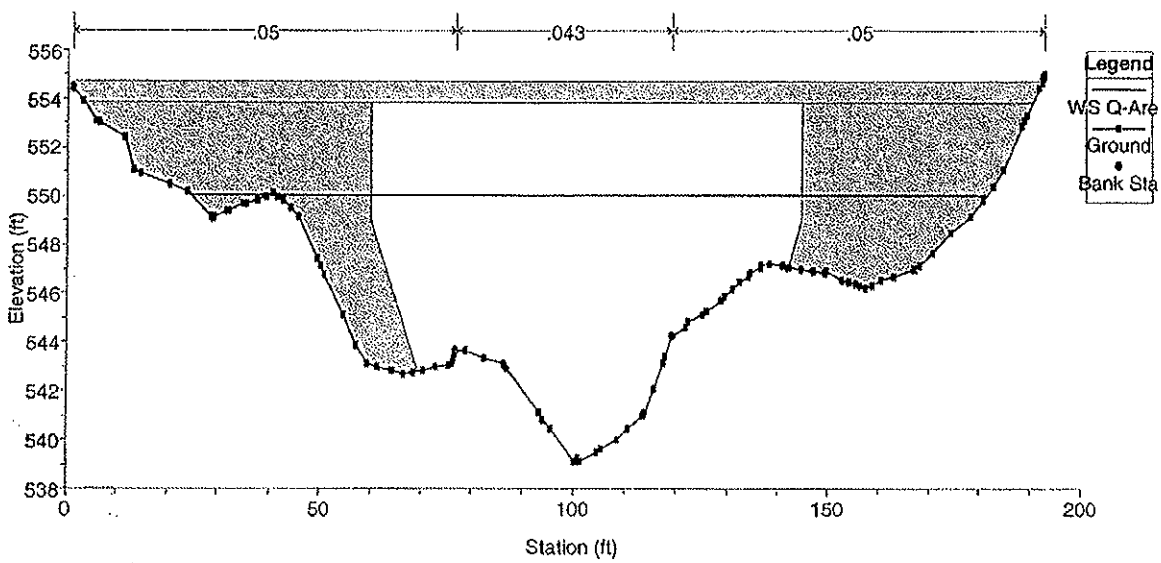


Figure 4 shows the cross-section at the bridge location RS 4+92. The base flood elevations are lower here than at RS 5+00 because flow undergoes a constriction upon flowing below the bridge deck. This decrease in water surface elevation is also seen in the longitudinal profile above. The 100-year water surface elevation directly under the bridge deck is 549.64 ft.

Figure 4. Base Flood Elevations (100-year Water Surface Elevation) at RS 4+98



Thus, the proposed bridge will have more than the required 1-ft of freeboard below the low chord of the bridge.

Table 4. Modeling Results

RS	Description	100-year Peak Flow (cfs)	BFE (FT-NGVD29)	Low Chord Elevation (FT-NGVD29)	Freeboard (ft)
5+00	2-ft upstream of bridge	7278	552.75	553.82	1.07
4+98	directly below bridge deck	7278	550.03	553.82	3.79

I trust this is the information you require at this time. If you have any questions feel free to call Chien Wang or me at 510-236-6114.

