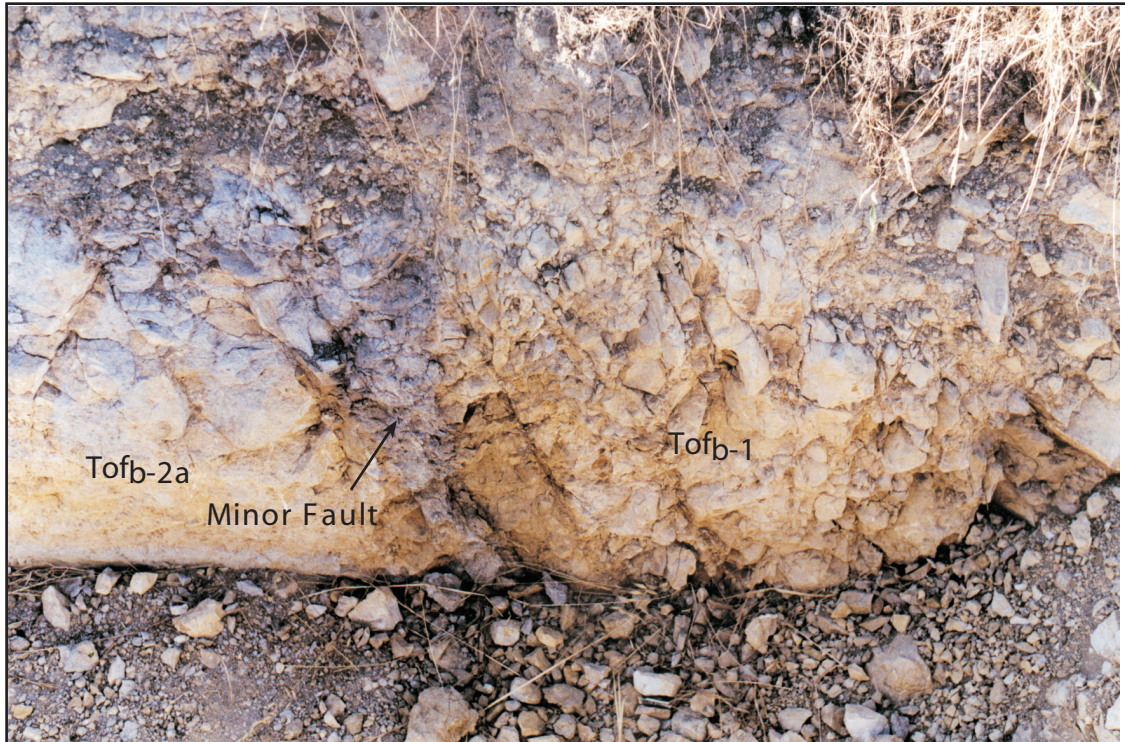
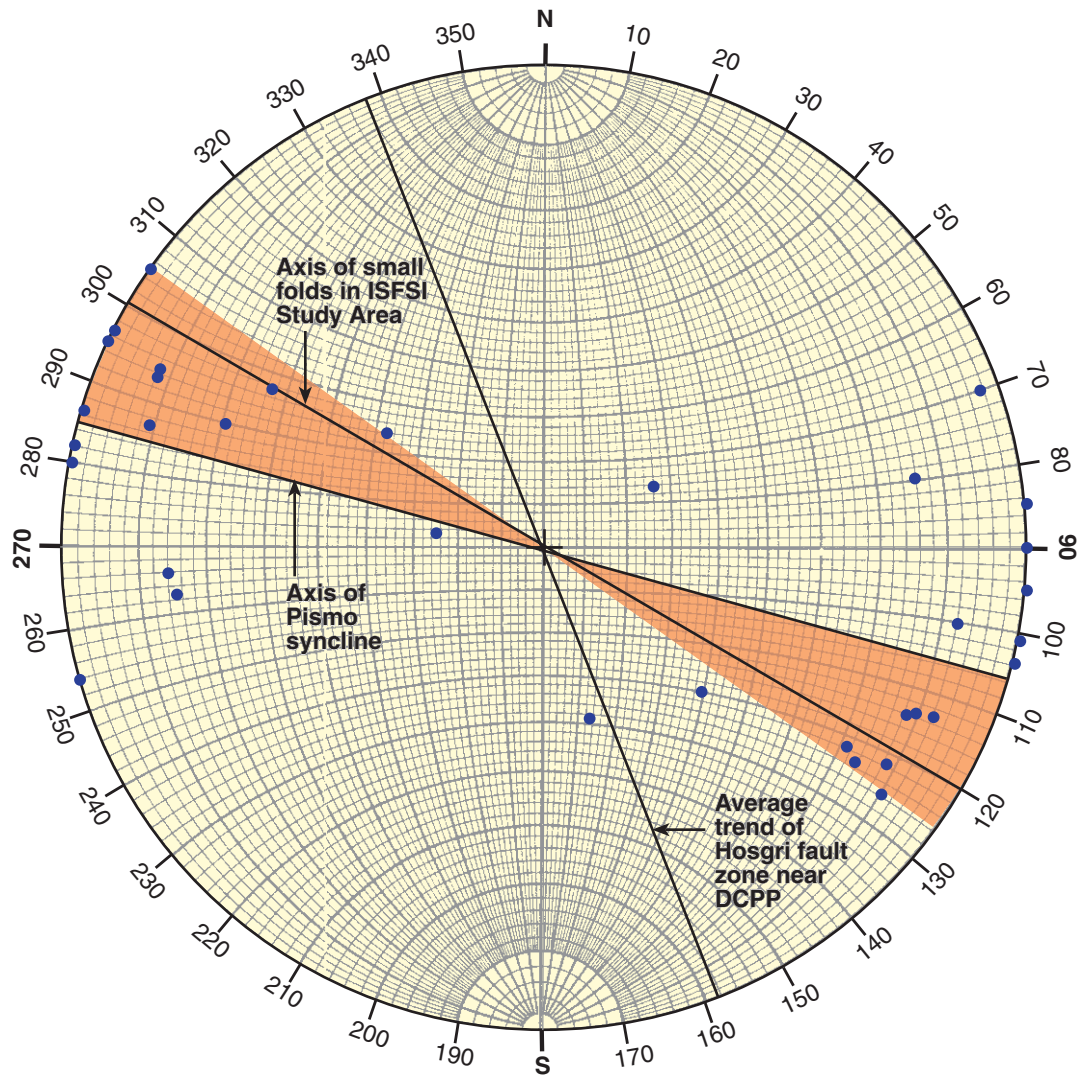




Minor fault in trench T-1 juxtaposing friable sandstone (Tof_{b-2a}) on left against dolomite (Tof_{b-1}). Photo roll JL B-2.

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-28
MINOR FAULT IN TRENCH T-1



Explanation

- General range in strike of zone of minor faults.
- Rake of slickenside on fault plane of minor faults

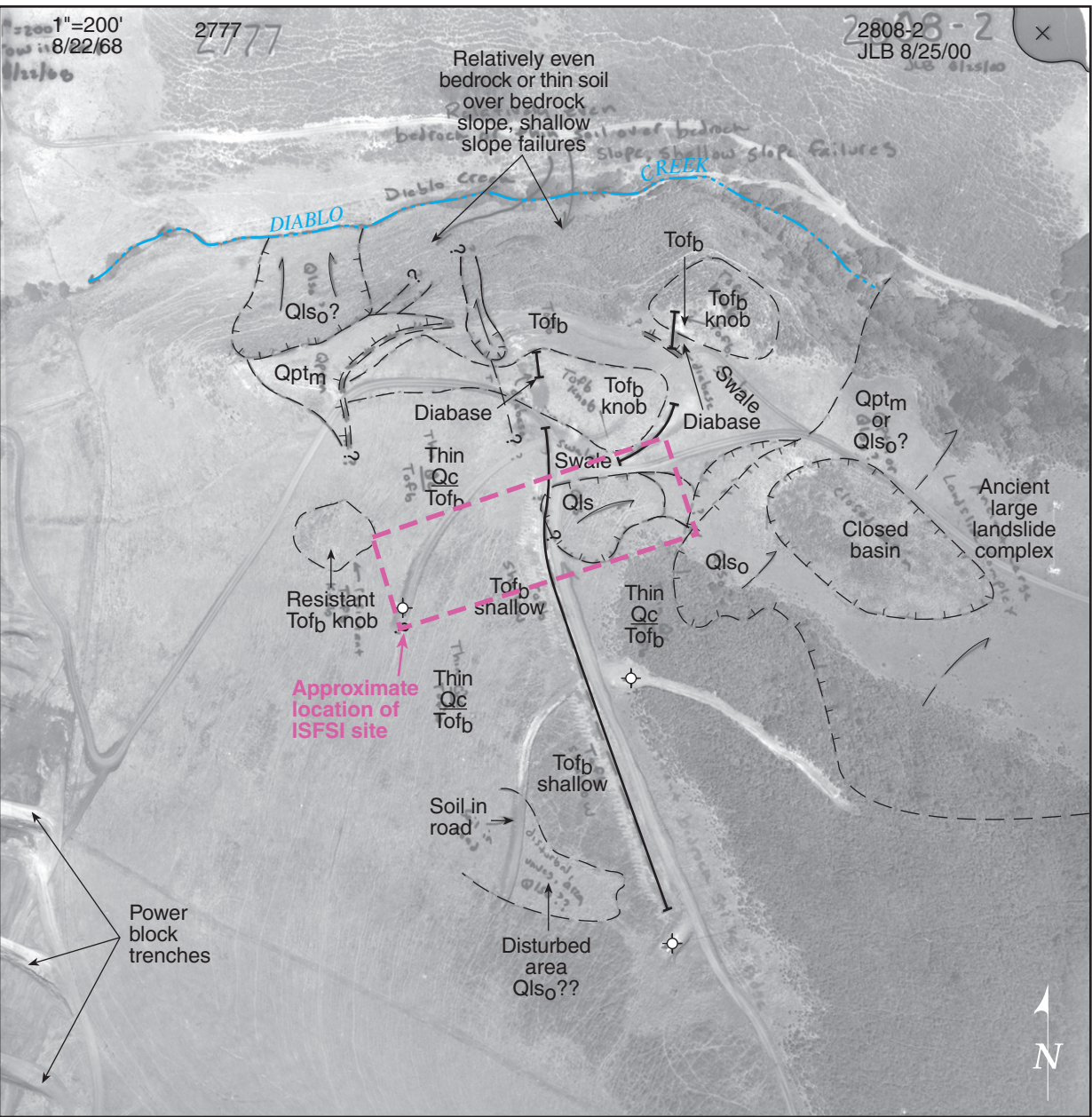
Equal-angle lower hemisphere plot.

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-29 COMPARISON OF ORIENTATIONS OF MINOR FAULTS AND FOLDS IN THE ISFSI STUDY AREA WITH OTHER STRUCTURES



Northward view of Diablo Creek Road cut showing steeply dipping minor faults in dolomite of unit Tof_{b-1} . Slickensides and mullions on the fault plane indicate primarily strike-slip displacement, but bedding also suggests a component of down-to-the-east vertical separation of approximately 3 to 6 feet. These faults are located along projection of faults exposed in trenches at the ISFSI, approximately 800 feet to the southeast, that have similar strike and slickenside/mullion rakes. Photo roll JLB 5/16-1.

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-30
MINOR FAULTS ALONG DIABLO CREEK ROAD

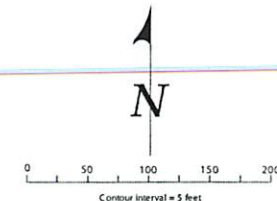
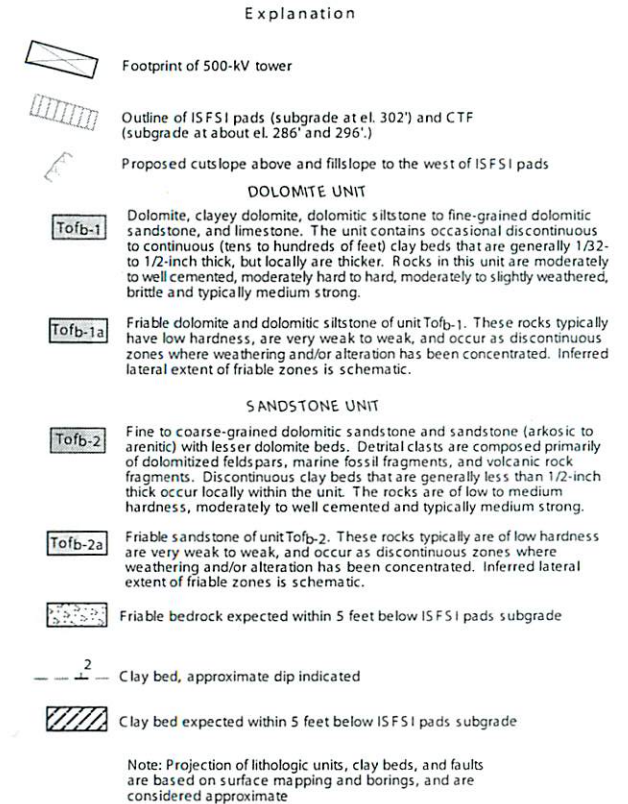


1968 stereo air photos (2777; 2808-1 and 2808-2) of ISFSI study area prior to the 1971 excavation of the borrow site. Diablo Creek traverses the upper (northern) part of the photo. Trenches for the power block are evident in the lower left. The road that follows the ridge crest in center of photo was removed during 1971 excavation of the borrow area. No features indicating deep seated landslides are present at the site; large landslides are evident to the east, however. The small landslide south of the word "swale" is shallow and was removed in the 1971 excavations. See Figure 2.6-7 for unit descriptions. To view with a stereoscope, fold and adjust the photos as necessary.



FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-31 1968 AERIAL STEREO PHOTOGRAPHY OF ISFSI STUDY AREA

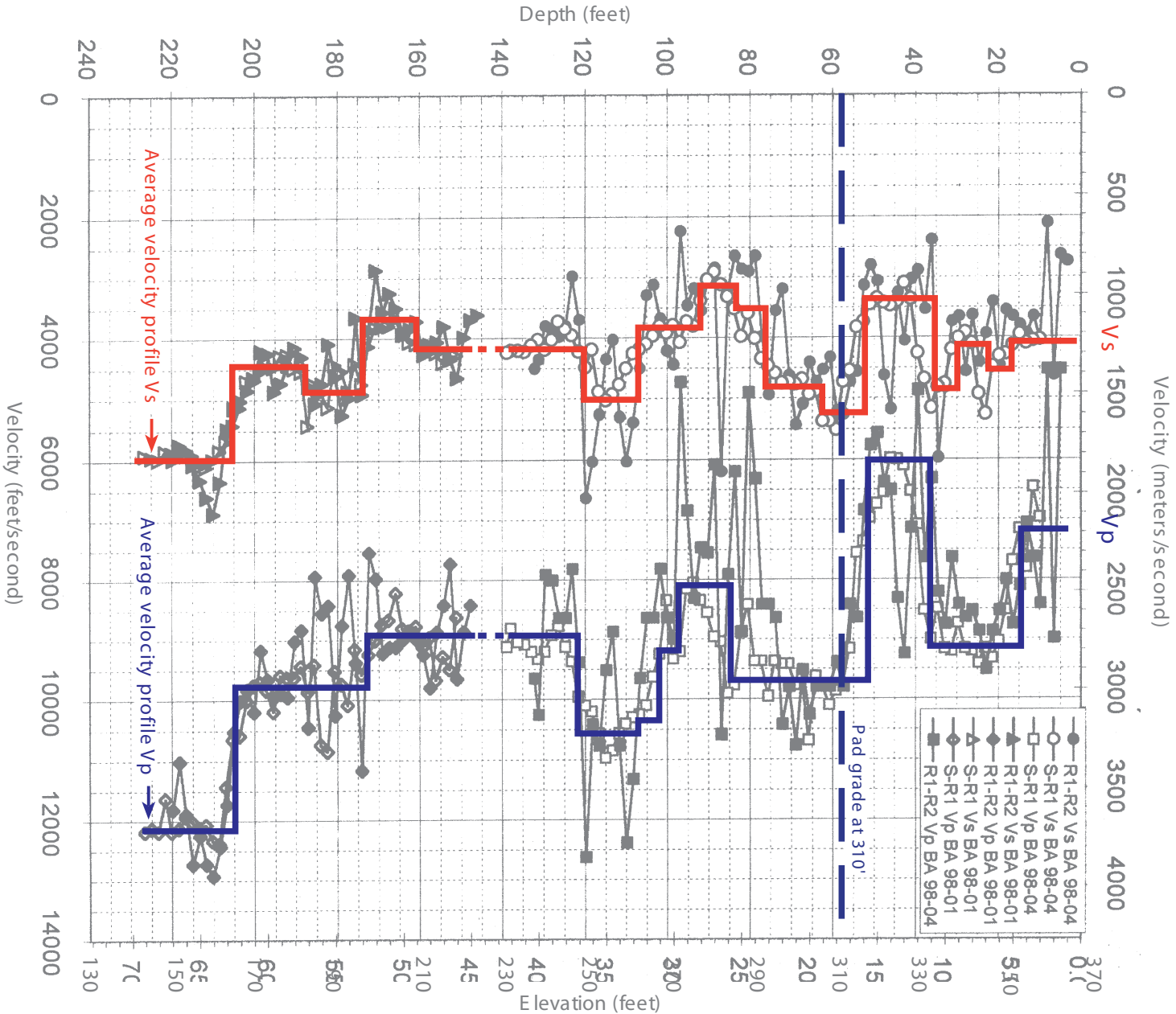
Figure Withheld Under 10 CFR 2.390



FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-32
GEOLOGY OF ISFSI AND CTF SITES AT PROPOSED FINAL GRADES

Revision 0 June 2004

Borings 98B A -1 and 98B A -4

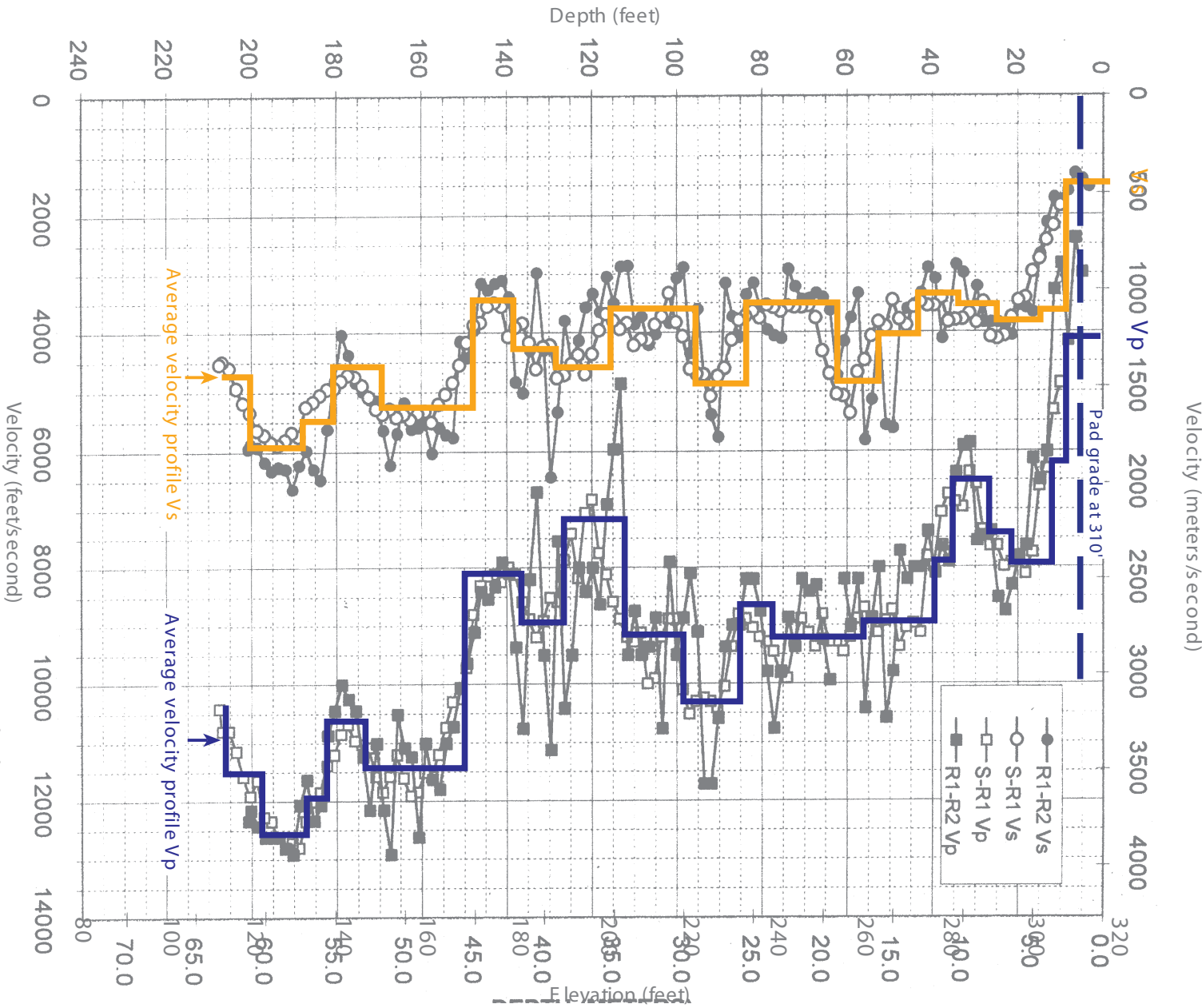


Note: Average velocity profiles interpreted from data

R1 - R2 = Receiver-to-receiver velocity (3.3-foot spacing)

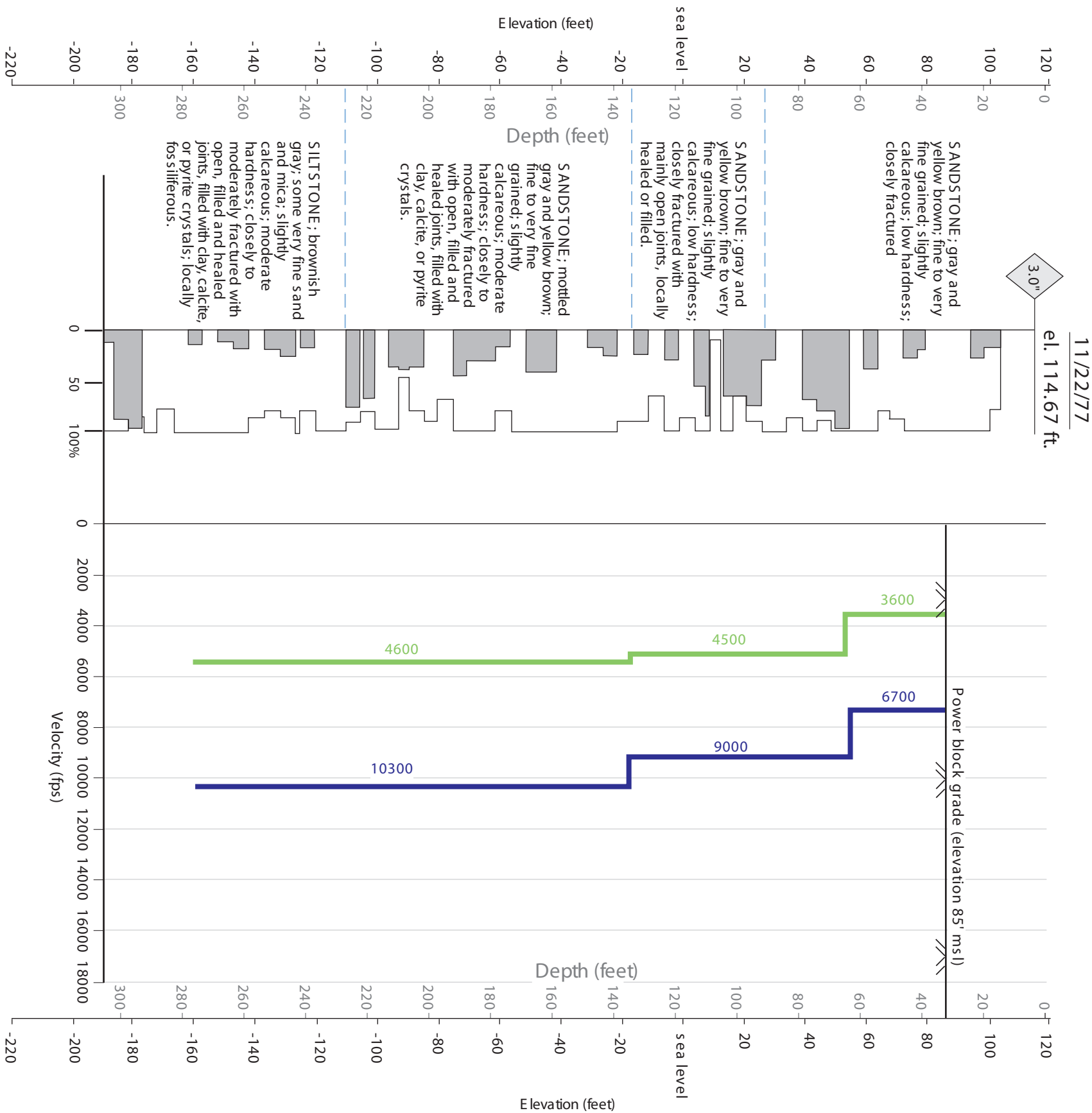
S-R1 = Source-to-receiver velocity (10.3-foot spacing)

Boring 98B A -3



Modified from GEOvision (1998), in William Lettis
& Assoc. Inc., 2001, DCP P ISFSI Data Report C.

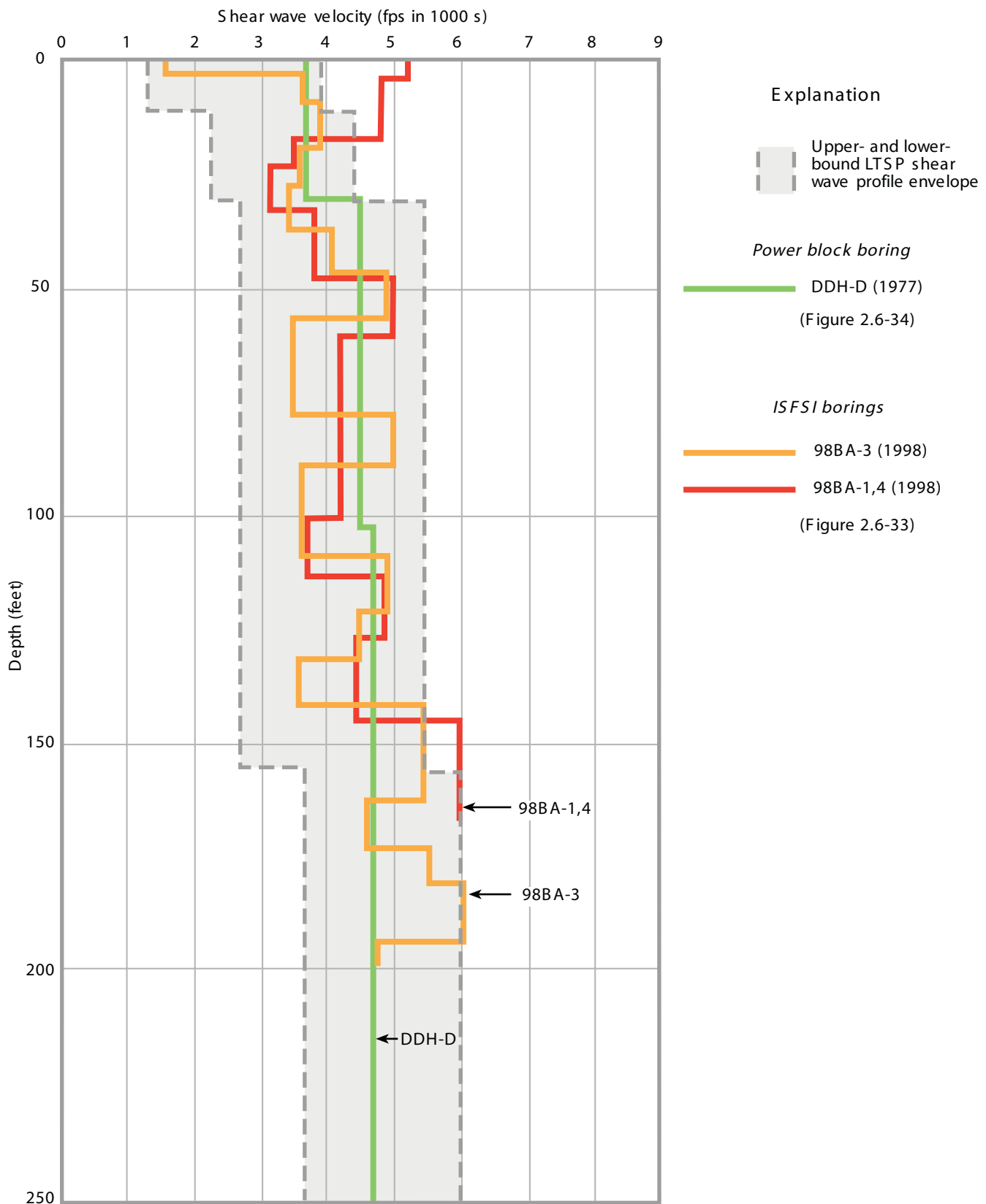
DDH-D



Explanation	
	Percent recovery of core run
	Rock Quality Designation of core run
	Geologic contact
	3.0-inch NX wireline coring
	Shear wave (Vs) velocity
	Compression wave (Vp) velocity

Note: Boring logged in 1977 by D.W. Frames.
Casing used for the upper 18.5 feet.
Downhole logging performed by Bruce Redpath.
Velocity profile from PG&E, 1989, Response to NRC Question 19 dated December 13, 1988.

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-34 SUMMARY LOG OF 1977 POWER BLOCK BORING DDH-D



FSAR UPDATE

DIABLO CANYON ISFSI

**FIGURE 2.6-35
COMPARISON OF SEISMIC SHEAR-
WAVE VELOCITIES AT THE POWER
BLOCK AND ISFSI SITES**

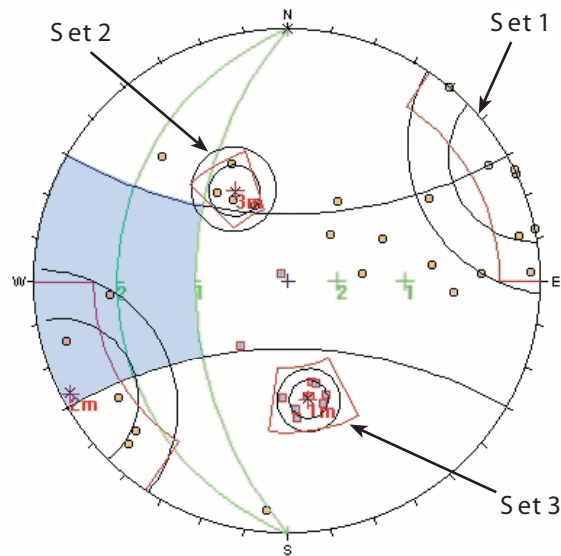
Figure Withheld Under 10 CFR 2.390

■ Transport route

Northeast view of the horseshoe curve along the transport route and the Patton Cove landslide. The Patton Cove landslide crosses the width of the cove in the center, and its headscarp encroaches on the existing roadway. The transport route is aligned north of the existing road to avoid the landslide. Photo roll JLB-AR-3.

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-36 TRANSPORT ROUTE NEAR PATTON COVE LANDSLIDE

Revision 0 June 2004



A. Topple hazard (moderate hazard)

Explanation

Poles

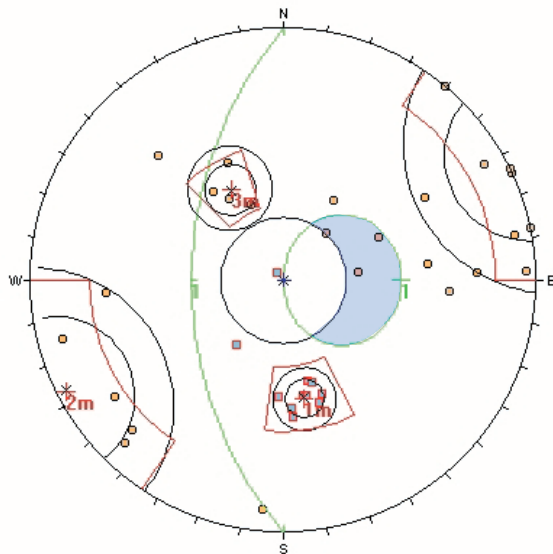
Joint

Bedding

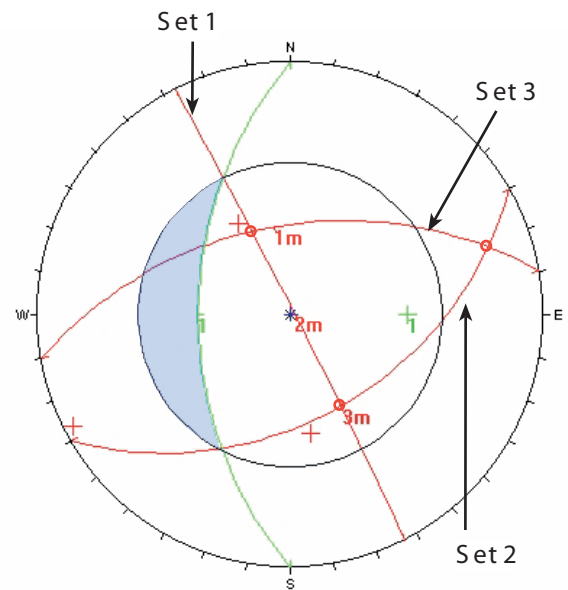
Failure envelope
(based on 28
friction angle)

Failure envelope for topple and planar sliding without poles indicates stable conditions.

Failure envelope for wedge sliding without great circle intersections indicates stable conditions.



