APPENDIX D

ON-SITE FHWA TRAFFIC NOISE MODEL CALCULATIONS

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard No Wall
Road Name: Pierson Boulevard
Lot Number: A

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,020 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	98 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	65.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	43.000
Medium Trucks:	42.794
Heavy Trucks:	42.814

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	1.10	0.59	0.00	-0.97	0.000	0.000
Medium Trucks:	77.62	-16.14	0.61	0.00	-1.15	0.000	0.000
Heavy Trucks:	82.14	-20.09	0.60	0.00	-1.65	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	69.1	67.4	61.3	69.9	70.5
Medium Trucks:	62.1	60.6	54.2	52.7	61.1	61.4
Heavy Trucks:	62.7	61.2	52.2	53.4	61.8	61.9
Vehicle Noise:	72.1	70.3	67.7	62.5	71.0	71.5

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	69.1	67.4	61.3	69.9	70.5
Medium Trucks:	62.1	60.6	54.2	52.7	61.1	61.4
Heavy Trucks:	62.7	61.2	52.2	53.4	61.8	61.9
Vehicle Noise:	72.1	70.3	67.7	62.5	71.0	71.5

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard No Wall
Road Name: Worsely Road
Lot Number: B

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	520 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	52 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	54.305
Medium Trucks:	54.142
Heavy Trucks:	54.158

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-4.79	-0.43	0.00	*-0.95*	0.000	0.000
Medium Trucks:	77.62	-22.03	-0.41	0.00	*-1.15*	0.000	0.000
Heavy Trucks:	82.14	-25.99	-0.42	0.00	*-1.70*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.1	62.2	60.5	54.4	63.0	63.6
Medium Trucks:	55.2	53.7	47.3	45.8	54.2	54.5
Heavy Trucks:	55.7	54.3	45.3	46.5	54.9	55.0
Vehicle Noise:	65.2	63.4	60.8	55.5	64.1	64.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.1	62.2	60.5	54.4	63.0	63.6
Medium Trucks:	55.2	53.7	47.3	45.8	54.2	54.5
Heavy Trucks:	55.7	54.3	45.3	46.5	54.9	55.0
Vehicle Noise:	65.2	63.4	60.8	55.5	64.1	64.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard No Wall
Road Name: Karen Avenue
Lot Number: C

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	640 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	54.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	51.157
Medium Trucks:	50.983
Heavy Trucks:	51.000

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	-3.89	-0.17	0.00	-0.93	0.000	0.000
Medium Trucks:	77.62	-21.13	-0.15	0.00	-1.15	0.000	0.000
Heavy Trucks:	82.14	-25.08	-0.15	0.00	-1.78	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	63.4	61.6	55.6	64.2	64.8
Medium Trucks:	56.3	54.8	48.5	46.9	55.4	55.6
Heavy Trucks:	56.9	55.5	46.4	47.7	56.1	56.2
Vehicle Noise:	66.3	64.5	62.0	56.7	65.3	65.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	63.4	61.6	55.6	64.2	64.8
Medium Trucks:	56.3	54.8	48.5	46.9	55.4	55.6
Heavy Trucks:	56.9	55.5	46.4	47.7	56.1	56.2
Vehicle Noise:	66.3	64.5	62.0	56.7	65.3	65.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard With Wall
Road Name: Pierson Boulevard
Lot Number: A

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,020 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	98 feet

Site Data

Barrier Height:	**7.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	65.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	36.140
Medium Trucks:	35.617
Heavy Trucks:	35.198

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	1.10	1.34	0.00	*0.44*	-8.200	-11.200
Medium Trucks:	77.62	-16.14	1.40	0.00	*0.34*	-7.700	-10.700
Heavy Trucks:	82.14	-20.09	1.46	0.00	*0.13*	-6.240	-9.240

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.8	69.9	68.1	62.1	70.7	71.3
Medium Trucks:	62.9	61.4	55.0	53.5	61.9	62.2
Heavy Trucks:	63.5	62.1	53.0	54.3	62.7	62.8
Vehicle Noise:	72.9	71.1	68.5	63.2	71.8	72.3

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.6	61.7	59.9	53.9	62.5	63.1
Medium Trucks:	55.2	53.7	47.3	45.8	54.2	54.5
Heavy Trucks:	57.3	55.8	46.8	48.1	56.4	56.5
Vehicle Noise:	65.0	63.2	60.4	55.4	63.9	64.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard With Wall
Road Name: Worsely Road
Lot Number: B

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	520 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	52 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	54.305
Medium Trucks:	54.142
Heavy Trucks:	54.158

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	-4.79	-0.43	0.00	-0.95	0.000	0.000
Medium Trucks:	77.62	-22.03	-0.41	0.00	-1.15	0.000	0.000
Heavy Trucks:	82.14	-25.99	-0.42	0.00	-1.70	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.2	60.5	54.4	63.0	63.6
Medium Trucks:	55.2	53.7	47.3	45.8	54.2	54.5
Heavy Trucks:	55.7	54.3	45.3	46.5	54.9	55.0
Vehicle Noise:	65.2	63.4	60.8	55.5	64.1	64.6

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	62.2	60.5	54.4	63.0	63.6
Medium Trucks:	55.2	53.7	47.3	45.8	54.2	54.5
Heavy Trucks:	55.7	54.3	45.3	46.5	54.9	55.0
Vehicle Noise:	65.2	63.4	60.8	55.5	64.1	64.6

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard With Wall
Road Name: Karen Avenue
Lot Number: C

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	640 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**5.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	54.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	50.460
Medium Trucks:	50.241
Heavy Trucks:	51.000

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	-3.89	-0.11	0.00	0.05	-5.500	-8.500
Medium Trucks:	77.62	-21.13	-0.09	0.00	0.02	-5.200	-8.200
Heavy Trucks:	82.14	-25.08	-0.15	0.00	-0.02	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	63.4	61.7	55.6	64.2	64.9
Medium Trucks:	56.4	54.9	48.5	47.0	55.5	55.7
Heavy Trucks:	56.9	55.5	46.4	47.7	56.1	56.2
Vehicle Noise:	66.4	64.6	62.0	56.8	65.3	65.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.8	57.9	56.2	50.1	58.7	59.4
Medium Trucks:	51.2	49.7	43.3	41.8	50.3	50.5
Heavy Trucks:	56.9	55.5	46.4	47.7	56.1	56.2
Vehicle Noise:	62.0	60.3	56.8	52.5	61.0	61.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: First Floor With Wall
Road Name: Pierson Boulevard
Lot Number: A

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,020 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	98 feet

Site Data

Barrier Height:	**7.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	75.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.5 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	46.181
Medium Trucks:	45.616
Heavy Trucks:	45.085

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	1.10	0.28	0.00	*0.40*	-8.000	-11.000
Medium Trucks:	77.62	-16.14	0.33	0.00	*0.27*	-7.290	-10.290
Heavy Trucks:	82.14	-20.09	0.38	0.00	*0.06*	-5.600	-8.600

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.7	68.8	67.1	61.0	69.6	70.2
Medium Trucks:	61.8	60.3	53.9	52.4	60.9	61.1
Heavy Trucks:	62.4	61.0	52.0	53.2	61.6	61.7
Vehicle Noise:	71.8	70.0	67.4	62.2	70.7	71.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	62.7	60.8	59.1	53.0	61.6	62.2
Medium Trucks:	54.5	53.0	46.7	45.1	53.6	53.8
Heavy Trucks:	56.8	55.4	46.4	47.6	56.0	56.1
Vehicle Noise:	64.2	62.4	59.5	54.6	63.2	63.7

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: First Floor With Wall
Road Name: Worsely Road
Lot Number: B

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	520 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	52 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	70.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.5 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	65.225
Medium Trucks:	65.071
Heavy Trucks:	65.041

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	-4.79	-1.22	0.00	*-0.39*	0.000	0.000
Medium Trucks:	77.62	-22.03	-1.21	0.00	*-0.56*	0.000	0.000
Heavy Trucks:	82.14	-25.99	-1.21	0.00	*-1.11*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.4	59.7	53.6	62.2	62.8
Medium Trucks:	54.4	52.9	46.5	45.0	53.4	53.7
Heavy Trucks:	54.9	53.5	44.5	45.7	54.1	54.2
Vehicle Noise:	64.4	62.6	60.0	54.7	63.3	63.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	61.4	59.7	53.6	62.2	62.8
Medium Trucks:	54.4	52.9	46.5	45.0	53.4	53.7
Heavy Trucks:	54.9	53.5	44.5	45.7	54.1	54.2
Vehicle Noise:	64.4	62.6	60.0	54.7	63.3	63.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: First Floor With Wall
Road Name: Karen Avenue
Lot Number: C

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	640 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**5.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	64.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.5 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	60.525
Medium Trucks:	60.277
Heavy Trucks:	61.468

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-3.89	-0.90	0.00	*0.10*	-6.000	-9.000
Medium Trucks:	77.62	-21.13	-0.88	0.00	*0.04*	-5.400	-8.400
Heavy Trucks:	82.14	-25.08	-0.97	0.00	*-0.02*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	64.6	62.7	60.9	54.8	63.5	64.1
Medium Trucks:	55.6	54.1	47.7	46.2	54.7	54.9
Heavy Trucks:	56.1	54.7	45.6	46.9	55.2	55.4
Vehicle Noise:	65.6	63.8	61.2	56.0	64.5	65.1

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	58.6	56.7	54.9	48.8	57.5	58.1
Medium Trucks:	50.2	48.7	42.3	40.8	49.3	49.5
Heavy Trucks:	56.1	54.7	45.6	46.9	55.2	55.4
Vehicle Noise:	60.9	59.2	55.6	51.4	59.9	60.3

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Second Floor With Wall
Road Name: Pierson Boulevard
Lot Number: A

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,020 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	98 feet

Site Data

Barrier Height:	**7.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	75.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.5 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	58.602
Medium Trucks:	58.077
Heavy Trucks:	57.150

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	1.10	-0.76	0.00	*-0.30*	0.000	0.000
Medium Trucks:	77.62	-16.14	-0.72	0.00	*-0.44*	0.000	0.000
Heavy Trucks:	82.14	-20.09	-0.65	0.00	*-0.89*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.8	66.0	60.0	68.6	69.2
Medium Trucks:	60.8	59.3	52.9	51.4	59.8	60.0
Heavy Trucks:	61.4	60.0	50.9	52.2	60.5	60.7
Vehicle Noise:	70.7	68.9	66.4	61.1	69.7	70.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.8	66.0	60.0	68.6	69.2
Medium Trucks:	60.8	59.3	52.9	51.4	59.8	60.0
Heavy Trucks:	61.4	60.0	50.9	52.2	60.5	60.7
Vehicle Noise:	70.7	68.9	66.4	61.1	69.7	70.2

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Second Floor With Wall
Road Name: Worsely Road
Lot Number: B

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	5,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	520 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	52 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	70.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.5 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	66.590
Medium Trucks:	66.128
Heavy Trucks:	65.316

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	69.34	-4.79	-1.31	0.00	-2.87	0.000	0.000
Medium Trucks:	77.62	-22.03	-1.28	0.00	-3.32	0.000	0.000
Heavy Trucks:	82.14	-25.99	-1.23	0.00	-4.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.2	61.3	59.6	53.5	62.1	62.7
Medium Trucks:	54.3	52.8	46.4	44.9	53.4	53.6
Heavy Trucks:	54.9	53.5	44.5	45.7	54.1	54.2
Vehicle Noise:	64.3	62.5	59.9	54.7	63.2	63.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.2	61.3	59.6	53.5	62.1	62.7
Medium Trucks:	54.3	52.8	46.4	44.9	53.4	53.6
Heavy Trucks:	54.9	53.5	44.5	45.7	54.1	54.2
Vehicle Noise:	64.3	62.5	59.9	54.7	63.2	63.8

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Second Floor With Wall
Road Name: Karen Avenue
Lot Number: C

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	6,400 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	640 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**5.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	64.0 feet
Barrier Distance to Observer:	20.0 feet
Observer Height (Above Pad):	14.0 feet
Pad Elevation:	0.5 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	63.105
Medium Trucks:	62.617
Heavy Trucks:	61.759

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	-3.89	-1.08	0.00	-0.64	0.000	0.000
Medium Trucks:	77.62	-21.13	-1.05	0.00	-0.88	0.000	0.000
Heavy Trucks:	82.14	-25.08	-0.99	0.00	-1.64	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.4	62.5	60.7	54.7	63.3	63.9
Medium Trucks:	55.4	53.9	47.6	46.0	54.5	54.7
Heavy Trucks:	56.1	54.7	45.6	46.9	55.2	55.3
Vehicle Noise:	65.4	63.6	61.0	55.8	64.4	64.9

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.4	62.5	60.7	54.7	63.3	63.9
Medium Trucks:	55.4	53.9	47.6	46.0	54.5	54.7
Heavy Trucks:	56.1	54.7	45.6	46.9	55.2	55.3
Vehicle Noise:	65.4	63.6	61.0	55.8	64.4	64.9

URBAN
CROSSROADS

July 20, 2004

Mr. Bob Gilroy
FIRST WEST CAPITAL CORP.
17962 Cowan Street
Irvine, CA 92614

Subject: Stoneridge Development Noise Analysis

Dear Mr. Gilroy:

The firm of Urban Crossroads, Inc. has revised the exterior noise impacts for portions of the proposed Stoneridge development. The noise barrier requirements for lots adjacent to Pierson Boulevard were revised according to preliminary grading plans provided by MSA Consulting, Inc. dated June, 2004. The revised calculations show that with a 6.0-foot high noise barrier, lots adjacent to Pierson Boulevard will meet the City of Desert Hot Springs 65 dBA CNEL exterior noise standard for residential uses.

A preliminary noise study will be required to analyze the exterior noise impacts to all lots prior to obtaining Tract Map Approval. If you have any questions please do not hesitate to give me a call at (949) 660-1994.

Respectfully submitted,

URBAN CROSSROADS, INC.

Fernando Sotelo
Transportation Engineer

FS:jb
JN:01566-07

Attachments

41 Corporate Park Suite 300 Irvine, CA 92606 · p:949.660.1994 · f:949.660.1911
urbanxroads.com

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard With Wall
Road Name: Pierson Boulevard
Lot Number: 53

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,020 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	98 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	130.0 feet
Centerline Dist. to Observer:	140.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,306.0 feet
Road Elevation:	1,300.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,300.000		
Medium Trucks:	1,302.297		
Heavy Trucks:	1,308.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	131.058
Medium Trucks:	130.852
Heavy Trucks:	130.528

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	1.10	-4.25	0.00	0.17	-6.560	-9.560
Medium Trucks:	77.62	-16.14	-4.25	0.00	0.14	-6.320	-9.320
Heavy Trucks:	82.14	-20.09	-4.24	0.00	0.08	-5.800	-8.800

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.2	64.3	62.5	56.5	65.1	65.7
Medium Trucks:	57.2	55.7	49.4	47.8	56.3	56.5
Heavy Trucks:	57.8	56.4	47.4	48.6	57.0	57.1
Vehicle Noise:	67.2	65.4	62.9	57.6	66.2	66.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.6	57.7	56.0	49.9	58.5	59.1
Medium Trucks:	50.9	49.4	43.1	41.5	50.0	50.2
Heavy Trucks:	52.0	50.6	41.6	42.8	51.2	51.3
Vehicle Noise:	60.8	59.0	56.3	51.2	59.7	60.3

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard With Wall
Road Name: Pierson Boulevard
Lot Number: 34

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,020 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	98 feet

Site Data

Barrier Height:	6.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	95.0 feet
Centerline Dist. to Observer:	105.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,371.6 feet
Road Elevation:	1,370.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,370.000		
Medium Trucks:	1,372.297		
Heavy Trucks:	1,378.006	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	91.792
Medium Trucks:	91.610
Heavy Trucks:	91.439

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	1.10	-2.71	0.00	0.14	-6.320	-9.320
Medium Trucks:	77.62	-16.14	-2.70	0.00	0.11	-6.080	-9.080
Heavy Trucks:	82.14	-20.09	-2.69	0.00	0.04	-5.400	-8.400

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.7	65.8	64.1	58.0	66.6	67.2
Medium Trucks:	58.8	57.3	50.9	49.4	57.8	58.1
Heavy Trucks:	59.4	57.9	48.9	50.2	58.5	58.6
Vehicle Noise:	68.8	67.0	64.4	59.2	67.7	68.2

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.4	59.5	57.8	51.7	60.3	60.9
Medium Trucks:	52.7	51.2	44.8	43.3	51.8	52.0
Heavy Trucks:	54.0	52.5	43.5	44.8	53.1	53.2
Vehicle Noise:	62.6	60.8	58.1	53.0	61.6	62.1

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard With Wall
Road Name: Pierson Boulevard
Lot Number: 59

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,020 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	98 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	85.0 feet
Centerline Dist. to Observer:	95.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,413.0 feet
Road Elevation:	1,410.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,410.000		
Medium Trucks:	1,412.297		
Heavy Trucks:	1,418.006	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	80.086
Medium Trucks:	79.828
Heavy Trucks:	79.512

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	1.10	-2.11	0.00	*0.18*	-6.640	-9.640
Medium Trucks:	77.62	-18.14	-2.10	0.00	*0.14*	-6.320	-9.320
Heavy Trucks:	82.14	-20.09	-2.08	0.00	*0.05*	-5.500	-8.500

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.3	66.4	64.7	58.6	67.2	67.8
Medium Trucks:	59.4	57.9	51.5	50.0	58.4	58.7
Heavy Trucks:	60.0	58.5	49.5	50.8	59.1	59.2
Vehicle Noise:	69.4	67.6	65.0	59.8	68.3	68.8

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.7	59.8	58.0	52.0	60.6	61.2
Medium Trucks:	53.1	51.6	45.2	43.7	52.1	52.3
Heavy Trucks:	54.5	53.0	44.0	45.3	53.6	53.7
Vehicle Noise:	62.9	61.1	58.4	53.3	61.9	62.4

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL (CALVENO)

Scenario: Backyard With Wall
Road Name: Pierson Boulevard
Lot Number: 68

Project Name: Stoneridge Alternative 2
Job Number: 1556
Analyst: F. Sotelo

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,200 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,020 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	98 feet

Site Data

Barrier Height:	**6.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	130.0 feet
Centerline Dist. to Observer:	140.0 feet
Barrier Distance to Observer:	10.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	1,335.3 feet
Road Elevation:	1,330.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	10
Medium Trucks (2 Axles):	10
Heavy Trucks (3+ Axles):	10

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	1,330.000		
Medium Trucks:	1,332.297		
Heavy Trucks:	1,338.008	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	130.991
Medium Trucks:	130.798
Heavy Trucks:	130.507

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	69.34	1.10	-4.25	0.00	0.16	-6.480	-9.480
Medium Trucks:	77.62	-16.14	-4.25	0.00	0.13	-6.240	-9.240
Heavy Trucks:	82.14	-20.09	-4.24	0.00	0.07	-5.700	-8.700

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.2	64.3	62.5	56.5	65.1	65.7
Medium Trucks:	57.2	55.7	49.4	47.8	56.3	56.5
Heavy Trucks:	57.8	56.4	47.4	48.6	57.0	57.1
Vehicle Noise:	67.2	65.4	62.9	57.6	66.2	66.7

Mitigated Noise Levels (with Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	59.7	57.8	56.1	50.0	58.6	59.2
Medium Trucks:	51.0	49.5	43.1	41.6	50.0	50.3
Heavy Trucks:	52.1	50.7	41.7	42.9	51.3	51.4
Vehicle Noise:	60.9	59.1	56.4	51.3	59.8	60.3

APPENDIX H

HYDROLOGY REPORT

Exponent, Inc.

Exponent®

Flood Hazard Analysis for Proposed Stoneridge Development Riverside County, California

OC10657.000

April 2, 2004

Exponent®
Failure Analysis Associates®

Exponent
320 Goddard
Suite 200
Irvine, CA 92618

telephone 949-341-6000
facsimile 949-341-6059
www.exponent.com

Flood Hazard Analysis for Proposed Stoneridge Development Riverside County, California

OC10657.000

Prepared for

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Engineers and Land Surveyors

April 2, 2004

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Acronyms and Abbreviations

DEM	Digital Elevation Model
LiDAR	Light Detection and Range
USGS	U.S. Geological Survey
cfs	cubic feet per second (ft^3/s)
cms	cubic meter per second (m^3/s)

Unit Conversion

1 m = 3.2808 ft
1 ft = 0.3048 m
1 m^3/s = 35.31467 ft^3/s
1 ft^3/s = 0.02831685 m^3/s

Geologic Glossary

Holocene	Time period extending from approximately 10,000 years ago to present. Post-dates last glacial period.
Pleistocene	Time period extending from approximately 2 million years ago to 10,000 years ago. Time generally dominated by glacial conditions.
Miocene	Time period extending from approximately 20 million years ago to 5 million years ago.
Cenozoic	Time period (era) extending from the end of the Mesozoic Era, 65 million years ago, to the present.
Mesozoic	Time period (era) extending from the end of the Paleozoic Era, 250 million years ago, to approximately 65 million years ago. Time period when dinosaurs dominated life on land.
Precambrian	Time period extending from the origin of the earth, 4.6 billion years ago, to the beginning of the Paleozoic Era, approximately 550 million years ago. Time period dominated by single-celled life forms.

Introduction

This report describes the results of an investigation of the 100-year flood hazard for the proposed Stoneridge development. The project area is located in the upper Coachella Valley about 3 miles west of Desert Hot Springs, California, primarily within T2S, R4E, Section 28. The 540± acre site is bounded on the west by Worsley Road, on the south by the West Pierson Boulevard, on the east by Karen Avenue, and on the north by undeveloped land (Figure 1). The primary objectives of this study were to estimate the maximum 100-year discharge entering the project area from an unnamed drainage south of Mission Creek, and to provide recommendations for conveyance of this offsite drainage across the property.

The project site is located on an alluvial plain constructed by Mission Creek and other unnamed creeks draining the eastern slopes of the San Bernardino Mountains. Active uplift and a shift to intermittent stream flow during the Holocene have resulted in incision of Mission Creek into the alluvial plain. As a result, most of the flooding from this drainage is confined to the existing channel of Mission Creek north of the site. Stormwater flows that reach the site originate on the alluvial piedmont west of the site and south of Mission Creek. Surface flows are strongly affected by human development west and north of the project area, including concrete lining of a portion of Mission Creek, construction of elevated State Highway 62, construction of a protective levee over the top of the Colorado River aqueduct, and the recent excavation of a series of groundwater recharge basins north of the property.

Historical aerial photo coverage of a flood that struck the area in 1991 indicate that stormwater in Mission Creek passed north and east of the project site during this event. During the 1991 flood, the site was subject to relatively minor surface water flows originating in a small drainage watershed west of the subject property.

The future 100-year stormwater flows from Mission Creek are anticipated to travel down the existing channels of Mission Creek and run north and east of the project site. The unnamed drainage that passes through the site passes through the box culvert under Highway 62.

Blockage of the culvert would not result in overtopping of the highway. Rather, it would result in diversion of water south of the property along the western side of the highway embankment.

The 100-year storm runoff from the un-named wash was estimated using the 100-year six-hour point precipitation transformed with the desert s-graph for Riverside County in a HEC-1 hydrological model. LAPRE-1 was used as a preprocessor for the input to the HEC-1 model. The HEC-1 model is attached in the Appendix. Our modeling yields 100-year storm totals from an unnamed wash of approximately 1,130 cfs. These flows will be accommodated by an anticipated on-site stormwater conveyance system.

Study Area Description

Physiography and Topography

The study area is located at an elevation of about 1,400 feet in the upper Coachella Valley, about 6 miles northeast of the San Gorgonio Pass (Figure 1). Plate 1 is a recent aerial photo of the study area. The Coachella Valley is northwest-trending basin that comprises the northern portion of the Salton Trough, a large structural depression that extends from San Gorgonio Pass to the Gulf of California. The flood hazard of concern in this report originates in a small watershed in the foothills of the San Bernardino Mountains west of the site (Figure 2).

Geology and Soil Conditions

Figure 3 summarizes the geologic conditions in the vicinity of the Stoneridge project (Proctor, 1968). The San Bernardino Mountains are underlain by crystalline metamorphic and igneous rock of Precambrian- to Mesozoic-age (Figure 3). The floor of the Coachella Valley is underlain by several thousand feet of Cenozoic alluvium and lake sediments.

The major landforms in the site vicinity originated in late Miocene time, roughly 5 million years ago. At about this time, the Gulf of California extended nearly to San Gorgonio Pass and the San Bernardino Mountains began to rise. In late Pleistocene time, the Little San Bernardino Mountains and San Jacinto Range began to rise as well (Proctor, 1968). The late Pleistocene was also marked by numerous glacial ages, during which time precipitation was significantly greater than at present (Stout, 1977) and San Gorgonio Peak was glaciated (Proctor, 1968).

Soils of the Carsitas Series are exposed throughout the project area. These soils belong to Hydrologic Soil Groups A, indicating high infiltration rates (Knecht, 1980).

Faulting and Related Conditions

As shown on Figure 3, the site is located between sub-parallel strands of the San Andreas fault system. The San Andreas is a major transform fault system that forms the boundary between the Pacific Plate on the west and the North American Plate to the north and east. The San Andreas fault consists of two major active strands in the upper Coachella Valley region: the Mission Creek fault (north strand), and the Banning or south strand of the San Andreas (Figure 3). Uplift along the Mission Creek fault has resulted in major incision of Mission Creek, which is currently confined to a well-defined channel that extends about 1 mile from the mountain front.

Fluvial Landforms

Morongo Wash constructed the alluvial surface upon which the site is located in late Pleistocene and Holocene time. There is no evidence of debris flow deposition in the project area. Active uplift and a shift to intermittent stream flow during the Holocene have resulted in incision of Mission Creek into the alluvial piedmont (Figure 4). As a result, most of the flooding from Mission Creek is confined to the existing channels, leaving the adjacent alluvial surfaces largely inactive.

The small (1,900-acre) drainage basin that contributes surface runoff to the project site is located in an area of uplifted and dissected alluvial fans (Figure 3). Mission Creek constructed portions of this alluvial apron. Due to uplift and incision of Mission Creek, these surfaces are now out of the floodplain of Mission Creek and receive only local runoff. Figures 5A and 5B show upstream and downstream views of one of the small drainage courses that lead to the project site.

Human Activity

Human construction activity in the project vicinity includes the Colorado River Aqueduct, elevated Highway 62, Worsely Road, modification of the natural stream

channel in Mission Creek and construction of a series of groundwater recharge basins north of the property.

As shown on Figures 1 and 2, the Colorado River Aqueduct, Highway 62, and Worsely Road are all located between the source watershed and the project location. The Colorado River Aqueduct is buried under a protective dike west of the site. Occasional low points were constructed in the dike to allow surface water flow to cross the aqueduct alignment.

Highway 62 is an elevated structure. Culverts convey drainage beneath the highway fill embankment at a small number of locations. Stormwater flow in the principal (unnamed) drainage course that crosses the site crosses beneath Highway 62 at a box culvert (Figure 2). Each cell of the culvert is 4.7 feet high and 10 feet wide (Figure 6A). The culvert has a maximum capacity of about 1,600 cfs, which is adequate for the contributing drainage area.

Worsely Road is constructed at grade and uses dip crossings to convey flow across the roadway. This roadway does not present an obstacle to surface flow.

A portion of the south wall of Mission Creek has been armored with concrete to help channelize flows in the creek. The location of the armored section is shown on Figure 2. The armored section is about 8 feet high and 750 feet long. Photographs of this structure are shown on Figure 7.

North of the project site, a 115-acre groundwater recharge facility was recently constructed for the Desert Water Agency (Figure 8). The project consisted of the construction of 13 earthen basins (1 debris, 12 recharge). The recharge basins have an impound capacity for 303 acre-feet of water. A waterline is connected to MWD's Colorado River Aqueduct and was constructed at depths ranging from 10 to 20 feet and has a design capacity of 100 cfs (Krieger and Stewart, 2003). Construction of this facility nominally should have no effect on the existing flood hazard at the subject property. Mission Creek flood hazards are confined to areas north and east of the proposed project.

Historical Flooding Patterns

Flood Events in the Upper Coachella Valley

The upper Coachella Valley area has experienced numerous flooding events in the historical period. Three types of storms produce precipitation in the study area: general winter storms, general summer storms and localized thunderstorms (Bechtel, 1997). Significant flood events have accompanied each type of storm in the study area. Table 1 provides a summary of major flood discharges recorded at Mission Creek, the nearest gauged stream to the study area. As indicated on Table 1, the major stream flows recorded at Mission Creek are principally related to general winter storms (possibly augmented by snowmelt), followed by general summer storms.