Sincerely,

Sydney Temple, P.E.
Principal/Senior Hydrologist

Appendix A
Log-Pearson Type III Analysis of San Antonio Creek Gage Data

					MAXIMUM Q				
Rank	Water Year	Annual AVERAGE (cfs)	Annual MAX (cfs)	Annual MIN (cfs)	Log Q	logQ-avg(logQ)^2	logQ-avg(logQ)^3	T	P
52	1955	0.24	19	0	1.278754	1.584642	-1.994787	1.019231	0.981132
51	1961	0.20	21.00	0.00	1.322219	1.477099	-1.795207	1.039216	0.962264
50	2002	1.52	27.00	0.00	1.431364	1.223712	-1.353689	1.06	0.943396
49	1960	0.64	30.00	0.00	1.477121	1.124571	-1.19256	1.081633	0.924528
48	1987	1.93	30.00	0.00	1.477121	1.124571	-1.19256	1.104167	0.90566
47	1964	0.44	32.00	0.00	1.50515	1.06591	-1.100476	1.12766	0.886792
46	1999	5.45	38.00	0.61	1.579784	0.917372	-0.878655	1.152174	0.867925
45	1953	1.92	48	0	1.681241	0.733314	-0.627965	1.177778	0.849057
44	1990	0.41	51.00	0.00	1.70757	0.688915	-0.571805	1.204545	0.830189
43	1957	0.30	52.00	0.00	1.716003	0.674987	-0.554553	1.232558	0.811321
42	1989	1.02	60.00	0.00	1.778151	0.576731	-0.437985	1.261905	0.792453
41	1977	1.19	66.00	0.00	1.819544	0.515574	-0.370201	1.292683	0.773585
40	1959	3.15	92.00	0.00	1.963788	0.329236	-0.188913	1.325	0.754717
39	1954	1.81	104	0	2.017033	0.270968	-0.141051	1.358974	0.735849
38	1985	2.41	109.00	0.00	2.037426	0.250153	-0.125114	1.394737	0.716981
37	1968	3.91	126.00	0.00	2.100371	0.191151	-0.083573	1.432432	0.698113
36	1976	1.72	135.00	0.00	2.130334	0.165849	-0.067541	1.472222	0.679245
35	1984	7.20	147.00	0.36	2.167317	0.137094	-0.050761	1.514286	0.660377
34	1965	1.22	153.00	0.00	2.184691	0.12453	-0.043945	1.558824	0.641509
33	1963	1.48	191.00	0.00	2.281033	0.065816	-0.016885	1.606061	0.622642
32	1982	4.46	191.00	0.64	2.281033	0.065816	-0.016885	1.65625	0.603774
31	1981	6.23	216.00	0.53	2.334454	0.04126	-0.008381	1.709677	0.584906
30	1994	4.57	225.00	0.09	2.352183	0.034372	-0.006372	1.766667	0.566038
29	1970	7.13	318.00	0.64	2.502427	0.001236	-4.34E-05	1.827586	0.54717
28	1972	2.72	321.00	0.00	2.506505	0.000966	-3E-05	1.892857	0.528302
27	1956	1.59	357	0	2.552668	0.000228	3.44E-06	1.962963	0.509434
26	1988	3.08	360.00	0.00	2.556303	0.000351	6.56E-06	2.038462	0.490566
25	1975	7.05	417.00	0.09	2.620136	0.006816	0.000563	2.12	0.471698
24	2000	7.47	428.00	0.19	2.631444	0.008811	0.000827	2.208333	0.45283
23	2003	3.85	483.00	0.00	2.683947	0.021424	0.003136	2.304348	0.433962
22	1971	7.61	525.00	0.44	2.720159	0.033336	0.006086	2.409091	0.415094
21	1979	15.88	620.00	3.10	2.792392	0.064929	0.016545	2.52381	0.396226
20	1974	6.70	683.00	0.29	2.834421	0.088115	0.026156	2.65	0.377358
19	1996	6.51	696.00	0.19	2.842609	0.093043	0.028381	2.789474	0.358491
18	1991	9.23	708.00	0.00	2.850033	0.097628	0.030504	2.944444	0.339623
17	1997	12.09	775.00	0.24	2.889302	0.123709	0.043511	3.117647	0.320755
16	1986	17.73	808.00	0.00	2.907411	0.136776	0.050584	3.3125	0.301887
15	1952	17.12	1460	0	3.164353	0.392845	0.246225	3.533333	0.283019
14	1966	17.58	1520.00	0.00	3.181844	0.415077	0.267419	3.785714	0.264151
13	1962	19.05	1860.00	0.00	3.269513	0.535727	0.392117	4.076923	0.245283
12	1958	32.97	1890.00	0.00	3.276462	0.545948	0.403391	4.416667	0.226415
11	1980	37.71	1890.00	2.60	3.276462	0.545948	0.403391	4.818182	0.207547
10	1992	28.33	1980.00	0.00	3.296665	0.576212	0.437394	5.3	0.188679
9	1967	24.26	2150.00	0.00	3.332438	0.631801	0.502193	5.888889	0.169811
8	2001	25.42	2390.00	0.37	3.378398	0.706976	0.594439	6.625	0.150943

7	1993	84.37	2430.00	1.30	3.385606	0.71915	0.609859	7.571429	0.132075
6	1973	26.45	2500.00	0.00	3.39794	0.740221	0.636857	8.833333	0.113208
5	1983	69.22	2930.00	0.64	3.466868	0.863577	0.802512	10.6	0.09434
4	1995	67.13	4260.00	0.09	3.62941	1.192094	1.301565	13.25	0.075472
3	1978	74.52	4300.00	0.00	3.633468	1.200974	1.316134	17.66667	0.056604
2	1998	101.53	5420.00	0.04	3.733999	1.431421	1.712581	26.5	0.037736
1	1969	108.30	10405.00	0.00	4.017242	2.189403	3.239578	53	0.018868
			AVERAGE		AVERAGE	sum	sum		
			1097.058		2.537579	26.74838	0.252023		
								VARIANCE	0.52
								SD	0.70
								CS, SKEW	0.01
									0.01353
					Cs=0	Cs=0.1	Cs=0.01		
			RAS Profile	Tr	K	K	K	avg(logQ)+KSy	Q
			1	1	-2.326	-2.252	-2.32526	0.909364	8
			2	2	0	-0.017	-0.00017	2.53746	345
			3	5	0.842	0.836	0.84194	3.12713	1340
			4	10	1.282	1.292	1.2821	3.435343	2725
			5	25	1.751	1.785	1.75134	3.763919	5807
			6	50	2.054	2.107	2.05453	3.976221	9467
			7	100	2.326	2.4	2.32674	4.16683	14684
			8	200	2.576	2.67	2.57694	4.342028	21980

U.S. DEPARTMENT OF HOMELAND SECURITY
Federal Emergency Management Agency
National Flood Insurance Program

ELEVATION CERTIFICATE

Important: Read the instructions on pages 1-9.