B. Planar sliding hazard (low hazard)



C. Wedge sliding hazard (very low hazard)

Notes

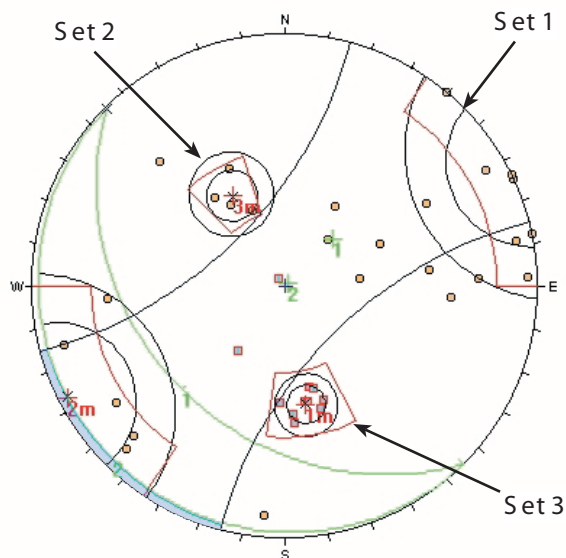
Analysis performed using computer program DIPS (Rocscience, 1999, DIPS: Plotting analysis, and presentation of structural data using spherical projection techniques, version 5.041, Toronto, 86p).

Fracture data from stations 38+00 to 45+00 applied to north-trending cutslope above Reservoir Road from stations 43+00 to 46+00.

FSAR UPDATE

DIABLO CANYON ISFSI

FIGURE 2.6-37
KINEMATIC ANALYSES OF NORTH-TRENDING
CUTSLOPE OF TRANSPORT ROUTE (STATIONS
43+00 TO 46+00



A. Topples hazard (low hazard)

Explanation

Poles

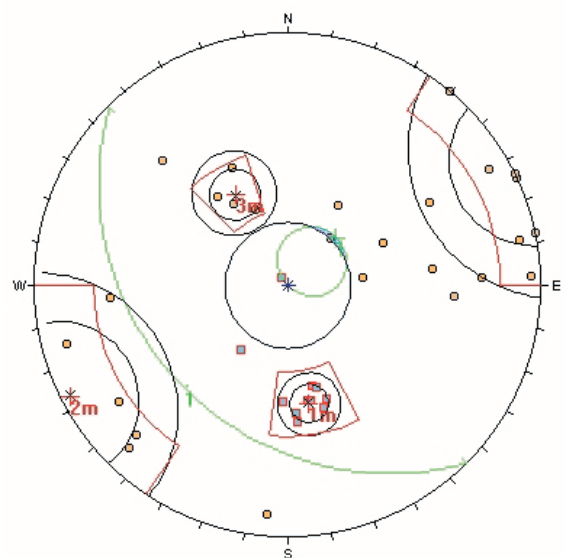
Joint

Bedding

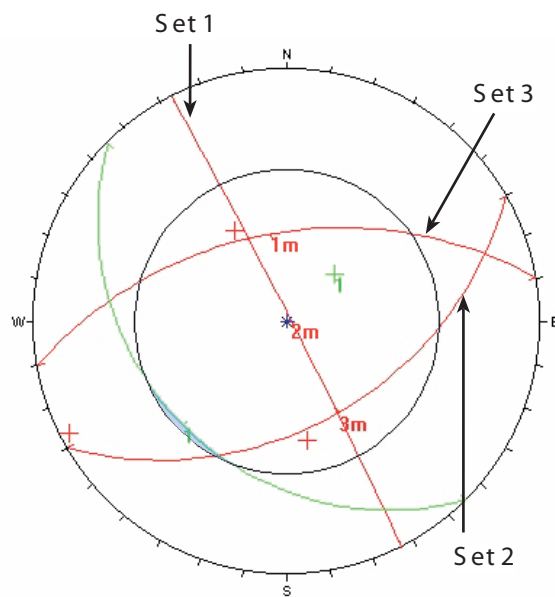
Failure envelope
(based on 28
friction angle)

Failure envelope for topple and planar sliding without poles indicates stable conditions.

Failure envelope for wedge sliding without great circle intersections indicates stable conditions.



B. Planar sliding hazard (very low hazard)



C. Wedge sliding hazard (very low hazard)

Notes

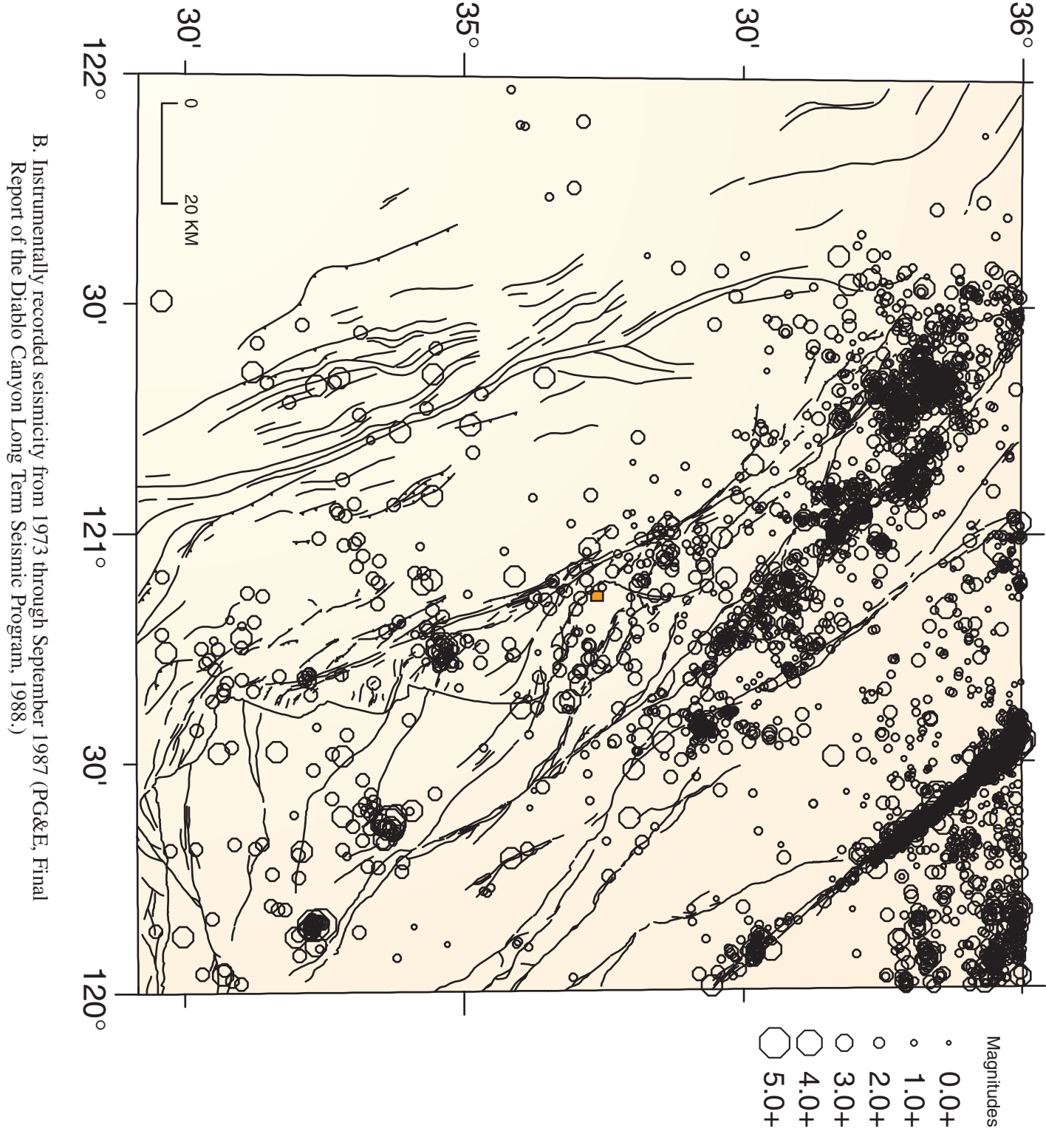
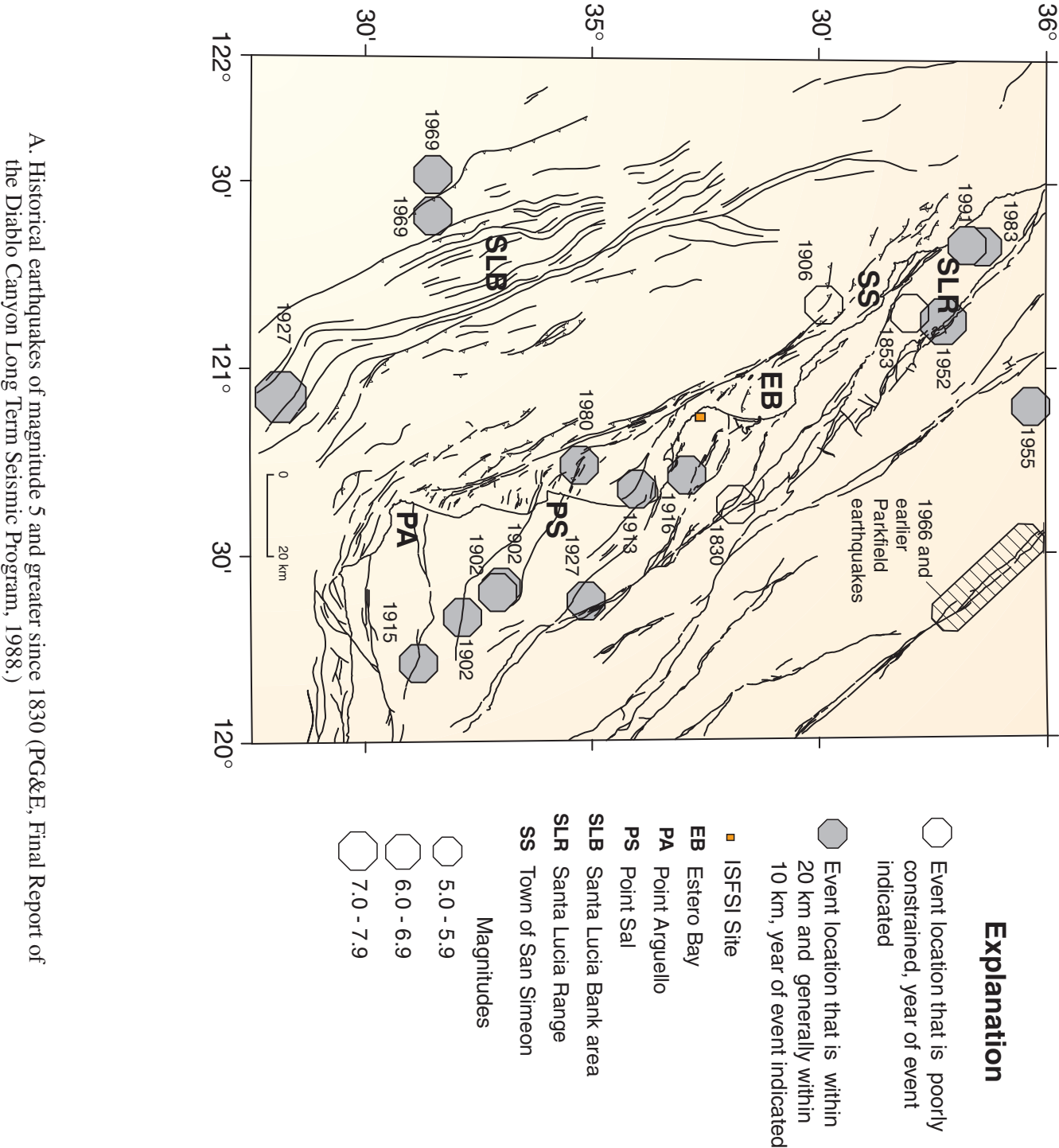
Analysis performed using computer program DIPS (Rocscience, 1999, DIPS: Plotting analysis, and presentation of structural data using spherical projection techniques, version 5.041, Toronto, 86p).

Fracture data from stations 38+00 to 45+00 applied to northwest-trending cutslope above Reservoir Road from stations 35+00 to 43+00.

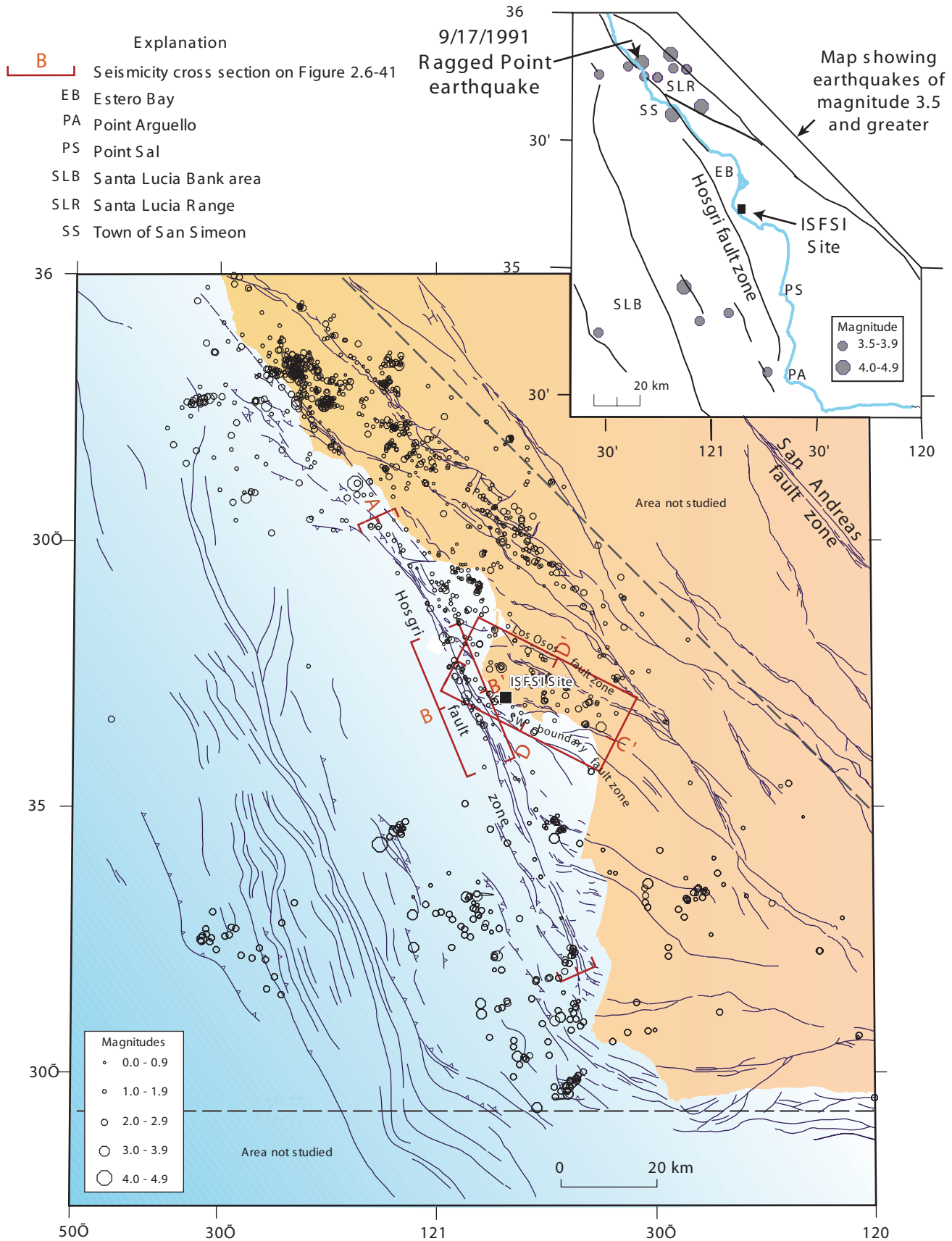
FSAR UPDATE

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FIGURE 2.6-38 KINEMATIC ANALYSES OF NORTHWEST- TRENDING CUTSLOPE OF TRANSPORT ROUTE (STATIONS 35+00 TO 43+00)

