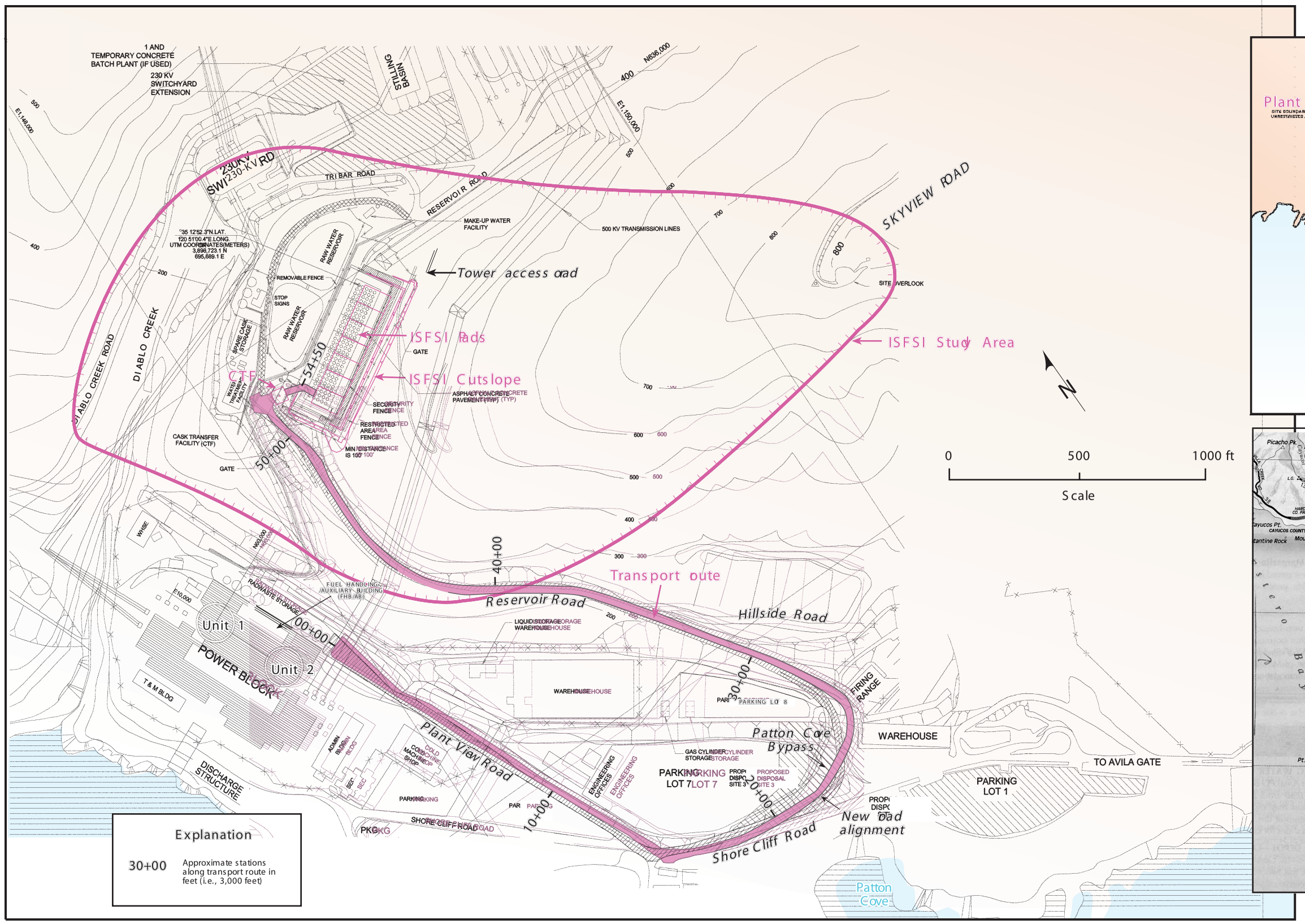