OMB No. 1660-0008
Expires March 31, 2012

SECTION A - PROPERTY INFORMATION

For Insurance Company Use:
Policy Number
Company NAIC Number

A1. Building Owner's Name Mary Bergen

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.
~~11584 Creek Road~~ 11730 Creek Road
City Ojai State CA ZIP Code 93023

A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)
APN 035-0-050-055

A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.) Private bridge to single family dwelling Lat 34° 25' 15.62 N

A5. Latitude/Longitude: Lat. ~~34°~~ Long. _____ Horizontal Datum: ☐ NAD 1927 ☑ NAD 1983 long 119° 15' 46.18 W

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number N/A Private Bridge Crossing Datum: W GS 84

A8. For a building with a crawlspace or enclosure(s):
- a) Square footage of crawlspace or enclosure(s) N/A sq ft
- b) No. of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade N/A
- c) Total net area of flood openings in A8.b N/A sq in
- d) Engineered flood openings? ☐ Yes ☒ No

A9. For a building with an attached garage:
- a) Square footage of attached garage N/A sq ft
- b) No. of permanent flood openings in the attached garage within 1.0 foot above adjacent grade N/A
- c) Total net area of flood openings in A9.b N/A sq in
- d) Engineered flood openings? ☐ Yes ☒ No

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

B1. NFIP Community Name & Community Number	B2. County Name	B3. State
Ventura County (Unincorporated Areas) 060413	Ventura County	California

B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
~~0611C~~ / 0567 06111C	E	Jan. 20, 2010	Jan. 20, 2010	A	N/A

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9.
☐ FIS Profile ☐ FIRM ☐ Community Determined ☒ Other (Describe) Questa Engineering Corp. (See Attachment)

B11. Indicate elevation datum used for BFE in Item B9: ☐ NGVD 1929 ☒ NAVD 1988 ☐ Other (Describe)
Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? ☐ Yes ☒ No
Designation Date N/A ☐ CBRS ☐ OPA

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete. BRIDGE ONLY

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.
Benchmark Utilized _____ Vertical Datum 1988 NAVD
Conversion/Comments

			Check the measurement used.	
a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	_____.____	☐ feet	☐ meters (Puerto Rico only)
b)	Top of the next higher floor	_____.____	☐ feet	☐ meters (Puerto Rico only)
c)	Bottom of the lowest horizontal structural member (~~V Zones only~~) BRIDGE ONLY	556.43	☑ feet	☐ meters (Puerto Rico only) NAVD 1988
d)	Attached garage (top of slab) (Soffit of bridge)	_____.____	☐ feet	☐ meters (Puerto Rico only)
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	_____.____	☐ feet	☐ meters (Puerto Rico only)
f)	Lowest adjacent (finished) grade next to building (LAG)	_____.____	☐ feet	☐ meters (Puerto Rico only)
g)	Highest adjacent (finished) grade next to building (HAG)	_____.____	☐ feet	☐ meters (Puerto Rico only)
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	_____.____	☐ feet	☐ meters (Puerto Rico only)

Approximate H' Zone without BFE requirements

RECEIVED FEB 22 2011

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION

This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. *I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.* ☒

✓ Check here if comments are provided on back of form. Were latitude and longitude in Section A provided by a licensed land surveyor? ☐ Yes ☒ No

Certifier's Name Jeffrey S. Morris License Number C 46005

Title Civil Engineer Company Name Morris Engineering

Address 6901 Lorene Road City Redwood Valley State CA ZIP Code 95470

Signature [signature] Date 2/15/11 Telephone (707) 485-1133

REGISTERED PROFESSIONAL ENGINEER
JEFFREY S. MORRIS
No. C46005
Exp 12/31/12
CIVIL
STATE OF CALIFORNIA

IMPORTANT: In these spaces, copy the corresponding information from Section A.	For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. ~~11584 Creek Road~~ 11730 Creek Road, Ojai, CA	Policy Number
City Ojai State CA ZIP Code 93023	Company NAIC Number

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments The lowest horizontal structure member (bottom of bridge soffit) for this private residential bridge is 556.43 feet (NAVD 1988 datum) which is 0.06 feet above the 1-ft. freeboard above the calculated BFE which is 555.37 feet (NAVD 1988 Datum). BFE determined by Questa Engineering Corporation (Richmond, CA) in a report dated November 16, 2007 (Attachment).

Signature [signature] Date 2/15/11

☒ Check here if attachments

SECTION E - BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)

Not a Building - Road is a Private Bridge

For Zones AO and A (without BFE), complete Items E1-E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1-E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
a) Top of bottom floor (including basement, crawlspace, or enclosure) is N/A ☐ feet ☐ meters ☐ above or ☐ below the HAG.
b) Top of bottom floor (including basement, crawlspace, or enclosure) is N/A ☐ feet ☐ meters ☐ above or ☐ below the LAG.

E2. For Building Diagrams 6-9 with permanent flood openings provided in Section A Items 8 and/or 9 (see pages 8-9 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is N/A ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E3. Attached garage (top of slab) is N/A ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E4. Top of platform of machinery and/or equipment servicing the building is N/A ☐ feet ☐ meters ☐ above or ☐ below the HAG.

E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance? ☐ Yes ☐ No ☐ Unknown. The local official must certify this information in Section G. N/A (See Section G Comments)

SECTION F - PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. *The statements in Sections A, B, and E are correct to the best of my knowledge.*

Property Owner's or Owner's Authorized Representative's Name
y Bergen

Address 11584 Creek Road City Ojai State CA ZIP Code 93023

Signature [signature] Date 2-18-11 Telephone (805) 649-5207

Comments BFE determined by Questa Engineering Corporation (Richmond, CA) in a report dated November 16, 2007. See Attachment.