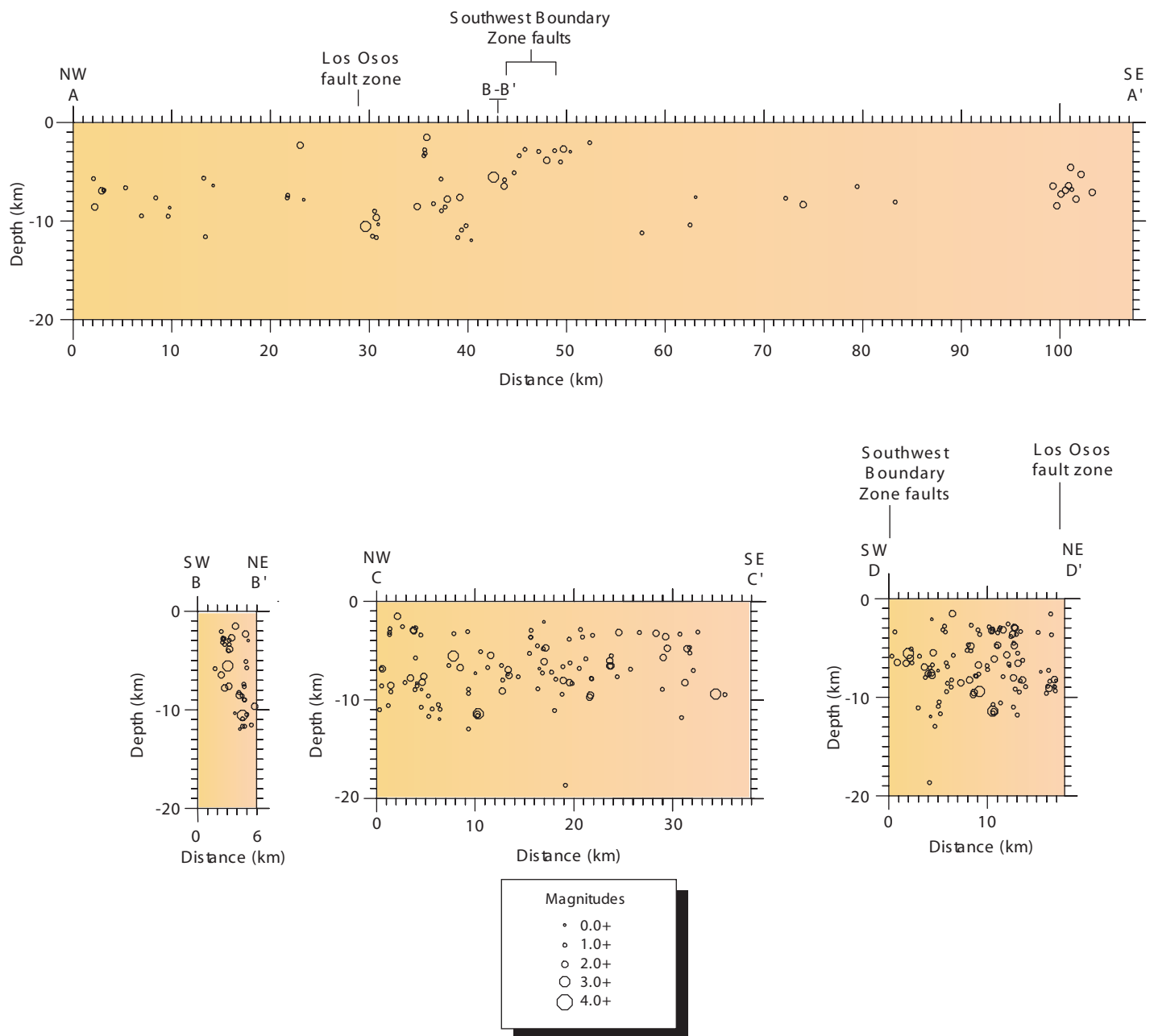


FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-39 HISTORICAL EARTHQUAKES OF MAGNITUDE 5 AND GREATER SINCE 1830 AND INSTRUMENTALLY RECORDED SEISMICITY FROM 1973 THROUGH SEPTEMBER 1987



(From M.K. Mc Laren and W.U. Savage, Seismicity of south-central coastal California, October 1987 through January 1997, Bulletin of the Seismological Society of America, in press)

FSAR UPDATE
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FIGURE 2.6-40
QUATERNARY FAULTS AND SEISMICITY FROM
OCTOBER 1987 THROUGH JANUARY 1997

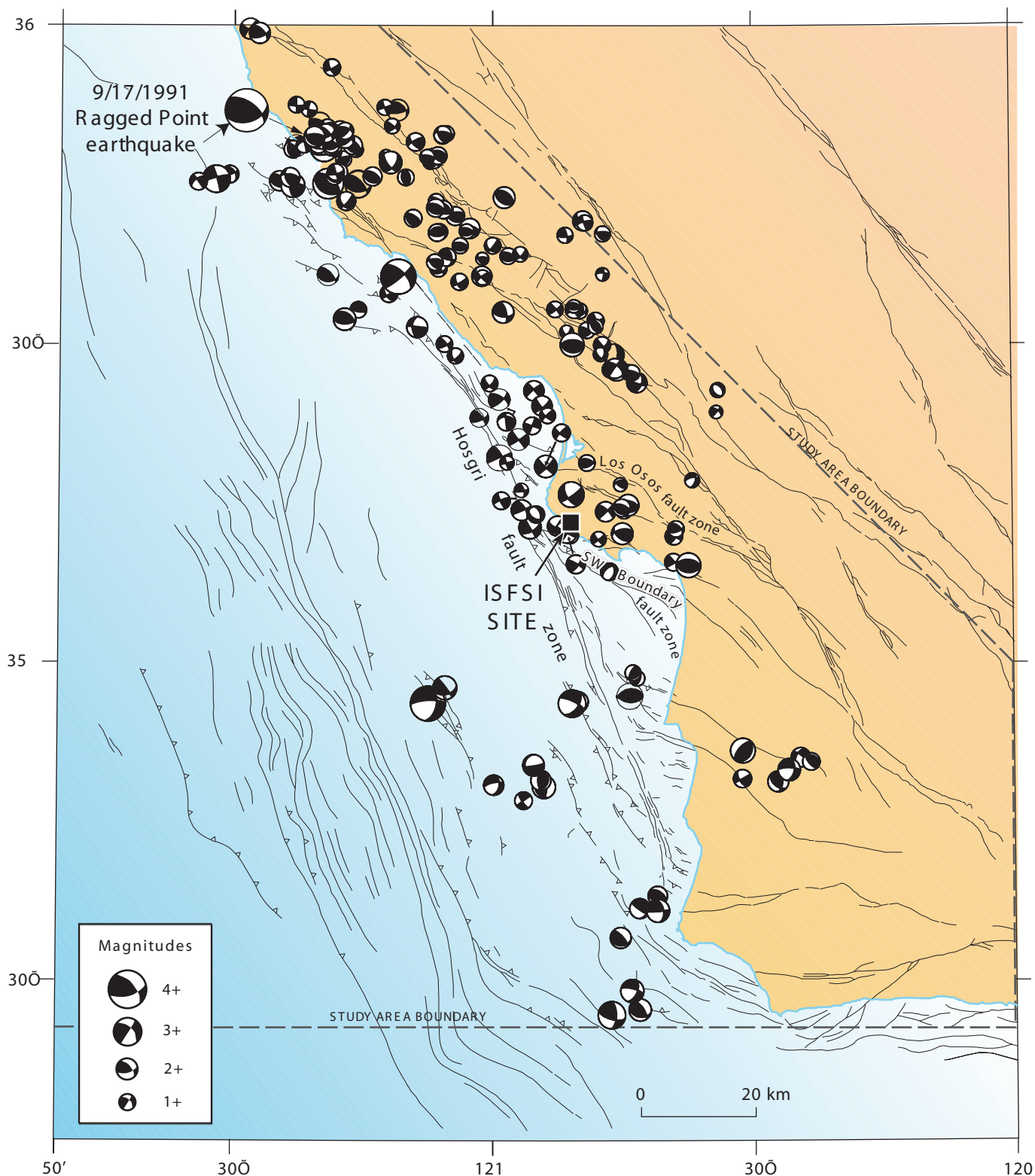


(From M.K. Mc Laren and W.U. Savage, Seismicity of south-central coastal California, October 1987 through January 1997, Bulletin of the Seismological Society of America, in press)

FSAR UPDATE

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FIGURE 2.6-41
SEISMICITY CROSS SECTION A-A' THROUGH D-D'
FOR EARTHQUAKES FROM OCTOBER 1987
THROUGH JANUARY 1997

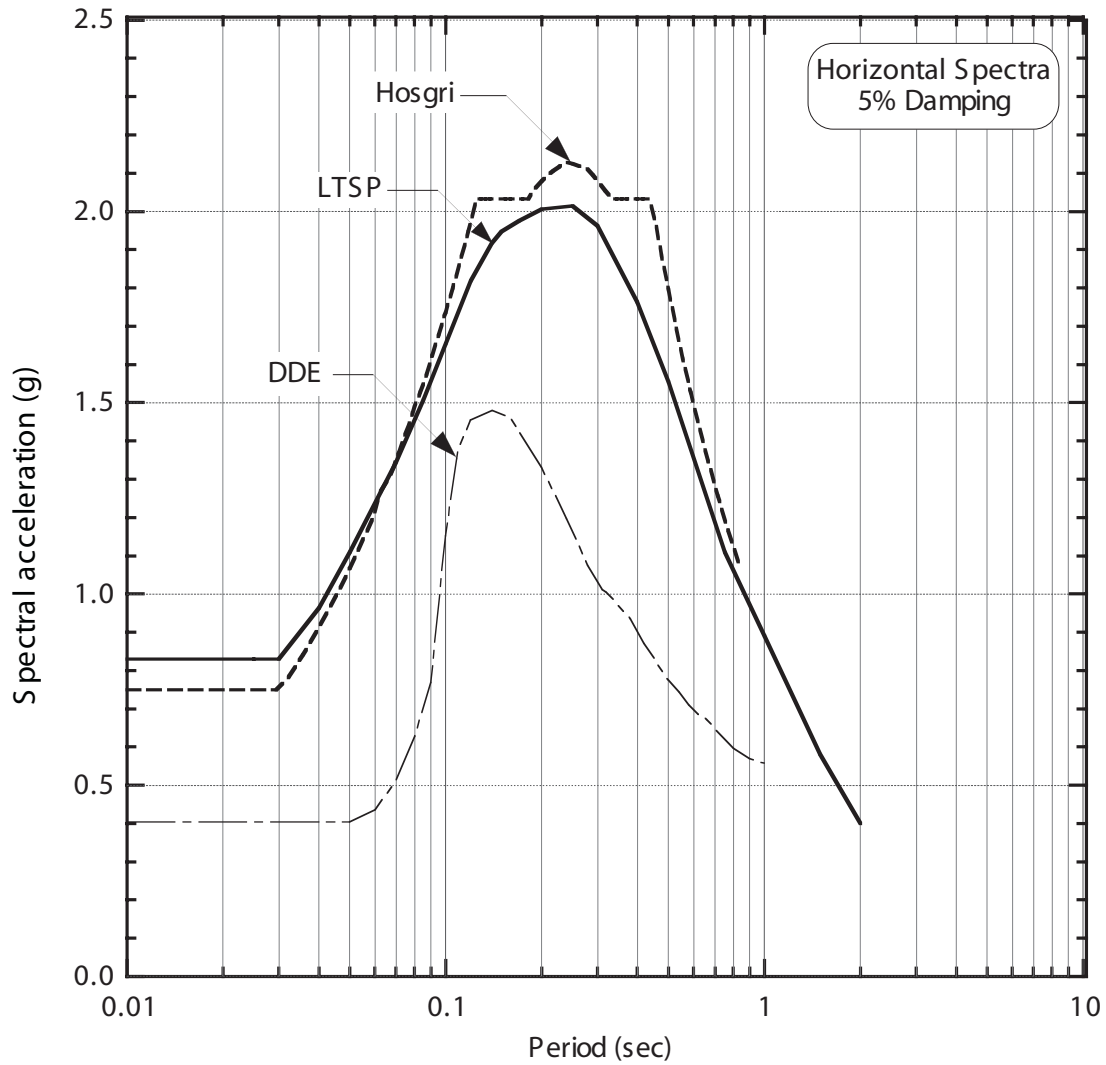


(From M.K. Mc Laren and W.U. Savage, Seismicity of south-central coastal California, October 1987 through January 1997, Bulletin of the Seismological Society of America, in press)

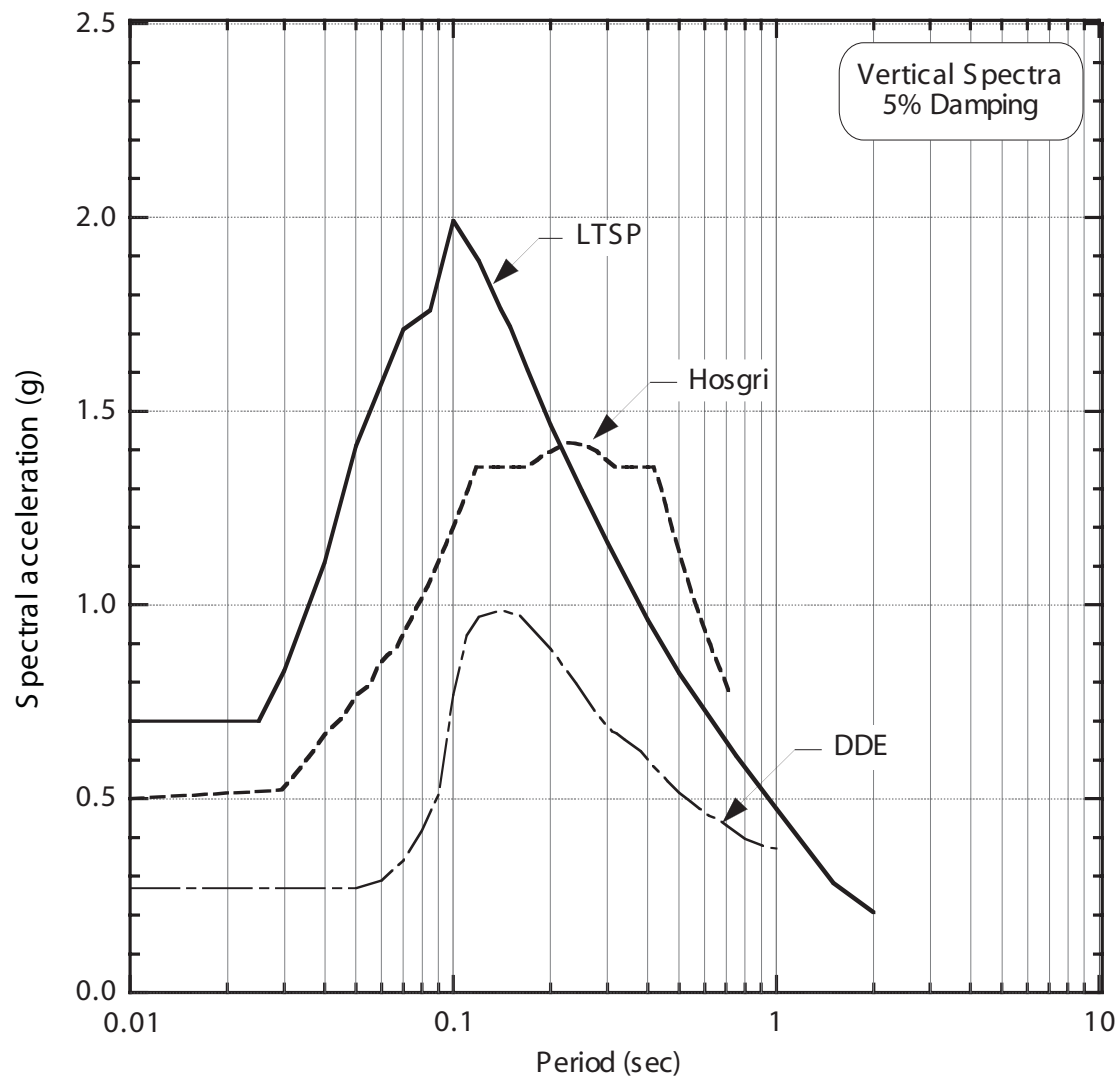
FSAR UPDATE

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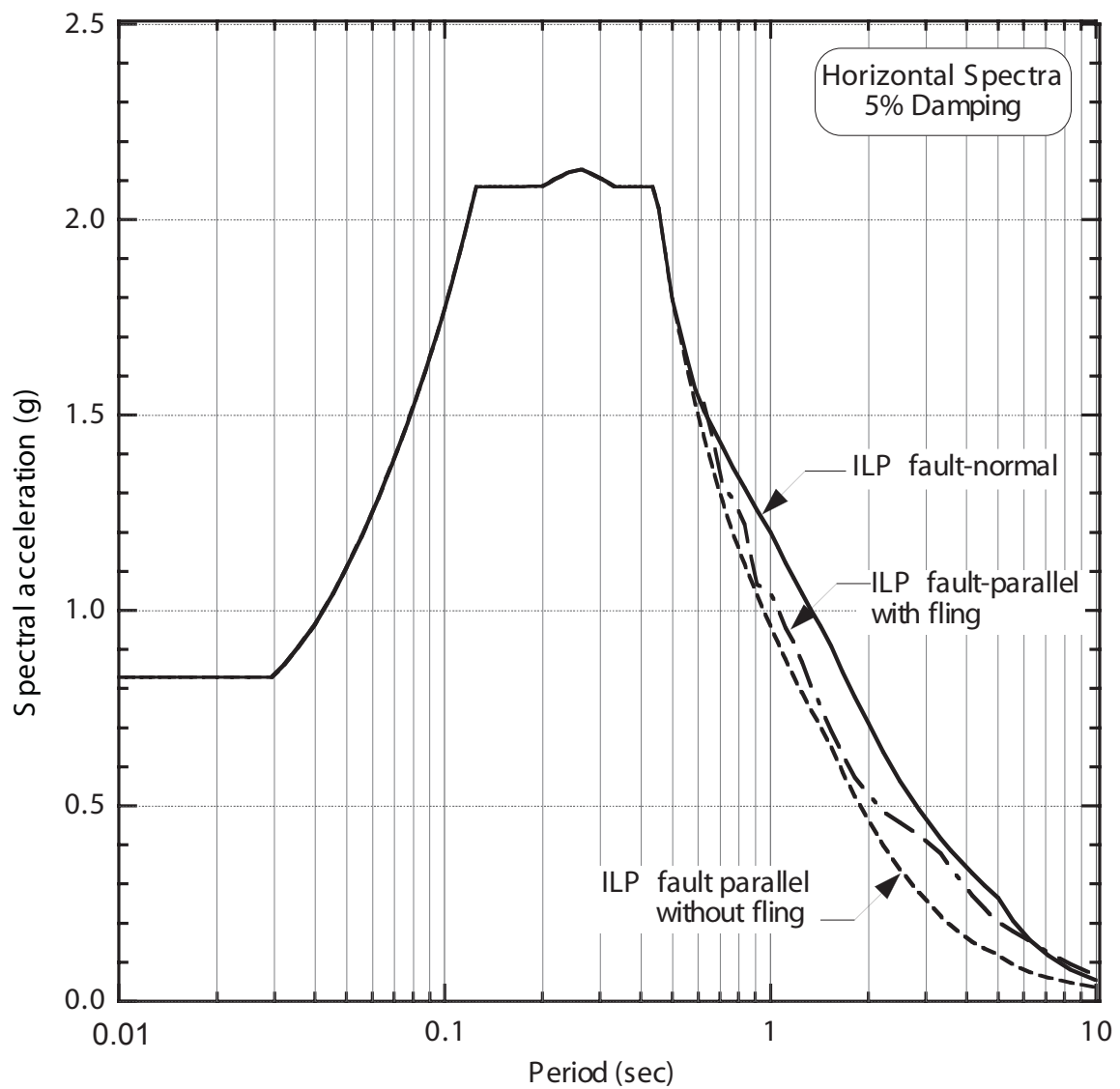
FIGURE 2.6-42
LOWER HEMISPHERE, P-WAVE, FIRST-MOTION
FOCAL MECHANISM PLOTS OF EARTHQUAKES
FROM OCTOBER 1987 THROUGH JANUARY 1997