Historic Flood Pathways

Historical aerial photo coverage is available for the March 1, 1991 flood. This coverage was obtained from Aero Tech Surveys, Inc., of Riverside, California. The flooding accompanied a series of very intense spring storms from the Pacific Ocean. During this event, the stream gauge at Mission Creek recorded a moderate peak discharge of 173 cfs. Although flows in Mission Creek were significantly smaller in 1991 than those recorded in some earlier storm events, the aerial photo record is useful because it shows preferred pathways of stormwater flow for both major and minor drainages.

As shown on Figure 8 discharge from Mission Creek traversed the alluvial surface north of the project site and entered the channelized reach of Mission Creek about 3,000 feet east of the project site. Runoff from the local watershed passed through the box culvert beneath State Hwy. 62, flowed across the project site and exited the property across West Pierson Blvd.

Potential Future Flood Pathways

Our review of the natural drainage network, engineered drainage features and historical flood data permit an assessment to be made of the behavior of future 100-year floods in the project area. Future 100-year stormwater flows from Mission Creek are anticipated to travel down the existing channels of Mission Creek and run north and east of the project site. This conclusion is consistent with FEMA FIRM mapping for the area.

The unnamed drainage channel which crosses State Highway 62 at the triple box culvert is the primary flood hazard for the project site.

Hydrologic Analysis

Four drainage areas (A, B, C, and D, see Plate 2) contribute flow which could potentially impact the project site. Area A (1.82 sq mi) and Area B (1.14sq mi) lie to the northwest of the project, to the north of State Route 62. Area B drains directly to a drainage course identified as "unnamed drainage" in Figure 8. Interpretation of topography, aerial photographs and site observation shows that part of Area A might drain to the south, and part might drain to "unnamed drainage". For the purpose of this analysis, it has been conservatively assumed that all of Area A also drains directly to "unnamed drainage".

Combined flow from Area A and Area B in "unnamed drainage" pass under SR 62 through the reinforced concrete triple box culvert with a capacity to convey all the combined flow. Combined flow continues to the northeast corner of the project site, where it traverses the site from northwest to southeast through a series of braided watercourses.

Area C (0.43 sq mi) lies directly to the north of the project site and southeast of SR 62. Runoff from Area C flows through a series of braided streams in a northwest to southeast direction, toward the northern boundary of the project site. Flow from this Area C will cross the proposed Mission Lakes Blvd. and be directed through the site.

Area D (0.39 sq mi) lies directly to the west of the project site and southeast of SR 62. Runoff from Area D flows through a series of braided streams in a northwest to southeast direction, toward the western boundary of the project site. A graded berm and channel will be constructed along the western boundary of the project site to redirect the flow to the south.

Hydrologic modeling was based on the RCFCD Hydrology Manual using the U.S. Army Corps of Engineers LAPRE-1 and HEC-1 models. Riverside County Flood Control & Water Conservation District's input data for 100-year, 6-hour point precipitation transformed with the desert s-graph. Peak discharge from Area A is 584 cfs. Peak discharge from Area B is 463 cfs. The combined peak discharge to "unnamed wash" is 1024 cfs. This discharge passes under SR 62 will be conveyed through the project site in an engineered channel. Peak discharge from

Area C is 240 cfs. Peak discharge from Area D is 254 cfs. These discharges will be conveyed around and through the project site.

References

Bechtel, 1997. "Without Project" Hydrology Report, Thousand Palms Area, Whitewater River Basin, Riverside and San Bernardino Counties, California: Unpublished consultant's report, 72 p.

Knecht, A.A., 1980. Soil Survey of Riverside County, Coachella Valley Area: U.S. Department of Agriculture Soil Conservation Service, in cooperation with University of California Agricultural Experiment Station, 42 p.

Krieger & Stewart, Inc., 2003. Mission Creek Groundwater Recharge Basins: http://www.kriegerandstewart.com/projects/water/dwa-s3.htm

Proctor, R.J., 1968. Geology of the Desert Hot Springs – Upper Coachella Valley area, California: California Division of Mines and Geology, Special Report 94, 50 p.

Stout, M.l., 1977. Radiocarbon dating of landslides in southern California: California Geology, pp. 99-105.

Table 1 Top Flooding Events Recorded in Mission Creek 1967 to Present

Date of Storm	Peak Flow in Mission Creek (cfs)[1]	Storm Type[2]		
		General Summer	General Winter	Localized T-Storm
1/25/1969	1,660		X	
8/17/1977	463	X		
3/4/1978	1,050		X	
2/18/1980	540		X	
8/17/1983	1,750	X		
8/20/1988	800			?
3/1/1991	173		X	

Notes: 1) Based on U.S. Geological Survey stream gage records 10/1967-Present.
2) Data from Bechtel (1997)

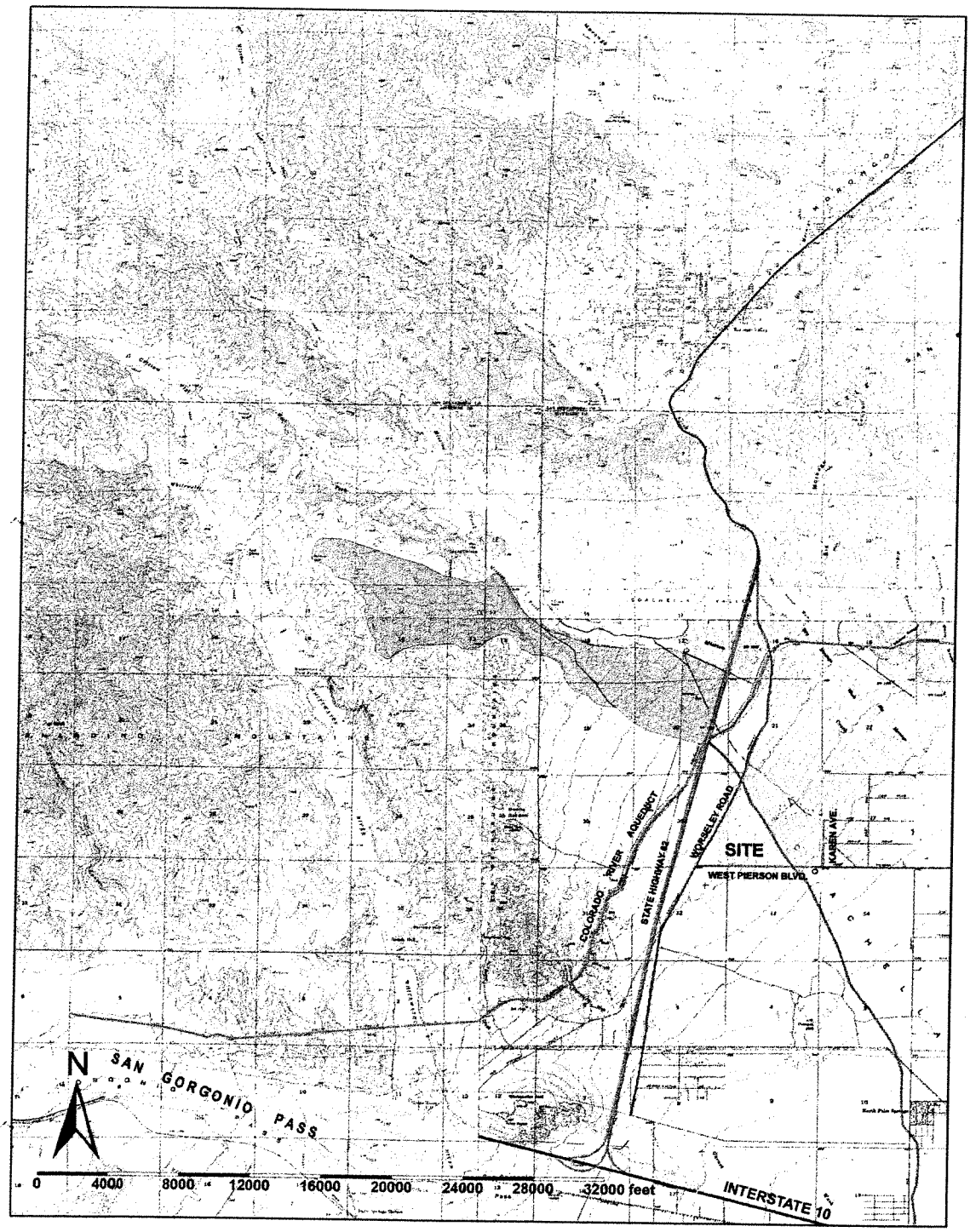


Figure 1. Site location and index map. Blue shaded area indicates limits of watershed area that drains through the subject property along unnamed drainage (blue line). Modified from U.S.G.S. 1:24,000-scale Desert Hot Springs and Whitewater topographic quadrangle map sheets.

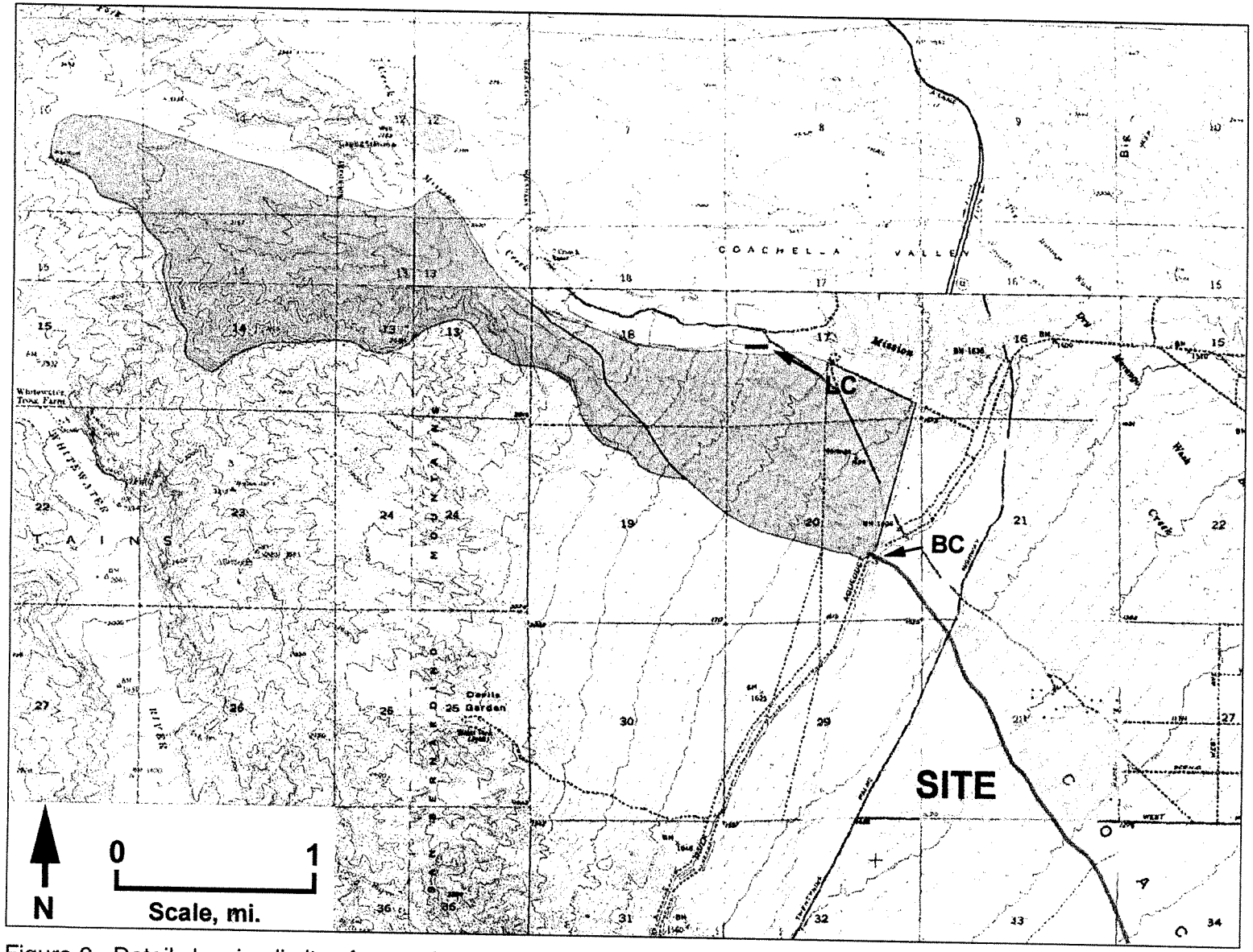


Figure 2. Detail showing limits of watershed area that drains through site. Unnamed drainage course indicated by blue line. "BC" indicates location of box culvert at Highway 62. "LC" indicates location of concrete-lined wall of Mission Creek. Modified from U.S.G.S. 1:24,000-scale Desert Hot Springs, Whitewater, Morongo Valley and Catclaw Flat topographic quadrangle map sheets.

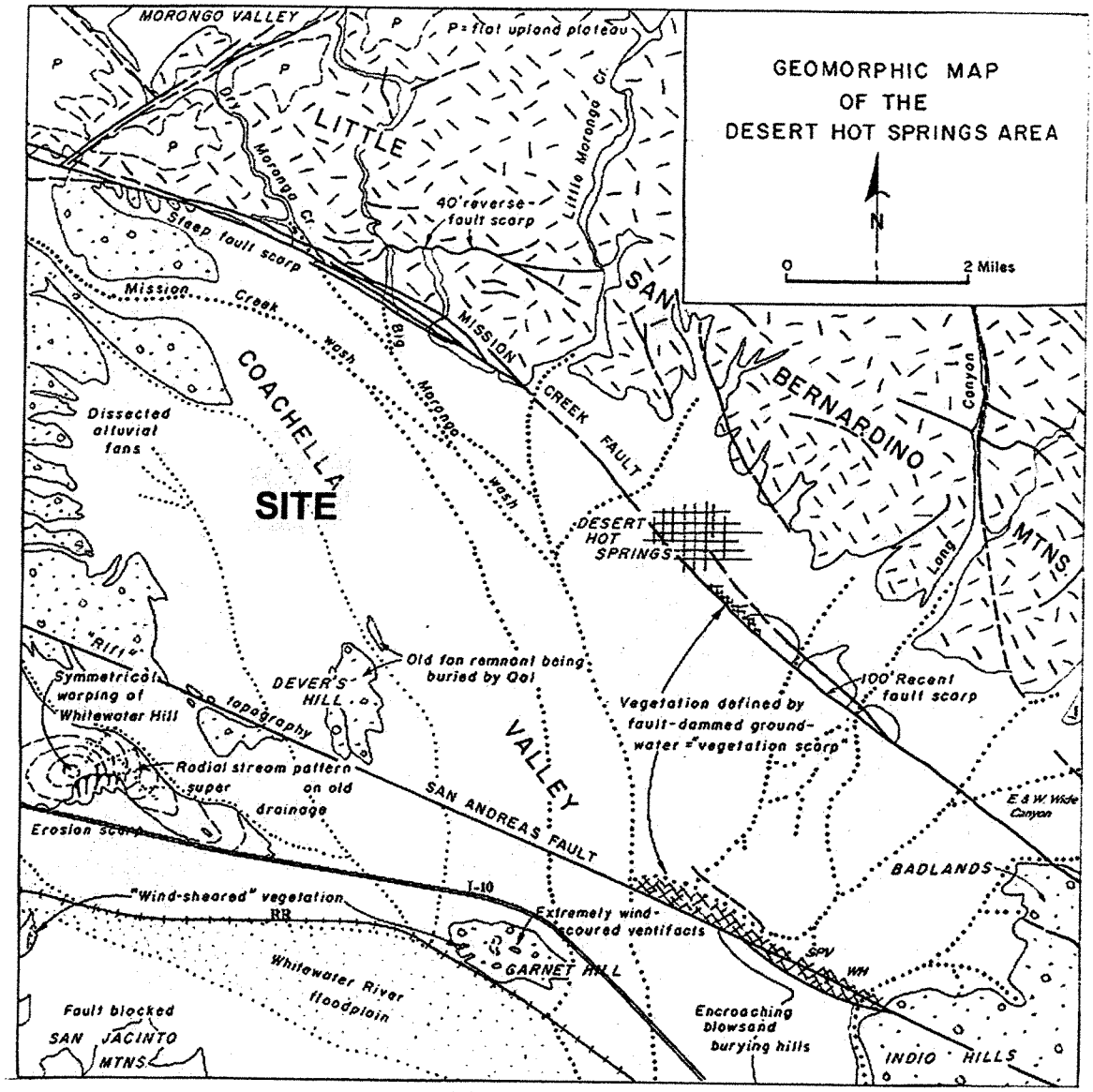


Figure 3. Geomorphic map of Desert Hot Springs Area, Upper Coachella Valley. SPV= Seven Palms Valley, WH= Willow Hole (modified from Proctor, 1968).

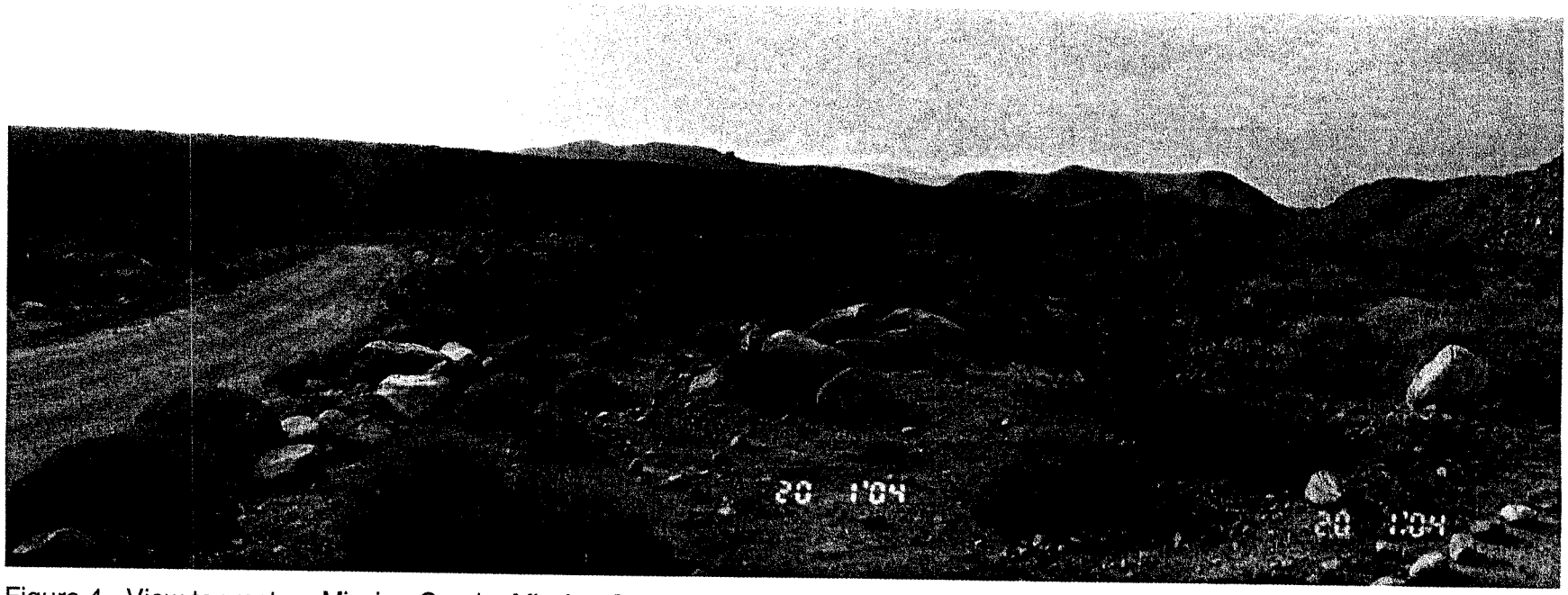


Figure 4. View to west up Mission Creek. Mission Creek is incised about 60 feet into older alluvium at this location as a result of tectonic activity in the watershed area.

Figures 5A and 5B. Upstream (top) and downstream views of small drainage channel that drains to project site. Photos taken a few hundred yards northwest of box culvert beneath Highway 62 (see Figure 2). Highway is visible in extreme distance in lower photo.

Figure 6A. View to northwest (upstream) of box culvert at Highway 62. Culvert conveys principal drainage to site. Each cell in the culvert measures 10 feet wide and 4.7 feet high.

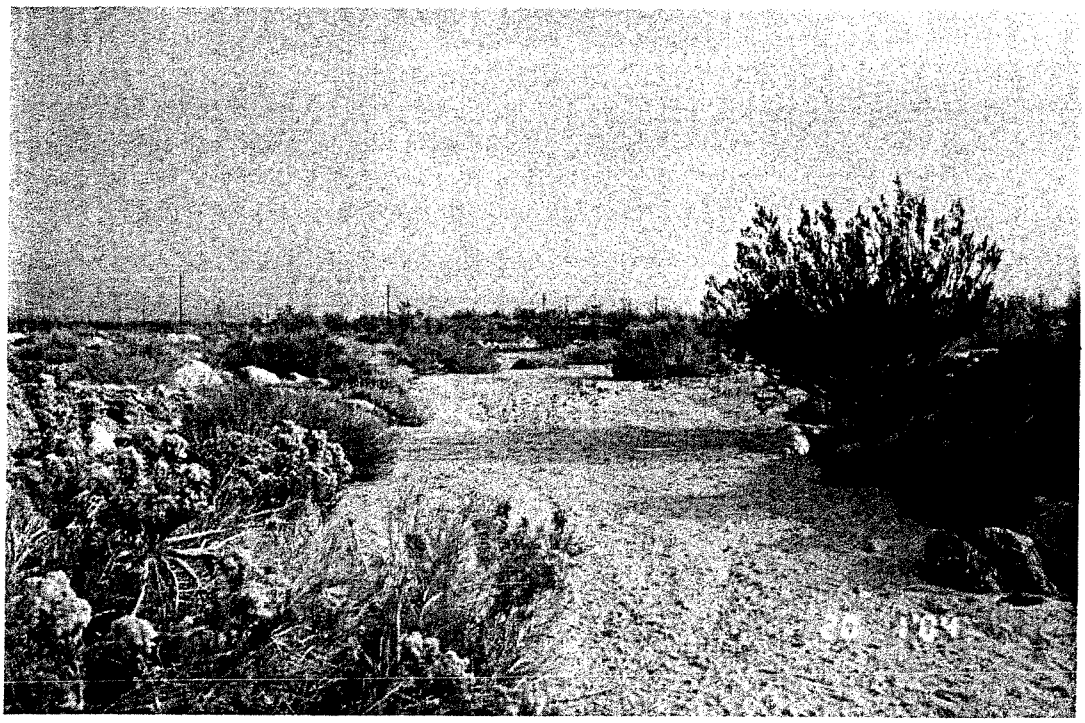
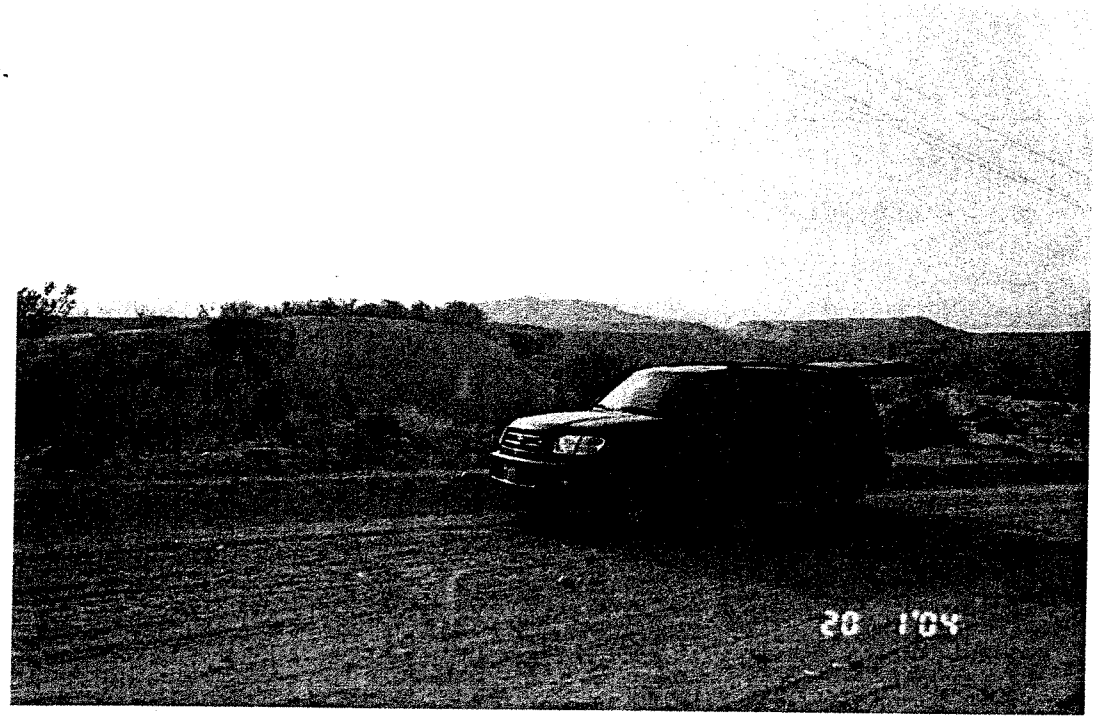
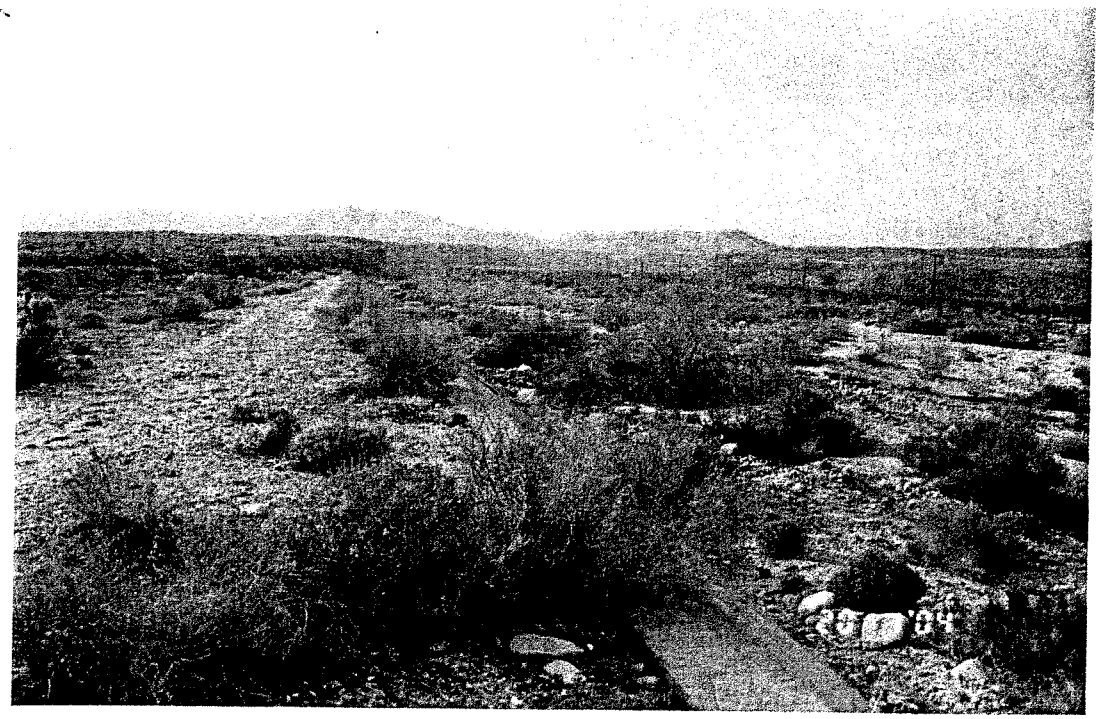


Figure 6B. View to southeast (downstream) of drainage course from area of box culvert.





Figures 7A and 7B. Two views of the 750-foot-long protective concrete channel wall built along the southern edge of Mission Creek west to Highway 62. The upper photo shows the eastern end of the channel wall at Mission Creek Road. The lower photo is taken along the top of the wall, looking west (upstream).