☒ Check here if attachments

SECTION G - COMMUNITY INFORMATION (OPTIONAL)

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8 and G9.

G1. ☑ The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)

G2. ☐ A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.

G3. ☐ The following information (Items G4-G9) is provided for community floodplain management purposes.

G4. Permit Number	G5. Date Permit Issued	G6. Date Certificate Of Compliance/Occupancy Issued
F 2008-03	05/08/08	02/23/11

G7. This permit has been issued for: ☑ New Construction ☐ Substantial Improvement

G8. Elevation of as-built lowest floor (including basement) of the building: 556.43 ☑ feet ☐ meters (PR) Datum NAVD1988 bridge soffit.

G9. BFE or (in Zone AO) depth of flooding at the building site: — ☐ feet ☐ meters (PR) Datum

G10. Community's design flood elevation 555.37 ☑ feet ☐ meters (PR) Datum NAVD1988

Local Official's Name Brian Trautwein Title Floodplain Manager

Community Name County of Ventura Telephone (805) 477-1967

Signature [signature] Date 02/23/11

Comments Project is a private bridge crossing. Bottom of soffit is 0.06 feet above the BFE + 1'-0" freeboard. Building materials are flood resistant.

☐ Check here if attachments

Building Photographs

See Instructions for Item A6.

	For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. ~~11584 Creek Road~~ 11730 Creek Road	Policy Number
City Ojai State CA ZIP Code 93023	Company NAIC Number

If using the Elevation Certificate to obtain NFIP flood insurance, affix at least two building photographs below according to the instructions for Item A6. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View." If submitting more photographs than will fit on this page, use the Continuation Page, following.

Building Photographs

Continuation Page

ilding Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.	For Insurance Company Use:
~~1584 Creek Road~~ 11730 Creek Road	Policy Number
City Ojai State CA ZIP Code 93023	Company NAIC Number

If submitting more photographs than will fit on the preceding page, affix the additional photographs below. Identify all photographs with: date taken; "Front View" and "Rear View"; and, if required, "Right Side View" and "Left Side View."

Survey Monument Data Sheet

County of Ventura -- Public Works Agency

Date Revised: 3/6/1997 Printed: 6/17/2008

VCPID	974	Stamping	49-13 RM 1 1986
Designation	49-13 RM 1	Magnetic	NO
NGSPID		Special Control	VCBN (LBN)
Alias		Specific Setting	WALL
Search Northing	337450	Character	VENTURA COUNTY BRASS DISK
Search Easting	1617730	Vicinity	OAK VIEW

Visit Date	Ground to Mark	Visit By Description	Condition Description
01-Jan-86	3	VENTURA COUNTY	ESTABLISHED
01-Jan-92	3	VENTURA COUNTY	GOOD

Visit Date	To Reach
01-Jan-86	3.2 MILE NORTHEASTERLY ALONG CREEK ROAD FROM ITS INTERSECTION WITH HIGHWAY 33, 25.0 FEET WESTERLY FROM THE CENTER OF CREEK ROAD, 15.0 FEET SOUTHERLY FROM NORTHERLY END OF WALL.

Ortho Height (meters)	Ortho Datum	Ortho Epoch	Ortho Order Class	Survey Date
546.30' 166.514	NAVD 88	VEN CO ADJ PUB 1992	2ND-I	1/1/1992
543.75' 165.736	NGVD 29	SCRP PUB 1980	1ST	1/1/1986

WARNING!!!

In Ventura County there is a variable difference of approximately 3/4 meter between the National Geodetic Vertical Datum of 1929 (NGVD' 29) and the North American Vertical Datum of 1988 (NAVD'88)

2.55' DIFFERENCE
NAVD 88 IS 2.55' HIGHER THAN NGVD 29

BRIDGE SOFFIT ELEV. 553.88 (NGVD 1929)
+ 2.55
556.43 (NAVD 1988)

556.43'
- 555.37'
1.06'

SOFFIT 0.06'

ABOVE 1-FT FREEBOARD

BFE = 552.82' (NGVD 1929)
QUESTA REPORT DATED 11/16/2007
= 555.37 (NAVD 1988)

QUESTA ENGINEERING CORP.

Civil, Environmental & Water Resources

TECHNICAL MEMORANDUM

Date: November 16, 2007

Subject: Base Flood Elevation Determination for Lions Canyon Creek at 11584 Creek Road, Ojai, California

To: Mary Bergen

From: Sydney Temple P.E. Questa Engineering Corporation

Introduction

This memo discusses the hydrologic and hydraulic analysis for base flood elevation determination for the bridge design on Lions Canyon Creek in Ojai, California. The following sections describe 1) determination of the BFE, 2) the hydraulic model and assumptions used, 3) the modeled proposed bridge configuration, and 4) water surface elevations for the proposed bridge configuration.

Two design constraints exist based on state and county regulations:

- 1 foot of freeboard above the 100-year water surface elevation is required for the low chord (bottom) of the bridge deck, and
- the bridge must be able to facilitate use by a fire truck.

BFE Determination

The Ventura County Floodplain Manager determined that the site is located in a FEMA-determined 100-year floodplain, with a designation of "Approximate Zone 'A' Area," meaning that FEMA has not calculated the 100-year water surface elevation, known as the "Base Flood Elevation," or BFE. As such, the property owner is required to retain a civil engineer to use FEMA-established base flood elevation methodologies to calculate the BFE for the site.