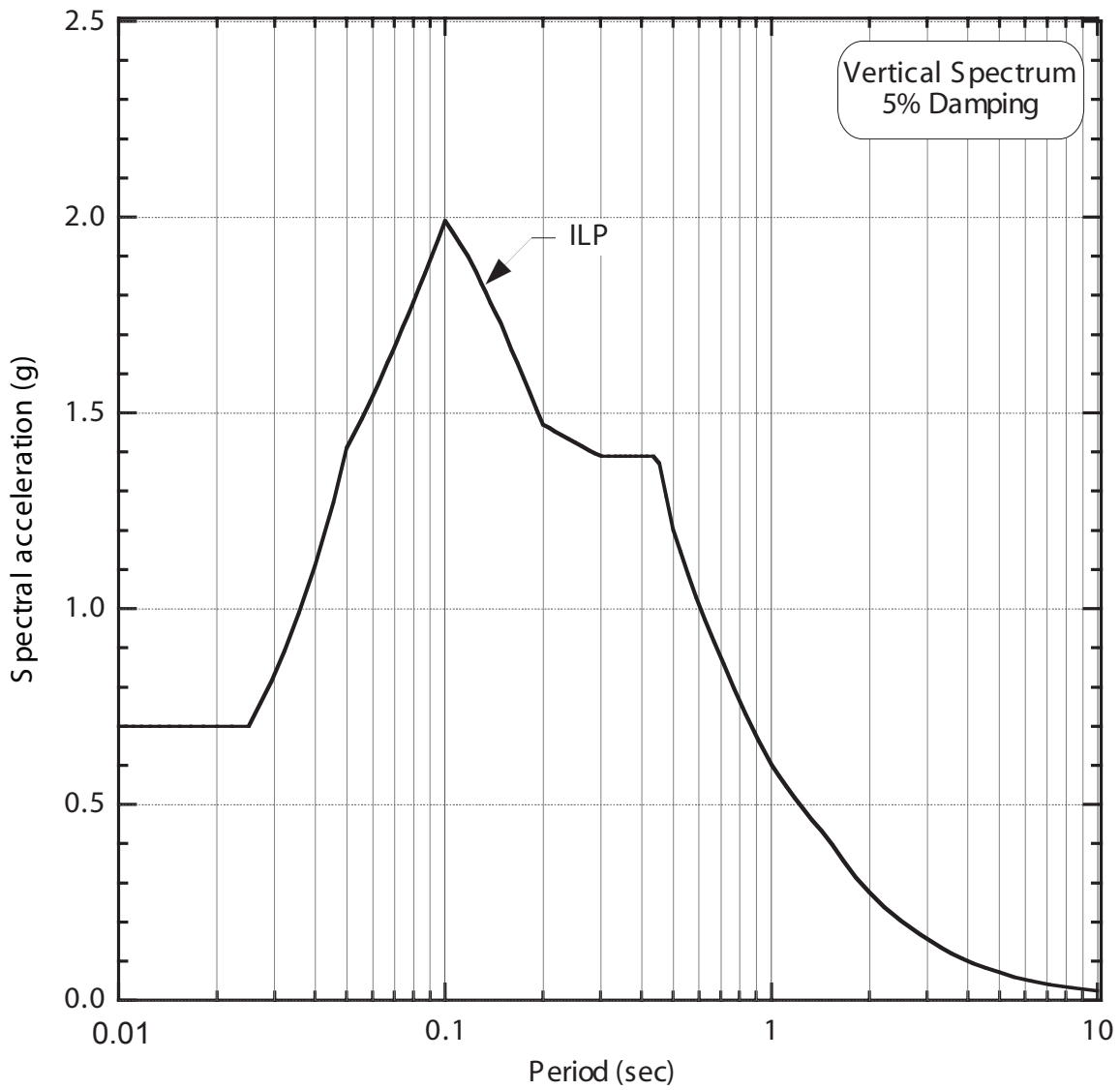
FSAR UPDATE
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FIGURE 2.6-43 DDE, HOSGRI, AND LTSP HORIZONTAL SPECTRA



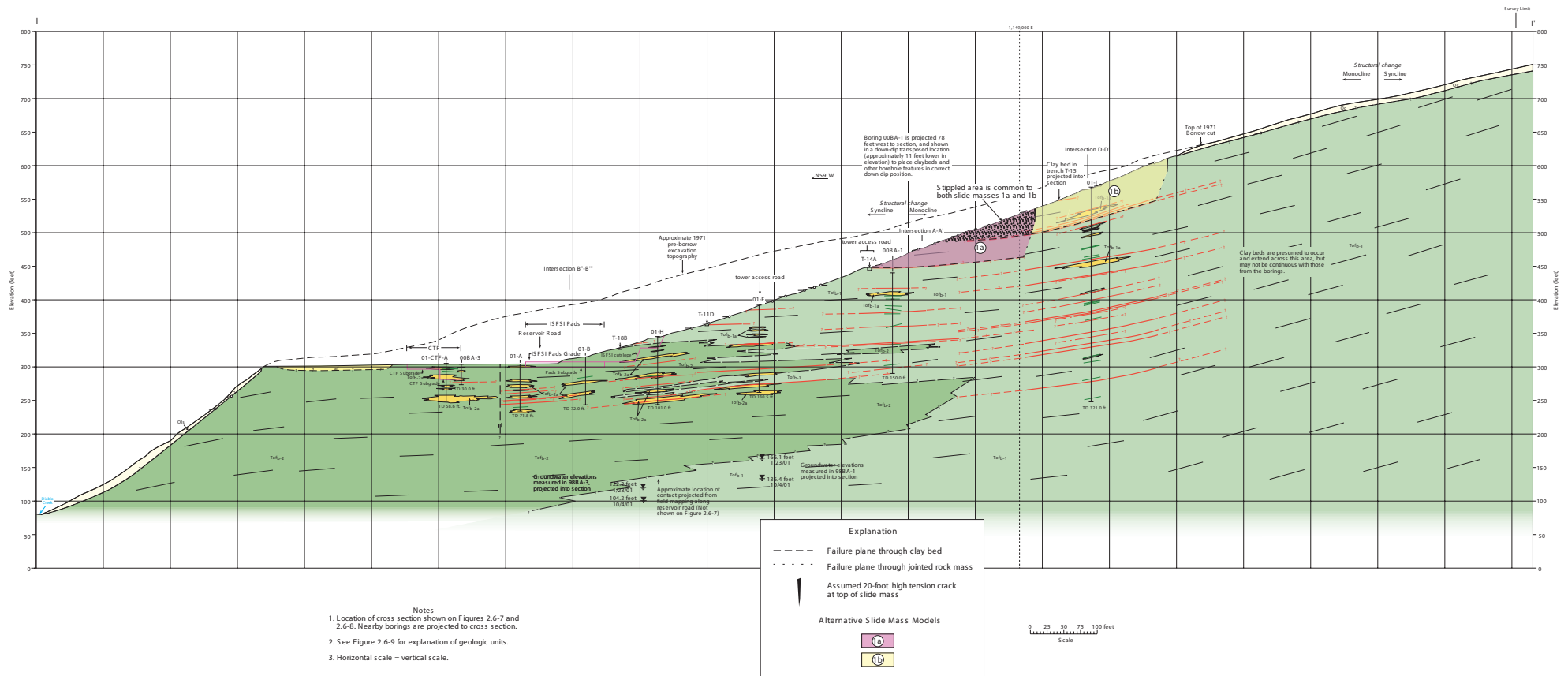
FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-44 DDE, HOSGRI, AND LTSP VERTICAL SPECTRA