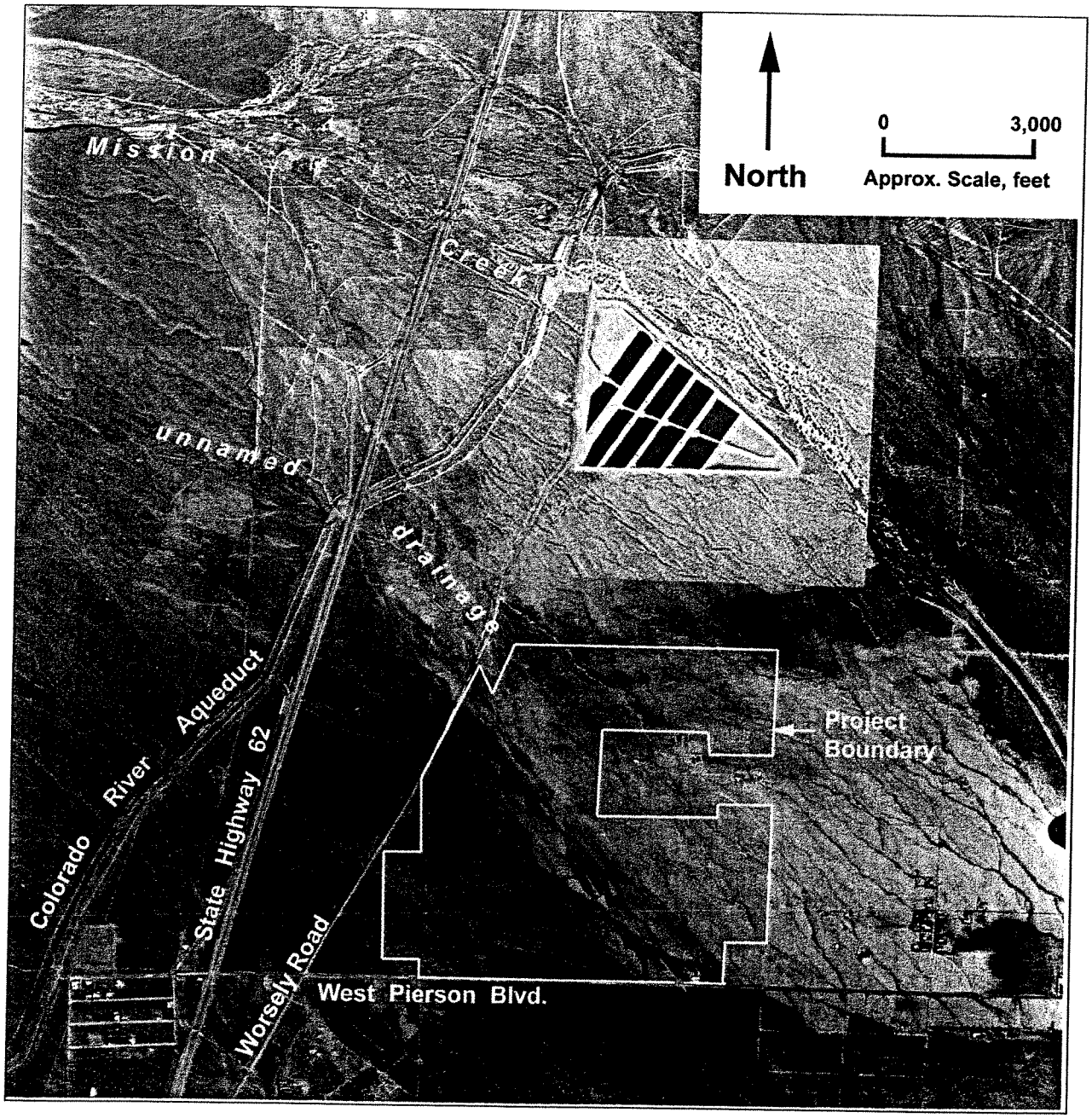


Figure 8. Aerial View of Recently Constructed Groundwater Recharge Basins

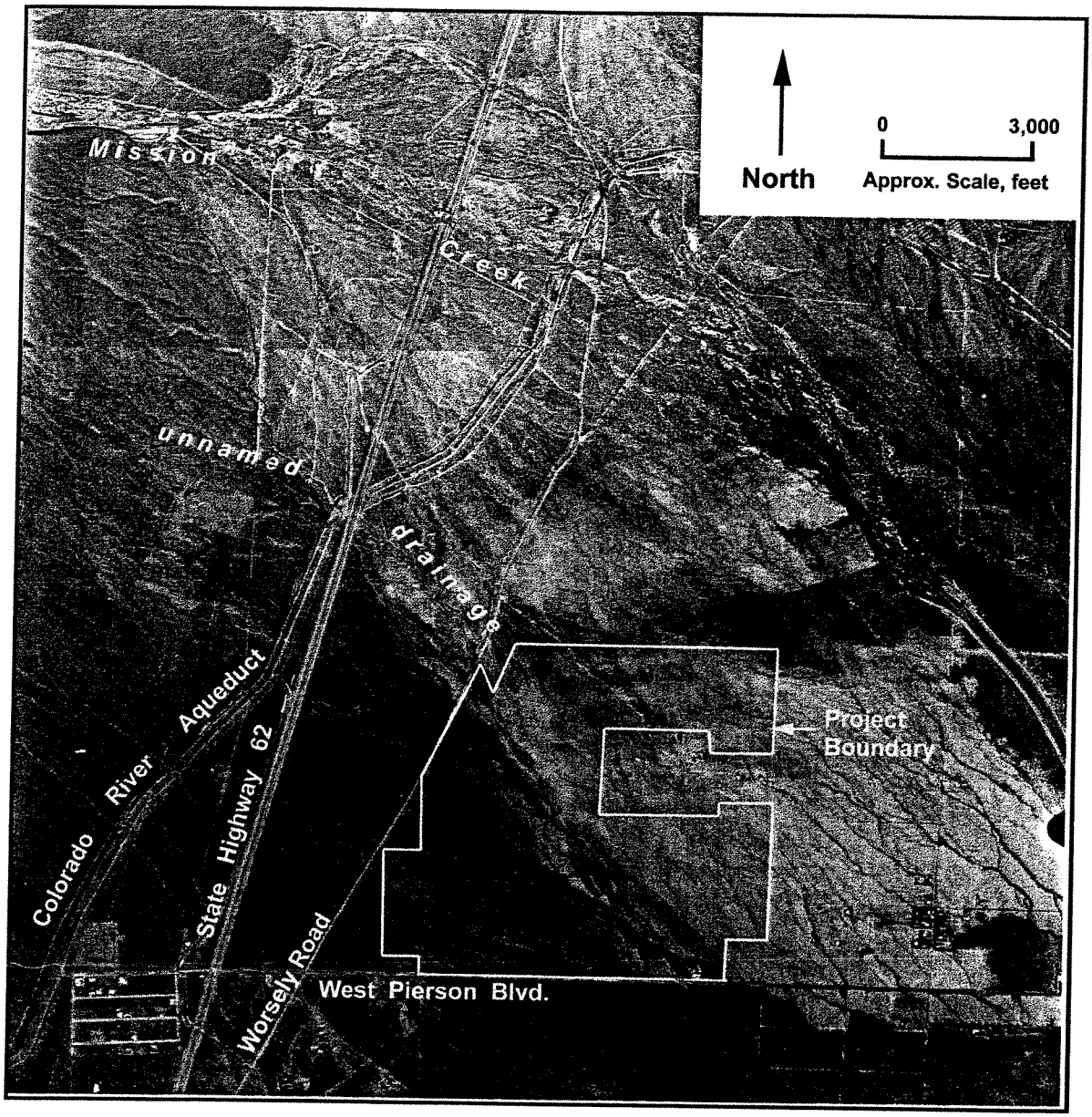
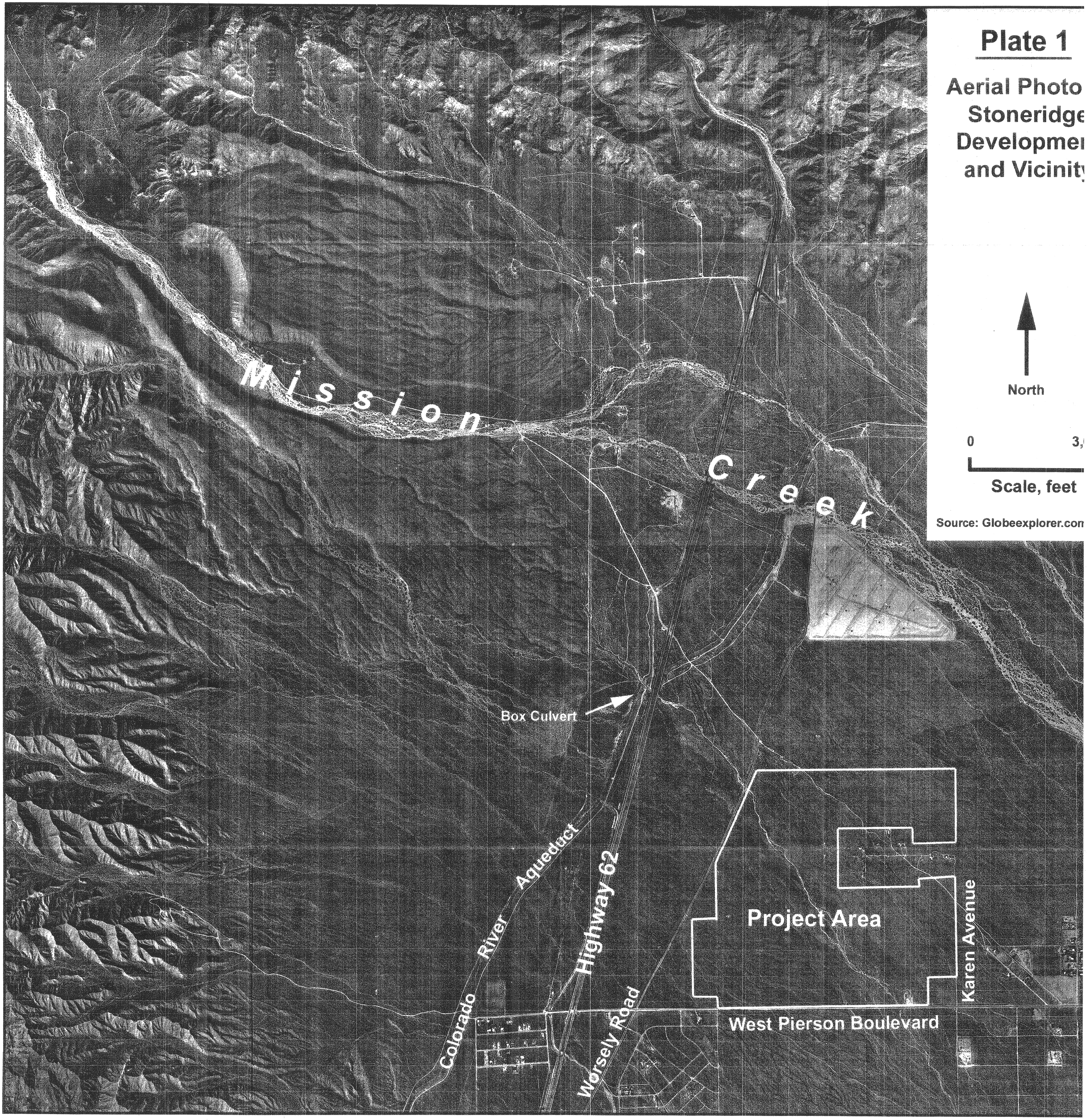


Figure 9. Aerial photo of project area taken one day after March 1, 1991 flood event. Surface water flows are shown with blue arrows. Mission Creek drainage (larger arrows) traversed alluvial surface north of project site and entered channelized reach about 3,000 feet east of the project site. Runoff from the local watershed (smaller arrows) passed through the box culvert beneath SH 62, flowed across the project site and exited the property across West Pierson Blvd (Aero Tech Surveys, Inc., Frames 1-33 and 1-34, 3-2-91).

Appendix

Plate 1

Aerial Photo
Stoneridge
Developmer
and Vicinity



North

0 3,

Scale, feet

Source: Globeexplorer.com

A
1170 ACRES

B
730 ACRES

C
270 ACRES

D
250 ACRES

Possible Flow Path

Historical Flow Path

N

0 4000 8000 12000 16000 20000 24000 28000 32000 feet

Stoneridge Development

Plate 2
Drainage Subarea Map

Appendix

```
ID Stoneridge Watershed
ID 100-year flood, Riverside County Hydrology Manual

ID Existing Conditions Analysis
*DIAGRAM
IT     5 01JAN04        0     100
IO     0
KKAREA A
KM     RUNOFF FROM AREA A
BA  1.82
PB   3.0
PI    .5       .6       .6       .6       .6       .7       .7       .7       .7       .7
PI    .7       .8       .8       .8       .8       .8       .8       .8       .8       .8
PI    .8       .8       .8       .9       .8       .9       .9       .9       .9       .9
PI    .9       .9      1.0      1.0      1.0      1.0      1.0      1.1      1.1      1.1
PI   1.2      1.3      1.4      1.4      1.5      1.5      1.6      1.6      1.7      1.8
PI   1.9      2.0      2.1      2.1      2.2      2.4      2.4      2.4      2.5      2.6
PI   3.1      3.6      3.9      4.2      4.7      5.6      1.9       .9       .6       .5
PI    .3       .2        0        0        0        0        0        0        0        0
PI     0        0        0        0        0        0        0        0        0        0
PI     0        0        0        0        0        0        0        0        0        0

LS   0.0       80      0.0
KM UHG FROM VALLEY S-GRAPH
UI   170.     189.     232.     297.     359.     407.     559.     584.     678.     678.
UI   772.     772.     766.     685.     554.     501.     381.     339.     339.     264.
UI   254.     220.     203.     203.     173.     164.     145.     142.     136.     131.
UI   113.     113.     101.      97.      97.      84.      81.      81.      77.      68.
UI  67.8     67.8     66.2     59.8     59.8     59.8     59.8     53.6     47.3     47.3
UI  47.3     47.3     47.3     42.1     37.7     37.7     37.7     37.7     37.7     37.7
UI  37.2     29.9     29.9     29.9     29.9     29.9     29.9     29.9     29.9     29.9
UI  23.4     19.7     19.7     19.7     19.7     19.7     19.7     19.7     19.7     19.7
UI  19.7     19.7     19.7     19.7     16.0      9.7      9.7      9.7      9.7      9.7
UI   9.7      9.7      9.7      9.7      9.7      9.7      9.7      9.7      9.7      9.7
UI   9.7      9.7      9.7      9.7      9.7      9.7      9.7      9.7      9.7      9.7
UI   9.7      9.7      9.7      5.6
KKAREA B
KM     RUNOFF FROM AREA B
BA  1.14
LS   0.0       80      0.0
KM UHG FROM VALLEY S-GRAPH
UI   162.     218.     300.     386.     534.     649.     708.     708.     708.     541.
UI   422.     325.     284.     241.     195.     187.     159.     139.     131.     118.
UI   108.      94.      93.      78.      78.      68.      65.      65.      57.      57.
UI  57.3     46.1     45.3     45.3     45.0     36.1     36.1     36.1     36.1     35.0
UI  28.7     28.7     28.7     28.7     28.7     28.7     19.0     18.9     18.9     18.9
UI  18.9     18.9     18.9     18.9     18.9     12.6      9.3      9.3      9.3      9.3
UI   9.3      9.3      9.3      9.3      9.3      9.3      9.3      9.3      9.3      9.3
UI   9.3      9.3      9.3      9.3      2.5
KK HWY62
KM Combined Hydrograph at Hwy. 62
HC     2
KKAREA C
KM     RUNOFF FROM AREA C
BA  0.43
LS   0.0       80      0.0
KM UHG FROM VALLEY S-GRAPH
UI   159.     298.     501.     593.     428.     254.     177.     137.     108.      87.
UI  71.7     60.7     52.6     46.6     41.2     36.7     31.3     29.2     26.5     23.2
UI  23.2     18.6     15.3     15.3     15.3     13.5      7.6      7.6      7.6      7.6
UI   7.6      7.6      7.6      7.6      4.4
KKAREA D
KM     RUNOFF FROM AREA D
BA  0.39
LS   0.0       80      0.0
KM UHG FROM VALLEY S-GRAPH
UI   284.     683.     747.     369.     218.     148.     108.      82.      69.      55.
UI  45.0     39.6     33.3     28.1     22.0     22.0     14.0     10.8     10.8     10.8
```

```
UI  10.8      9.2
ZZ
```

```
1****************************************
*                                      *
*    FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*                JUN  1998             *
*              VERSION 4.1             *
*                                      *
*  RUN DATE   02APR04  TIME  15:27:49  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1

HEC-1 INPUT


```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID   Stoneridge Watershed
   2          ID   100-year flood, Riverside County Hydrology Manual
   3          ID   Existing Conditions Analysis
              *DIAGRAM
   4          IT       5 01JAN04       0     100
   5          IO       0

   6          KK  AREA A
   7          KM      RUNOFF FROM AREA A
   8          BA    1.82
   9          PB     3.0
  10          PI      .5      .6      .6      .6      .6      .7      .7      .7      .7      .7
```

```
11          PI      .7      .8      .8      .8      .8      .8      .8      .8      .8      .8      .8
12          PI      .8      .8      .8      .9      .8      .9      .9      .9      .9      .9      .9
13          PI      .9      .9     1.0     1.0     1.0     1.0     1.0     1.1     1.1     1.1
14          PI     1.2     1.3     1.4     1.4     1.5     1.5     1.6     1.6     1.7     1.8
15          PI     1.9     2.0     2.1     2.1     2.2     2.4     2.4     2.4     2.5     2.6
16          PI     3.1     3.6     3.9     4.2     4.7     5.6     1.9      .9      .6      .5
17          PI      .3      .2       0       0       0       0       0       0       0       0
18          PI       0       0       0       0       0       0       0       0       0       0
19          PI       0       0       0       0       0       0       0       0       0       0
20          LS     0.0      80     0.0
21          KM   UHG FROM VALLEY S-GRAPH
22          UI    170.    189.    232.    297.    359.    407.    559.    584.    678.    678.
23          UI    772.    772.    766.    685.    554.    501.    381.    339.    339.    264.
24          UI    254.    220.    203.    203.    173.    164.    145.    142.    136.    131.
25          UI    113.    113.    101.     97.     97.     84.     81.     81.     77.     68.
26          UI   67.8    67.8    66.2    59.8    59.8    59.8    59.8    53.6    47.3    47.3
27          UI   47.3    47.3    47.3    42.1    37.7    37.7    37.7    37.7    37.7    37.7
28          UI   37.2    29.9    29.9    29.9    29.9    29.9    29.9    29.9    29.9    29.9
29          UI   23.4    19.7    19.7    19.7    19.7    19.7    19.7    19.7    19.7    19.7
30          UI   19.7    19.7    19.7    19.7    16.0     9.7     9.7     9.7     9.7     9.7
31          UI    9.7     9.7     9.7     9.7     9.7     9.7     9.7     9.7     9.7     9.7
32          UI    9.7     9.7     9.7     9.7     9.7     9.7     9.7     9.7     9.7     9.7
33          UI    9.7     9.7     9.7     5.6

34          KK  AREA B
35          KM      RUNOFF FROM AREA B
36          BA   1.14
37          LS    0.0      80     0.0
38          KM   UHG FROM VALLEY S-GRAPH
39          UI    162.    218.    300.    386.    534.    649.    708.    708.    708.    541.
40          UI    422.    325.    284.    241.    195.    187.    159.    139.    131.    118.
41          UI    108.     94.     93.     78.     78.     68.     65.     65.     57.     57.
42          UI   57.3    46.1    45.3    45.3    45.0    36.1    36.1    36.1    36.1    35.0
43          UI   28.7    28.7    28.7    28.7    28.7    28.7    19.0    18.9    18.9    18.9
44          UI   18.9    18.9    18.9    18.9    18.9    12.6     9.3     9.3     9.3     9.3
45          UI    9.3     9.3     9.3     9.3     9.3     9.3     9.3     9.3     9.3     9.3
46          UI    9.3     9.3     9.3     9.3     2.5
```

1


```
LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

47          KK   HWY62
48          KM   Combined Hydrograph at Hwy. 62
49          HC     2

50          KK  AREA C
51          KM      RUNOFF FROM AREA C
52          BA   0.43
53          LS    0.0      80     0.0
```

```
 54          KM   UHG FROM VALLEY S-GRAPH
 55          UI    159.    298.    501.    593.    428.    254.    177.    137.    108.     87.
 56          UI    71.7    60.7    52.6    46.6    41.2    36.7    31.3    29.2    26.5    23.2
 57          UI    23.2    18.6    15.3    15.3    15.3    13.5     7.6     7.6     7.6     7.6
 58          UI     7.6     7.6     7.6     7.6     4.4

 59          KK  AREA D
 60          KM      RUNOFF FROM AREA D
 61          BA   0.39
 62          LS    0.0      80     0.0
 63          KM   UHG FROM VALLEY S-GRAPH
 64          UI    284.    683.    747.    369.    218.    148.    108.     82.     69.     55.
 65          UI    45.0    39.6    33.3    28.1    22.0    22.0    14.0    10.8    10.8    10.8
 66          UI    10.8     9.2
 67          ZZ
1
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
  LINE      (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

     6      AREA A
                .
                .
    34          .       AREA B
                .          .
                .          .
    47      HWY62.............
                .
                .
    50          .       AREA C
                .          .
                .          .
    59          .          .       AREA D
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   02APR04  TIME  15:27:49   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
```

```
                    Stoneridge Watershed
                    100-year flood, Riverside County Hydrology Manual
                    Existing Conditions Analysis

  5 IO          OUTPUT CONTROL VARIABLES
                      IPRNT            0  PRINT CONTROL
                      IPLOT            0  PLOT CONTROL
                      QSCAL           0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN            5  MINUTES IN COMPUTATION INTERVAL
                      IDATE       1JAN 4  STARTING DATE
                      ITIME         0000  STARTING TIME
                         NQ          100  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE       1JAN 4  ENDING DATE
                     NDTIME         0815  ENDING TIME
                      ICENT           19  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE    8.25 HOURS

           ENGLISH UNITS
                DRAINAGE AREA           SQUARE MILES
                PRECIPITATION DEPTH     INCHES
                LENGTH, ELEVATION       FEET
                FLOW                    CUBIC FEET PER SECOND
                STORAGE VOLUME          ACRE-FEET
                SURFACE AREA            ACRES
                TEMPERATURE             DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

           **************
           *            *
  6 KK     *   AREA A   *
           *            *
           **************

                         RUNOFF FROM AREA A
                       UHG FROM VALLEY S-GRAPH

              SUBBASIN RUNOFF DATA

  8 BA         SUBBASIN CHARACTERISTICS
                    TAREA         1.82  SUBBASIN AREA

               PRECIPITATION DATA
```

9 PB STORM 3.00 BASIN TOTAL PRECIPITATION

10 PI INCREMENTAL PRECIPITATION PATTERN

.50	.60	.60	.60	.60	.70	.70	.70	.70	.70
.70	.80	.80	.80	.80	.80	.80	.80	.80	.80
.80	.80	.80	.90	.80	.90	.90	.90	.90	.90
.90	.90	1.00	1.00	1.00	1.00	1.00	1.10	1.10	1.10
1.20	1.30	1.40	1.40	1.50	1.50	1.60	1.60	1.70	1.80
1.90	2.00	2.10	2.10	2.20	2.40	2.40	2.40	2.50	2.60
3.10	3.60	3.90	4.20	4.70	5.60	1.90	.90	.60	.50
.30	.20								

20 LS SCS LOSS RATE

STRTL	.50	INITIAL ABSTRACTION
CRVNBR	80.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

21 UI INPUT UNITGRAPH, 114 ORDINATES, VOLUME = 1.00

170.0	189.0	232.0	297.0	359.0	407.0	559.0	584.0	678.0	678.0
772.0	772.0	766.0	685.0	554.0	501.0	381.0	339.0	339.0	264.0
254.0	220.0	203.0	203.0	173.0	164.0	145.0	142.0	136.0	131.0
113.0	113.0	101.0	97.0	97.0	84.0	81.0	81.0	77.0	68.0
67.8	67.8	66.2	59.8	59.8	59.8	59.8	53.6	47.3	47.3
47.3	47.3	47.3	42.1	37.7	37.7	37.7	37.7	37.7	37.7
37.2	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9	29.9
23.4	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7
19.7	19.7	19.7	19.7	16.0	9.7	9.7	9.7	9.7	9.7
9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
9.7	9.7	9.7	5.6						

***

****

HYDROGRAPH AT STATION AREA A

****

DA MON HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1 JAN 0000	1	.00	.00	.00	0.
1 JAN 0005	2	.01	.01	.00	0.
1 JAN 0010	3	.02	.02	.00	0.
1 JAN 0015	4	.02	.02	.00	0.
1 JAN 0020	5	.02	.02	.00	0.
1 JAN 0025	6	.02	.02	.00	0.
1 JAN 0030	7	.02	.02	.00	0.
1 JAN 0035	8	.02	.02	.00	0.
1 JAN 0410	51	.05	.03	.02	108.
1 JAN 0415	52	.06	.03	.03	119.
1 JAN 0420	53	.06	.03	.03	131.
1 JAN 0425	54	.06	.03	.03	144.
1 JAN 0430	55	.06	.03	.03	158.
1 JAN 0435	56	.07	.03	.04	173.
1 JAN 0440	57	.07	.03	.04	188.
1 JAN 0445	58	.07	.03	.04	205.

1	JAN 0040	9	.02	.02	.00	0.	*	1	JAN 0450	59	.07	.03	.04	223.
1	JAN 0045	10	.02	.02	.00	0.	*	1	JAN 0455	60	.07	.03	.05	241.
1	JAN 0050	11	.02	.02	.00	0.	*	1	JAN 0500	61	.08	.03	.05	261.
1	JAN 0055	12	.02	.02	.00	0.	*	1	JAN 0505	62	.09	.03	.06	283.
1	JAN 0100	13	.02	.02	.00	0.	*	1	JAN 0510	63	.11	.04	.07	308.
1	JAN 0105	14	.02	.02	.00	0.	*	1	JAN 0515	64	.12	.04	.08	335.
1	JAN 0110	15	.02	.02	.00	0.	*	1	JAN 0520	65	.13	.04	.09	365.
1	JAN 0115	16	.02	.02	.00	0.	*	1	JAN 0525	66	.14	.04	.10	398.
1	JAN 0120	17	.02	.02	.00	0.	*	1	JAN 0530	67	.17	.05	.12	438.
1	JAN 0125	18	.02	.02	.00	0.	*	1	JAN 0535	68	.06	.01	.04	467.
1	JAN 0130	19	.02	.02	.00	0.	*	1	JAN 0540	69	.03	.01	.02	495.
1	JAN 0135	20	.02	.02	.00	0.	*	1	JAN 0545	70	.02	.00	.01	521.
1	JAN 0140	21	.02	.02	.00	0.	*	1	JAN 0550	71	.01	.00	.01	545.
1	JAN 0145	22	.02	.02	.00	0.	*	1	JAN 0555	72	.01	.00	.01	564.
1	JAN 0150	23	.02	.02	.00	0.	*	1	JAN 0600	73	.01	.00	.00	581.
1	JAN 0155	24	.02	.02	.00	0.	*	1	JAN 0605	74	.00	.00	.00	584.
1	JAN 0200	25	.03	.03	.00	0.	*	1	JAN 0610	75	.00	.00	.00	582.
1	JAN 0205	26	.02	.02	.00	0.	*	1	JAN 0615	76	.00	.00	.00	568.
1	JAN 0210	27	.03	.03	.00	0.	*	1	JAN 0620	77	.00	.00	.00	549.
1	JAN 0215	28	.03	.03	.00	1.	*	1	JAN 0625	78	.00	.00	.00	516.
1	JAN 0220	29	.03	.02	.00	1.	*	1	JAN 0630	79	.00	.00	.00	475.
1	JAN 0225	30	.03	.02	.00	2.	*	1	JAN 0635	80	.00	.00	.00	427.
1	JAN 0230	31	.03	.02	.00	3.	*	1	JAN 0640	81	.00	.00	.00	379.
1	JAN 0235	32	.03	.02	.00	4.	*	1	JAN 0645	82	.00	.00	.00	338.
1	JAN 0240	33	.03	.02	.00	6.	*	1	JAN 0650	83	.00	.00	.00	299.
1	JAN 0245	34	.03	.02	.01	8.	*	1	JAN 0655	84	.00	.00	.00	270.
1	JAN 0250	35	.03	.02	.01	11.	*	1	JAN 0700	85	.00	.00	.00	245.
1	JAN 0255	36	.03	.02	.01	13.	*	1	JAN 0705	86	.00	.00	.00	221.
1	JAN 0300	37	.03	.02	.01	17.	*	1	JAN 0710	87	.00	.00	.00	202.
1	JAN 0305	38	.03	.02	.01	20.	*	1	JAN 0715	88	.00	.00	.00	186.
1	JAN 0310	39	.03	.02	.01	24.	*	1	JAN 0720	89	.00	.00	.00	173.
1	JAN 0315	40	.03	.02	.01	29.	*	1	JAN 0725	90	.00	.00	.00	161.
1	JAN 0320	41	.03	.02	.01	34.	*	1	JAN 0730	91	.00	.00	.00	150.
1	JAN 0325	42	.04	.02	.01	39.	*	1	JAN 0735	92	.00	.00	.00	140.
1	JAN 0330	43	.04	.03	.01	44.	*	1	JAN 0740	93	.00	.00	.00	131.
1	JAN 0335	44	.04	.03	.01	50.	*	1	JAN 0745	94	.00	.00	.00	124.
1	JAN 0340	45	.04	.03	.02	57.	*	1	JAN 0750	95	.00	.00	.00	118.
1	JAN 0345	46	.04	.03	.02	64.	*	1	JAN 0755	96	.00	.00	.00	111.
1	JAN 0350	47	.04	.03	.02	71.	*	1	JAN 0800	97	.00	.00	.00	105.
1	JAN 0355	48	.05	.03	.02	79.	*	1	JAN 0805	98	.00	.00	.00	100.
1	JAN 0400	49	.05	.03	.02	88.	*	1	JAN 0810	99	.00	.00	.00	94.
1	JAN 0405	50	.05	.03	.02	98.	*	1	JAN 0815	100	.00	.00	.00	90.

****

TOTAL RAINFALL = 3.00, TOTAL LOSS = 1.75, TOTAL EXCESS = 1.25

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
+ (CFS)	(HR)	6-HR	24-HR	72-HR	8.25-HR	

```
                          (CFS)
+      584.      6.08
                                     213.        155.        155.        155.
                        (INCHES)    1.086       1.086       1.086       1.086
                         (AC-FT)     105.        105.        105.        105.