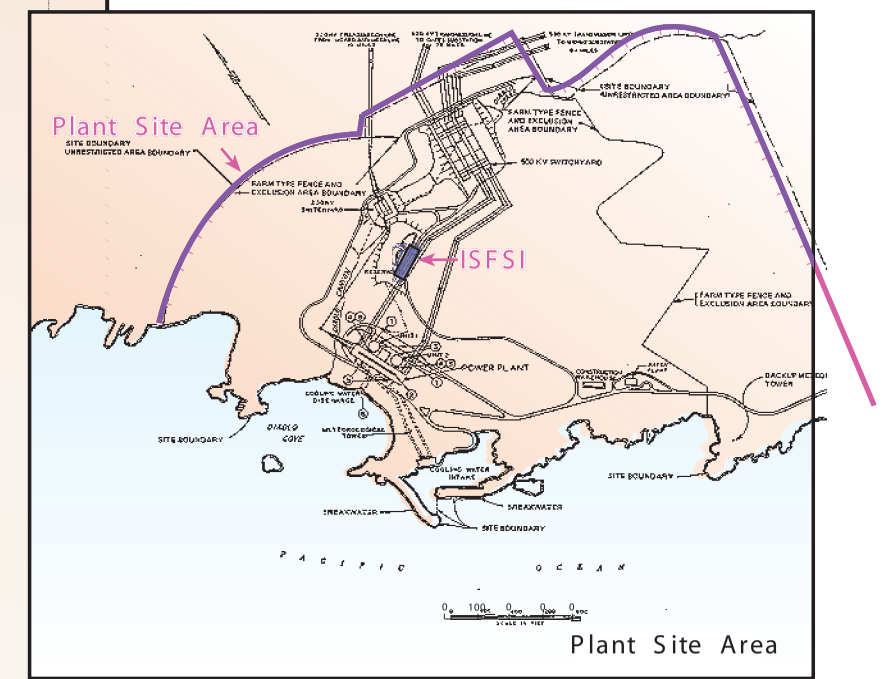
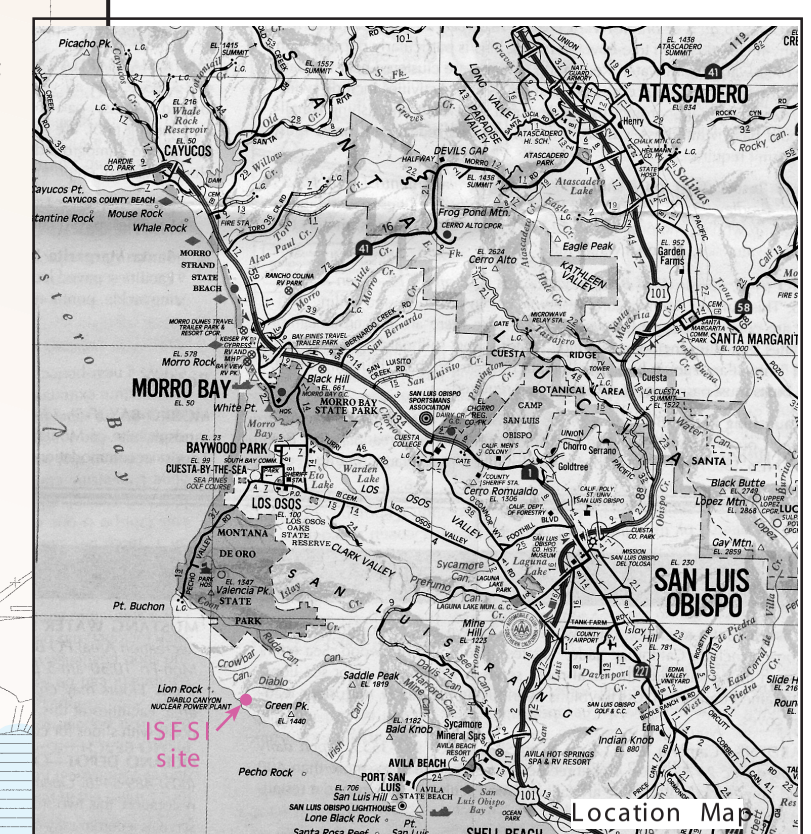