The FEMA Technical Bulletin 265 (July 1995) "Managing Floodplain Development in Approximate Zone A Areas" was followed to determine the BFE for the site. The Discharge-Drainage Area Relationships method resulted in the highest 100-year peak flow, and was used to provide a conservative analysis of BFE for the proposed site. The two other methods used to estimate BFE are also shown below for comparison.

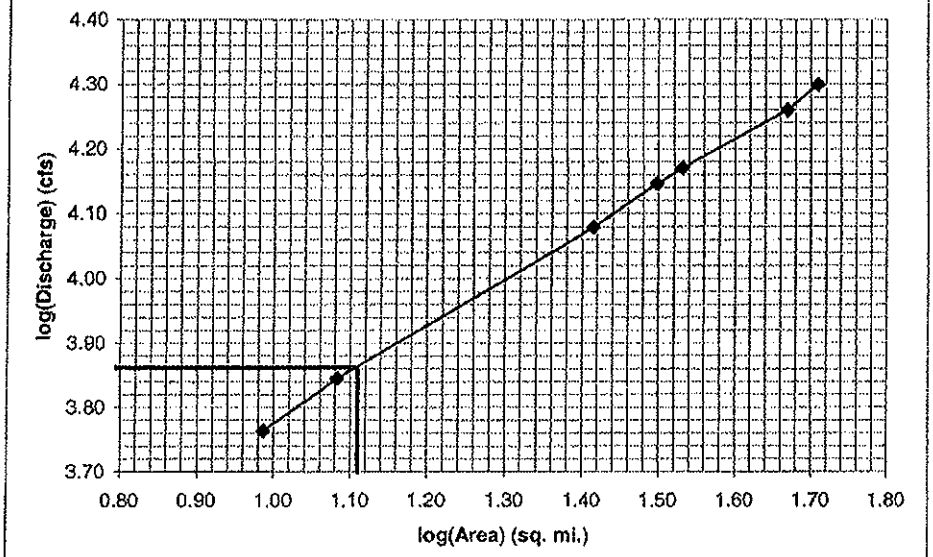
Discharge-Drainage Area Relationships

A discharge-drainage area relationship was plotted from San Antonio Creek 100-year flow rates and corresponding drainage areas (Flood Insurance Study, Ventura County, Unincorporated Areas, FEMA, 1997). Table 1 shows the discharges and areas for the San Antonio Creek watershed from the FEMA studies, which are plotted on a log-log plot, shown on Figure 1. This method results in a 100-year peak flow rate of 7,278 cfs.

Table 1. FEMA Summary of Discharges and Drainage Areas for San Antonio Creek Watershed

	Drainage Area (sq. mi.)	log(Area)	Discharge (cfs)	log(Discharge)
	9.7	0.99	5,800	3.76
	12.1	1.08	7,000	3.85
	26	1.41	12,000	4.08
	31.5	1.50	14,000	4.15
	34	1.53	14,800	4.17
	46.7	1.67	18,200	4.26
	51.2	1.71	19,900	4.30
Proposed Site	12.92	1.11	**7,278**	3.86

Figure 1. San Antonio Creek Discharge-Drainage Area Relationship



Regression Equations

The 100-year peak flow rate was also estimated using the California regression equations found in "Nationwide summary of U.S. Geological Survey regional regression equations for estimating magnitude and frequency of floods for ungaged sites," (U.S. Geological Survey Water-Resources Investigations Report 94-4002, 1993).

$$Q100 = 1.95\ A^{0.83}\ P^{1.87}$$

where:
Q100 = the 100-year peak flow rate
A = drainage area (sq. mi.)
P = mean annual precipitation (in.)

Table 2. Regression Equation Results

Area (sq. mi.)	Mean Annual Precipitation (in.)	Q100 (cfs)
12.92	21	4,840

Using regression equations, the estimated 100-year peak flow rate is 4,840 cfs.

Log-Pearson, Type III Analysis of 50-year Gage Data

The 100-year peak flow rate was also estimated by analyzing 50 years of stream gage data for San Antonio Creek using a log-Pearson, Type III analysis. The Log-Pearson calculations are shown in Appendix A The peak discharges for San Antonio Creek were then scaled, by drainage area, to find appropriate discharges for Lion's Canyon Creek. The watershed area for San Antonio Creek at the gage location is 34 square miles; the watershed area for Lion's Canyon Creek at the bridge site is 12.92 square miles. Thus, the San Antonio Creek discharges must be scaled by 38% to determine Lion's Canyon Creek discharges. The 100-year peak flow rate for the bridge site estimated from the Log-Pearson, Type III analysis is 5,580 cfs.

Table 3. Log-Pearson, Type III Results

Recurrence Interval (years)	San Antonio Creek Peak Flow Rates (cfs)	Lion's Canyon Creek Peak Flow Rates Scaled from San Antonio Creek Flows (cfs)
1	8	3
2	345	131
5	1,340	509
10	2,725	1,035
25	5,807	2,206
50	9,467	3,598
100	14,684	**5,580**
200	21,980	8,352

Thus, 7,278 cfs, the highest 100-year peak flow rate estimated from the discharge-drainage area relationship of the FEMA methodologies, was used to determine base flood elevations at the project site.