                        CUMULATIVE AREA =     1.82 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

             **************
             *            *
  34 KK      *   AREA B   *
             *            *
             **************

                            RUNOFF FROM AREA B
                          UHG FROM VALLEY S-GRAPH

               SUBBASIN RUNOFF DATA

  36 BA         SUBBASIN CHARACTERISTICS
                     TAREA         1.14   SUBBASIN AREA

                PRECIPITATION DATA

   9 PB              STORM         3.00   BASIN TOTAL PRECIPITATION

  10 PI          INCREMENTAL PRECIPITATION PATTERN
                     .50       .60       .60       .60       .60       .70       .70       .70       .70       .70
                     .70       .80       .80       .80       .80       .80       .80       .80       .80       .80
                     .80       .80       .80       .90       .80       .90       .90       .90       .90       .90
                     .90       .90      1.00      1.00      1.00      1.00      1.00      1.10      1.10      1.10
                    1.20      1.30      1.40      1.40      1.50      1.50      1.60      1.60      1.70      1.80
                    1.90      2.00      2.10      2.10      2.20      2.40      2.40      2.40      2.50      2.60
                    3.10      3.60      3.90      4.20      4.70      5.60      1.90       .90       .60       .50
                     .30       .20

  37 LS         SCS LOSS RATE
                     STRTL          .50   INITIAL ABSTRACTION
                    CRVNBR        80.00   CURVE NUMBER
                     RTIMP          .00   PERCENT IMPERVIOUS AREA

  38 UI         INPUT UNITGRAPH,  75 ORDINATES,  VOLUME = 1.00
                   162.0     218.0     300.0     386.0     534.0     649.0     708.0     708.0     708.0     541.0
                   422.0     325.0     284.0     241.0     195.0     187.0     159.0     139.0     131.0     118.0
                   108.0      94.0      93.0      78.0      78.0      68.0      65.0      65.0      57.0      57.0
                    57.3      46.1      45.3      45.3      45.0      36.1      36.1      36.1      36.1      35.0
```

28.7	28.7	28.7	28.7	28.7	28.7	19.0	18.9	18.9	18.9
18.9	18.9	18.9	18.9	18.9	12.6	9.3	9.3	9.3	9.3
9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
9.3	9.3	9.3	9.3	2.5					

***

****

HYDROGRAPH AT STATION AREA B

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	0000	1	.00	.00	.00	0.	*	1	JAN	0410	51	.05	.03	.02	97.
1	JAN	0005	2	.01	.01	.00	0.	*	1	JAN	0415	52	.06	.03	.03	106.
1	JAN	0010	3	.02	.02	.00	0.	*	1	JAN	0420	53	.06	.03	.03	116.
1	JAN	0015	4	.02	.02	.00	0.	*	1	JAN	0425	54	.06	.03	.03	127.
1	JAN	0020	5	.02	.02	.00	0.	*	1	JAN	0430	55	.06	.03	.03	138.
1	JAN	0025	6	.02	.02	.00	0.	*	1	JAN	0435	56	.07	.03	.04	150.
1	JAN	0030	7	.02	.02	.00	0.	*	1	JAN	0440	57	.07	.03	.04	163.
1	JAN	0035	8	.02	.02	.00	0.	*	1	JAN	0445	58	.07	.03	.04	177.
1	JAN	0040	9	.02	.02	.00	0.	*	1	JAN	0450	59	.07	.03	.04	192.
1	JAN	0045	10	.02	.02	.00	0.	*	1	JAN	0455	60	.07	.03	.05	207.
1	JAN	0050	11	.02	.02	.00	0.	*	1	JAN	0500	61	.08	.03	.05	223.
1	JAN	0055	12	.02	.02	.00	0.	*	1	JAN	0505	62	.09	.03	.06	240.
1	JAN	0100	13	.02	.02	.00	0.	*	1	JAN	0510	63	.11	.04	.07	260.
1	JAN	0105	14	.02	.02	.00	0.	*	1	JAN	0515	64	.12	.04	.08	282.
1	JAN	0110	15	.02	.02	.00	0.	*	1	JAN	0520	65	.13	.04	.09	308.
1	JAN	0115	16	.02	.02	.00	0.	*	1	JAN	0525	66	.14	.04	.10	338.
1	JAN	0120	17	.02	.02	.00	0.	*	1	JAN	0530	67	.17	.05	.12	375.
1	JAN	0125	18	.02	.02	.00	0.	*	1	JAN	0535	68	.06	.01	.04	404.
1	JAN	0130	19	.02	.02	.00	0.	*	1	JAN	0540	69	.03	.01	.02	430.
1	JAN	0135	20	.02	.02	.00	0.	*	1	JAN	0545	70	.02	.00	.01	450.
1	JAN	0140	21	.02	.02	.00	0.	*	1	JAN	0550	71	.01	.00	.01	463.
1	JAN	0145	22	.02	.02	.00	0.	*	1	JAN	0555	72	.01	.00	.01	460.
1	JAN	0150	23	.02	.02	.00	0.	*	1	JAN	0600	73	.01	.00	.00	441.
1	JAN	0155	24	.02	.02	.00	0.	*	1	JAN	0605	74	.00	.00	.00	407.
1	JAN	0200	25	.03	.03	.00	0.	*	1	JAN	0610	75	.00	.00	.00	365.
1	JAN	0205	26	.02	.02	.00	0.	*	1	JAN	0615	76	.00	.00	.00	313.
1	JAN	0210	27	.03	.03	.00	0.	*	1	JAN	0620	77	.00	.00	.00	268.
1	JAN	0215	28	.03	.03	.00	1.	*	1	JAN	0625	78	.00	.00	.00	230.
1	JAN	0220	29	.03	.02	.00	2.	*	1	JAN	0630	79	.00	.00	.00	201.
1	JAN	0225	30	.03	.02	.00	3.	*	1	JAN	0635	80	.00	.00	.00	176.
1	JAN	0230	31	.03	.02	.00	4.	*	1	JAN	0640	81	.00	.00	.00	155.
1	JAN	0235	32	.03	.02	.00	6.	*	1	JAN	0645	82	.00	.00	.00	138.
1	JAN	0240	33	.03	.02	.00	8.	*	1	JAN	0650	83	.00	.00	.00	124.
1	JAN	0245	34	.03	.02	.01	10.	*	1	JAN	0655	84	.00	.00	.00	112.
1	JAN	0250	35	.03	.02	.01	13.	*	1	JAN	0700	85	.00	.00	.00	103.

							ST10[illegible]OUT					
1 JAN 0255	36	.03	.02	.01	16.	*	1 JAN 0705	86	.00	.00	.00	94.
1 JAN 0300	37	.03	.02	.01	19.	*	1 JAN 0710	87	.00	.00	.00	87.
1 JAN 0305	38	.03	.02	.01	22.	*	1 JAN 0715	88	.00	.00	.00	80.
1 JAN 0310	39	.03	.02	.01	26.	*	1 JAN 0720	89	.00	.00	.00	75.
1 JAN 0315	40	.03	.02	.01	30.	*	1 JAN 0725	90	.00	.00	.00	70.
1 JAN 0320	41	.03	.02	.01	34.	*	1 JAN 0730	91	.00	.00	.00	65.
1 JAN 0325	42	.04	.02	.01	38.	*	1 JAN 0735	92	.00	.00	.00	61.
1 JAN 0330	43	.04	.03	.01	42.	*	1 JAN 0740	93	.00	.00	.00	58.
1 JAN 0335	44	.04	.03	.01	47.	*	1 JAN 0745	94	.00	.00	.00	55.
1 JAN 0340	45	.04	.03	.02	53.	*	1 JAN 0750	95	.00	.00	.00	52.
1 JAN 0345	46	.04	.03	.02	59.	*	1 JAN 0755	96	.00	.00	.00	49.
1 JAN 0350	47	.04	.03	.02	65.	*	1 JAN 0800	97	.00	.00	.00	47.
1 JAN 0355	48	.05	.03	.02	72.	*	1 JAN 0805	98	.00	.00	.00	44.
1 JAN 0400	49	.05	.03	.02	80.	*	1 JAN 0810	99	.00	.00	.00	41.
1 JAN 0405	50	.05	.03	.02	88.	*	1 JAN 0815	100	.00	.00	.00	40.
						*						

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TOTAL RAINFALL = 3.00, TOTAL LOSS = 1.75, TOTAL EXCESS = 1.25

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.25-HR
+ (CFS)	(HR)					
		(CFS)				
+ 463.	5.83		144.	105.	105.	105.
		(INCHES)	1.175	1.175	1.175	1.175
		(AC-FT)	71.	71.	71.	71.

CUMULATIVE AREA = 1.14 SQ MI

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              *            *
   47 KK      *    HWY62   *
              *            *
              **************
                         Combined Hydrograph at Hwy. 62

   49 HC           HYDROGRAPH COMBINATION
                       ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION HWY62
SUM OF 2 HYDROGRAPHS

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1	JAN	0000	1	0.	1	JAN	0205	26	0.	1	JAN	0410	51	205.	1	JAN	0615	76	881.
1	JAN	0005	2	0.	1	JAN	0210	27	1.	1	JAN	0415	52	225.	1	JAN	0620	77	816.
1	JAN	0010	3	0.	1	JAN	0215	28	2.	1	JAN	0420	53	247.	1	JAN	0625	78	746.
1	JAN	0015	4	0.	1	JAN	0220	29	3.	1	JAN	0425	54	271.	1	JAN	0630	79	676.
1	JAN	0020	5	0.	1	JAN	0225	30	5.	1	JAN	0430	55	296.	1	JAN	0635	80	603.
1	JAN	0025	6	0.	1	JAN	0230	31	7.	1	JAN	0435	56	323.	1	JAN	0640	81	534.
1	JAN	0030	7	0.	1	JAN	0235	32	10.	1	JAN	0440	57	352.	1	JAN	0645	82	476.
1	JAN	0035	8	0.	1	JAN	0240	33	14.	1	JAN	0445	58	383.	1	JAN	0650	83	423.
1	JAN	0040	9	0.	1	JAN	0245	34	18.	1	JAN	0450	59	415.	1	JAN	0655	84	382.
1	JAN	0045	10	0.	1	JAN	0250	35	24.	1	JAN	0455	60	448.	1	JAN	0700	85	348.
1	JAN	0050	11	0.	1	JAN	0255	36	29.	1	JAN	0500	61	484.	1	JAN	0705	86	315.
1	JAN	0055	12	0.	1	JAN	0300	37	36.	1	JAN	0505	62	524.	1	JAN	0710	87	289.
1	JAN	0100	13	0.	1	JAN	0305	38	43.	1	JAN	0510	63	568.	1	JAN	0715	88	266.
1	JAN	0105	14	0.	1	JAN	0310	39	50.	1	JAN	0515	64	617.	1	JAN	0720	89	248.
1	JAN	0110	15	0.	1	JAN	0315	40	59.	1	JAN	0520	65	672.	1	JAN	0725	90	231.
1	JAN	0115	16	0.	1	JAN	0320	41	67.	1	JAN	0525	66	736.	1	JAN	0730	91	215.
1	JAN	0120	17	0.	1	JAN	0325	42	77.	1	JAN	0530	67	813.	1	JAN	0735	92	201.
1	JAN	0125	18	0.	1	JAN	0330	43	87.	1	JAN	0535	68	871.	1	JAN	0740	93	189.
1	JAN	0130	19	0.	1	JAN	0335	44	98.	1	JAN	0540	69	924.	1	JAN	0745	94	179.
1	JAN	0135	20	0.	1	JAN	0340	45	110.	1	JAN	0545	70	971.	1	JAN	0750	95	169.
1	JAN	0140	21	0.	1	JAN	0345	46	122.	1	JAN	0550	71	1007.	1	JAN	0755	96	160.
1	JAN	0145	22	0.	1	JAN	0350	47	136.	1	JAN	0555	72	1024.	1	JAN	0800	97	151.
1	JAN	0150	23	0.	1	JAN	0355	48	152.	1	JAN	0600	73	1022.	1	JAN	0805	98	143.
1	JAN	0155	24	0.	1	JAN	0400	49	168.	1	JAN	0605	74	991.	1	JAN	0810	99	136.
1	JAN	0200	25	0.	1	JAN	0405	50	186.	1	JAN	0610	75	947.	1	JAN	0815	100	130.

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	8.25-HR
+	(CFS)	(HR)					
			(CFS)				
+	1024.	5.92		357.	259.	259.	259.
			(INCHES)	1.120	1.121	1.121	1.121
			(AC-FT)	177.	177.	177.	177.

CUMULATIVE AREA = 2.96 SQ MI

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          *            *
50 KK     *    AREA C  *
          *            *
          **************
                        RUNOFF FROM AREA C
                      UHG FROM VALLEY S-GRAPH

               SUBBASIN RUNOFF DATA

52 BA            SUBBASIN CHARACTERISTICS
                       TAREA          .43  SUBBASIN AREA

                 PRECIPITATION DATA

 9 PB                  STORM         3.00  BASIN TOTAL PRECIPITATION

10 PI              INCREMENTAL PRECIPITATION PATTERN
                     .50    .60    .60    .60    .60    .70    .70    .70    .70    .70
                     .70    .80    .80    .80    .80    .80    .80    .80    .80    .80
                     .80    .80    .80    .90    .80    .90    .90    .90    .90    .90
                     .90    .90   1.00   1.00   1.00   1.00   1.00   1.10   1.10   1.10
                    1.20   1.30   1.40   1.40   1.50   1.50   1.60   1.60   1.70   1.80
                    1.90   2.00   2.10   2.10   2.20   2.40   2.40   2.40   2.50   2.60
                    3.10   3.60   3.90   4.20   4.70   5.60   1.90    .90    .60    .50
                     .30    .20

53 LS            SCS LOSS RATE
                      STRTL          .50  INITIAL ABSTRACTION
                     CRVNBR        80.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

54 UI            INPUT UNITGRAPH,  35 ORDINATES,  VOLUME = 1.00
                   159.0  298.0  501.0  593.0  428.0  254.0  177.0  137.0  108.0   87.0
                    71.7   60.7   52.6   46.6   41.2   36.7   31.3   29.2   26.5   23.2
                    23.2   18.6   15.3   15.3   15.3   13.5    7.6    7.6    7.6    7.6
                     7.6    7.6    7.6    7.6    4.4
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HYDROGRAPH AT STATION AREA C

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DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	0000	1	.00	.00	.00	0.	1	JAN	0410	51	.05	.03	.02	55.

1 JAN	0005	2	.01	.01	.00	0.	*
1 JAN	0010	3	.02	.02	.00	0.	*
1 JAN	0015	4	.02	.02	.00	0.	*
1 JAN	0020	5	.02	.02	.00	0.	*
1 JAN	0025	6	.02	.02	.00	0.	*
1 JAN	0030	7	.02	.02	.00	0.	*
1 JAN	0035	8	.02	.02	.00	0.	*
1 JAN	0040	9	.02	.02	.00	0.	*
1 JAN	0045	10	.02	.02	.00	0.	*
1 JAN	0050	11	.02	.02	.00	0.	*
1 JAN	0055	12	.02	.02	.00	0.	*
1 JAN	0100	13	.02	.02	.00	0.	*
1 JAN	0105	14	.02	.02	.00	0.	*
1 JAN	0110	15	.02	.02	.00	0.	*
1 JAN	0115	16	.02	.02	.00	0.	*
1 JAN	0120	17	.02	.02	.00	0.	*
1 JAN	0125	18	.02	.02	.00	0.	*
1 JAN	0130	19	.02	.02	.00	0.	*
1 JAN	0135	20	.02	.02	.00	0.	*
1 JAN	0140	21	.02	.02	.00	0.	*
1 JAN	0145	22	.02	.02	.00	0.	*
1 JAN	0150	23	.02	.02	.00	0.	*
1 JAN	0155	24	.02	.02	.00	0.	*
1 JAN	0200	25	.03	.03	.00	0.	*
1 JAN	0205	26	.02	.02	.00	0.	*
1 JAN	0210	27	.03	.03	.00	1.	*
1 JAN	0215	28	.03	.03	.00	1.	*
1 JAN	0220	29	.03	.02	.00	2.	*
1 JAN	0225	30	.03	.02	.00	3.	*
1 JAN	0230	31	.03	.02	.00	5.	*
1 JAN	0235	32	.03	.02	.00	6.	*
1 JAN	0240	33	.03	.02	.00	7.	*
1 JAN	0245	34	.03	.02	.01	9.	*
1 JAN	0250	35	.03	.02	.01	10.	*
1 JAN	0255	36	.03	.02	.01	12.	*
1 JAN	0300	37	.03	.02	.01	13.	*
1 JAN	0305	38	.03	.02	.01	15.	*
1 JAN	0310	39	.03	.02	.01	17.	*
1 JAN	0315	40	.03	.02	.01	19.	*
1 JAN	0320	41	.03	.02	.01	21.	*
1 JAN	0325	42	.04	.02	.01	23.	*
1 JAN	0330	43	.04	.03	.01	25.	*
1 JAN	0335	44	.04	.03	.01	28.	*
1 JAN	0340	45	.04	.03	.02	31.	*
1 JAN	0345	46	.04	.03	.02	35.	*
1 JAN	0350	47	.04	.03	.02	39.	*
1 JAN	0355	48	.05	.03	.02	43.	*
1 JAN	0400	49	.05	.03	.02	47.	*
1 JAN	0405	50	.05	.03	.02	51.	*
							*

1 JAN	0415	52	.06	.03	.03	60.
1 JAN	0420	53	.06	.03	.03	65.
1 JAN	0425	54	.06	.03	.03	71.
1 JAN	0430	55	.06	.03	.03	77.
1 JAN	0435	56	.07	.03	.04	84.
1 JAN	0440	57	.07	.03	.04	91.
1 JAN	0445	58	.07	.03	.04	97.
1 JAN	0450	59	.07	.03	.04	105.
1 JAN	0455	60	.07	.03	.05	112.
1 JAN	0500	61	.08	.03	.05	119.
1 JAN	0505	62	.09	.03	.06	127.
1 JAN	0510	63	.11	.04	.07	139.
1 JAN	0515	64	.12	.04	.08	154.
1 JAN	0520	65	.13	.04	.09	174.
1 JAN	0525	66	.14	.04	.10	197.
1 JAN	0530	67	.17	.05	.12	223.
1 JAN	0535	68	.06	.01	.04	238.
1 JAN	0540	69	.03	.01	.02	240.
1 JAN	0545	70	.02	.00	.01	219.
1 JAN	0550	71	.01	.00	.01	177.
1 JAN	0555	72	.01	.00	.01	138.
1 JAN	0600	73	.01	.00	.00	111.
1 JAN	0605	74	.00	.00	.00	91.
1 JAN	0610	75	.00	.00	.00	75.
1 JAN	0615	76	.00	.00	.00	62.
1 JAN	0620	77	.00	.00	.00	51.
1 JAN	0625	78	.00	.00	.00	43.
1 JAN	0630	79	.00	.00	.00	37.
1 JAN	0635	80	.00	.00	.00	33.
1 JAN	0640	81	.00	.00	.00	29.
1 JAN	0645	82	.00	.00	.00	25.
1 JAN	0650	83	.00	.00	.00	23.
1 JAN	0655	84	.00	.00	.00	20.
1 JAN	0700	85	.00	.00	.00	18.
1 JAN	0705	86	.00	.00	.00	16.
1 JAN	0710	87	.00	.00	.00	14.
1 JAN	0715	88	.00	.00	.00	13.
1 JAN	0720	89	.00	.00	.00	11.
1 JAN	0725	90	.00	.00	.00	10.
1 JAN	0730	91	.00	.00	.00	9.
1 JAN	0735	92	.00	.00	.00	8.
1 JAN	0740	93	.00	.00	.00	6.
1 JAN	0745	94	.00	.00	.00	6.
1 JAN	0750	95	.00	.00	.00	5.
1 JAN	0755	96	.00	.00	.00	5.
1 JAN	0800	97	.00	.00	.00	4.
1 JAN	0805	98	.00	.00	.00	3.
1 JAN	0810	99	.00	.00	.00	3.
1 JAN	0815	100	.00	.00	.00	2.

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TOTAL RAINFALL = 3.00, TOTAL LOSS = 1.75, TOTAL EXCESS = 1.25

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.25-HR
+ (CFS)	(HR)					
		(CFS)				
+ 240.	5.67		58.	42.	42.	42.
		(INCHES)	1.248	1.248	1.248	1.248
		(AC-FT)	29.	29.	29.	29.

CUMULATIVE AREA = .43 SQ MI

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*            *
*            *
*    AREA D  *
*            *
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59 KK

RUNOFF FROM AREA D
UHG FROM VALLEY S-GRAPH

SUBBASIN RUNOFF DATA

61 BA SUBBASIN CHARACTERISTICS

TAREA .39 SUBBASIN AREA

PRECIPITATION DATA

9 PB STORM 3.00 BASIN TOTAL PRECIPITATION

10 PI INCREMENTAL PRECIPITATION PATTERN

.50	.60	.60	.60	.60	.70	.70	.70	.70	.70
.70	.80	.80	.80	.80	.80	.80	.80	.80	.80
.80	.80	.80	.90	.80	.90	.90	.90	.90	.90
.90	.90	1.00	1.00	1.00	1.00	1.00	1.10	1.10	1.10
1.20	1.30	1.40	1.40	1.50	1.50	1.60	1.60	1.70	1.80
1.90	2.00	2.10	2.10	2.20	2.40	2.40	2.40	2.50	2.60
3.10	3.60	3.90	4.20	4.70	5.60	1.90	.90	.60	.50
.30	.20								

62 LS SCS LOSS RATE

STRTL .50 INITIAL ABSTRACTION

CRVNBR 80.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

63 UI INPUT UNITGRAPH, 22 ORDINATES, VOLUME = 1.00

284.0	683.0	747.0	369.0	218.0	148.0	108.0	82.0	69.0	55.0
45.0	39.6	33.3	28.1	22.0	22.0	14.0	10.8	10.8	10.8
10.8	9.2								

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HYDROGRAPH AT STATION AREA D

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	JAN	0000	1	.00	.00	.00	0.	1	JAN	0410	51	.05	.03	.02	58.
1	JAN	0005	2	.01	.01	.00	0.	1	JAN	0415	52	.06	.03	.03	63.
1	JAN	0010	3	.02	.02	.00	0.	1	JAN	0420	53	.06	.03	.03	69.
1	JAN	0015	4	.02	.02	.00	0.	1	JAN	0425	54	.06	.03	.03	75.
1	JAN	0020	5	.02	.02	.00	0.	1	JAN	0430	55	.06	.03	.03	82.
1	JAN	0025	6	.02	.02	.00	0.	1	JAN	0435	56	.07	.03	.04	88.
1	JAN	0030	7	.02	.02	.00	0.	1	JAN	0440	57	.07	.03	.04	94.
1	JAN	0035	8	.02	.02	.00	0.	1	JAN	0445	58	.07	.03	.04	102.
1	JAN	0040	9	.02	.02	.00	0.	1	JAN	0450	59	.07	.03	.04	109.
1	JAN	0045	10	.02	.02	.00	0.	1	JAN	0455	60	.07	.03	.05	115.
1	JAN	0050	11	.02	.02	.00	0.	1	JAN	0500	61	.08	.03	.05	121.
1	JAN	0055	12	.02	.02	.00	0.	1	JAN	0505	62	.09	.03	.06	131.
1	JAN	0100	13	.02	.02	.00	0.	1	JAN	0510	63	.11	.04	.07	147.
1	JAN	0105	14	.02	.02	.00	0.	1	JAN	0515	64	.12	.04	.08	168.
1	JAN	0110	15	.02	.02	.00	0.	1	JAN	0520	65	.13	.04	.09	190.
1	JAN	0115	16	.02	.02	.00	0.	1	JAN	0525	66	.14	.04	.10	214.
1	JAN	0120	17	.02	.02	.00	0.	1	JAN	0530	67	.17	.05	.12	243.
1	JAN	0125	18	.02	.02	.00	0.	1	JAN	0535	68	.06	.01	.04	254.
1	JAN	0130	19	.02	.02	.00	0.	1	JAN	0540	69	.03	.01	.02	220.
1	JAN	0135	20	.02	.02	.00	0.	1	JAN	0545	70	.02	.00	.01	159.
1	JAN	0140	21	.02	.02	.00	0.	1	JAN	0550	71	.01	.00	.01	118.
1	JAN	0145	22	.02	.02	.00	0.	1	JAN	0555	72	.01	.00	.01	93.
1	JAN	0150	23	.02	.02	.00	0.	1	JAN	0600	73	.01	.00	.00	74.
1	JAN	0155	24	.02	.02	.00	0.	1	JAN	0605	74	.00	.00	.00	58.
1	JAN	0200	25	.03	.03	.00	0.	1	JAN	0610	75	.00	.00	.00	45.
1	JAN	0205	26	.02	.02	.00	0.	1	JAN	0615	76	.00	.00	.00	35.
1	JAN	0210	27	.03	.03	.00	1.	1	JAN	0620	77	.00	.00	.00	28.
1	JAN	0215	28	.03	.03	.00	2.	1	JAN	0625	78	.00	.00	.00	23.
1	JAN	0220	29	.03	.02	.00	3.	1	JAN	0630	79	.00	.00	.00	19.
1	JAN	0225	30	.03	.02	.00	5.	1	JAN	0635	80	.00	.00	.00	16.
1	JAN	0230	31	.03	.02	.00	6.	1	JAN	0640	81	.00	.00	.00	13.
1	JAN	0235	32	.03	.02	.00	7.	1	JAN	0645	82	.00	.00	.00	11.
1	JAN	0240	33	.03	.02	.00	8.	1	JAN	0650	83	.00	.00	.00	8.

1 JAN 0245	34	.03	.02	.01	10.	*	1 JAN 0655	84	.00	.00	.00	7.
1 JAN 0250	35	.03	.02	.01	12.	*	1 JAN 0700	85	.00	.00	.00	6.
1 JAN 0255	36	.03	.02	.01	13.	*	1 JAN 0705	86	.00	.00	.00	5.
1 JAN 0300	37	.03	.02	.01	15.	*	1 JAN 0710	87	.00	.00	.00	3.
1 JAN 0305	38	.03	.02	.01	17.	*	1 JAN 0715	88	.00	.00	.00	2.
1 JAN 0310	39	.03	.02	.01	18.	*	1 JAN 0720	89	.00	.00	.00	1.
1 JAN 0315	40	.03	.02	.01	20.	*	1 JAN 0725	90	.00	.00	.00	1.
1 JAN 0320	41	.03	.02	.01	23.	*	1 JAN 0730	91	.00	.00	.00	0.
1 JAN 0325	42	.04	.02	.01	25.	*	1 JAN 0735	92	.00	.00	.00	0.
1 JAN 0330	43	.04	.03	.01	27.	*	1 JAN 0740	93	.00	.00	.00	0.
1 JAN 0335	44	.04	.03	.01	31.	*	1 JAN 0745	94	.00	.00	.00	0.
1 JAN 0340	45	.04	.03	.02	34.	*	1 JAN 0750	95	.00	.00	.00	0.
1 JAN 0345	46	.04	.03	.02	38.	*	1 JAN 0755	96	.00	.00	.00	0.
1 JAN 0350	47	.04	.03	.02	42.	*	1 JAN 0800	97	.00	.00	.00	0.
1 JAN 0355	48	.05	.03	.02	46.	*	1 JAN 0805	98	.00	.00	.00	0.
1 JAN 0400	49	.05	.03	.02	49.	*	1 JAN 0810	99	.00	.00	.00	0.
1 JAN 0405	50	.05	.03	.02	53.	*	1 JAN 0815	100	.00	.00	.00	0.

****

TOTAL RAINFALL = 3.00, TOTAL LOSS = 1.75, TOTAL EXCESS = 1.25

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	8.25-HR
(CFS)	(HR)	(CFS)				
254.	5.58		52.	38.	38.	38.
		(INCHES)	1.250	1.250	1.250	1.250
		(AC-FT)	26.	26.	26.	26.

CUMULATIVE AREA = .39 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
				6-HOUR	24-HOUR	72-HOUR			
HYDROGRAPH AT	AREA A	584.	6.08	213.	155.	155.	1.82		
HYDROGRAPH AT	AREA B	463.	5.83	144.	105.	105.	1.14		
2 COMBINED AT	HWY62	1024.	5.92	357.	259.	259.	2.96		

	HYDROGRAPH AT						
+	AREA C	240.	5.67	58.	42.	42.	.43
	HYDROGRAPH AT						
+	AREA D	254.	5.58	52.	38.	38.	.39

*** NORMAL END OF HEC-1 ***