FSAR UPDATE
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FIGURE 2.6-45 ILP HORIZONTAL SPECTRA



FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-46 ILP VERTICAL SPECTRUM

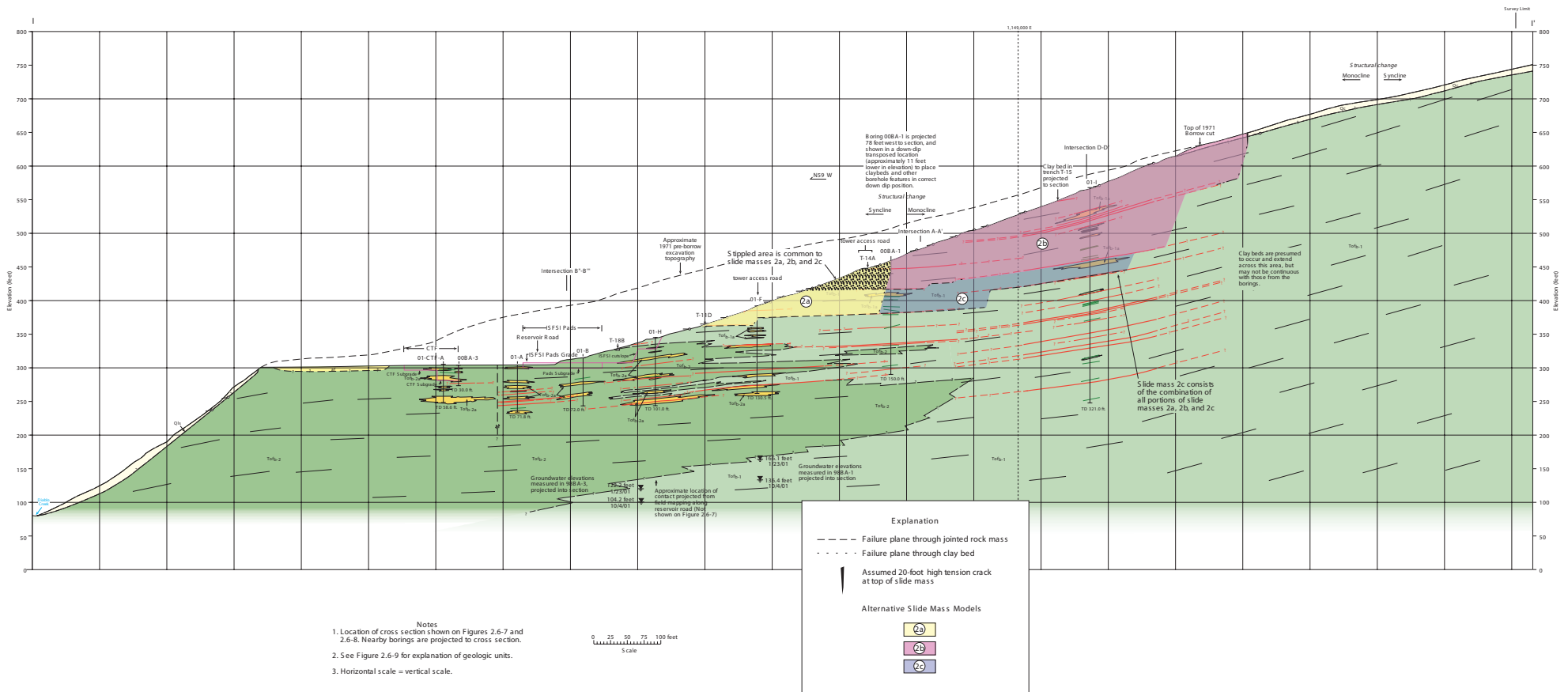


FSAR UPDATE

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FIGURE 2.6-47

SLIDE MASS MODEL 1

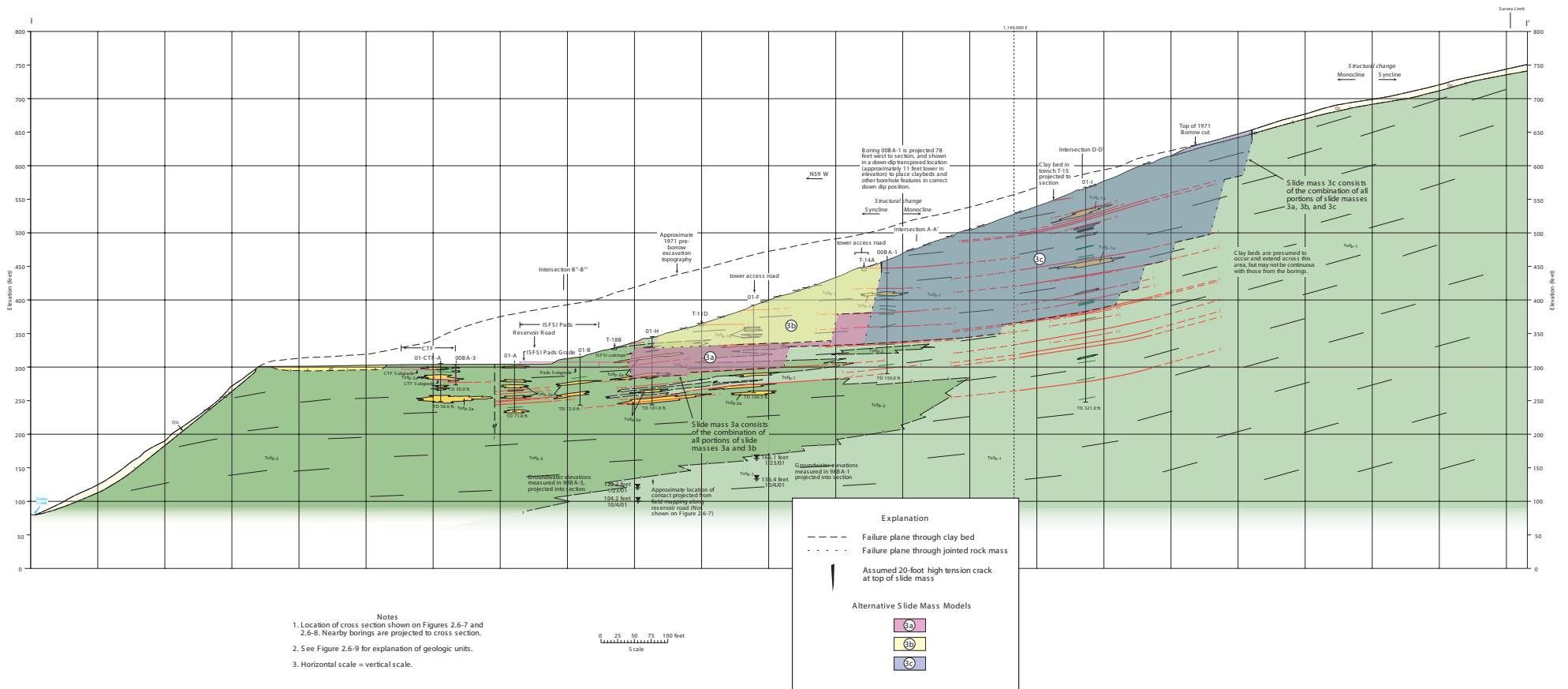


FSAR UPDATE

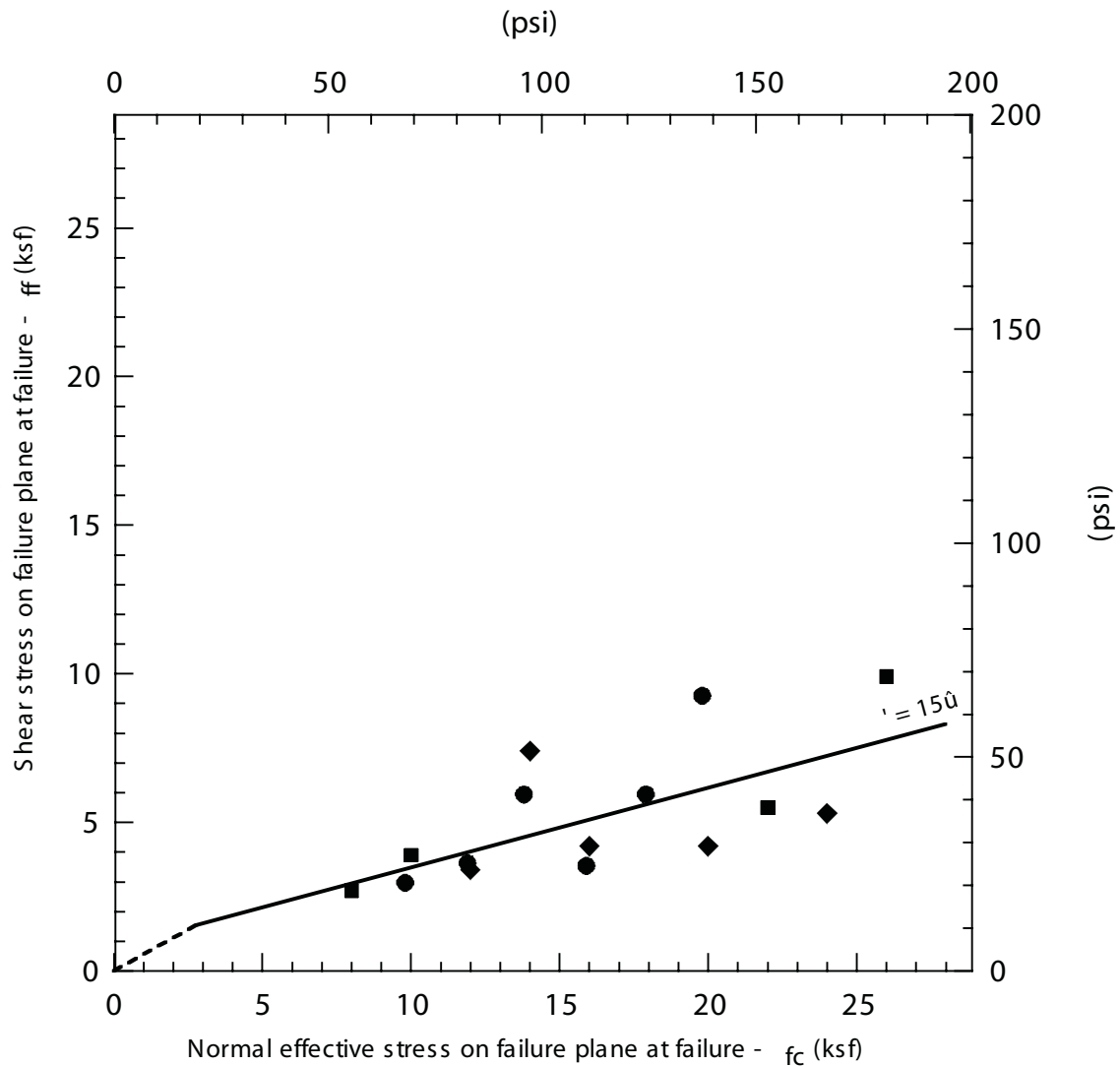
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FIGURE 2.6-48

SLIDE MASS MODEL 2



FSAR UPDATE
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FIGURE 2.6-49
SLIDE MASS MODEL 3

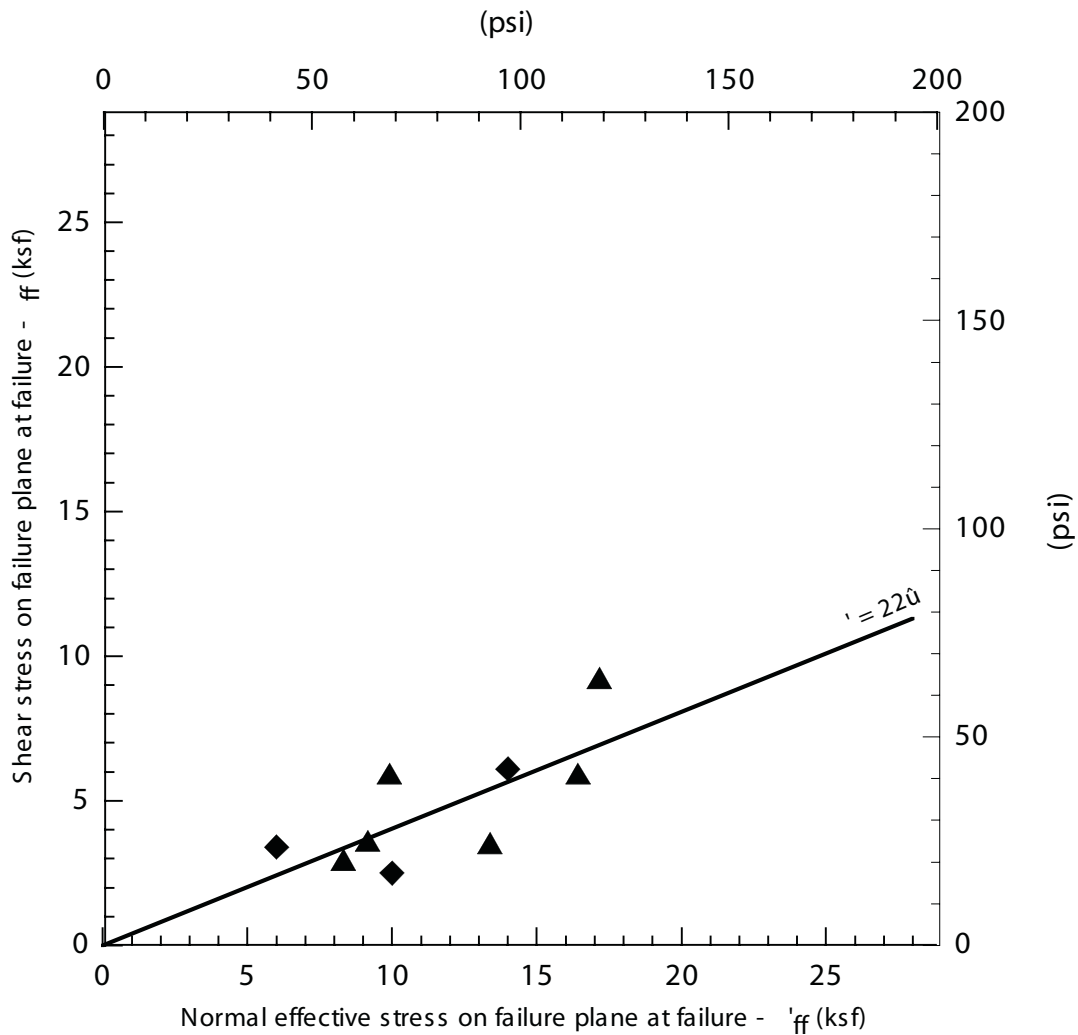


EXPLANATION

- Triaxial compression tests: consolidated undrained
- ◆ Direct shear tests: monotonic loading
- Direct shear tests: cyclic loading
- Undrained shear strength envelope $\tau = f_c \tan(29^\circ)$
- Undrained shear strength envelope $\tau = 0.8 \text{ ksf} + f_c \tan(15^\circ)$

Data from William Lettis & Associates, 2001, Diablo Canyon ISFSI Data Report G, Soil Laboratory Test Data, Cooper Testing Laboratory

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-50 DESIGN UNDRAINED STRENGTH OF CLAY BEDS

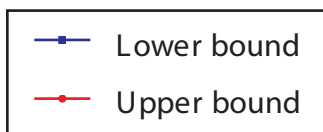
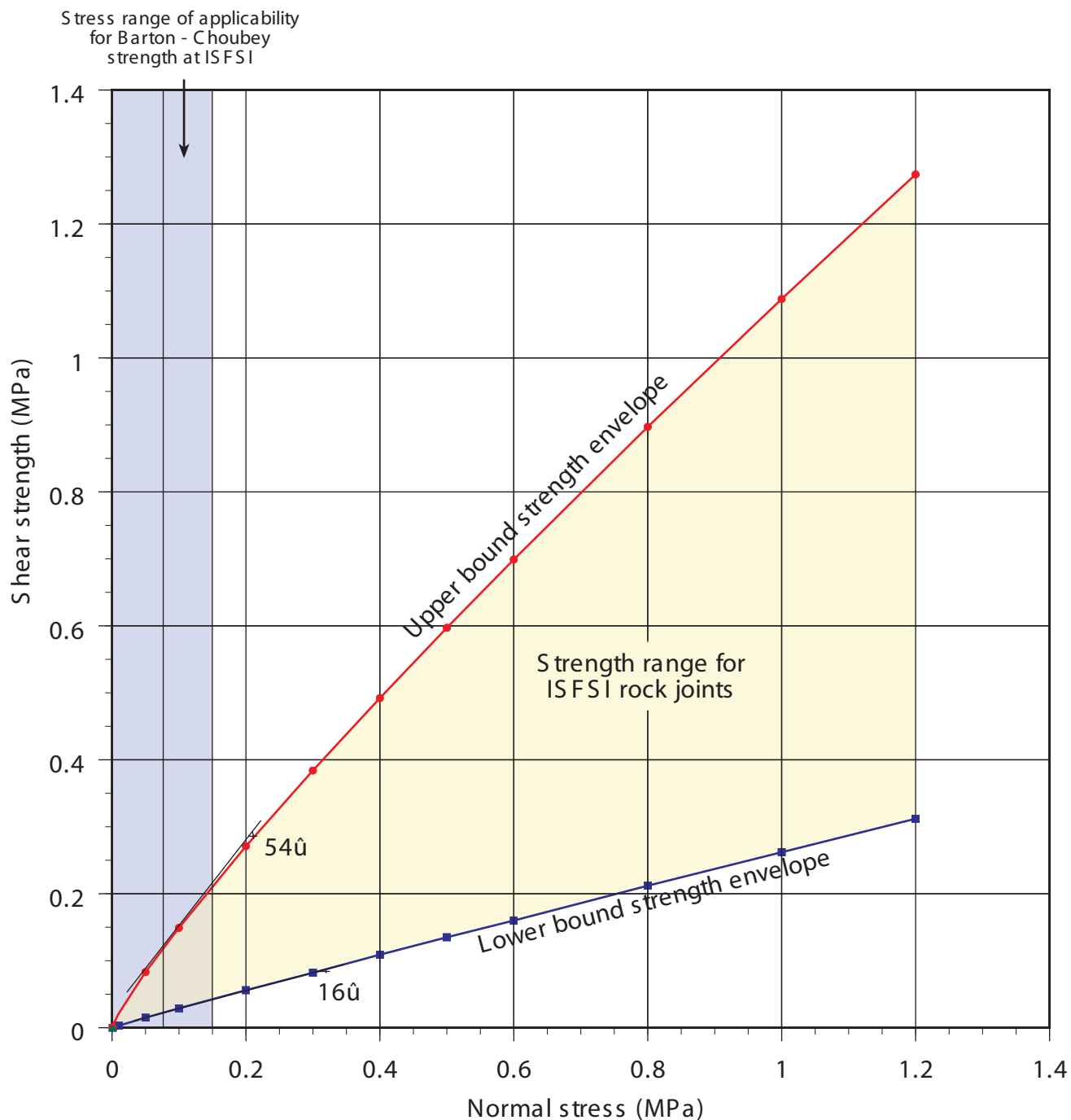


EXPLANATION

▲ Triaxial compression tests: consolidated undrained
 ◆ Direct shear tests: drained monotonic loading
 — Effective friction angle (ϕ) = 22 deg, $c \approx 0$ psf

Data from William Lettis & Associates, 2001, Diablo Canyon ISFSI Data Report G, Soil Laboratory Test Data, Cooper Testing Laboratory

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-51
DESIGN DRAINED STRENGTH OF CLAY BEDS

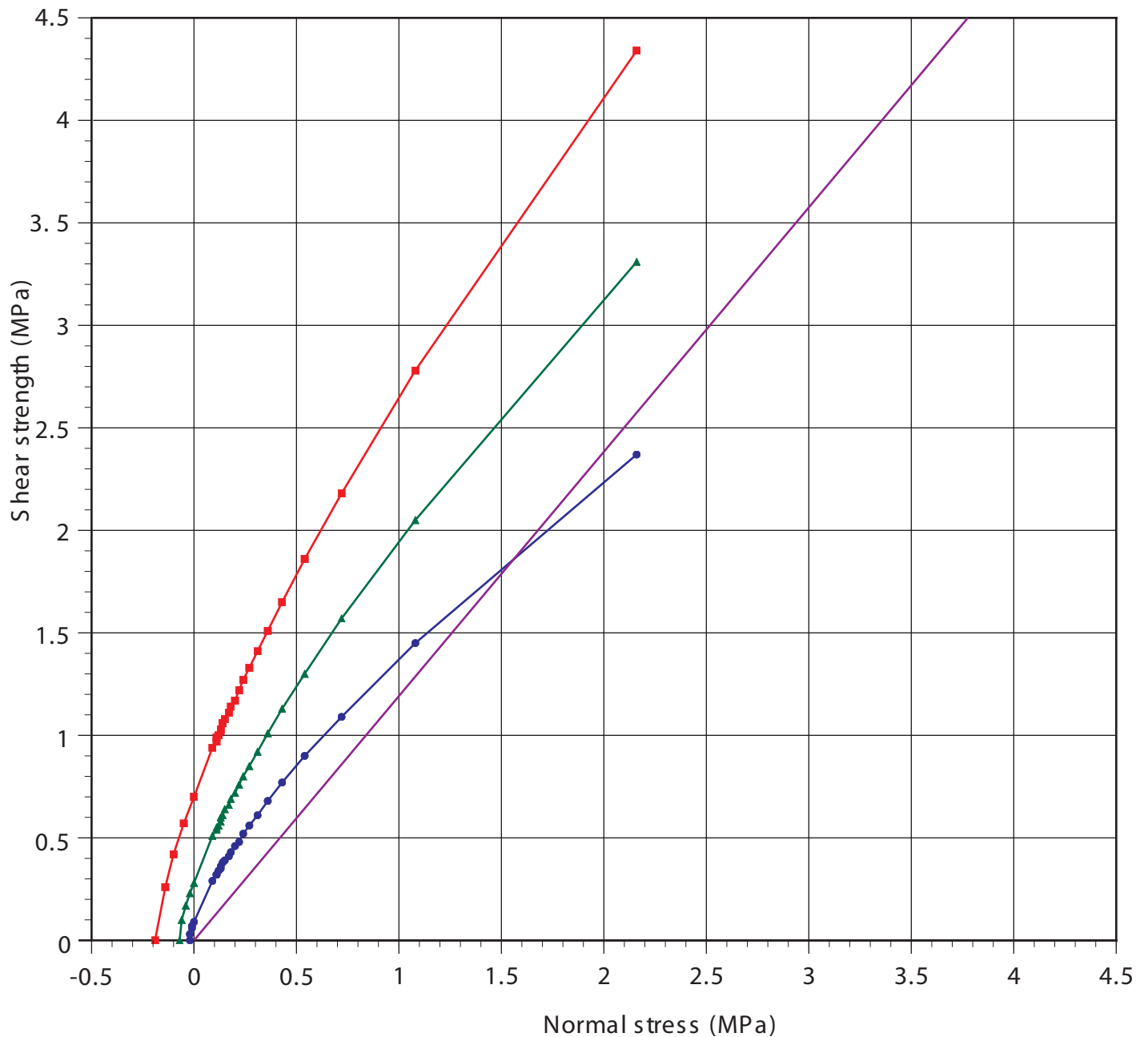


Data from William Lettis & Associates, Inc. (2001)
Diablo Canyon ISFSI Data Reports I, Rock Laboratory
Test Data (GeoTest Unlimited) and H, Rock Strength
Data and GSI Sheets

16 $\hat{u}$

Tangent line drawn tangent
to the curve at the midpoint
of normal stress range (0 to
0.15 MPa).