Hydraulic Model

A hydraulic model was used to simulate the response of the existing channel geometry with the proposed bridge configurations. HEC-RAS (Hydrologic Engineering Center River Analysis System version 3.1, 2002) was used to predict the hydraulic response of the proposed structure. In order to run a hydraulic model the channel geometry and the discharge for the design storms need to be specified. Surveyed channel topography was used to generate cross-section geometry data for the model. Overall 18 cross-sections spaced 50 to 100 feet apart were used. Roughness coefficients were (Manning's n value) assigned a value of 0.043 in the channel and 0.05 for overbank flows. These values were selected from the publication "Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains" (USGS WSP-2339). For each modeled design storm, boundary conditions are necessary at the upstream and downstream ends of the river system. This analysis used a "Normal Depth" boundary condition at the upstream and downstream boundaries. This requires an energy slope to be used in calculating normal depth (Manning's equation) at each cross-section for each profile. Since the energy slope was unknown, the average slope of the channel bottom was used (S=0.023).

Proposed Bridge Modeling Results

The bridge proposed for the site is an 85-ft span "rail-road" bridge that uses railroad components for the bridge deck. The longitudinal width is 14 ft, and the elevation of the low chord is 553.82 ft (NGVD29).

Figure 2. Base Flood Elevations (100-year Water Surface Elevation) at RS 5+00

LC Plan: FEMA BFE-FEMA_DATUM 11/16/2007

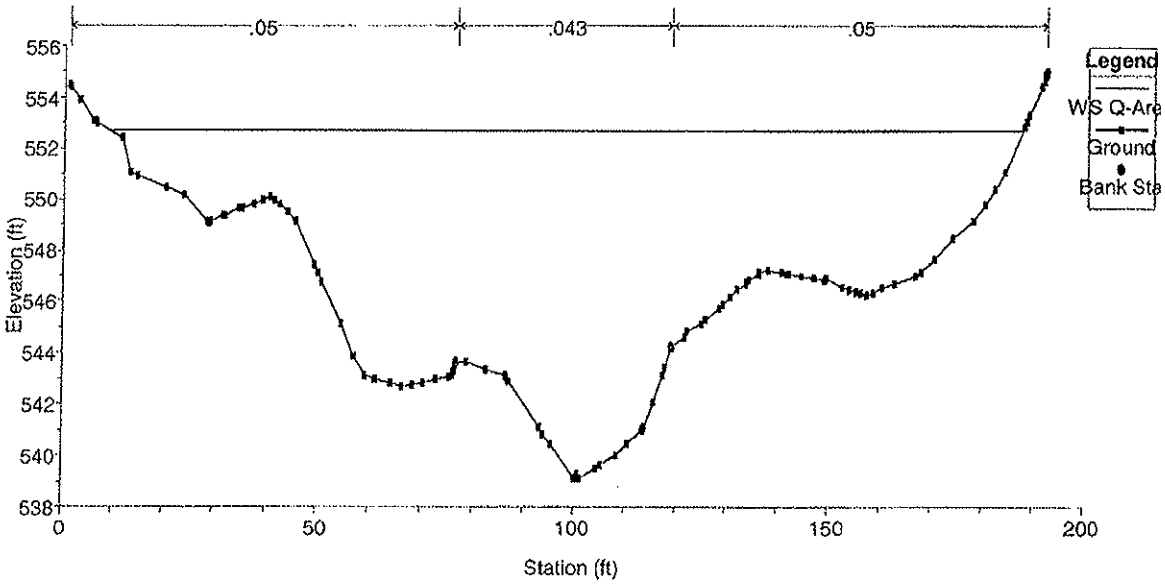


Figure 2 shows that the estimated existing BFE for the site is 552.75 ft, which provides the 1-ft required freeboard below the bridge low chord. The BFE was taken from the cross-section at RS 5+00, 2 feet upstream of the proposed bridge, to adequately capture the backwater effects of the proposed bridge. Figure 3 shows the longitudinal profile of the channel.

Figure 3. Longitudinal Profile of the Project Reach showing 100-year Water Surface Elevations.