```
IDStone Ridgeridge Watershed
ID100-year freq. Indio Storm of 1939
IDExisting Conditions Analysis
*DIAGRAM
IT      5 01JAN04        0        5
IO      0
KKAREA A
KM     RUNOFF FROM AREA A
BA   1.82
LS    0.0        80       0.0
$U   4.19     2.48       346      .06        2        0        1
KKAREA B
KM     RUNOFF FROM AREA B
BA   1.14
LS    0.0        80       0.0
$U   2.49     1.19       263      .06        2        0        1
KKAREA C
KM     RUNOFF FROM AREA C
BA   0.43
LS    0.0        80       0.0
$U   0.78     0.39       155      .06        2        0        1
KKAREA D
KM     RUNOFF FROM AREA D
BA   0.39
LS    0.0        80       0.0
$U   0.46     0.23       210      .06        2        0        1
ZZ                                                                  1
```

```
1*************************************
*                                   *
*   L.A. DISTRICT HEC-1 PREPROCESSOR *
*            MARCH 1984             *
*                                   *
* LAST REVISED 13 JUL 1998   Ver 2.0 *
*                                   *
*  RUN DATE 04/02/2004  TIME 15:24:05 *
*                                   *
*************************************

     L           A     PPPPPP   RRRRRR   EEEEEEE   1
     L          A A    P     P  R     R  E         11
     L         A   A   P     P  R     R  E          1
     L        A     A  PPPPPP   RRRRRR   EEEEE      1
     L        AAAAAAA  P        R   R    E          1
     L        A     A  P        R    R   E          1
     LLLLLLL  A     A  P        R     R  EEEEEEE  111
```

IDStone Ridgeridge Watershed

ID100-year freq. Indio Storm of 1939

IDExisting Conditions Analysis

TIME INTERVAL IS 0 HR 5 MIN

KKAREA A

AREA = 1.82 SQ.MI.

XL	XLCA	S	BN	NNT	ZFAC	RATIOL
4.19	2.48	346.00	.060	2	.0	1.00

VALLEY S-GRAPH

UNIT HYDROGRAPH	LH= 114	PERCENT	LAG=	7.22	LAG=	1.15	UG VOL.=	14087.
170.	189.	232.	297.	359.	407.	559.	584.	678.	678.
772.	772.	766.	685.	554.	501.	381.	339.	339.	264.
254.	220.	203.	203.	173.	164.	145.	142.	136.	131.
113.	113.	101.	97.	97.	84.	81.	81.	77.	68.
68.	68.	66.	60.	60.	60.	60.	54.	47.	47.
47.	47.	47.	42.	38.	38.	38.	38.	38.	38.
37.	30.	30.	30.	30.	30.	30.	30.	30.	30.
23.	20.	20.	20.	20.	20.	20.	20.	20.	20.
20.	20.	20.	20.	16.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	10.	10.	10.	10.	10.	10.	10.
10.	10.	10.	6.						

KKAREA B

AREA = 1.14 SQ.MI.

XL	XLCA	S	BN	NNT	ZFAC	RATIOL
2.49	1.19	263.00	.060	2	.0	1.00

VALLEY S-GRAPH

UNIT HYDROGRAPH	LH= 75	PERCENT	LAG=	11.04	LAG=	.75	UG VOL.=	8824.
162.	218.	300.	386.	534.	649.	708.	708.	708.	534.	541.	649.	218.	7
422.	325.	284.	241.	195.	187.	159.	139.	131.	195.	118.	187.	325.	1

108.	94.	93.	78.	78.	68.	65.	65.	57.	57.
57.	46.	45.	45.	45.	36.	36.	36.	36.	35.
29.	29.	29.	29.	29.	29.	19.	19.	19.	19.
19.	19.	19.	19.	19.	13.	9.	9.	9.	9.
9.	9.	9.	9.	9.	9.	9.	9.	9.	9.
9.	9.	9.	9.	3.					

KKAREA C

AREA = .43 SQ.MI.

XL	XLCA	S	BN	NNT	ZFAC	RATIOL
.78	.39	155.00	.060	2	.0	1.00

VALLEY S-GRAPH

UNIT HYDROGRAPH LH= 35 PERCENT LAG= 23.71 LAG= .35 UG VOL.= 3328.

159.	298.	501.	593.	428.	254.	177.	137.	108.	87.
72.	61.	53.	47.	41.	37.	31.	29.	27.	23.
23.	19.	15.	15.	15.	13.	8.	8.	8.	8.
8.	8.	8.	8.	4.					

KKAREA D

AREA = .39 SQ.MI.

XL	XLCA	S	BN	NNT	ZFAC	RATIOL
.46	.23	210.00	.060	2	.0	1.00

VALLEY S-GRAPH

UNIT HYDROGRAPH LH= 22 PERCENT LAG= 37.53 LAG= .22 UG VOL.= 3019.

284.	683.	747.	369.	218.	148.	108.	82.	69.	55.
45.	40.	33.	28.	22.	22.	14.	11.	11.	11.
11.	9.								

APPENDIX I-1

PHASE I – 550 ACRES

Earth Systems
Southwest

REPORT OF PHASE I ENVIRONMENTAL SITE ASSESSMENT OLYMPUS PROJECT 550 ACRES NORTH OF PIERSON BOULEVARD BETWEEN WORSLEY ROAD AND KAREN AVENUE DESERT HOT SPRINGS, CALIFORNIA

Earth Systems
Southwest

79-811B Country Club Drive
Bermuda Dunes, CA 92201
(760) 345-1588
(800) 924-7015
FAX (760) 345-7315

January 27, 2004

File No.: 09366-02
04-01-780

Royce International Investment Company
74-900 Highway 111, Suite 111
Indian Wells, California 92210

Attention: Mr. Keith Christiansen

Subject: **Report of Phase I Environmental Site Assessment**

Project: **Olympus Project**
550 Acres North of Pierson Boulevard
Between Worsley Road and Karen Avenue
Desert Hot Springs, California

Dear Mr. Christiansen:

As you requested, Earth Systems Southwest has completed this Phase I Environmental Site Assessment (ESA) of the site referenced above. Note that this report was prepared for your exclusive use. It was prepared to stand as a whole and no part should be excerpted or used in exclusion of any other part. This project was conducted in accordance with our proposal dated August 28, 2003 and authorized December 18, 2003. This report completes the scope of services outlined in our proposal.

Thank you for this opportunity to be of service. If you have any questions regarding this report or the information contained herein, please contact this office at your convenience.

Sincerely,
EARTH SYSTEMS SOUTHWEST

Scot A. Stormo, RG 4826
Vice President

ESA/sas/reh

Distribution: 6/Royce International Investment Company
1/SAS
2/BD File
1/RC File

REPORT OF PHASE I
ENVIRONMENTAL SITE ASSESSMENT
OLYMPUS PROJECT
550 ACRES NORTH OF
PIERSON BOULEVARD
BETWEEN WORSLEY ROAD
AND KAREN AVENUE
DESERT HOT SPRINGS, CALIFORNIA

January 27, 2004

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1.0 INTRODUCTION

1.1 Project Information

This report presents the findings of the Phase I Environmental Site Assessment (ESA) conducted by Earth Systems Southwest (ESSW) for 550 acres of undeveloped land located north of Pierson Boulevard, between Worsley Road and Karen Avenue, in the City of Desert Hot Springs, Riverside County, California. We understand the final project will involve between 430 and 550 acres. This ESA was conducted to assume the 550-acre size. Figures depicting the site location and layout are presented in Appendix A. This project was conducted for Royce International Investment Company in accordance with our proposal dated August 28, 2003 and authorized December 18, 2003.

1.2 Purpose and Scope of Work

The purpose of an ESA is to evaluate the potential for the presence of soil or groundwater contamination that may be present because of the past use, handling, storage, or disposal of hazardous materials or petroleum products on or near the property. The scope of work for this evaluation is based on ASTM Standard E-1527-00, *Standard Practice for Environmental Site Assessments*, and consisted of the tasks listed below.

Site Reconnaissance: This involved: (A) a visual reconnaissance of the site, noting physical evidence of potential contamination or possible sources of contamination; (B) interviews with persons familiar with the site (if possible) regarding present and past site usage; and (C) observation of adjacent properties to identify visual evidence of possible impacts to the subject site. Significant on-site conditions were photographed to document current conditions. Selected site photographs are presented in Appendix B.

Site History Investigation: The history of the site was investigated regarding past land use at and near the site, specifically as it relates to the storage, production, use, or disposal of hazardous materials. The sources of information for this evaluation are listed in the references section of this report and included the following categories of information:

- Aerial photographs.
- Topographic maps.
- Munger Oil maps.
- Personnel interviews.

Due to prior development being limited to residential, building department records were not reviewed.

Regulatory Agency Record Review: Many regulatory agencies compile information concerning sites that generate, store, use, and/or release hazardous materials. This information can be accessed by reviewing lists published by the regulatory agencies. A report listing known sites that generate, store, use, and/or have released hazardous materials was obtained from Track Info Services LLC, a firm that specializes in

maintaining a database of this type of information. A copy of the Track Info Services LLC Environmental FirstSearch report is presented in Appendix C and discussed in Section 4. The search radius for this review was in accordance with ASTM standard E-1527-00. In addition, selected government agencies were contacted for information they may have regarding environmental conditions at or near the site.

Report Preparation: This report was prepared to present our findings, conclusions, and recommendations. A qualifications statement regarding the personnel who performed this evaluation is presented in Appendix D.

Exclusions: Testing the air, groundwater, soil, or building materials for the presence of hazardous constituents was beyond the scope of this evaluation. As stated in the proposal, land title information would only be reviewed if furnished by the Client. Land title information was not provided to ESSW and therefore was not reviewed.

1.3 Limitations

This report has been prepared for the exclusive use of Royce International Investment Company. The conclusions and recommendations rendered in this report are opinions based on readily available information obtained to date within the scope of the work authorized by the client. The scope of work for this project was developed to address the needs of the client as part of a property transaction (buy, sell, refinance, etc.) and may not meet the needs of other users. Other parties participating in the transaction for which this project was conducted may also use the information presented in this report, provided said parties agree that ESSW shall have no additional liability arising from such use than described in the contract under which this project was conducted (a copy of that contract will be provided upon request). Any other use of or reliance on the information and opinions contained in this report without the written authorization of ESSW is at the sole risk of the user.

It should be noted that any level of assessment cannot ascertain that a property is completely free of chemical or toxic substances. We believe the scope of work has been appropriate to allow the client to make an informed business decision.

The results contained in this report are based upon the information acquired during the assessment, including information obtained from third parties. ESSW makes no claim as to the accuracy of the information obtained from others. In addition, it is possible that variations exist beyond or between points explored during the course of the investigation, and that changes in conditions can occur in the future due to the works of man, contaminant migration, variations in rainfall, temperature, and/or other factors not apparent at the time of the field investigation. It should also be noted that in active blow-sand areas, sand can accumulate quickly behind windbreaks. Consequently, materials can be buried out of view by natural wind-blown sand in a relatively short period of time under favorable conditions.

The services performed by ESSW have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the site vicinity. No warranty is expressed or implied.

2.0 SITE INFORMATION

2.1 Site Location and Development

For the purposes of this ESA, the site consists of 550 acres comprising most of Section 28, Township 2 South, Range 4 East, San Bernardino baseline and meridian (see Figure 1 in Appendix A). The site does not include residential parcels on the north and south sides of Via Diablo in the eastern half of the Section, or a parcel at the southeast corner of the Section. The subject property is located north of Pierson Boulevard between Worsley Road and Karen Avenue in Desert Hot Springs, Riverside County, California. The site consists mostly of undeveloped desert terrain, one vacant and vandalized residence on Pierson Boulevard, and a former house site.

The site is bordered by a dirt road to the west; by Worsley Road along the northwest boundary; by undeveloped desert to the north and northeast; by Karen Avenue (a dirt road) to the east; and by Pierson Boulevard and undeveloped land on the south boundary. Many portions of the site boundary were poorly demarcated. The site surrounds residential parcels along Via Diablo, which is perpendicular to Karen Avenue in the eastern half of the site. The elevation of the site ranges from approximately 1,500 feet above mean sea level at the northwest corner to approximately 1,280 feet above mean sea level at the southeast corner. The terrain is a moderately sloping alluvial plain characterized by outwash gullies up to approximately 3 feet deep. Surface water in the area generally drains to the southeast.

2.2 Current Site Condition

ESSW personnel visited the site on January 12, 2004 to observe current site conditions and adjacent land use. A summary of our findings is presented below.

- The site was observed to consist primarily of undeveloped native desert terrain (Photo 1). Mature native shrubs and smaller vegetation covered the site and were thickest where runoff tended to collect in wash areas. The vegetation did not show unusual signs of stress.

  A dirt road called Molly Road crossed the site from Karen Avenue, near the center of the east boundary, to near the northwest corner of the site. Molly Road also crossed the residential properties along Via Diablo, which are not a part of the site. A power line and a telephone line paralleled Molly Road, and a power line paralleled the dirt road along the west boundary (Photo 2).

  Some graded areas were noted near the southwest corner of the site. A portion of one of the graded areas was lined with black plastic sheeting (Photo 3).

- The interior of the site contained little evidence of dumping or debris. Debris was noted along the dirt road on the west boundary. This debris consisted of a television housing, a 30-foot span of asbestos-cement (AC) shingles, and several empty Camp Fuel cans (Photos 5 and 6). Three small piles of demolition debris, mostly sheetrock, were noted along Karen Avenue.

- An abandoned residence was located at 62800 Pierson Boulevard, near the southeast corner of the site. The entire house site was littered with trash and debris consisting of household items, empty water tanks, and demolition debris (Photos 7 and 8). Four small areas of stained soil, which smelled of motor oil, were scattered in the vicinity of the house. These stains appeared to be from vehicle motor oil changes and were not extensive. A pressurized water tank, which was leaking water, was on the north side of the house.

  Remains of a burned trailer home were adjacent to a dirt road that led northwest from the house (Photo 9).

  Charred evidence of a former residence was observed approximately 1,000 feet northeast of the house (Photo 10).

2.3 Site Vicinity

The site vicinity consisted of a mix of municipal, residential, and undeveloped properties. Undeveloped land beyond Pierson Boulevard, a paved road, was to the south; the site surrounded single-family residences along Via Diablo; and undeveloped land was beyond the dirt road to the west, to the north, and beyond Karen Avenue to the east. The new Mission Springs Water District spreading basin is approximately 1 mile north of the site. Illegal dumping had occurred along the north end of Molly Road, east of Worsley Road, in an area that is off-site. The debris consisted of appliances, yard waste, demolition debris, and household debris (Photo 4). The demolition debris included several pieces of what appeared to be asbestos-cement (AC) siding. The dumping ceased further to the southeast along Molly Road. The north boundary of the site was not clearly marked, but the dumping appeared to end before reaching the site. No hazardous materials were noted in the debris closest to the site. Evidence was not observed that the site was adversely affected by properties in the site vicinity.

2.4 Geology and Hydrogeology

The site is located in the Coachella Valley of Southern California. The Coachella Valley is part of the tectonically active Salton Trough, which is a closed, internally draining basin bounded by the San Jacinto and Santa Rosa Mountains to the southwest, the San Bernardino Mountains to the northwest, and the Little San Bernardino and Orocopia Mountains to the northeast and east. These mountain ranges and the basement rock underlying the Coachella Valley are primarily composed of granitic and metamorphic rock. Within the Coachella Valley, the basement complex is overlain by a series of unconsolidated and semi-consolidated continental clastic sediments eroded from the surrounding mountain ranges, lacustrine deposits of ancient Lake Cahuilla, and wind-blown sand deposited in the active blow-sand area of Riverside County (DWR, 1964). The site is located on continental clastic sediments eroded from the mountains north and west of the site.

The northwest trending San Andreas fault zone is the major geologic feature of the Coachella Valley. The Banning, Mission Creek, and Garnet Hill faults, which are part of the San Andreas fault system, divide the Coachella Valley into four distinct hydrogeologic subbasins. Most subbasins are further divided into subareas, based either on the type of water-bearing formation, water quality, areas of confined groundwater, forebay areas, groundwater divides, or surface

water divides. The site is located within the Mission Creek subbasin. This subbasin is bound by the Banning fault to the south, the Mission Creek fault to the north and east, the Indio Hills to the southeast, and the San Bernardino Mountains to the west. The Indio Hills and the San Bernardino Mountains are both considered not to be water-bearing. The Mission Creek fault and Banning fault are both barriers to groundwater flow, so that significant differences in groundwater levels are present on opposite sides of these faults. The alluvial materials within the Mission Creek Subbasin are primarily heterogeneous alluvial fan deposits exhibiting little sorting. Groundwater within this subarea generally flows in a southerly direction along a relatively flat gradient. The depth to groundwater in this subbasin ranges from flowing wells to 425 feet, due primarily to the change in surface elevation (DWR, 1964).

The depth to groundwater at the site was evaluated by contacting the Mission Springs Water District (MSWD). Mr. Gary Brockman of the MSWD indicated the depth to groundwater in a well located at the spreading basin approximately one mile north of the site was 530 feet when measured in the summer of 2003.