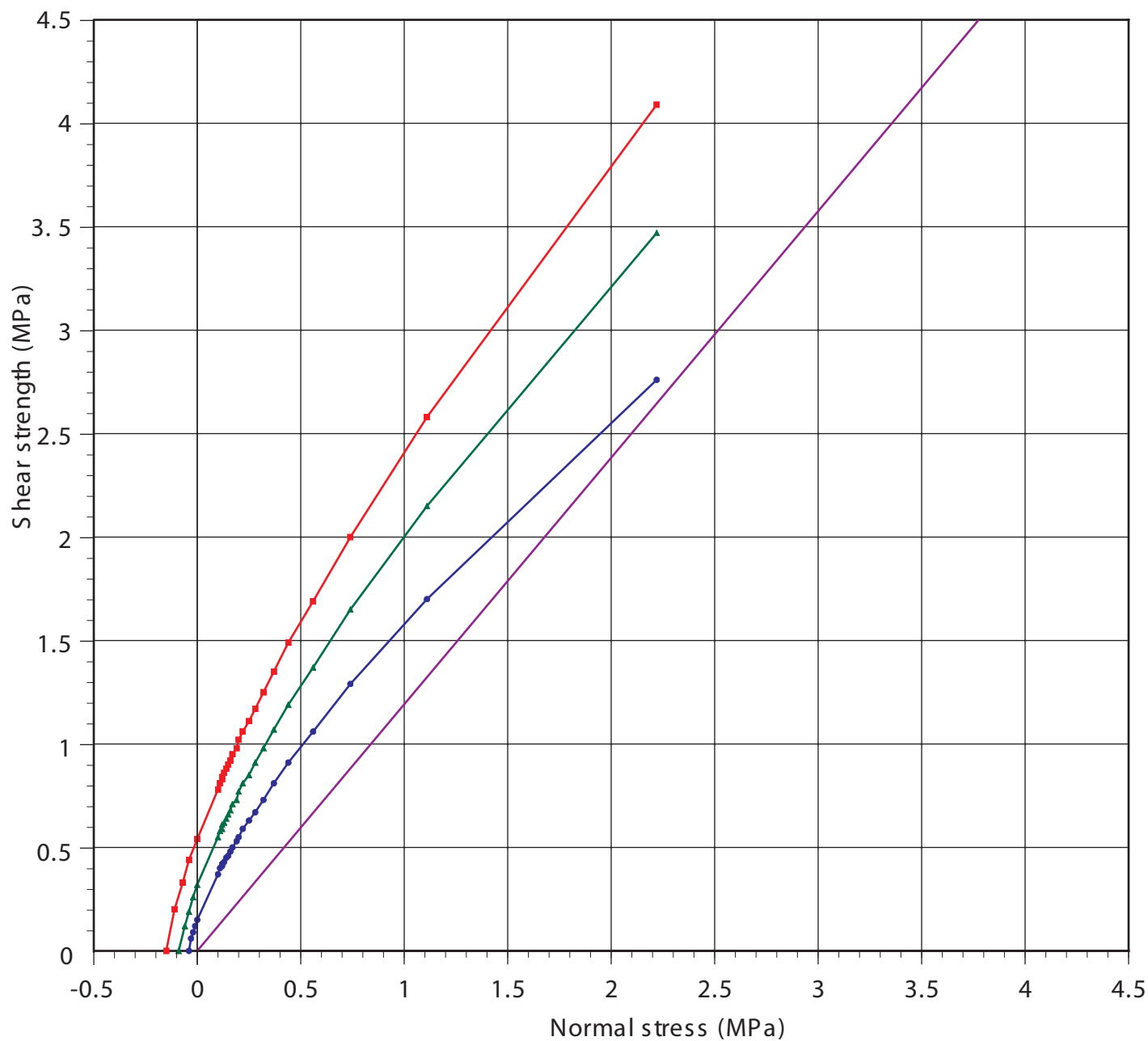
FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-52 RANGE OF SHEAR STRENGTHS FOR IN SITU DOLOMITE AND SANDSTONE ROCK JOINTS USING THE BARTON-CHOUBEY METHOD



FSAR UPDATE

DIABLO CANYON ISFSI

**FIGURE 2.6-53
COMPARISON OF HOEK-BROWN
ENVELOPE FOR DOLOMITE WITH
DESIGN STRENGTH OF 50 DEGREES**

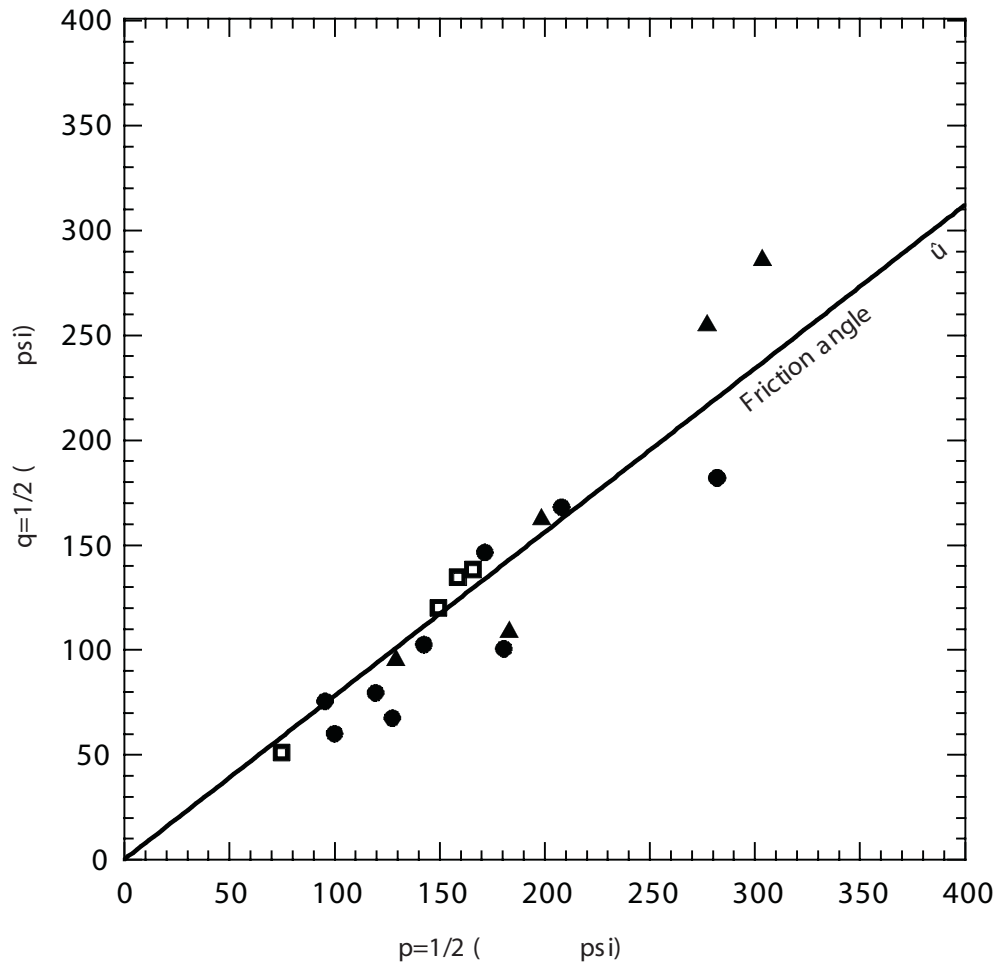


Note: Upper and lower bounds represent one standard deviation above and below the mean, respectively.

FSAR UPDATE

DIABLO CANYON ISFSI

**FIGURE 2.6-54
COMPARISON OF HOEK-BROWN
ENVELOPE FOR SANDSTONE WITH
DESIGN STRENGTH OF 50 DEGREES**



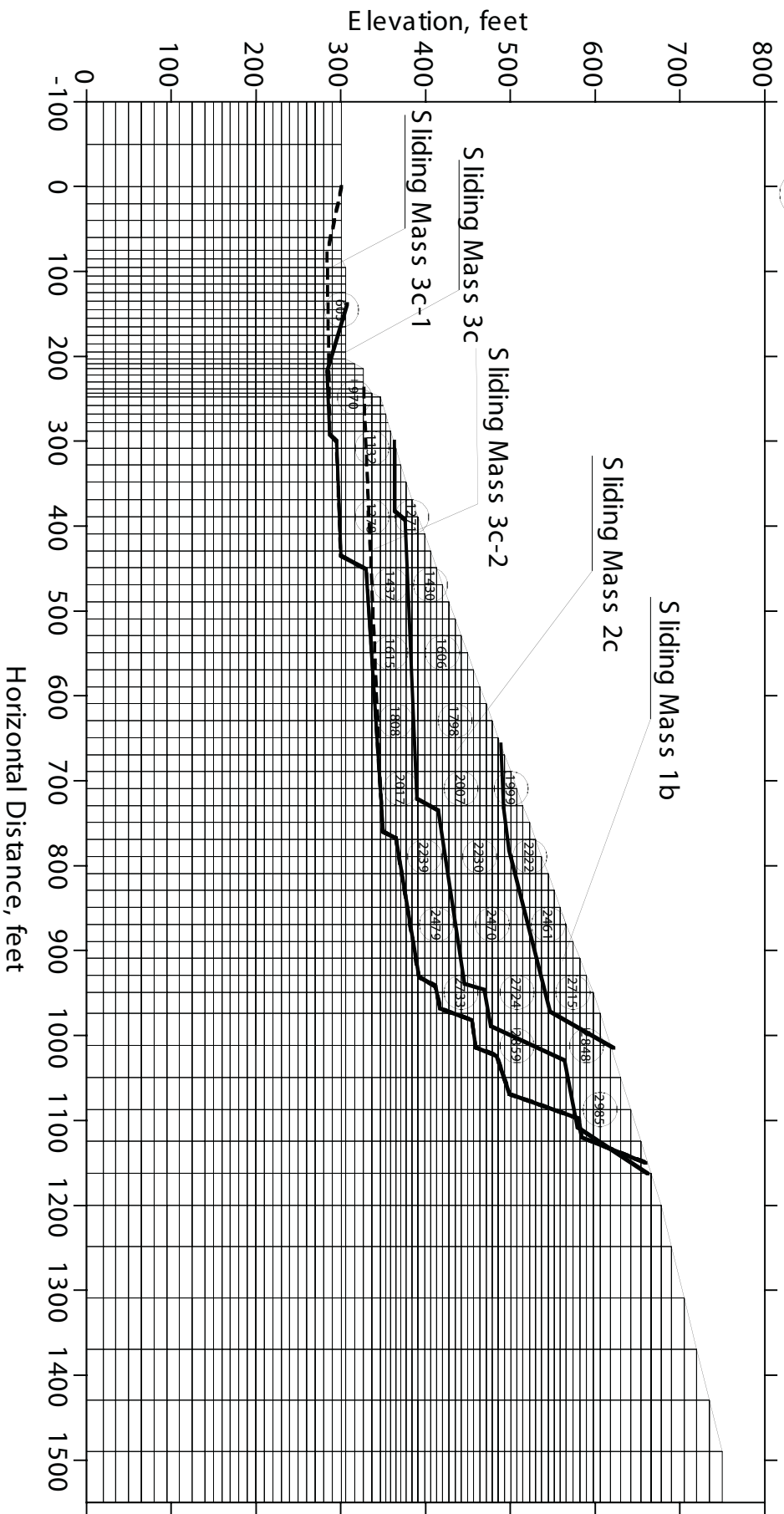
EXPLANATION

- Multi-stage triaxial tests with pore-water pressure measurements (pad + slope)
- ▲ Multi-stage triaxial tests without pore-water pressure measurements (pad + slope)
- Multi-stage triaxial tests without pore-water pressure measurements from boring (00BA-2)

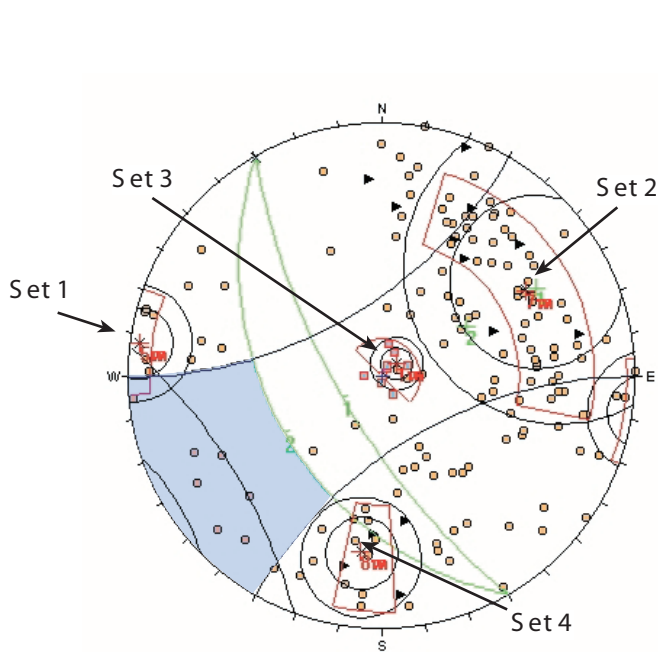
Data from William Lettis & Associates, 2001, Diablo Canyon ISFSI Data Report G, Soil Laboratory Test Data, Cooper Testing Laboratory

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FIGURE 2.6-55 TOTAL STRENGTH ANALYSIS OF FRIABLE SANDSTONE BASED ON TRIAXIAL TESTS

999 - node points to compute acceleration time histories



FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-56
POTENTIAL SLIDING MASSES AND NODE POINTS
FOR COMPUTED ACCELERATION TIME
HISTORIES



A. Topples hazard (low hazard)

Explanation

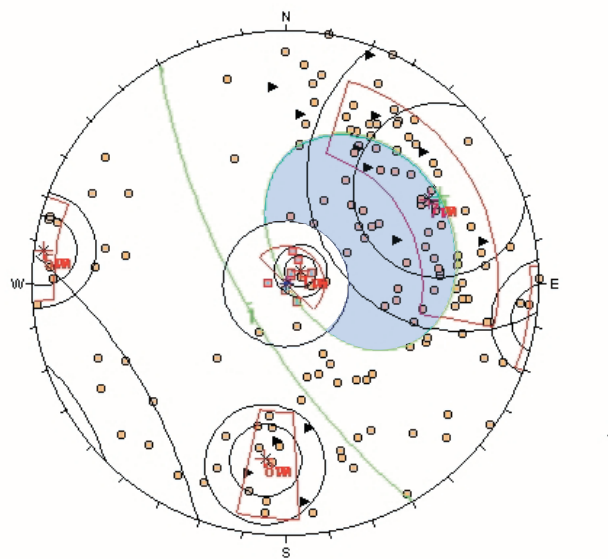
Poles

- Bedding
- ▲ Fault
- Joint

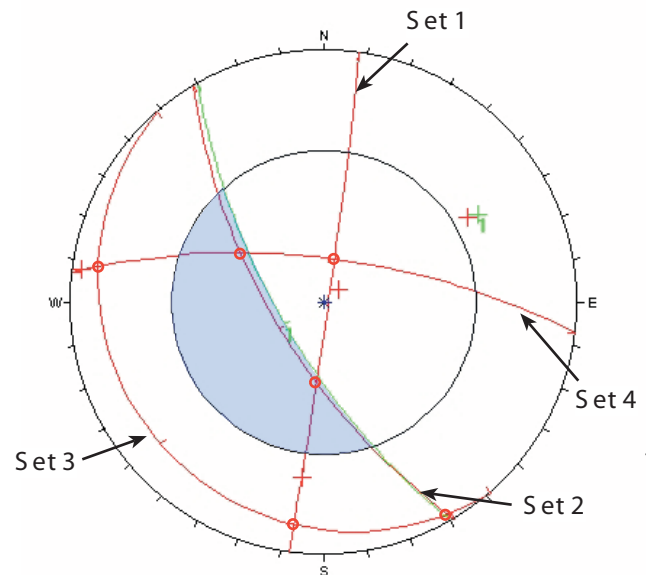
Failure envelope (based on 28 friction angle)

Failure envelope for topple and planar sliding without poles indicates stable conditions.

Failure envelope for wedge sliding without great circle intersections indicates stable conditions.



B. Planar sliding hazard (moderate to high hazard)



C. Wedge sliding hazard (moderate to high hazard)

Notes

Analysis performed using computer program DIPS (Rocscience, 1999, DIPS: Plotting analysis, and presentation of structural data using spherical projection techniques, version 5.041, Toronto, 86p).

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-57
KINEMATIC ANALYSES OF EAST CUTSLOPE

Explanation

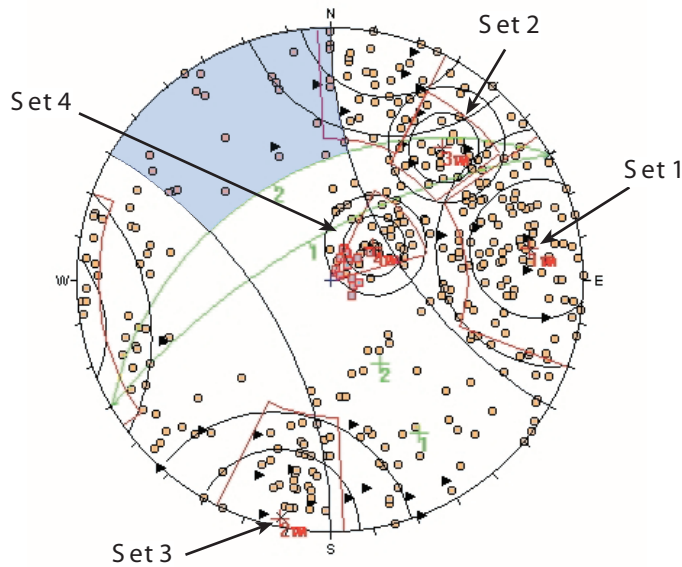
Poles

- Bedding
- ▲ Fault
- ◆ Joint

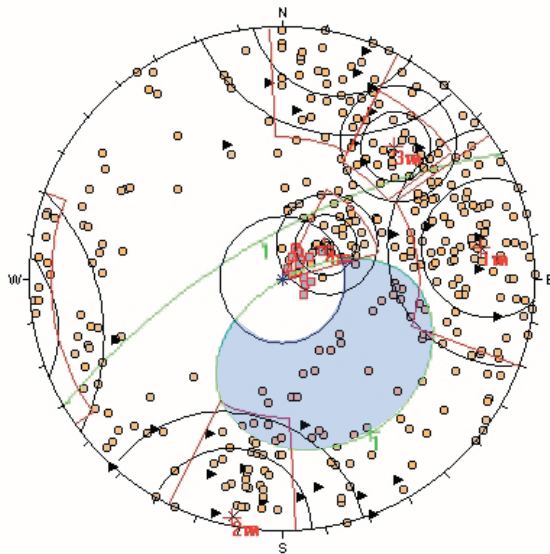
Failure envelope
(based on 28
friction angle)

Failure envelope for topple and planar sliding without poles indicates stable conditions.