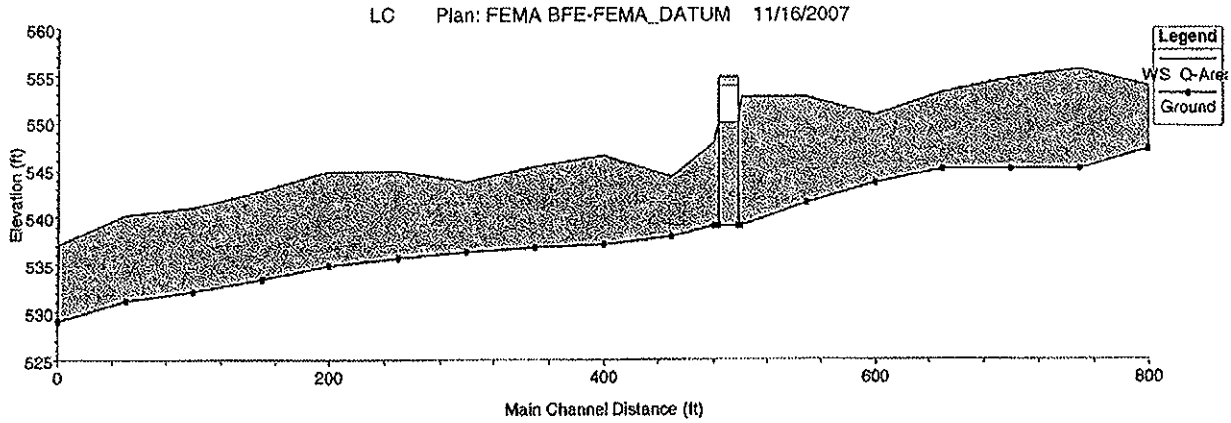
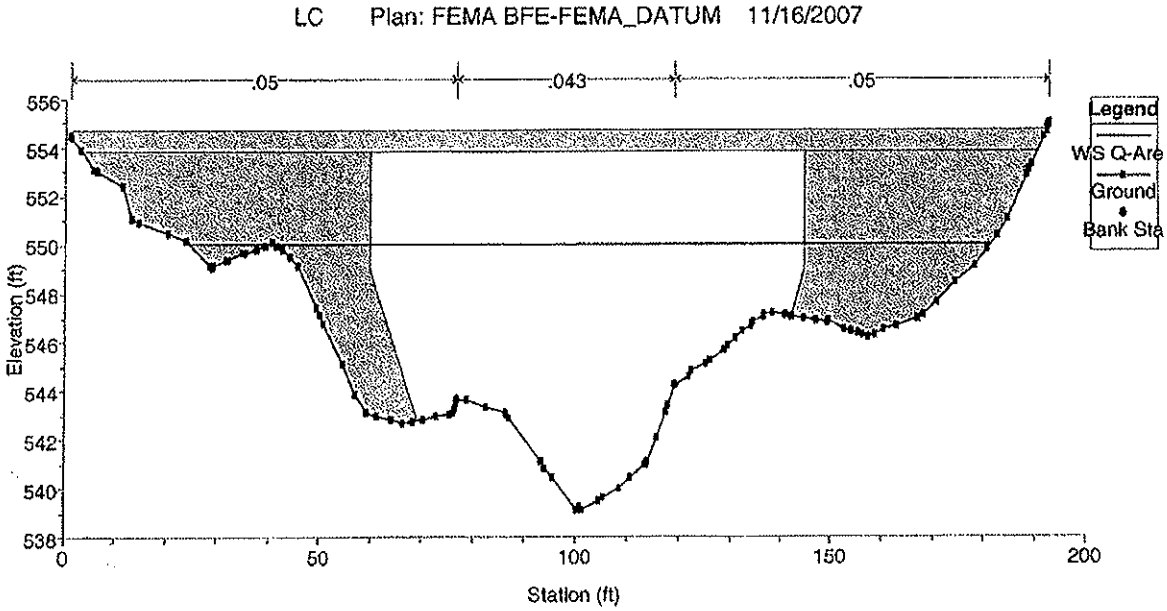


Figure 4 shows the cross-section at the bridge location RS 4+92. The base flood elevations are lower here than at RS 5+00 because flow undergoes a constriction upon flowing below the bridge deck. This decrease in water surface elevation is also seen in the longitudinal profile above. The 100-year water surface elevation directly under the bridge deck is 549.64 ft.

Figure 4. Base Flood Elevations (100-year Water Surface Elevation) at RS 4+98



Thus, the proposed bridge will have more than the required 1-ft of freeboard below the low chord of the bridge.

Table 4. Modeling Results

RS	Description	100-year Peak Flow (cfs)	BFE (FT-NGVD29)	Low Chord Elevation (FT-NGVD29)	Freeboard (ft)
5+00	2-ft upstream of bridge	7278	552.75	553.82	1.07
4+98	directly below bridge deck	7278	550.03	553.82	3.79

I trust this is the information you require at this time. If you have any questions feel free to call Chien Wang or me at 510-236-6114.