3.0 HISTORICAL INFORMATION

Information regarding the history of the site was obtained from historical aerial photographs, topographic maps, Munger Oil maps, and persons familiar with the site. The results of this research are summarized below.

3.1 Aerial Photographs

ESSW aerial photo archives were reviewed to evaluate the history of the site and vicinity, with particular attention to indications of the potential use, storage, or disposal of hazardous materials. Five sets of photographs for the years 1980, 1984, 1990, 1995, and 2000 were reviewed (see references). Our interpretations of these photographs are presented below:

- In 1980, the site was much as it appeared at the time of the site visit. Dry washes traversed the site from northwest to southeast. The dirt road was visible along the west boundary; Molly Road crossed the site from Karen Avenue on the east boundary; the house on Pierson Boulevard was present and had a trailer or RV in the driveway; and a clearing with dark coloration was visible at the location of the charred evidence of a former residence northeast of the house on Pierson Boulevard.

  In the vicinity, Worsley Road and Pierson Boulevard were two-lane paved roads. Several houses were visible along Via Diablo, and a small residential development was ½ mile to the east. The Colorado River Aquaduct is visible approximately ½ mile to the northwest.

- In 1984, the site was generally unchanged. The trailer or RV near the house on Pierson Boulevard was gone. The site vicinity appeared generally unchanged, except that a small fenced area had been built on the east side of Worsley Road, beyond the north end of the west dirt road, and contained several objects.

- In 1990, the vegetation over most of the site was gone, as were many of the houses along Via Diablo. Only four of the approximately 14 houses remained. This is likely due to the fire that the interviewee Steve mentioned (see Section 3.4). A dirt road or firebreak followed the northwest edge of the denuded portion of the site. Much of the site vicinity to the east and southeast also appeared to have been affected by the fire. Other significant changes in the site vicinity were not observed.

- By 1995, vegetation on-site had reestablished. The site was otherwise much as it appeared in 1990. In the vicinity, a few more homes had been built at a distance to the east. The vicinity was otherwise generally unchanged.

- In 2000, a few dumped objects were visible near the north end of the west dirt road, where it intersects with Worsley Road. The site and vicinity were otherwise much as they appeared in 1995.

3.2 Topographic Maps

Topographic maps produced by the U.S.G.S. were reviewed for information concerning the development history of the site. The 7.5-minute *Desert Hot Springs, California* Quadrangle, dated 1955 and photo-revised in 1972, was reviewed. This map depicts the site as primarily undeveloped land. A building is depicted in the location of the burned remnants noted during the site visit, near the southeast corner of the site. Molly Road, an unimproved road, is depicted crossing the site from the center of the east boundary to near the northwest corner of the site. In the vicinity, Pierson Boulevard is depicted as a medium duty paved road, as is Worsley Road (identified as Twentynine Palms Highway on the map). Karen Road is an unimproved road along the south half of the east boundary. Eleven homes are depicted in the vicinity of Molly Road, adjacent to the current location of Via Diablo. By 1972, the residence at 62800 Pierson Boulevard had been built. Four more homes are depicted in the vicinity of the others along Molly Road, and Via Diablo was completed to provide access to this group of homes. In the extended vicinity, the roadways for residential developments to the southeast and southwest were completed.

3.3 Munger Oil Maps

The Munger Oil map book was reviewed for information regarding historic oil-well drilling activities near the site. The map book did not depict oil wells having been drilled within 1 mile of the site. Approximately two miles south of the site is Western Development Co. Well 27-975, which is depicted as "uncompleted abandoned."

3.4 Interviews

"Steve," a Molly Road resident for 19 years, was interviewed at the time of the site visit. He stated that the home at the west end of Molly Road was there as early as 1937, and that it had burned along with several others on Molly Road just prior to Steve's moving to the neighborhood. The homes are each on separate septic systems and at least one has its own well, though most homeowners truck their water. Steve was aware of the dumped debris near the northwest corner of the site, and he was not aware of any additional dumping on-site.

Mr. Oscar Hendrix of Caltrans was contacted concerning the fuel spill discussed in Section 4.1. Mr. Hendrix stated that the volume of fuel involved was 6,700 gallons, not 67,000 gallons as indicated by the database review. The bulk of the fuel remained in the tanker, and less than 500 gallons spilled from the tanker and ran off the road to the east. A "stinger" operation was used to drill a hole in the tanker, transfer the fuel to another tanker, and remove the fuel from the site. A Fire Department crew was present for this operation. Riverside County Department of Environmental Health (RCDEH) oversight of the clean-up operation was also present. The clean-up activities were conducted by a subcontractor to the trucking company. Approximately 100 yards (three truckloads) of soil were removed off-site. RCDEH signed off and declared the clean-up complete.

4.0 AGENCY INFORMATION

4.1 Agency Database Search Report

A report summarizing the information available from regulatory agencies regarding sites that generate, store, use, and/or have released hazardous materials was obtained from Track Info Services LLC (aka Environmental FirstSearch or FirstSearch), a firm that specializes in maintaining a database of this type of information. The publications referenced by FirstSearch are listed in the FirstSearch report, presented in Appendix C. The search radii used for each list were in accordance with ASTM guidelines, plus 1 mile to accommodate the size of the site. The information obtained during this review is summarized below.

- The site is not listed in the FirstSearch report.
- No sites are listed within the search radii.
- FirstSearch lists an additional 27 sites as unmapped, due to vague address listings or the inability of the automated search system to identify the location of the release site. A review of these listings identified two of them to be within the search radii as follows:
    - Search I.D. 11 is for an Emergency Response Notification System (ERNS) incident located eastbound on Highway 62, east of Pierson Boulevard, which places the incident approximately ½ mile west of the site. The incident occurred on August 31, 1994 and involved the collision of an automobile with a tanker truck. The tanker truck overturned and ruptured, spilling as much as "67,000 gallons" (typographical error) of Jet Fuel, JP-5. Action taken was a clean-up by "Caltrans." See Section 3.4 for more information regarding this spill.
    - Search I.D. 9 is for an ERNS involving the discovery on August 12, 1994 of a spill of 10 gallons of PCP drug lab waste near the intersection of Highway 62 and Pierson Boulevard. Roadway Bureau of Land Management was called to identify the drugs and the RCDEH cleaned up the spill.

  Due to the "cleaned up" status of these listings, they are not considered a threat to the subject site.

4.2 Agency Interviews

Ms. Linda Shurlow with the RCDEH was contacted regarding known problems at the site or in the site vicinity. Ms. Shurlow reported that she was not aware of any problems at the site or in the site vicinity.

5.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This report presents the findings of the Phase I Environmental Site Assessment (ESA) conducted by Earth Systems Southwest (ESSW) for the Olympus Project, consisting of 550 acres of mostly undeveloped land located north of Pierson Boulevard, between Worsley Road and Karen Avenue, in Desert Hot Springs, California. The purpose of this assessment was to evaluate the potential for the presence of soil or groundwater contamination because of past use, handling, storage, or disposal of hazardous materials or petroleum products on or near the subject property. The scope of work for this evaluation included a reconnaissance of the site and vicinity, a review of the history of the site, and a review of information obtained from regulatory agencies regarding the use, storage, generation, or release of hazardous materials on the site or in the site vicinity. Based on this review, ESSW presents the following summary and conclusions:

1. The site was observed to consist primarily of undeveloped native desert terrain characterized by alluvial outwash channels. An abandoned house was located on-site at 68200 Pierson Boulevard. Yard waste, demolition debris, and household debris were noted around the abandoned house at 62800 Pierson Boulevard. Demolition debris was noted in two locations along Karen Avenue. The debris did not appear to contain hazardous materials. Observations of stained soil were limited to four small areas of what appeared to be motor oil. A small pickup truckload-sized pile of AC shingles was observed along the dirt road on the west boundary. Removal of the asbestos-cement shingles dumped on-site needs to be performed by a licensed asbestos contractor and disposed of to a permitted landfill following appropriate protocols.

2. Two burned areas were noted on-site: one of a mobile home trailer northwest of the house on Pierson Boulevard and the other of a former house 1,000 feet northeast of the house on Pierson Boulevard.

   Remote residences are sometimes set up to be self-sufficient, which can include the installation of an underground storage tank (UST) for storing fuels. We did not observe evidence of the presence of a UST, but given the dilapidated nature of the residential areas, surficial evidence of a UST may no longer be visible. USTs are a concern because they can leak in a manner that is not readily detectable for a long period of time. If this is of concern to you, a geophysical survey can be conducted in areas likely to contain a UST. If a UST is identified, further work would be needed to evaluate whether a release had occurred.

3. The site vicinity consisted of a mix of municipal, residential, and undeveloped properties. Evidence was not observed that the site was adversely affected by activities in the site vicinity.

4. The site was not identified in the agency database review. The two other listings identified within the radius of concern have statuses of "cleaned up" and do not appear to pose a risk to the subject site.

-o0o-

REFERENCES

Brockman, Gary, Mission Springs Water District, phone interview, January 15, 2004.

California Department of Water Resources (DWR), 1964, *Bulletin Number 108 – Coachella Valley Investigation*, July 1964

ESSW, aerial photograph archives, as listed below:

Date	Source/Flight	Frame	Approximate Scale
01-23-80	RCFCD	123 & 124	1" = 2,100'
02-23-84	RCFCD	1673, 1674 & 1675	1" = 1,600'
01-28-90	RCFCD	3-64, 3-65 & 3-66	1" = 1,700'
02-06-95	RCFCD	3-60, 3-61 & 3-62	1" = 1,700'
01-29-00	RCFCD	3-63 & 3-64	1" = 1,600'

Hendrix, Oscar, Caltrans, phone contact, January 15, 2004.

Munger Map Book, 1997, *California - Alaska Oil and Gas Fields*.

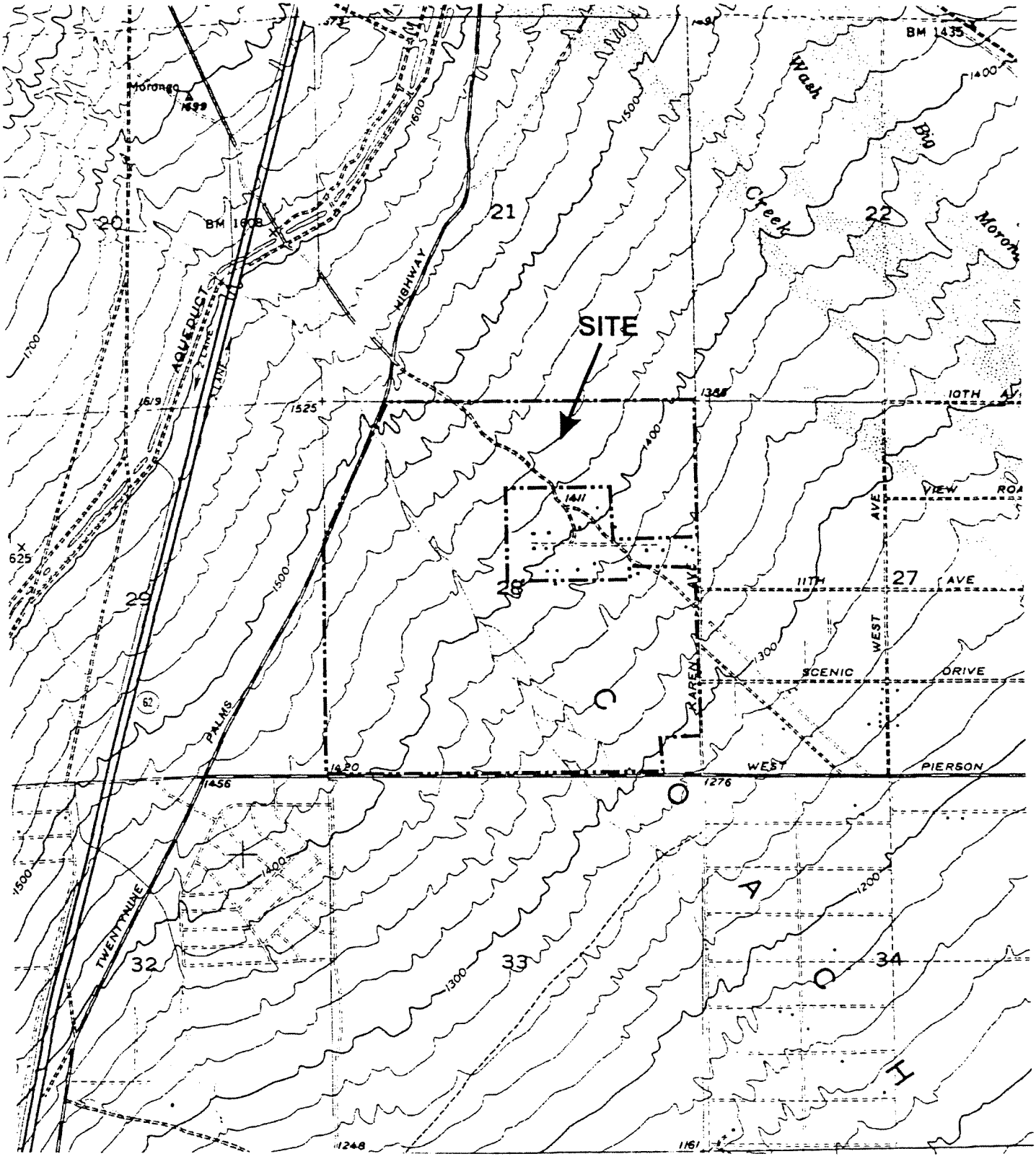
Shurlow, Linda, Riverside County Department of Environmental Health, phone interview, January 6, 2004.

Track Info Services LLC, *Environmental FirstSearch Report*, dated January 8, 2004.

United States Geologic Survey, 7.5 minute *Desert Hot Springs, California* Quadrangle, 1955, photo-revised 1972.

APPENDIX A

FIGURES



Base Map: U.S.G.S. 7.5 Minute Quadrangle. Desert Hot Springs, Calif. (1955. photo-revised 1972)

Site Boundary

Scale: 1" = 2,000'

0 2,000' 4,000'

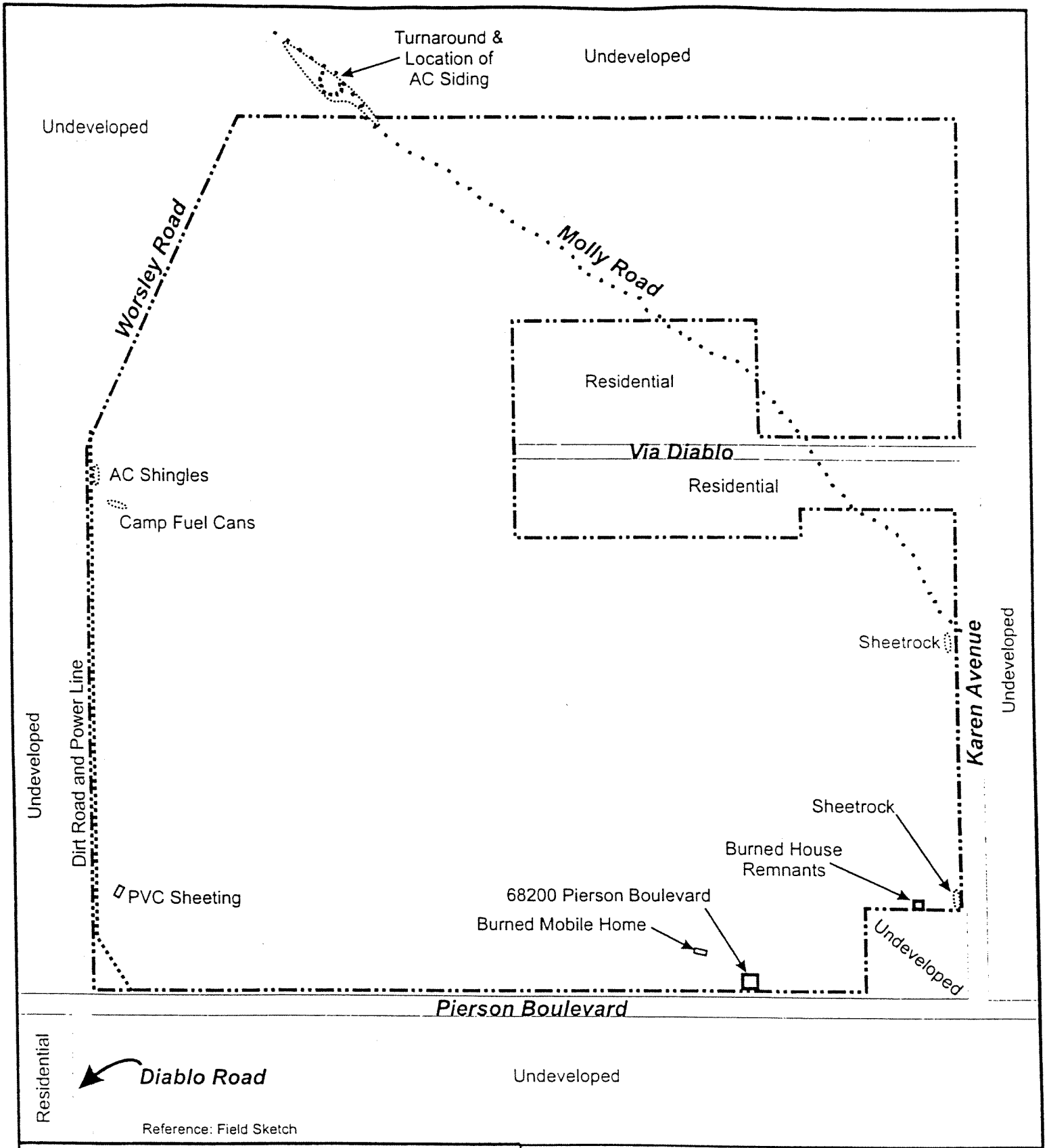
N

Figure 1
Site Location

Olympus Project, North of Pierson Blvd.
Desert Hot Springs, Riverside County, California

Earth Systems
Southwest

01/27/04	09366-02



LEGEND

Site Boundary

Debris Area

Scale: 1" = 800'

0 800' 1,600'

N

Figure 2
Site Layout

Olympus Project, North of Pierson Blvd.
Desert Hot Springs, Riverside County, California

Earth Systems Southwest

01/27/04 | 09366-02

APPENDIX B

PHOTOGRAPHS

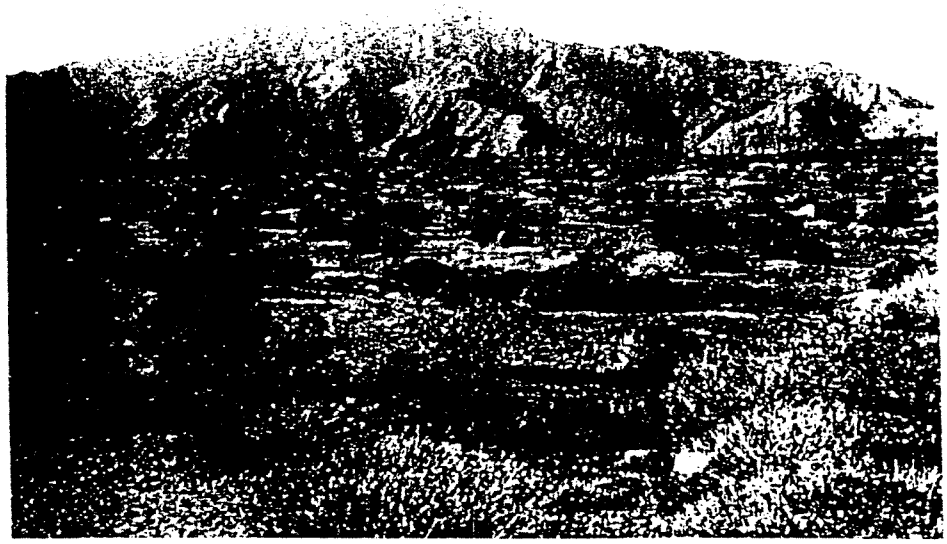


Photo 1. Typical view of site from west end of Via Diablo looking to southwest.

Photo 2. Dirt road and power lines along west boundary of site. View is to north.

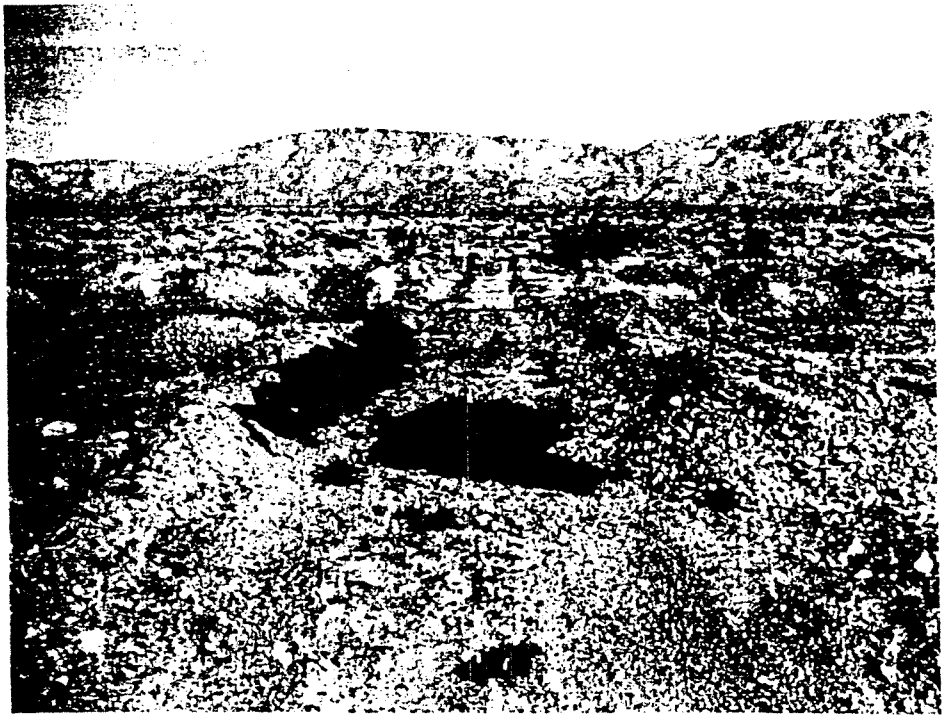


Photo 3. Polyethylene sheeting in graded area near southwest corner of site.

Photo 4. Debris on either side of the north end of Molly Road, near north boundary of site. View is to east-southeast.

Photo 5. Asbestos cement shingles adjacent to west dirt road near intersection with Worsley Road.

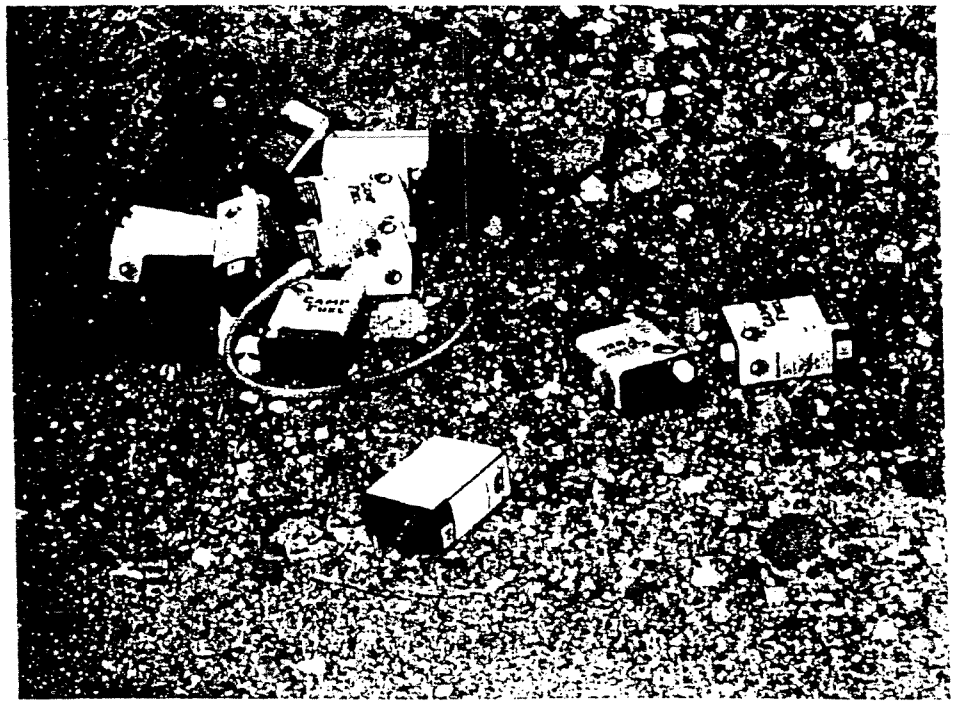


Photo 6. Empty camp fuel cans near west dirt road.

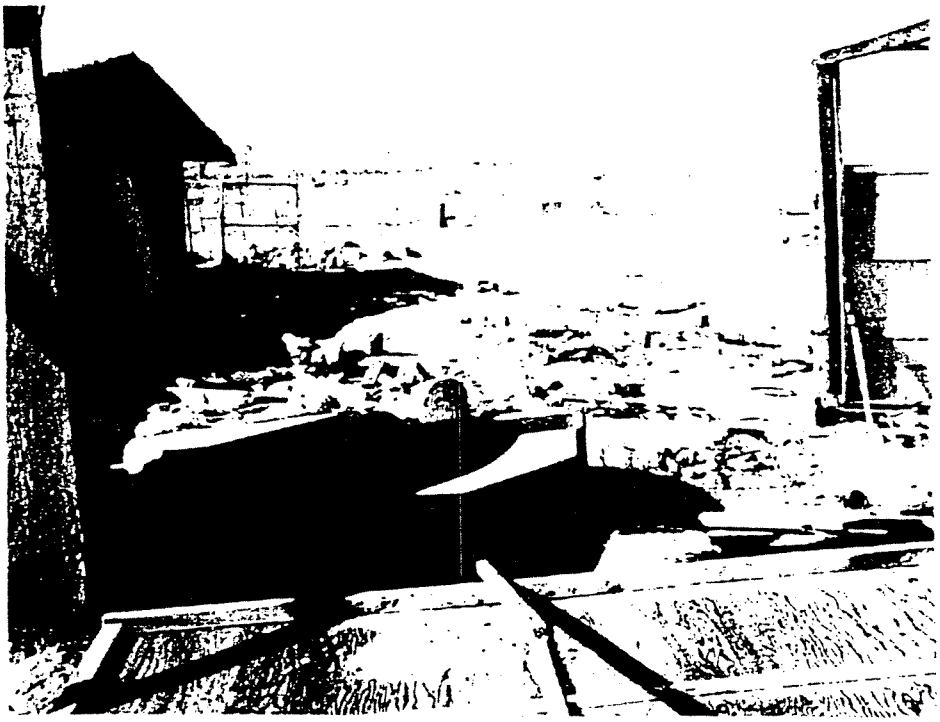


Photo 7. Debris on north side of 62800 Pierson Boulevard. View is to west.

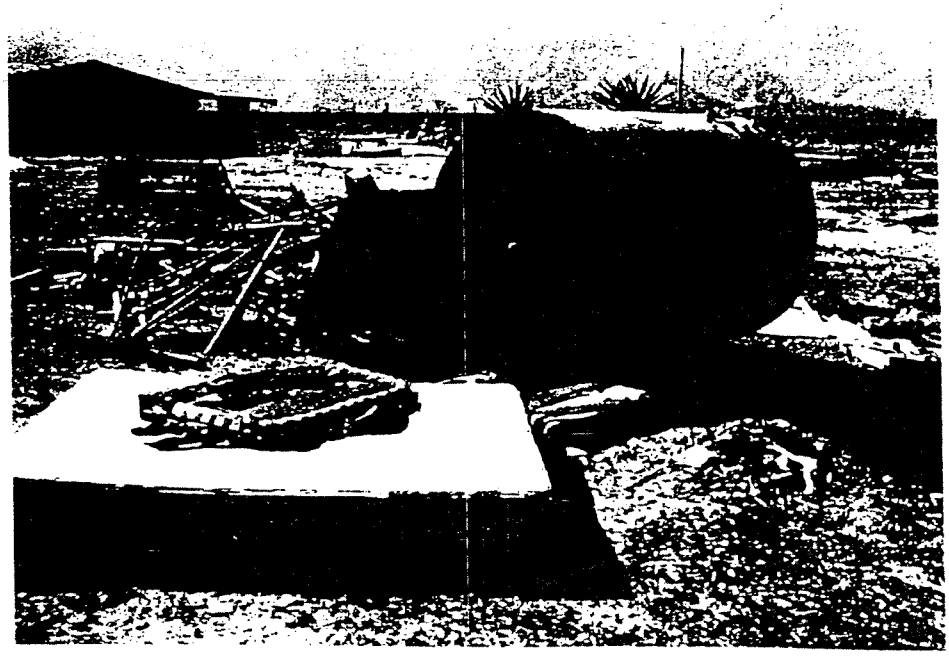


Photo 8. Debris. including a discarded water tank. north of the residence.

Photo 9. Burned mobile home remnants to northwest of residence. View is to northwest.

Photo 10. Site of former residence; note burned building materials in foreground. View is to west.

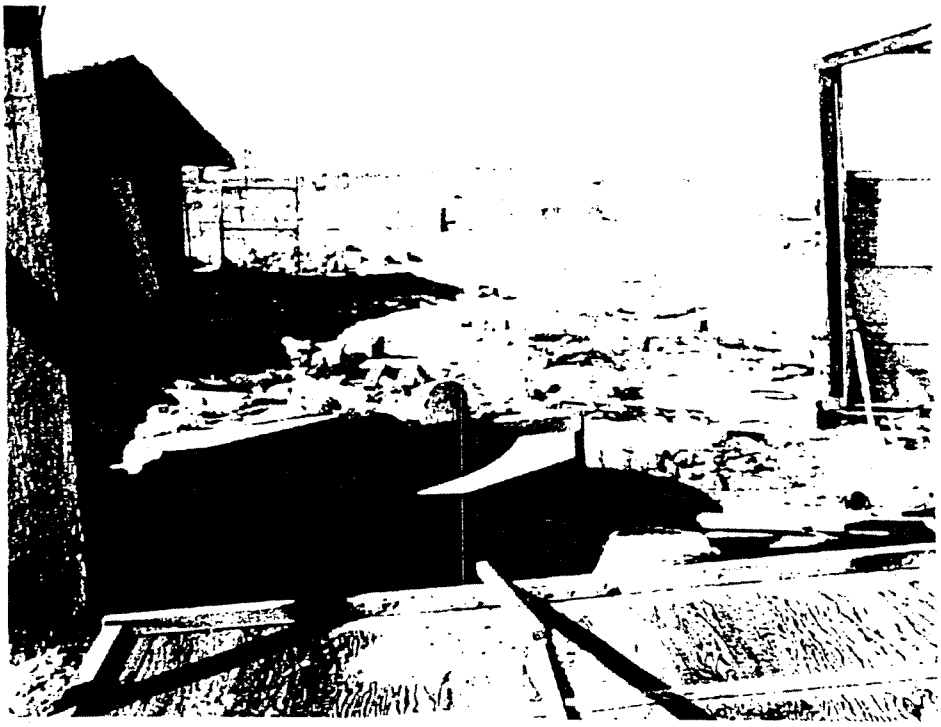


Photo 7. Debris on north side of 62800 Pierson Boulevard. View is to west.

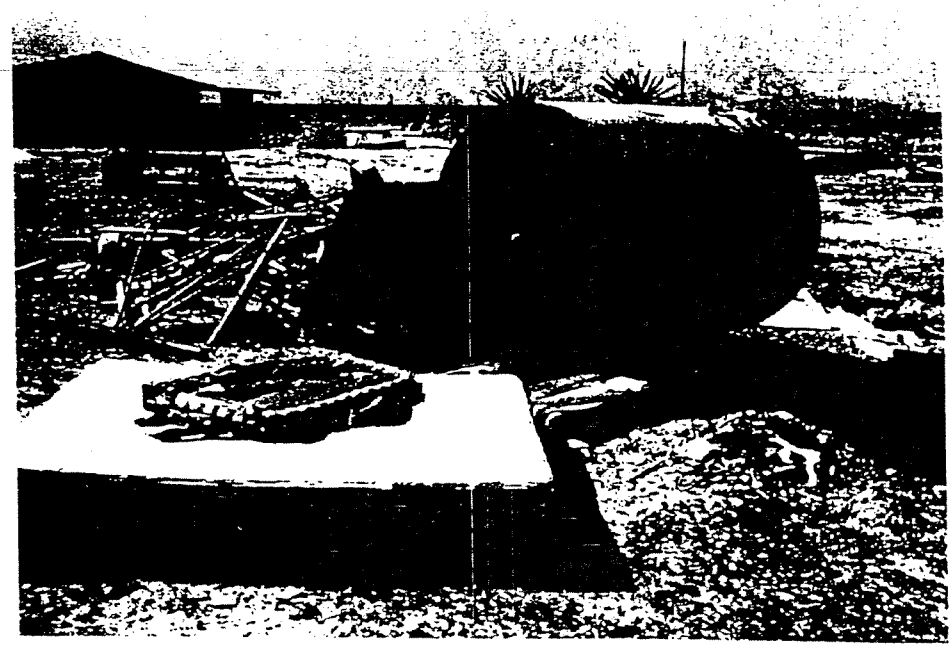


Photo 8. Debris, including a discarded water tank, north of the residence.

Photo 9. Burned mobile home remnants to northwest of residence. View is to northwest.

Photo 10. Site of former residence; note burned building materials in foreground. View is to west.

APPENDIX C

AGENCY DATABASE SEARCH REPORT

TRACK ➤ INFO SERVICES, LLC

Environmental FirstSearch™ Report

TARGET PROPERTY:

NWC PIERSON BLVD/KAR

DESERT HOT SPRINGS CA 92240

Job Number: 09366-02

PREPARED FOR:

Earth Systems Southwest

79-811B Country Club Drive

Bermuda Dunes, CA 92201

01-08-04

Tel: (323) 664-9981 *Fax: (323) 664-9982*

Environmental FirstSearch
Search Summary Report

Target Site: NWC PIERSON BLVD/KAR
DESERT HOT SPRINGS CA 92240

FirstSearch Summary

Database	Sel	Updated	Radius	Site	1/8	1/4	1/2	1/2>	ZIP	TOTALS
NPL	Y	09-09-03	2.00	0	0	0	0	0	0	0
CERCLIS	Y	12-08-03	1.50	0	0	0	0	0	0	0
NFRAP	Y	12-08-03	1.25	0	0	0	0	0	0	0
RCRA TSD	Y	09-09-03	1.25	0	0	0	0	0	0	0
RCRA COR	Y	09-09-03	2.00	0	0	0	0	0	0	0
RCRA GEN	Y	09-09-03	1.25	0	0	0	0	0	4	4
RCRA NLR	Y	09-09-03	0.12	0	0	-	-	-	0	0
ERNS	Y	12-31-02	1.25	0	0	0	0	0	13	13
State Sites	Y	09-30-03	2.00	0	0	0	0	0	0	0
Spills-1990	Y	07-01-03	1.25	0	0	0	0	0	0	0
SWL	Y	12-01-03	1.50	0	0	0	0	0	2	2
Permits	Y	06-03-03	0.12	0	0	-	-	-	0	0
Other	Y	09-30-03	0.12	0	0	-	-	-	0	0
REG UST/AST	Y	10-02-03	1.25	0	0	0	0	0	7	7
Leaking UST	Y	12-11-02	1.50	0	0	0	0	0	1	1
- TOTALS -				0	0	0	0	0	27	27

Notice of Disclaimer

Due to the limitations, constraints, inaccuracies and incompleteness of government information and computer mapping data currently available to TRACK Info Services, certain conventions have been utilized in preparing the locations of all federal, state and local agency sites residing in TRACK Info Services's databases. All EPA NPL and state landfill sites are depicted by a rectangle approximating their location and size. The boundaries of the rectangles represent the eastern and western most longitudes; the northern and southern most latitudes. As such, the mapped areas may exceed the actual areas and do not represent the actual boundaries of these properties. All other sites are depicted by a point representing their approximate address location and make no attempt to represent the actual areas of the associated property. Actual boundaries and locations of individual properties can be found in the files residing at the agency responsible for such information.

Waiver of Liability

Although TRACK Info Services uses its best efforts to research the actual location of each site, TRACK Info Services does not and can not warrant the accuracy of these sites with regard to exact location and size. All authorized users of TRACK Info Services's services proceeding are signifying an understanding of TRACK Info Services's searching and mapping conventions, and agree to waive any and all liability claims associated with search and map results showing incomplete and or inaccurate site locations.

Environmental FirstSearch
Site Information Report

Request Date:	01-08-04	**Search Type:**	COORD
Requestor Name:	Kirsten Murch	**Job Number:**	09366-02
Standard:	ASTM		

TARGET ADDRESS: NWC PIERSON BLVD/KAR
DESERT HOT SPRINGS CA 92240

Demographics

Sites: 27	**Non-Geocoded:** 27	**Population:** NA
Radon: NA		

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)		UTMs
Longitude:	-116.571961	-116:34:19	**Easting:**	539543.783
Latitude:	33.969158	33:58:9	**Northing:**	3758624.468
			Zone:	11

Comment

Comment:

Additional Requests/Services

Adjacent ZIP Codes: 2 Mile(s)

ZIP Code	City Name	ST	Dist/Dir	Sel
92282	WHITE WATER	CA	0.84 NW	Y

Services:

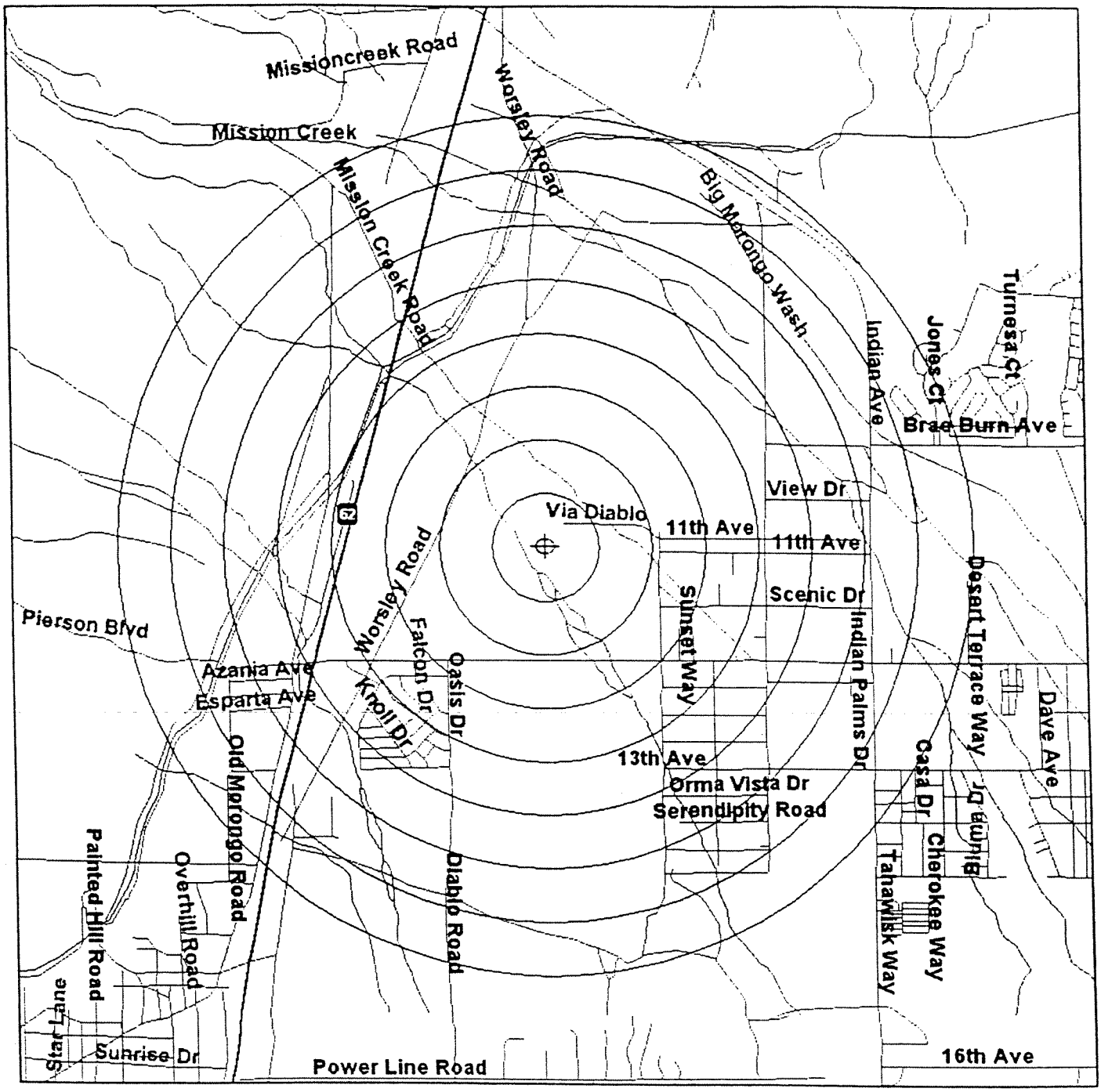
	Requested?	Date
Sanborns	No	
Aerial Photographs	No	
Topographical Maps	No	
City Directories	No	
Title Search	No	
Municipal Reports	No	
Online Topos	No	

Environmental FirstSearch

2 Mile Radius

ASTM: NPL, RCRACOR, STATE

NWC PIERSON BLVD/KAR , DESERT HOT SPRINGS CA 9224(



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 33.969158 Longitude: -116.571961) .....

Identified Site. Multiple Sites. Receptor .....

NPL. Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

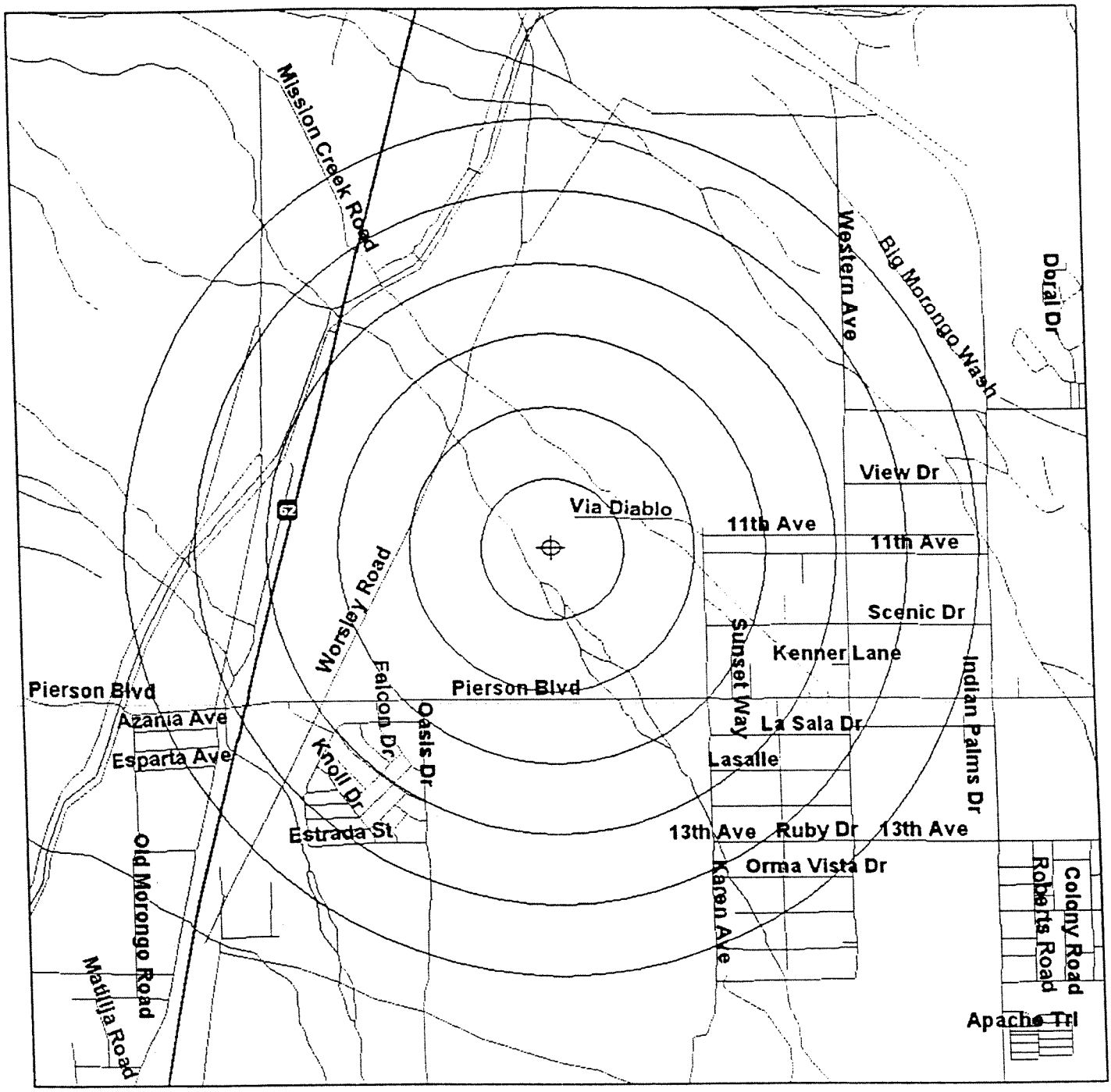
Black Rings Represent 1/4 Mile Radii. Red Ring Represents 500 ft. Radius

Environmental FirstSearch

1.5 Mile Radius

ASTM: CERCLIS, LUST, SWL

NWC PIERSON BLVD/KAR , DESERT HOT SPRINGS CA 9224(



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 33.969158 Longitude: -116.571961) .....

Identified Site, Multiple Sites, Receptor .....

NPL, Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

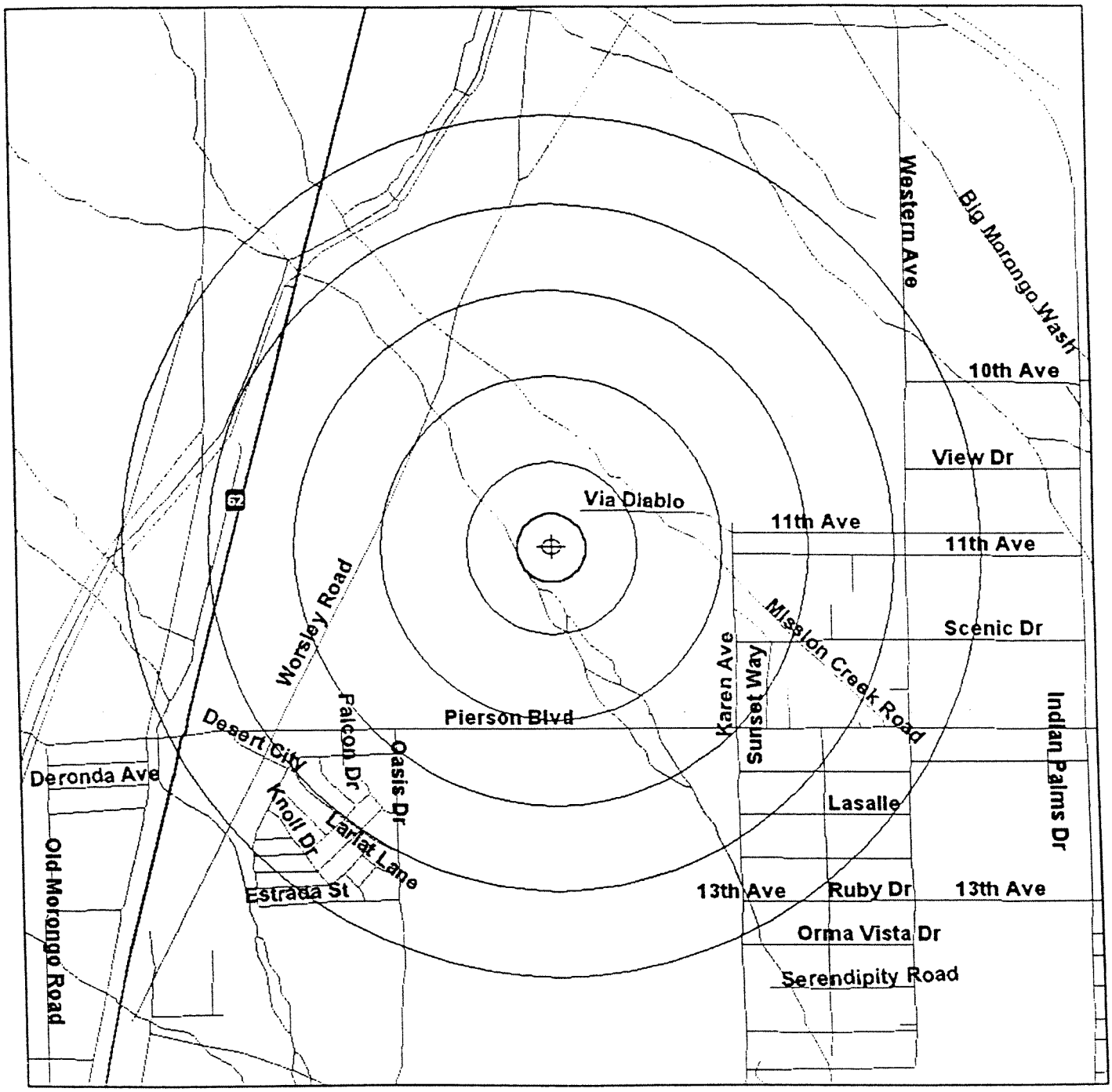
Black Rings Represent 1/4 Mile Radii; Red Ring Represents 500 ft. Radius

Environmental FirstSearch

1.25 Mile Radius

ASTM: Multiple Databases