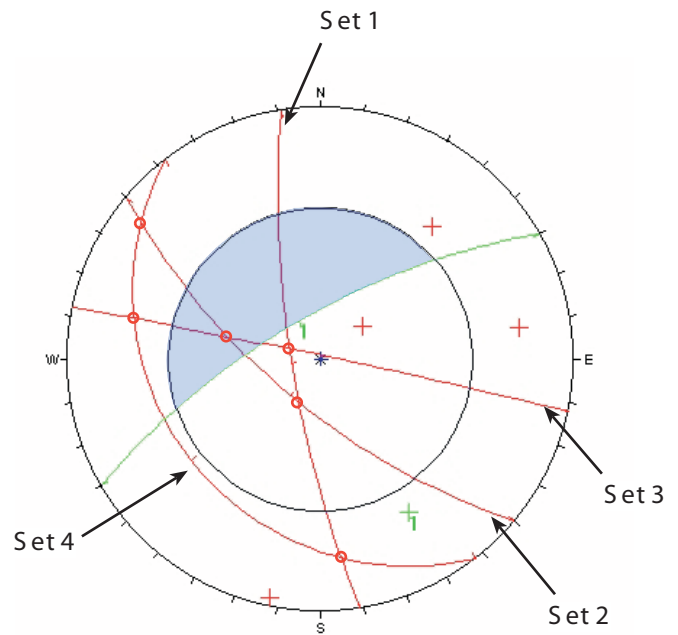
Failure envelope for wedge sliding without great circle intersections indicates stable conditions.



A. Toppole hazard (low hazard)



B. Planar sliding hazard (low to moderate hazard)



C. Wedge sliding hazard (high hazard)

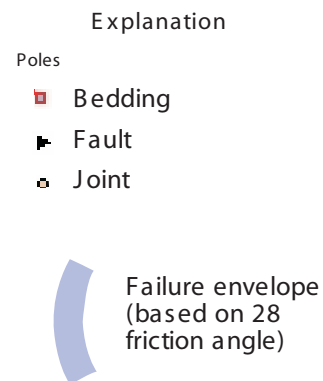
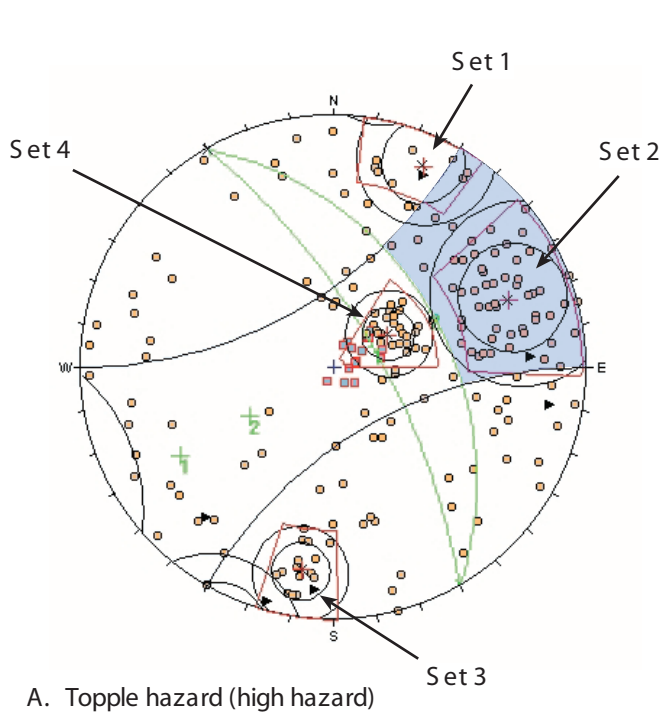
Notes

Analysis performed using computer program DIPS (Rocscience, 1999, DIPS: Plotting analysis, and presentation of structural data using spherical projection techniques, version 5.041, Toronto, 86p).

FSAR UPDATE

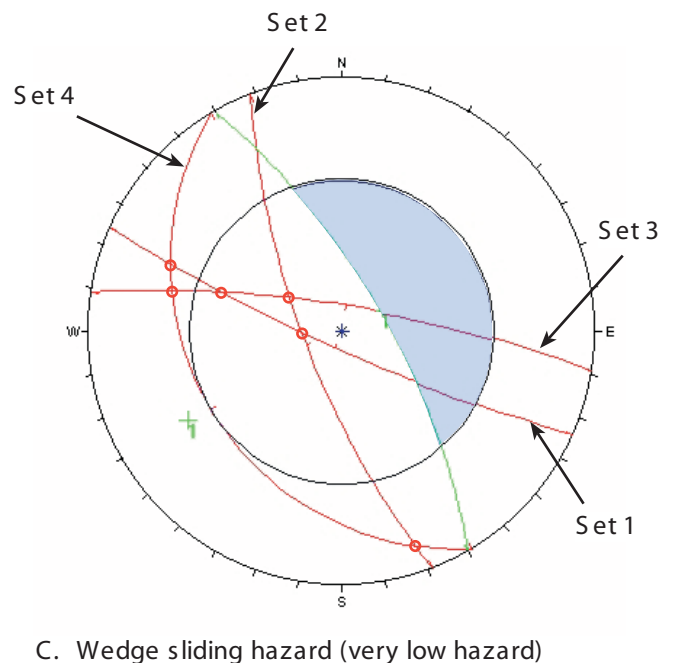
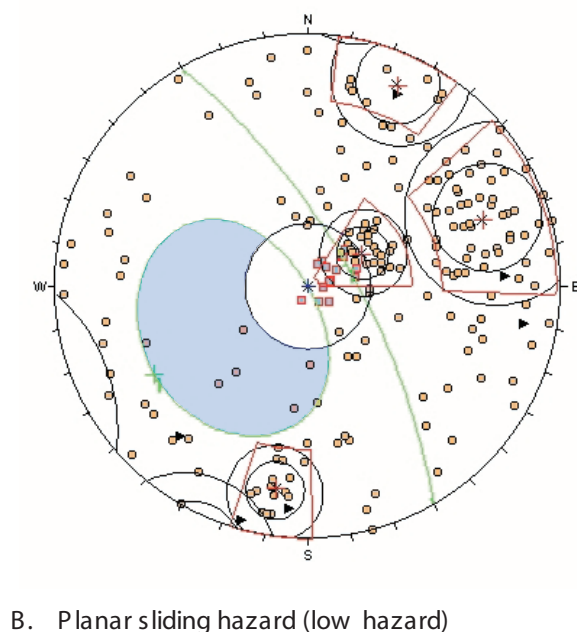
DIABLO CANYON ISFSI

FIGURE 2.6-58 KINEMATIC ANALYSES OF BACK CUTSLOPE



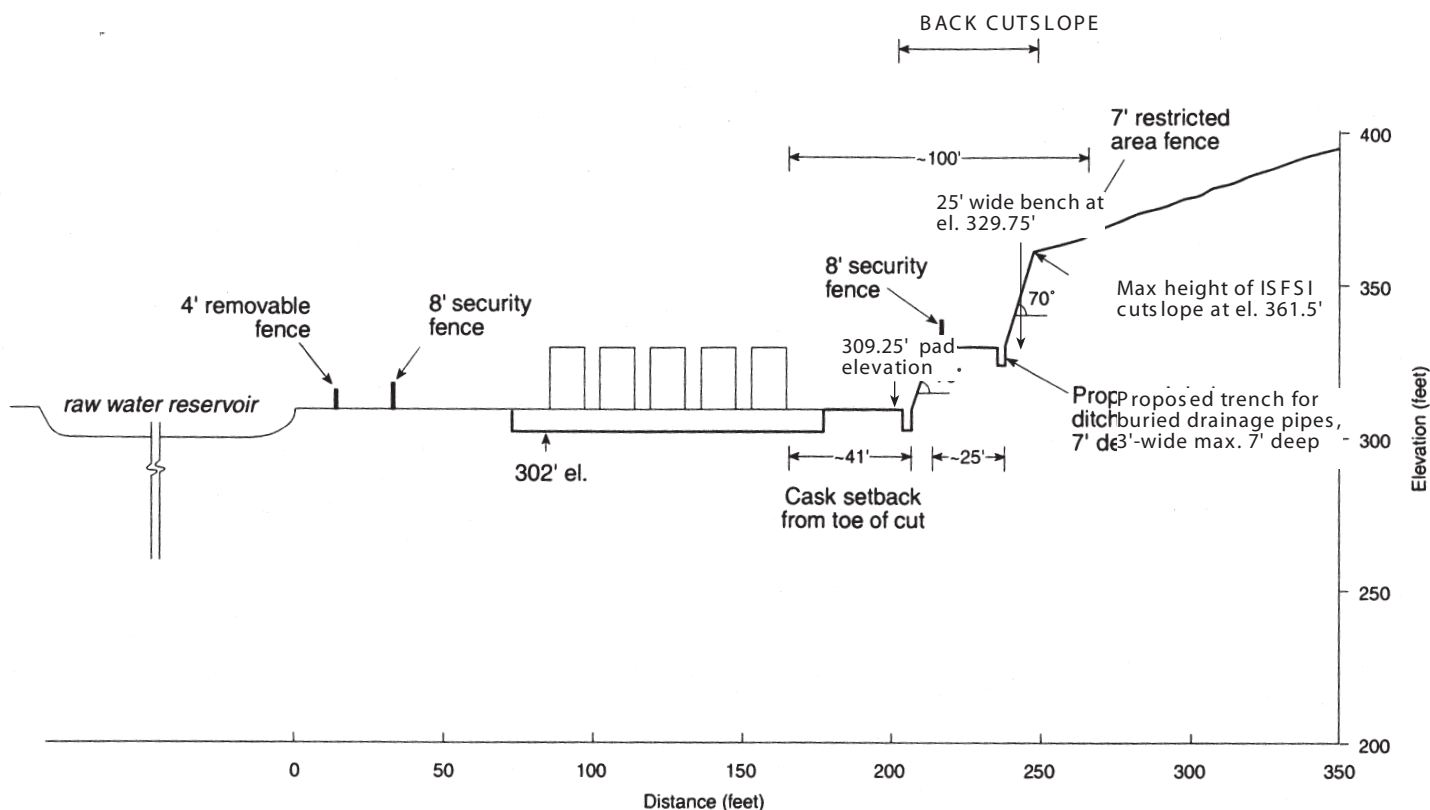
Failure envelope for topple and planar sliding without poles indicates stable conditions.

Failure envelope for wedge sliding without great circle intersections indicates stable conditions.

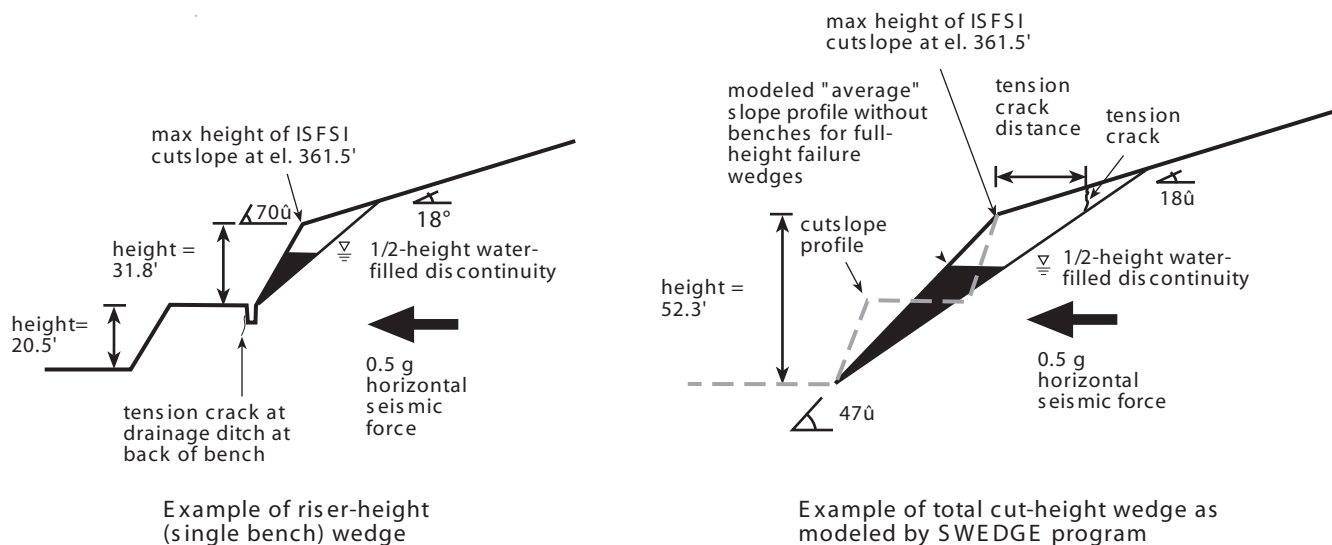


Notes
Analysis performed using computer program DIPS (Rocscience, 1999, DIPS: Plotting analysis, and presentation of structural data using spherical projection techniques, version 5.041, Toronto, 86p).

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-59 KINEMATIC ANALYSES OF WEST CUTSLOPE

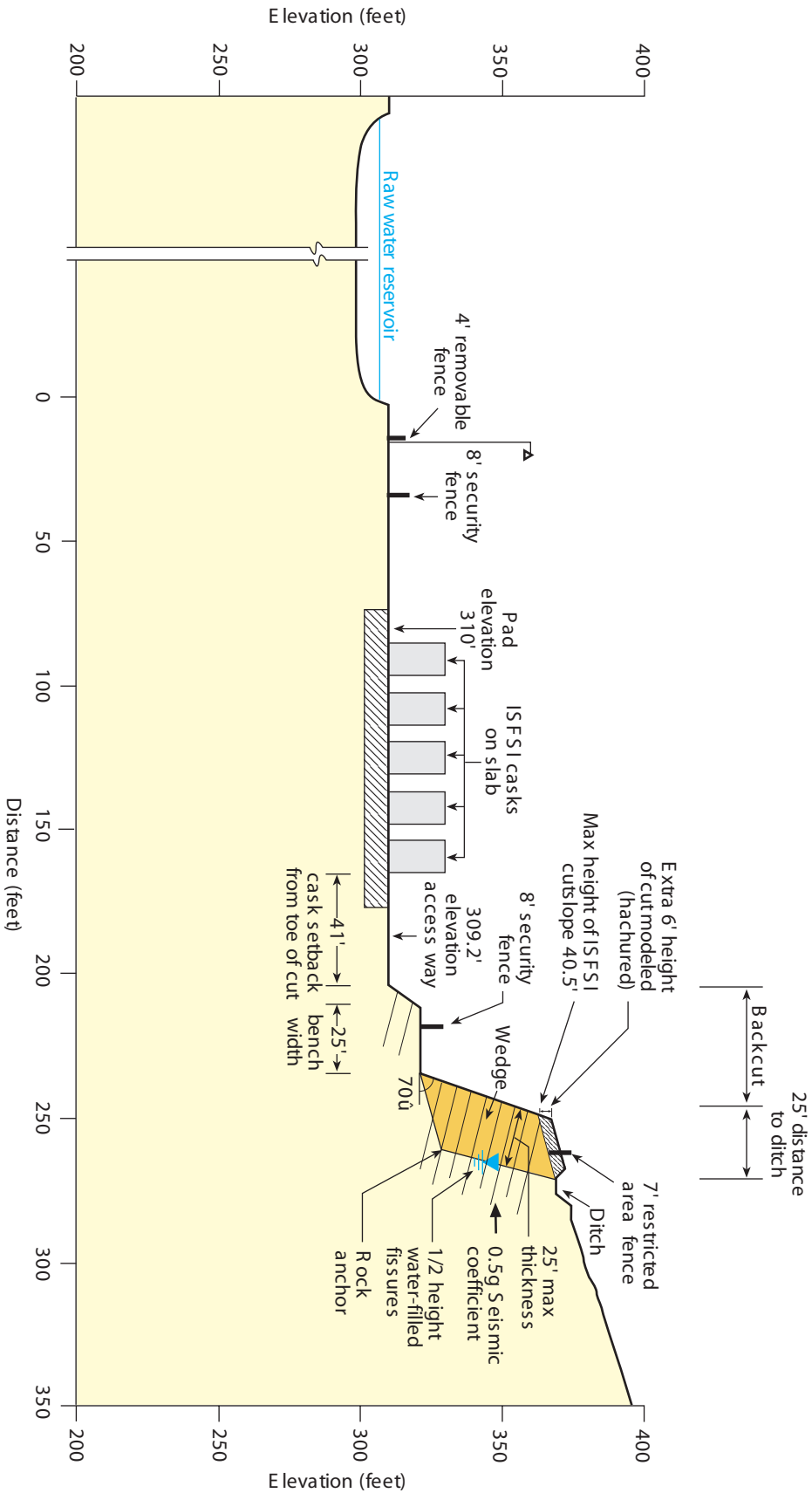


A. Cross section through ISFSI pad and back cut, looking east



B. SWEDGE analysis cut configurations

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-60 CUTSLOPE CONFIGURATION USED IN SWEDGE ANALYSES



Note: cutslope geometry is based on PG&E Cannon Associates drawings, numbers CE41240EX1/EX2, 1/26/05.

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-61
REVISED CUTSLOPE CONFIGURATION USED IN SWEDGE ANALYSES