Sincerely,

Sydney Temple, P.E.
Principal/Senior Hydrologist

					MAXIMUM Q				
Rank	Water Year	Annual AVERAGE (cfs)	Annual MAX (cfs)	Annual MIN (cfs)	Log Q	logQ-avg(logQ)^2	logQ-avg(logQ)^3	T	P
52	1955	0.24	19	0	1.278754	1.584642	-1.994787	1.019231	0.981132
51	1961	0.20	21.00	0.00	1.322219	1.477099	-1.795207	1.039216	0.962264
50	2002	1.52	27.00	0.00	1.431364	1.223712	-1.353689	1.06	0.943396
49	1960	0.64	30.00	0.00	1.477121	1.124571	-1.19256	1.081633	0.924528
48	1987	1.93	30.00	0.00	1.477121	1.124571	-1.19256	1.104167	0.90566
47	1964	0.44	32.00	0.00	1.50515	1.06591	-1.100476	1.12766	0.886792
46	1999	5.45	38.00	0.61	1.579784	0.917372	-0.878655	1.152174	0.867925
45	1953	1.92	48	0	1.681241	0.733314	-0.627965	1.177778	0.849057
44	1990	0.41	51.00	0.00	1.70757	0.688915	-0.571805	1.204545	0.830189
43	1957	0.30	52.00	0.00	1.716003	0.674987	-0.554553	1.232558	0.811321
42	1989	1.02	60.00	0.00	1.778151	0.576731	-0.437985	1.261905	0.792453
41	1977	1.19	66.00	0.00	1.819544	0.515574	-0.370201	1.292683	0.773585
40	1959	3.15	92.00	0.00	1.963788	0.329236	-0.188913	1.325	0.754717
39	1954	1.81	104	0	2.017033	0.270968	-0.141051	1.358974	0.735849
38	1985	2.41	109.00	0.00	2.037426	0.250153	-0.125114	1.394737	0.716981
37	1968	3.91	126.00	0.00	2.100371	0.191151	-0.083573	1.432432	0.698113
36	1976	1.72	135.00	0.00	2.130334	0.165849	-0.067541	1.472222	0.679245
35	1984	7.20	147.00	0.36	2.167317	0.137094	-0.050761	1.514286	0.660377
34	1965	1.22	153.00	0.00	2.184691	0.12453	-0.043945	1.558824	0.641509
33	1963	1.48	191.00	0.00	2.281033	0.065816	-0.016885	1.606061	0.622642
32	1982	4.46	191.00	0.64	2.281033	0.065816	-0.016885	1.65625	0.603774
31	1981	6.23	216.00	0.53	2.334454	0.04126	-0.008381	1.709677	0.584906
30	1994	4.57	225.00	0.09	2.352183	0.034372	-0.006372	1.766667	0.566038
29	1970	7.13	318.00	0.64	2.502427	0.001236	-4.34E-05	1.827586	0.54717
28	1972	2.72	321.00	0.00	2.506505	0.000966	-3E-05	1.892857	0.528302
27	1956	1.59	357	0	2.552668	0.000228	3.44E-06	1.962963	0.509434
26	1988	3.08	360.00	0.00	2.556303	0.000351	6.56E-06	2.038462	0.490566
25	1975	7.05	417.00	0.09	2.620136	0.006816	0.000563	2.12	0.471698
24	2000	7.47	428.00	0.19	2.631444	0.008811	0.000827	2.208333	0.45283
23	2003	3.85	483.00	0.00	2.683947	0.021424	0.003136	2.304348	0.433962
22	1971	7.61	525.00	0.44	2.720159	0.033336	0.006086	2.409091	0.415094
21	1979	15.88	620.00	3.10	2.792392	0.064929	0.016545	2.52381	0.396226
20	1974	6.70	683.00	0.29	2.834421	0.088115	0.026156	2.65	0.377358
19	1996	6.51	696.00	0.19	2.842609	0.093043	0.028381	2.789474	0.358491
18	1991	9.23	708.00	0.00	2.850033	0.097628	0.030504	2.944444	0.339623
17	1997	12.09	775.00	0.24	2.889302	0.123709	0.043511	3.117647	0.320755
16	1986	17.73	808.00	0.00	2.907411	0.136776	0.050584	3.3125	0.301887
15	1952	17.12	1460	0	3.164353	0.392845	0.246225	3.533333	0.283019
14	1966	17.58	1520.00	0.00	3.181844	0.415077	0.267419	3.785714	0.264151
13	1962	19.05	1860.00	0.00	3.269513	0.535727	0.392117	4.076923	0.245283
12	1958	32.97	1890.00	0.00	3.276462	0.545948	0.403391	4.416667	0.226415
11	1980	37.71	1890.00	2.60	3.276462	0.545948	0.403391	4.818182	0.207547
10	1992	28.33	1980.00	0.00	3.296665	0.576212	0.437394	5.3	0.188679
9	1967	24.26	2150.00	0.00	3.332438	0.631801	0.502193	5.888889	0.169811
8	2001	25.42	2390.00	0.37	3.378398	0.706976	0.594439	6.625	0.150943

7	1993	84.37	2430.00	1.30	3.385606	0.71915	0.609859	7.571429	0.132075
6	1973	26.45	2500.00	0.00	3.39794	0.740221	0.636857	8.833333	0.113208
5	1983	69.22	2930.00	0.64	3.466868	0.863577	0.802512	10.6	0.09434
4	1995	67.13	4260.00	0.09	3.62941	1.192094	1.301565	13.25	0.075472
3	1978	74.52	4300.00	0.00	3.633468	1.200974	1.316134	17.66667	0.056604
2	1998	101.53	5420.00	0.04	3.733999	1.431421	1.712581	26.5	0.037736
1	1969	108.30	10405.00	0.00	4.017242	2.189403	3.239578	53	0.018868
			AVERAGE		AVERAGE	sum	sum		
			1097.058		2.537579	26.74838	0.252023		
								VARIANCE	0.52
								SD	0.70
								CS, SKEW	0.01
									0.01353
					Cs=0	Cs=0.1	Cs=0.01		
			RAS Profile	Tr	K	K	K	avg(logQ)+KSy	Q
			1	1	-2.326	-2.252	-2.32526	0.909364	8
			2	2	0	-0.017	-0.00017	2.53746	345
			3	5	0.842	0.836	0.84194	3.12713	1340
			4	10	1.282	1.292	1.2821	3.435343	2725
			5	25	1.751	1.785	1.75134	3.763919	5807
			6	50	2.054	2.107	2.05453	3.976221	9467
			7	100	2.326	2.4	2.32674	4.16683	14684
			8	200	2.576	2.67	2.57694	4.342028	21980