NWC PIERSON BLVD/KAR , DESERT HOT SPRINGS CA 9224(



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 33.969158 Longitude: -116.571961) .....

Identified Site. Multiple Sites. Receptor .....

NPL. Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

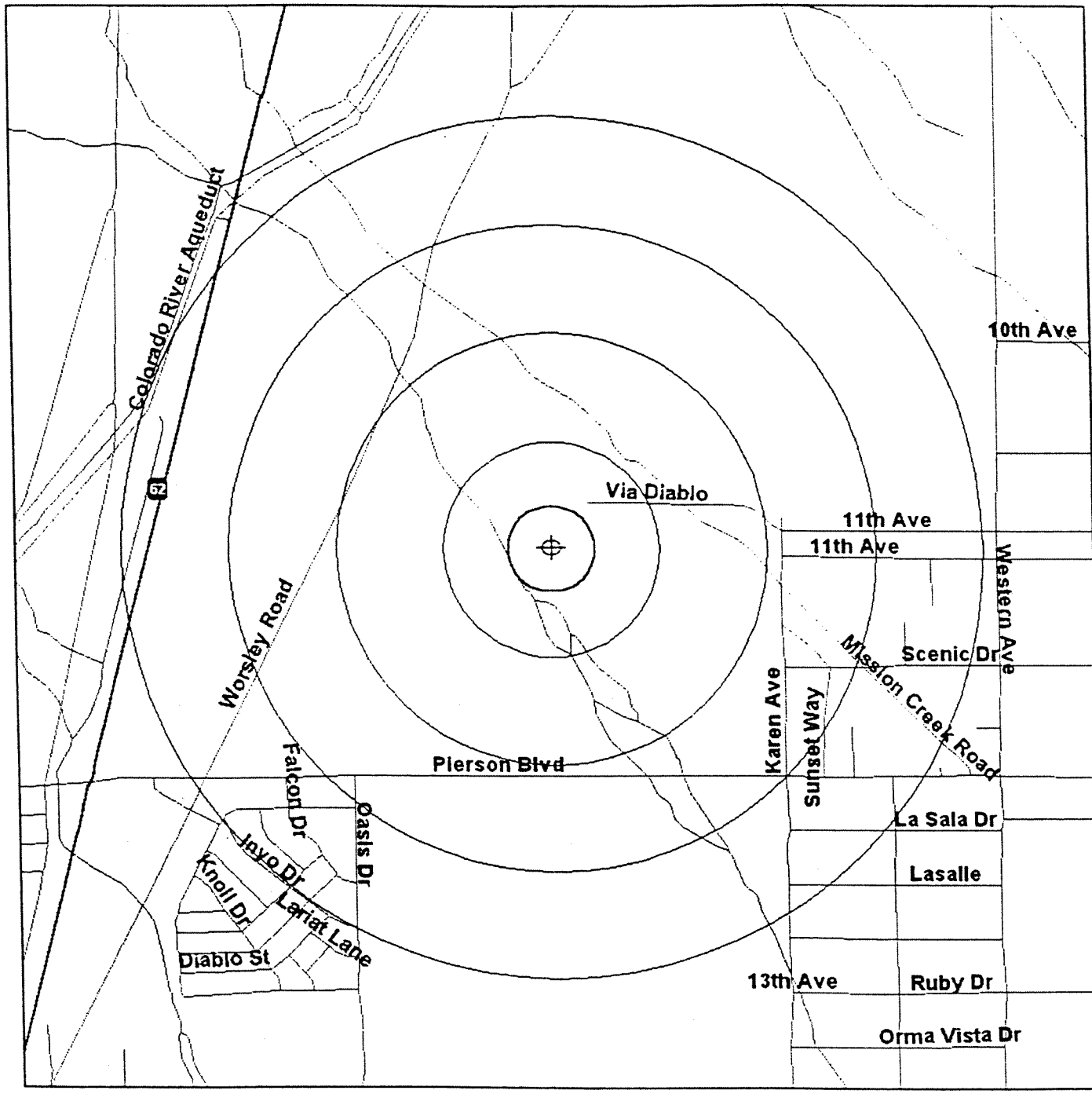
Black Rings Represent 1/4 Mile Radii: Red Ring Represents 500 ft. Radius

Environmental FirstSearch

1 Mile Radius

ASTM Map: NPL, RCRACOR, STATE Sites

NWC PIERSON BLVD/KAR , DESERT HOT SPRINGS CA 9224(



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 33.969158 Longitude: -116.571961) .....

Identified Site, Multiple Sites, Receptor .....

NPL, Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

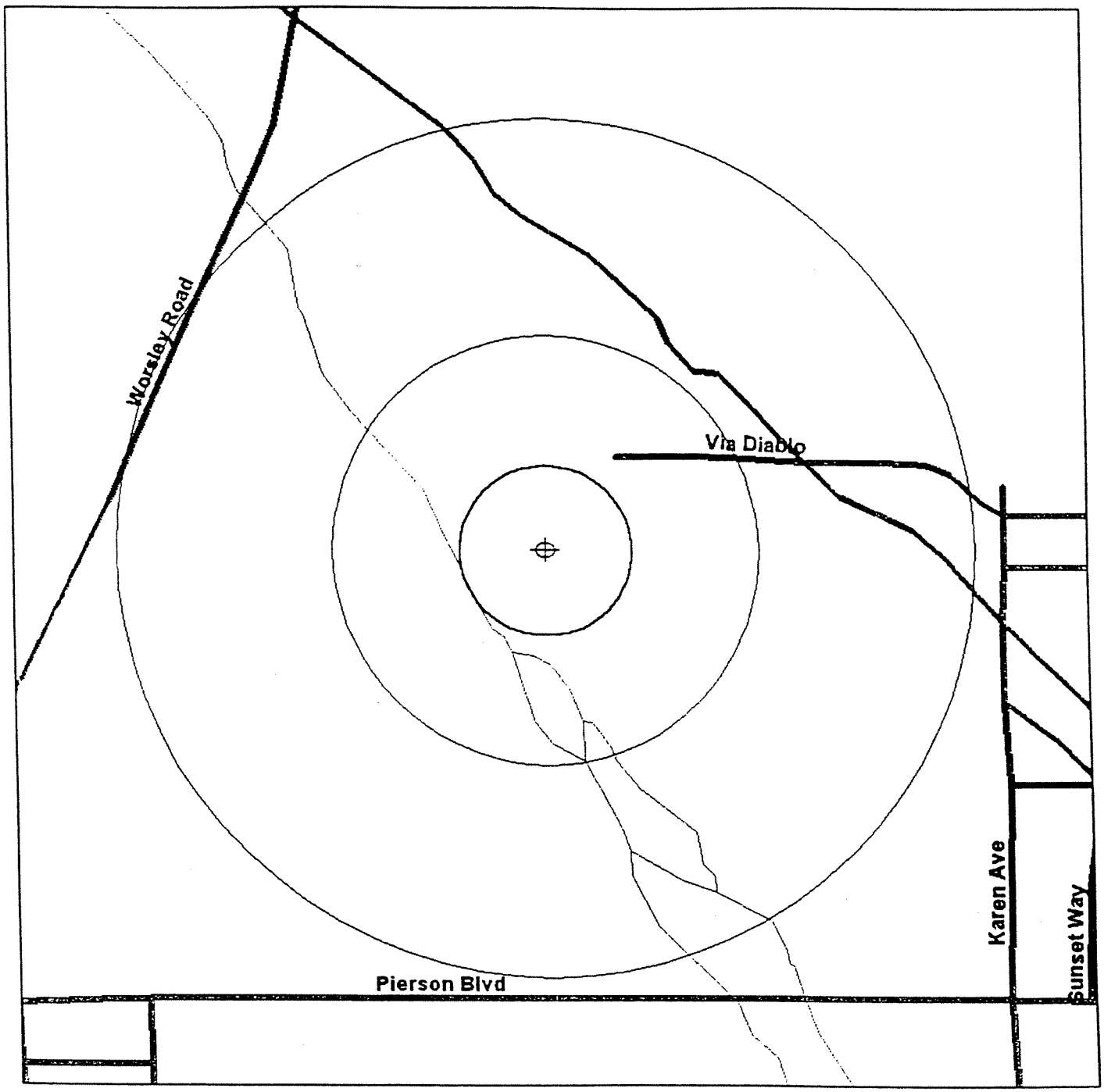
Black Rings Represent 1/4 Mile Radii: Red Ring Represents 500 ft. Radius

Environmental FirstSearch

.5 Mile Radius

ASTM Map: CERCLIS, RCRATSD, LUST, SWL

NWC PIERSON BLVD/KAR , DESERT HOT SPRINGS CA 9224(



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 33.969158 Longitude: -116.571961) .....

Identified Site, Multiple Sites, Receptor .....

NPL, Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

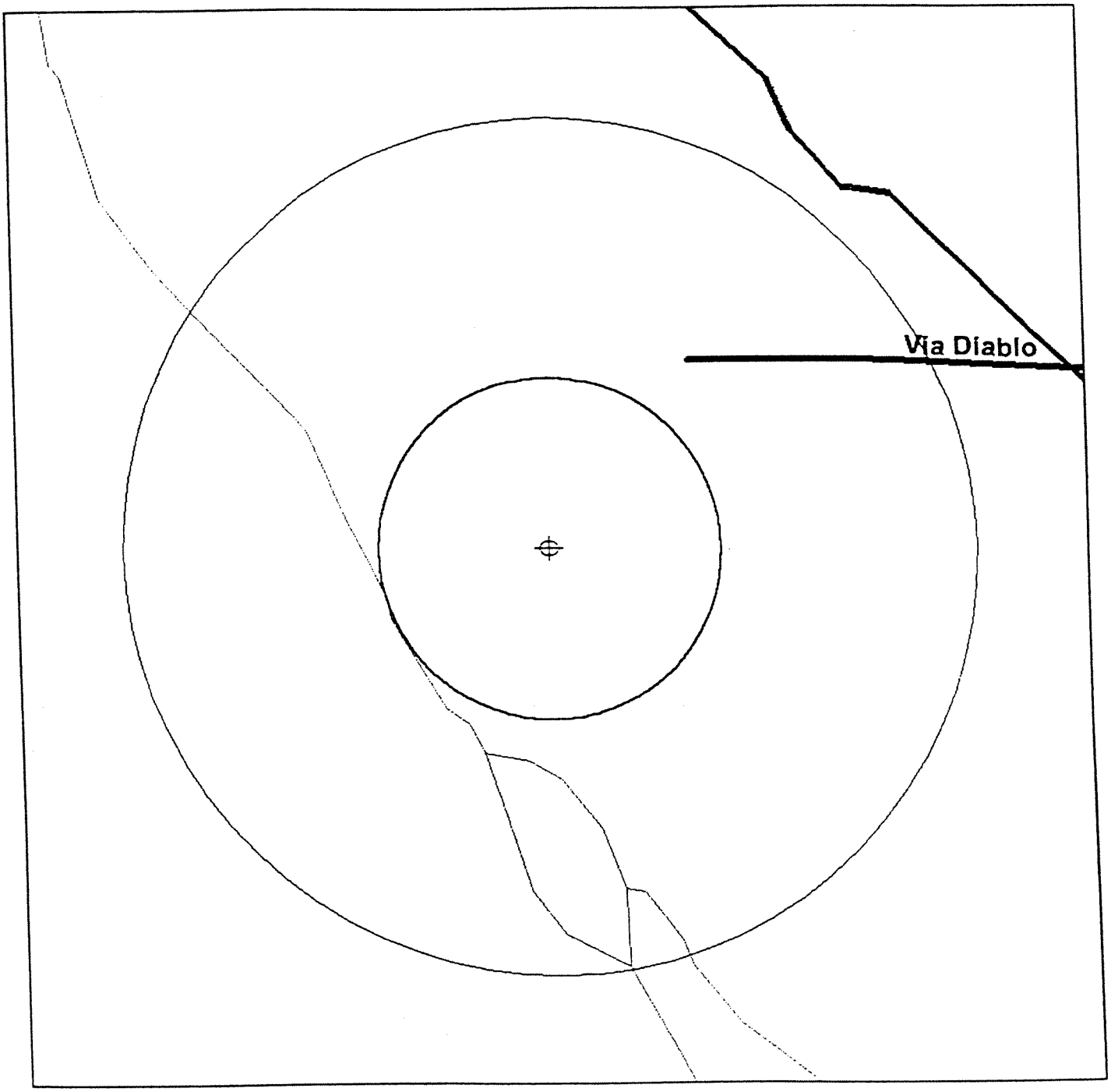
Black Rings Represent 1/4 Mile Radii: Red Ring Represents 500 ft. Radius

Environmental FirstSearch

.25 Mile Radius

ASTM Map: RCRAGEN, ERNS, UST

NWC PIERSON BLVD/KAR , DESERT HOT SPRINGS CA 9224(



Source: 1999 U.S. Census TIGER Files

Target Site (Latitude: 33.969158 Longitude: -116.571961) .....

Identified Site. Multiple Sites. Receptor .....

NPL. Solid Waste Landfill (SWL) or Hazardous Waste .....

Railroads .....

Black Rings Represent 1/4 Mile Radii: Red Ring Represents 500 ft. Radius

Environmental FirstSearch
Selected Sites Summary Report

TARGET SITE: NWC PIERSON BLVD/KAR
DESERT HOT SPRINGS CA 92240

JOB: 09366-02

TOTAL: 27 **GEOCODED:** 0 **NON GEOCODED:** 27 **SELECTED:** 2

ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	Map ID
11	ERNS	401085/HIGHWAY RELATED	EASTBOUND HWY 62, EAST OF PIER DESERT HOT SPR CA 92240	NON GC	
9	ERNS	UNKNOWN 397542/OFFSHORE - SPILL OFF	PIERSON ACROSS OF HWY 62 DESERT HOT SPR CA 92240	NON GC	

Environmental FirstSearch
Site Detail Report

TARGET SITE: NWC PIERSON BLVD/KAR
DESERT HOT SPRINGS CA 92240

JOB: 09366-02

EMERGENCY RESPONSE NOTIFICATION SITE

SEARCH ID: 11 **DIST/DIR:** NON GC **MAP ID:**

NAME:
ADDRESS: EASTBOUND HWY 62, EAST OF PIERSON BLVD
DESERT HOT SPRINGS CA 92240
Riverside
CONTACT:

REV: 8/31/94
ID1: 401085
ID2:
STATUS: HIGHWAY RELATED
PHONE:

SPILL INFORMATION
DATE OF SPILL: 8/31/1994 TIME OF SPILL: 1139

PRODUCT RELEASED (1): JET FUEL, JP-5
QUANTITY (1): 0
UNITS (1): OTH

PRODUCT RELEASED (2):
QUANTITY (2):
UNITS (2):

PRODUCT RELEASED (3):
QUANTITY (3):
UNITS (3):

MEDIUM/MEDIA AFFECTED

AIR:	NO	GROUNDWATER:	NO
LAND:	NO	FIXED FACILITY:	NO
WATER:	NO	OTHER:	NO

WATERBODY AFFECTED BY RELEASE:

CAUSE OF RELEASE

DUMPING:	NO	EQUIPMENT FAILURE:	NO
NATURAL PHENOMENON:	NO	OPERATOR ERROR:	NO
OTHER CAUSE:	NO	TRANSP. ACCIDENT:	NO
UNKNOWN:	NO		

ACTIONS TAKEN: CLEAN UP BY CALTRANS
RELEASE DETECTION: QT= POTENTIAL OF 67,000 GAL AUTO VERSUS BIG RIG, BIG RIG OVERTURNED, RUPTURED TANKER SPILLING FUEL.
MISC. NOTES: ADD L NOTIFIED: OSHA DRIVER HAS MINOR INJURIES: CUTS AND SCRATCHES

DISCHARGER INFORMATION
DISCHARGER ID: 401085 DUN & BRADSTREET #:
TYPE OF DISCHARGER: UNKNOWN
NAME OF DISCHARGER:
ADDRESS:

Environmental FirstSearch
Site Detail Report

TARGET SITE: NWC PIERSON BLVD/KAR
DESERT HOT SPRINGS CA 92240

JOB: 09366-02

EMERGENCY RESPONSE NOTIFICATION SITE

SEARCH ID: 9 **DIST/DIR:** NON GC **MAP ID:**

NAME:	UNKNOWN	**REV:**	8/12/94
ADDRESS:	PIERSON ACROSS OF HWY 62	**ID1:**	397542
	DESERT HOT SPRINGS CA 92240	**ID2:**	
	Riverside	**STATUS:**	OFFSHORE - SPILL OFF COAST
CONTACT:		**PHONE:**	

SPILL INFORMATION

DATE OF SPILL: 8/12/1994 **TIME OF SPILL:** 1540

PRODUCT RELEASED (1): PCP
QUANTITY (1): 10
UNITS (1): GAL

PRODUCT RELEASED (2):
QUANTITY (2):
UNITS (2):

PRODUCT RELEASED (3):
QUANTITY (3):
UNITS (3):

MEDIUM/MEDIA AFFECTED

AIR:	NO	**GROUNDWATER:**	NO
LAND:	NO	**FIXED FACILITY:**	NO
WATER:	NO	**OTHER:**	NO

WATERBODY AFFECTED BY RELEASE:

CAUSE OF RELEASE

DUMPING:	NO	**EQUIPMENT FAILURE:**	NO
NATURAL PHENOMENON:	NO	**OPERATOR ERROR:**	NO
OTHER CAUSE:	NO	**TRANSP. ACCIDENT:**	NO
UNKNOWN:	NO		

ACTIONS TAKEN: CLEANUP BY CO DOH
RELEASE DETECTION: ROADWAY BUREAU OF LAND MANAGEMENT CALLED TO ID DRUGS
MISC. NOTES:

DISCHARGER INFORMATION

DISCHARGER ID: 397542 **DUN & BRADSTREET #:**
TYPE OF DISCHARGER: UNKNOWN
NAME OF DISCHARGER: UNKNOWN
ADDRESS:

En :onmental FirstSearch
Federal Databases and Sources

ASTM Databases:

CERCLIS: ***Comprehensive Environmental Response Compensation and Liability Information System.*** The EPA's database of current and potential Superfund sites currently or previously under investigation. Source: Environmental Protection Agency.

Updated quarterly.

CERCLIS-NFRAP (Archive): ***Comprehensive Environmental Response Compensation and Liability Information System Archived Sites.*** The Archive designation means that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL). This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Updated quarterly.

ERNS: ***Emergency Response Notification System.*** The EPA's database of emergency response actions. Source: Environmental Protection Agency. Data since January, 2001, has been received from the National Response Center as the EPA no longer maintains this data.

Updated quarterly.

FINDS: ***The Facility Index System.*** The EPA's Index of identification numbers associated with a property or facility which the EPA has investigated or has been made aware of in conjunction with various regulatory programs. Each record indicates the EPA office that may have files on the site or facility. Source: Environmental Protection Agency.

Updated semi-annually.

NPL: ***National Priority List.*** The EPA's list of confirmed or proposed Superfund sites. Source: Environmental Protection Agency.

Updated quarterly.

RCRIS: ***Resource Conservation and Recovery Information System.*** The EPA's database of registered hazardous waste generators and treatment, storage and disposal facilities. Included are RAATS (RCRA Administrative Action Tracking System) and CMEL (Compliance Monitoring & Enforcement List). Source: Environmental Protection Agency.

RCRA TSD: ***Resource Conservation and Recovery Information System Treatment, Storage, and Disposal Facilities.*** The EPA's database of RCRIS sites which treat, store, dispose, or incinerate hazardous waste. This information is also reported in the standard RCRIS detailed data.

ASTM Databases (cont ied):

RCRA COR: ***Resource Conservation and Recovery Information System Corrective Action Sites.*** The EPA's database of RCRIS sites with reported corrective action. This information is also reported in the standard RCRIS detailed data.

RCRA GEN: ***Resource Conservation and Recovery Information System Large and Small Quantity Generators.*** The EPA's database of RCRIS sites that create more than 100kg of hazardous waste per month or meet other RCRA requirements. Included are RAATS (RCRA Administrative Action Tracking System) and CMEL (Compliance Monitoring & Enforcement List).

RCRA NLR: ***Resource Conservation and Recovery Information System sites No Longer Regulated.*** The EPA's database of RCRIS sites that create less than 100kg of hazardous waste per month or do not meet other RCRA requirements.

All RCRA databases are Updated quarterly

Environmental FirstSearch
Federal Databases and Sources

Non-ASTM Databases:

HMIRS: ***Hazardous Materials Incident Response System.*** This database contains information from the US Department of Transportation regarding materials, packaging, and a description of events for tracked incidents.

Updated quarterly.

NCDB: ***National Compliance Database.*** The National Compliance Data Base System (NCDB) tracks regional compliance and enforcement activity and manages the Pesticides and Toxic Substances Compliance and Enforcement program at a national level. The system tracks all compliance monitoring and enforcement activities from the time an inspector conducts and inspection until the time the inspector closes or the case settles the enforcement action. NCDB is the national repository of the 10 regional and Headquarters FIFRA/TSCA Tracking System (FTTS). Data collected in the regional FTTS is transferred to NCDB to support the need for monitoring national performance of regional programs.

Updated quarterly

NPDES: ***National Pollution Discharge Elimination System***. The EPA's database of all permitted facilities receiving and discharging effluents. Source: Environmental Protection Agency.

Updated semi-annually.

NRDB: ***National Radon Database.*** The NRDB was created by the EPA to distribute information regarding the EPA/State Residential Radon Surveys and the National Residential Radon Survey. The data is presented by zipcode in Environmental FirstSearch Reports. Source: National Technical Information Service (NTIS)

Updated Periodically

Nuclear: The Nuclear Regulatory Commission's (NRC) list of permitted nuclear facilities.

Updated Periodically

PADS: PCB Activity Database System
The EPA's database PCB handlers (generators, transporters, storers and/or disposers) that are required to notify the EPA, the rules being similar to RCRA. This database indicates the type of handler and registration number. Also included is the PCB Transformer Registration Database.

Updated semi-annually.

Receptors: 1995 TIGER census listing of schools and hospitals that may house individuals deemed sensitive to environmental discharges due to their fragile immune systems.

Updated Periodically

Non-ASTM Databases (ntinued):

RELEASES: ***Air and Surface Water Releases.*** A subset of the EPA's ERNS database which have impacted only air or surface water.

Updated semi-annually.

Soils: This database includes the State Soil Geographic (STATSGO) data for the conterminous United States. It contains information regarding soil characteristics such as water capacity, percent clay, organic material, permeability, thickness of layers, hydrological characteristics, quality of drainage, surface, slope, liquid limit, and the annual frequency of flooding. Source: United States Geographical Survey (USGS).

Updated quarterly

TRIS: ***Toxic Release Inventory System.*** The EPA's database of all facilities that have had or may be prone to toxic material releases. Source: Environmental Protection Agency.

Updated semi-annually.

ENVIRONMENTAL FIRST SEARCH
CALIFORNIA DATABASES (DB) AND SOURCES

CAL SITES: DB TYPE = ST (STATE SITES)
Source: The CAL EPA, Depart. Of Toxic Substances Control
Phone:(916) 323-3400

The CAL EPA Department of Toxic Substances Control (DTSC) maintains a database of information on properties (or sites) in California where hazardous substances have been released, or where the potential for such release exists. The types of properties in the CALSITES database are categorized as: Annual Work Plan, Backlogged Properties, Certified / De-listed Sites, No Further Action, Preliminary Endangerment Assessment in Progress, Preliminary Endangerment Assessment Required, Removal Action Required, Expedited Remedial Action Program, Voluntary Cleanup Program, Deed Restricted Properties, and Referred Properties. For more information on individual sites call the number listed above.

CORTESE: DB TYPE = ST (STATE SITES)
Source: The CAL EPA, Department of Toxic Substances Control
Phone:(916) 445-6532

Pursuant to Government Code Section 65962.5, the Hazardous Waste and Substances Sites List has been compiled by Cal/EPA, Hazardous Materials Data Management Program. The CAL EPA Dept. of Toxic Substances Control compiles information from subsets of the following databases to make up the CORTESE list:

1. The Dept. of Toxic Substances Control; contaminated or potentially contaminated hazardous waste sites listed in the CAL Sites database. Formerly known as ASPIS are included (CALSITES formerly known as ASPIS).
2. The California State Water Resources Control Board; listing of Leaking Underground Storage Tanks are included (LTANK)
3. The California Integrated Waste Management Board; Sanitary Landfills which have evidence of groundwater contamination or known migration of hazardous materials (formerly WB-LF, now AB 3750).

Note: Track Info Services collects each of the above data sets individually and lists them separately in the following First Search categories in order to provide more current and comprehensive information: CALSITES: SPL, LTANK: LUST, WB-LF: SWL

SWIS SOLID WASTE INFORMATION SYSTEM: DB TYPE = SW
(SOLID WASTE RELATED SITES)
Source: The Integrated Waste Management Board
Phone:(916) 255-2331

The California Integrated Waste Management Board maintains a database on solid waste facilities, operations, and disposal sites throughout the state of California. The types of facilities found in this database include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal sites. For more information on individual sites call the number listed above.

Note: This database contains poor site location information for many sites in the First Search reports; therefore, it may not be possible to locate or plot some sites in First Search reports.

WMUDS: DB TYPE = SW (SOL WASTE RELATED SITES)
Source: The State Water Resources Control Board
Phone:(916) 227-4365

The State Water Resources Control Board maintained the Waste Management Unit Database System (WMUDS). It is no longer updated. It tracked management units for several regulatory programs related to waste management and its potential impact on groundwater. Two of these programs (SWAT & TPCA) are no longer on-going regulatory programs as described below. Chapter 15 (SC15) is still an on-going regulatory program and information is updated periodically but not to the WMUDS database. The WMUDS System contains information from the following agency databases: Facility, Waste Management Unit (WMU), Waste Discharger System (WDS), SWAT, Chapter 15, TPCA, RCRA, Inspections, Violations, and Enforcement's.

Note: This database contains poor site location information for many sites in the First Search reports; therefore, it may not be possible to locate or plot some sites in First Search reports.

ORANGE COUNTY LANDFILLS: DB TYPE = SW (SOLID WASTE RELATED SITES)
Source: Orange County Health Dept.
Phone:(714) 834-3536

LUSTIS: DB TYPE = LU (LEAKING UNDERGROUND STORAGE TANKS)
Source: The State Water Resources Control Board
Phone:(916) 227-4416

The State Water Resources Control Board maintains a database of sites with confirmed or unconfirmed leaking underground storage tanks. Information for this database is collected from the states regional boards quarterly and integrated with this database.

SAN DIEGO COUNTY LEAKING TANKS: DB TYPE = LU
(LEAKING UNDERGROUND STORAGE TANKS)
Source: San Diego County Dept. of Environmental Health
Phone:(619) 338-2242

Maintains a database of sites with confirmed or unconfirmed leaking underground storage tanks within its HE17/58 database. For more information on a specific file call the HazMat Duty Specialist at phone number listed above.

SLIC REGIONS 1 - 9: DB TYPE = SP (SPILLS-90)
Source: The CAL EPA Regional Water Quality Control Boards 1 - 9

The California Regional Water Quality Control Boards maintain report of sites that have records of spills, leaks, investigation, and cleanups. For phone number listings of departments within each region visit their web sites at: http://www.swrcb.ca.gov/regions.html

SAN DIEGO COUNTY HE17 PERMITS: DB TYPE = PE (PERMITS)

Source: The San Diego County Depart. Of Environmental Health
Phone:(619) 338-2211

The HE17/58 database tracks establishments issued permits and the status of their permits in relation to compliance with federal, state, and local regulations that the County oversees. It tracks if a site is a hazardous waste generator, TSD, gas station, has underground tanks, violations, or unauthorized releases. For more information on a specific file call the HazMat Duty Specialist at the phone number listed above.

SAN BERNARDINO COUNTY HAZARDOUS MATERIALS PERMITS: DB TYPE = PE PERMITS)
Source: San Bernardino County Fire Dept.
Phone:(909) 387-3080

Handlers and Generators Permit Information Maintained by the Hazardous Materials Div.

LA COUNTY SITE MITIGATION COMPLAINT CONTROL LOG: DB TYPE = OT
(OTHER UNIQUE DATABASES)
Source: The Los Angeles County Hazardous Materials Division
Phone: (323) 890-7806

The County of Los Angeles Public Health Investigation Compliant Control Log

ORANGE COUNTY INDUSTRIAL SITE CLEANUPS: DB TYPE = OT
(OTHER UNIQUE DATABASES)
Source: Orange County Environmental Health Agency
Phone:(714) 834-3536

AST ABOVEGROUND STORAGE TANKS: DB TYPE = US (UNDERGROUND STORAGE TANKS)
Source: The State Water Resources Control Board
Phone:(916) 227-4364

The Above Ground Petroleum Storage Act became State Law effective January 1, 1990. In general, the law requires owners or operators of AST's with petroleum products to file a storage statement and pay a fee by July 1, 1990 and every two years thereafter, take specific action to prevent spills, and in certain instances implement a groundwater monitoring program. This law does not apply to that portion of a tank facility associated with the production oil and regulated by the State Division of Oil and Gas of the Dept. of Conservation.

SWEEPS / FIDS STATE REGISTERED UNERGOROUND STORAGE TANKS: DB TYPE = US
Source: CAL EPA Dept of Toxic Substances Control
Phone:(916)227-4404

Until 1994 the State Water Resources Control Board maintained a database of registered underground storage tanks statewide referred to as the SWEEPS System. The SWEEPS UST information was integrated with the CAL EPA's Facility Index System database (FIDS) which is a master index of information from numerous California agency environmental databases. That was last updated in 1994. Track Info Services included the UST information from the FIDS database in its First Search reports for historical purposes to help its clients identify where tanks may possibly have existed. For more information on specific sites from individual paper files archived at the State Water Resources Control Board call the number listed above.

PA DATABASES & SOURCES
(DB TYPE = US (UNDERGROUND STORAGE TANKS)

DEFINITION OF A CUPA: A Certified Unified Program Agency (CUPA) is a local agency that has been certified by the CAL EPA to implement six state environmental programs within the local agency's jurisdiction. These can be a county, city, or JPA (Joint Powers Authority). This program was established under the amendments to the California Health and Safety Code made by SB 1082 in 1994.

A Participating Agency (PA) is a local agency that has been designated by the local CUPA to administer one or more Unified Programs within their jurisdiction on behalf of the CUPA. A Designated Agency (DA) is an agency that has not been certified by the CUPA but is the responsible local agency that would implement the six unified programs until they are certified.

Please Note: Track Info Services, LLC collects and maintains information regarding Underground Storage Tanks from majority of the CUPAS and Participating Agencies in the State of California. These agencies typically do not maintain nor release such information on a uniform or consistent schedule; therefor, currency of the data may vary. Please look at the details on a specific site with a UST record in the First Search Report to determine the actual currency date of the record as provided by the relevant agency. Numerous efforts are made on a regular basis to obtain updated records.

ALAMEDA COUNTY CUPA'S
* County of Alameda Department of Environmental Health
* Cities of Berkeley, Fremont, Hayward, Livermore / Pleasanton, Newark, Oakland, San Leandro, Union

ALPINE COUNTY CUPA
* Health Department (Only updated by agency annually)

AMADOR COUNTY CUPA
* County of Amador Environmental Health Department

BUTTE COUNTY CUPA
* County of Butte Environmental Health Division (Only updated by agency biannually)

CALAVERAS COUNTY CUPA
* County of Calaveras Environmental Health Department

COLUSA COUNTY CUPA
* Environmental Health Dept.

CONTRA COSTA COUNTY CUPA
* Hazardous Materials Program

DEL NORTE COUNTY CUPA (US)
* Department of Health and Social Services

EL DORADO COUNTY CUPA'S
* County of El Dorado Environmental Health - Solid Waste Div (Only updated by agency annually)
* County of El Dorado EMD Tahoe Division
(Only updated by agency annually)

FRESNO COUNTY CUPA
* Haz. Mat and Solid Waste Programs

GLENN COUNTY CUPA
* Air Pollution Control District

HUMBOLDT COUNTY CUPA (US)
* Environmental Health Division

IMPERIAL COUNTY CUPA (US)
* Department of Planning and Building

INYO COUNTY CUPA (US)
* Environmental Health Department

KERN COUNTY CUPA (US)
* County of Kern Environmental Health Department
* City of Bakersfield Fire Department
KINGS COUNTY CUPA (US)
* Environmental Health Services
LAKE COUNTY CUPA (US)
* Division of Environmental Health
LASSEN COUNTY CUPA (US)
* Department of Agriculture
LOS ANGELES COUNTY CUPA'S (US)
* County of Los Angeles Fire Department
* County of Los Angeles Environmental Programs Division
* Cities of Burbank, El Segundo, Glendale, Long Beach/Signal Hill, Los Angeles,Pasadena, Santa Fe Springs, Santa Monica, Torrance, Vernon
MADERA COUNTY CUPA (US)
* Environmental Health Department
MARIN COUNTY CUPA (US)
* County of Marin Office of Waste Management
* City of San Rafael Fire Department
MARIPOSA COUNTY CUPA (US)
* Health Department
MENDOCINO COUNTY CUPA (US)
* Environmental Health Department
MERCED COUNTY CUPA (US)
* Division of Environmental Health
MODOC COUNTY CUPA (US)
* Department of Agriculture
MONO COUNTY CUPA (US)
* Health Department
MONTEREY COUNTY CUPA (US)
* Environmental Health Division
NAPA COUNTY CUPA (US)
* Hazardous Materials Section
NEVADA COUNTY CUPA (UST)
* Environmental Health Department
ORANGE COUNTY CUPA'S (US)
* County of Orange Environmental Health Department
* Cities of Anaheim, Fullerton, Orange, Santa Ana
* County of Orange Environmental Health Department
PLACER COUNTY CUPA (US)
* County of Placer Division of Environmental Health Field Office
* Tahoe City
* City of Roseville Roseville Fire Department
PLUMAS COUNTY CUPA (UST)
* Environmental Health Department
RIVERSIDE COUNTY CUPA (US)
* Environmental Health Department
SACRAMENTO COUNTY (US)
* County Environmental Mgmt Dept, Haz. Mat. Div.
SAN BENITO COUNTY CUPA (US)
* City of Hollister Environmental Service Department
SAN BERNARDINO COUNTY CUPA'S (US)
* County of San Bernardino Fire Department, Haz. Mat. Div.
* City of Hesperia Hesperia Fire Prevention Department
City of Victorville Victorville Fire Department
SAN DIEGO COUNTY CUPA (US)
* The San Diego County Dept. of Environmental Health HE 17/58
SAN FRANCISCO COUNTY CUPA (US)
* Department of Public Health
SAN JOAQUIN COUNTY CUPA (US)
* Environmental Health Division

SAN LUIS OBISPO COUNTY CUPA'S (US)
* County of San Luis Obispo Environmental Health Division
* City of San Luis Obispo City Fire Department
SAN MATEO COUNTY CUPA (US)
* Environmental Health Department
SANTA BARBARA COUNTY CUPA (US)
* Co Fire Dept Protective Services Div
SANTA CLARA COUNTY CUPA'S (US)
* County of Santa Clara Hazardous Materials Compliance Division
* Santa Clara Co Central Fire Prot. Dist. (Covers Campbell, Cupertino, Los Gatos, & Morgan Hill)
* Cities of Gilroy, Milpitas, Mountain View, Palo Alto, San Jose Fire, Santa Clara, Sunnyvale
SANTA CRUZ COUNTY CUPA (US)
* Environmental Health Department
SHASTA COUNTY CUPA (US)
* Environmental Health Department
SIERRA COUNTY CUPA (US)
* Health Department
SISKIYOU COUNTY CUPA (US)
* Environmental Health Department
SONOMA COUNTY CUPA'S (US)
* County of Sonoma Department Of Environmental Health
* Cities of Healdsburg / Sebastapol, Petaluma, Santa Rosa
STANINSLAUS COUNTY CUPA (US)
* Dept. of Env. Rsrcs. Haz. Mat. Div.
SUTTER COUNTY CUPA (US)
* Department of Agriculture
TEHAMA COUNTY CUPA (US)
* Department of Environmental Health
TRINITY COUNTY CUPA (US)
* Department of Health
TULARE COUNTY CUPA (US)
* Environmental Health Department
TUOLUMNE COUNTY CUPA (US)
* Environmental Health
VENTURA COUNTY CUPA'S (BWT UST'S & CERTIFIED UST'S)
* County of Ventura Environmental Health Division
* Cities of Oxnard, Ventura
YOLO COUNTY CUPA (US)
* Environmental Health Department
YUBA COUNTY CUPA (US)
* Yuba County of Emergency Services

Environmental FirstSearch
Street Name Report for Streets within .25 Mile(s) of Target Property

TARGET SITE: NWC PIERSON BLVD/KAR
DESERT HOT SPRINGS CA 92240

JOB: 09366-02

Street Name	Dist/Dir	Street Name	Dist/Dir
Via Diablo	0.14 NE		

APPENDIX D

QUALIFICATIONS STATEMENT

EARTH SYSTEMS SOUTHWEST
QUALIFICATIONS STATEMENT FOR ENVIRONMENTAL WORK

The principals of the Earth Systems companies have been consulting for an average of over 20 years, and the combined staff numbers nearly 100. Earth Systems' multidisciplinary professional staff has extensive experience with and education in chemistry, geology, geophysics, hydrogeology, mechanical engineering, civil engineering, mapping, soil science, drafting, and surveying. Our senior project and staff professionals include Certified Engineering Geologists, Registered Geologists, Registered Environmental Assessors and Professional Engineers. These professionals are highly qualified, holding an average of two registrations and/or certifications in their area of expertise. To continue to meet our commitment to technical expertise, Earth Systems considers it essential to train our personnel in the latest scientific advancements in assessment and mitigation techniques. This involves continuing education in the form of training seminars, literature reviews, and pertinent conferences to remain abreast of recent developments in this complex and rapidly changing field.

The attached résumés describe the credentials of the professionals who performed field, research, and/or report preparation work on the project.

Scot A. Stormo, RG, CHG, REA II

Vice President, Associate Geologist/Hydrogeologist

Years of Experience: 18

QUALIFICATIONS

Registered Geologist, State of California, 1990 (No. 4826)
Certified Hydrogeologist, State of California, 1995 (No. 204)
California Registered Environmental Assessor (REA II), 2001 (No. 20166)
California Registered Environmental Assessor (REA I), 1990 to 1995 (No. 2356)
EMS-I Training Course, Groundwater Flow and Transport Modeling with GMS, September 2002
OSHA 40-Hour HAZWOPER Course, Hazardous Materials and Site Investigations
(OSHA 29 CFR 1910.120[e]), 1987, 8-hour refresher courses taken annually
Association for Environmental Health and Sciences, March 2002
Short Course: Introduction to Environmental Forensics: Techniques and Applications
National Ground Water Association, 2000
Short Course: Geophysics for Environmental and Groundwater Applications
Princeton Groundwater, 1994
Short Course: Groundwater Pollution and Hydrology
MS, Geology, State University of New York at Stony Brook, 1984
BS, Geology, California Lutheran College, Thousand Oaks, California, 1981

PROFESSIONAL EXPERIENCE

1997 to present	Vice President Earth Systems Southwest, Bermuda Dunes
1991 to 1997	Senior Geologist Dames & Moore, Spokane, Washington and Ontario, California
1989 to 1991	Senior Project Geologist Exceltech, Inc., Irvine, California
1986 to 1989	Staff Geologist Leighton & Associates, Riverside, California
1985 to 1986	Consulting Geologist Epoch Well Logging, Ventura, California

Employed with Earth Systems' Bermuda Dunes office since 1997, Mr. Stormo is manager of our environmental services department. In this capacity, he directs all aspects of our environmental operations including performing water resource evaluations, and conducting investigations into the presence, source, and extent of hazardous materials and contaminants in soil and groundwater. Mr. Stormo has been providing geologic and hydrogeologic consulting services to a wide variety of clients since 1985. His involvement with contaminated sites has included performing numerous investigations related to landfills, leaking underground storage tanks, and properties of industrial, commercial, educational, residential, and agricultural usage. He has also been active in water supply and groundwater protection evaluations, providing advice to water supply organizations, Indian tribes, and governmental agencies. As a registered hydrogeologist, his expertise includes groundwater modeling and groundwater plume evaluations.

Scot A. Stormo, RG, CHG, REA II

Vice President, Associate Geologist/Hydrogeologist

HIGHLIGHTS OF RESPONSIBILITIES AND EXPERIENCE

- Conducts groundwater and surface water supply evaluations involving assessment of both quantity and quality.
- Develops watershed management, monitoring and protection strategies.
- Performs water quality monitoring of both surface water and groundwater resources.
- Conducts preliminary site assessments (Phase I) entailing site reconnaissance, historical research, regulatory agency records and database searches, aerial photograph review, and final report preparation.
- Performs site characterizations (Phase II) entailing subsurface exploration, sampling of soil and groundwater, chemical analyses of samples, evaluation of laboratory data, preparation of final report including recommendations for remediation.
- Conducts Preliminary Endangerment Assessments (PEAs) of proposed school sites, including planning and performing the field investigation, evaluating the laboratory data, and preparing the PEA report for DTSC review and approval.
- Designs and implements remediation programs such as groundwater monitoring and sampling; delineation of contaminant plumes; monitoring well installation and developments; in situ and above ground bioremediation systems; vapor extraction and soil venting systems; thermal/catalytic oxidation; and groundwater extraction, air stripping, activated carbon filtration, bioreactors.
- Conducts investigations of surficial contaminants such as lead, cadmium, chromium, zinc, copper and pesticides.
- Directs landfill investigations which include cover analysis and risk assessment.
- Performs risk evaluations and feasibility studies involving calculating mobility and potential impact of subsurface contaminants.
- Evaluates release scenarios using computer modeling and fate and transport simulations.
- Assesses and evaluates potential geologic hazards such as faults, liquefaction, and landslides.
- Provides expert witness and consultation services.

SELECT PROJECT EXPERIENCE

Water Resources Projects

Remote Mountain Community. Mr. Stormo evaluated the long-term use and availability of groundwater for a remote mountain community. Included a review of historic water levels and recharge rates, and identification of preferred drilling locations based on the geology of the site.

Proposed Residential Subdivision. Mr. Stormo provided hydrogeologic expertise on a water availability study for a proposed residential subdivision that will rely on groundwater.

Scot A. Stormo, RG, CHG, REA II

Vice President, Associate Geologist/Hydrogeologist

SELECT PROJECT EXPERIENCE (continued)

FDA Spring Certifications. Mr. Stormo has provided hydrogeologic expertise for spring certification reports on several properties throughout California in preparation for developing these sites as spring water sources.

Proposed "Spring" Site. Mr. Stormo performed an in-depth evaluation of a reported spring site to identify the nature of the "spring." The physical setting, geochemistry, and soil stratigraphy were evaluated, including the use of geophysical techniques to probe the subsurface. Concluded that the "spring" was not a natural feature.

Watershed Evaluation and Management Projects for Indian Tribe. Mr. Stormo has been the senior consultant and project manager for the development and implementation of two watershed evaluation and management programs. These activities have included: 1) identifying and quantifying wastewater sources in the watershed; 2) gaging stream flows and water quality in the major drainage of the watershed; 3) design of surface water sampling programs and development of Quality Assurance Project Plans; 4) design and installation of monitoring wells to evaluate water quality in the three water-bearing aquifers; and 5) data evaluation and report preparation.

Salt Water Intrusion Study. Mr. Stormo managed the installation of five wells to evaluate the potential for salt water intrusion into the upper aquifer adjacent to the Salton Sea.

Water Source Studies. Mr. Stormo evaluated the chemistry of waters at several sites to identify the source(s) of surface and groundwaters. The evaluations included comparisons of major and trace element geochemistries in on-site and potential off-site water sources. These projects were conducted in support of legal proceedings.

Hazardous Materials Projects

Industrial Park Environmental Assessment. Mr. Stormo was project manager for this assessment which involved research of current and past uses and practices, collection and analysis of soil and groundwater samples, and removal of underground storage tanks. Additionally, the project involved asbestos assessment and abatement, development of an asbestos management plan, and assessment of metallic dust residues.

Proposed School Site PEAs. Mr. Stormo was project manager and lead consultant for several proposed school sites required to go through the PEA process. At each site, he identified the issues warranting further evaluation, selected the investigative methods, negotiated the scope of work with the Department of Toxic Substance Control (DTSC), prepared a work plan, oversaw field sampling activities, reviewed the laboratory data, prepared a PEA report meeting the requirements of the DTSC.

Former Above-Ground Storage Tank and Pipeline Facility. Mr. Stormo managed the environmental investigation of this facility. He evaluated whether the facility contributed contaminants to a regionally extensive groundwater plume emanating from a nearby refinery. This involved differentiating between gasoline and diesel fuel in soil samples, estimating the extent of weathering of the hydrocarbons, and evaluating whether BTEX compounds were migrating upward through the soil as vapors.

Scot A. Stormo, RG, CHG, REA II

Vice President, Associate Geologist/Hydrogeologist

SELECT PROJECT EXPERIENCE (continued)

Law Suit Involving Pre-Existing Contamination. Mr. Stormo was project manager, principal geologist and expert witness in a law suit involving pre-existing contamination on a former service station property with numerous prior owners, operators and adjacent spills. He evaluated prior remedial activities for appropriateness; evaluated likelihood of upgradient sources; used computer modeling, and fate and transport simulations to evaluate the likelihood of various release scenarios; and, developed cost estimates for clean-up.

Groundwater Contamination at Two Landfills. Mr. Stormo was field manager and chief author of an investigation of the extent of groundwater contamination at two landfills. The project included well installation, aquifer testing, groundwater modeling, risk assessment, and remedial alternatives evaluation.

Phase I and II Investigations and Leaking UST's. Mr. Stormo was involved in numerous investigations related to leaking underground storage tanks and hundreds of environmental site assessments (Phase I Investigations) of industrial, commercial, residential, agricultural, and vacant properties, with follow-up (Phase II Investigations) of the sites identified as potentially contaminated.

Bunker C. Fuel Oil Spill. Mr. Stormo authored the Vacuum Extraction Pilot Test and the Soil Column Bioventing and Surfactant Flushing Treatability Study pertaining to this site. He performed data analyses and provided geochemical consulting services.

Groundwater Contamination Plume Geochemical Evaluation. Mr. Stormo evaluated the chemistry of a groundwater contamination plume involving solvents. He used an analysis of the relative concentrations of the two primary contaminants to identify three separate plumes with distinctive chemical signatures. He then delineated plume boundaries, mixing zones, and probable source areas.

Metal Working Facility Airborne Contaminant Investigation. Airborne metallic dusts such as lead, cadmium, and chromium were the primary concern at this site. As project manager and principal investigator, Mr. Stormo performed ambient air sampling and surficial dust sampling and analysis, and used the isotopic concentrations of the lead and the ratios of the various metals in the different media, to identify the source of the airborne materials.

PROFESSIONAL AFFILIATIONS

National Ground Water Association
Association of Ground Water Scientists and Engineers
Association for Environmental Health and Sciences