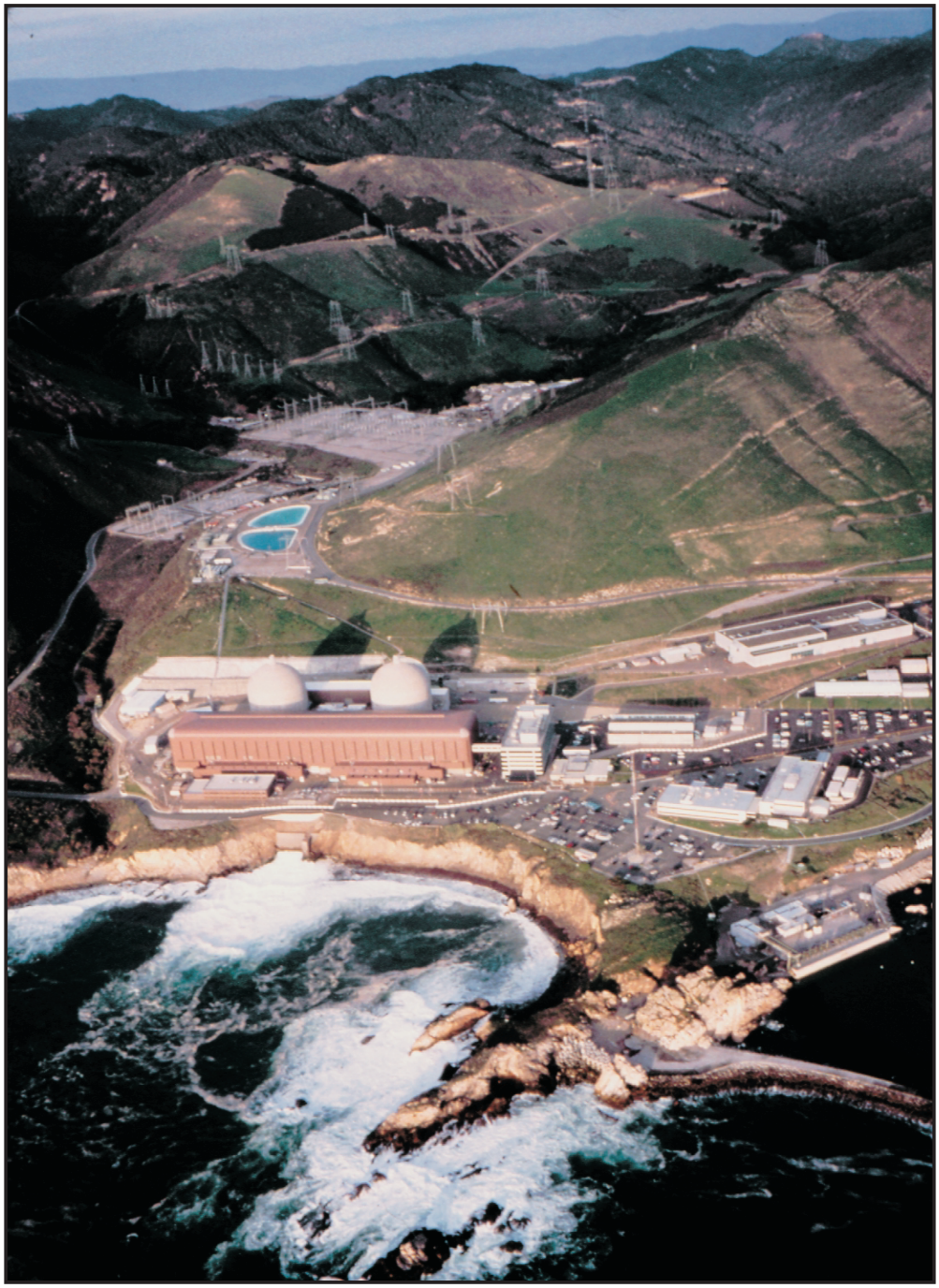




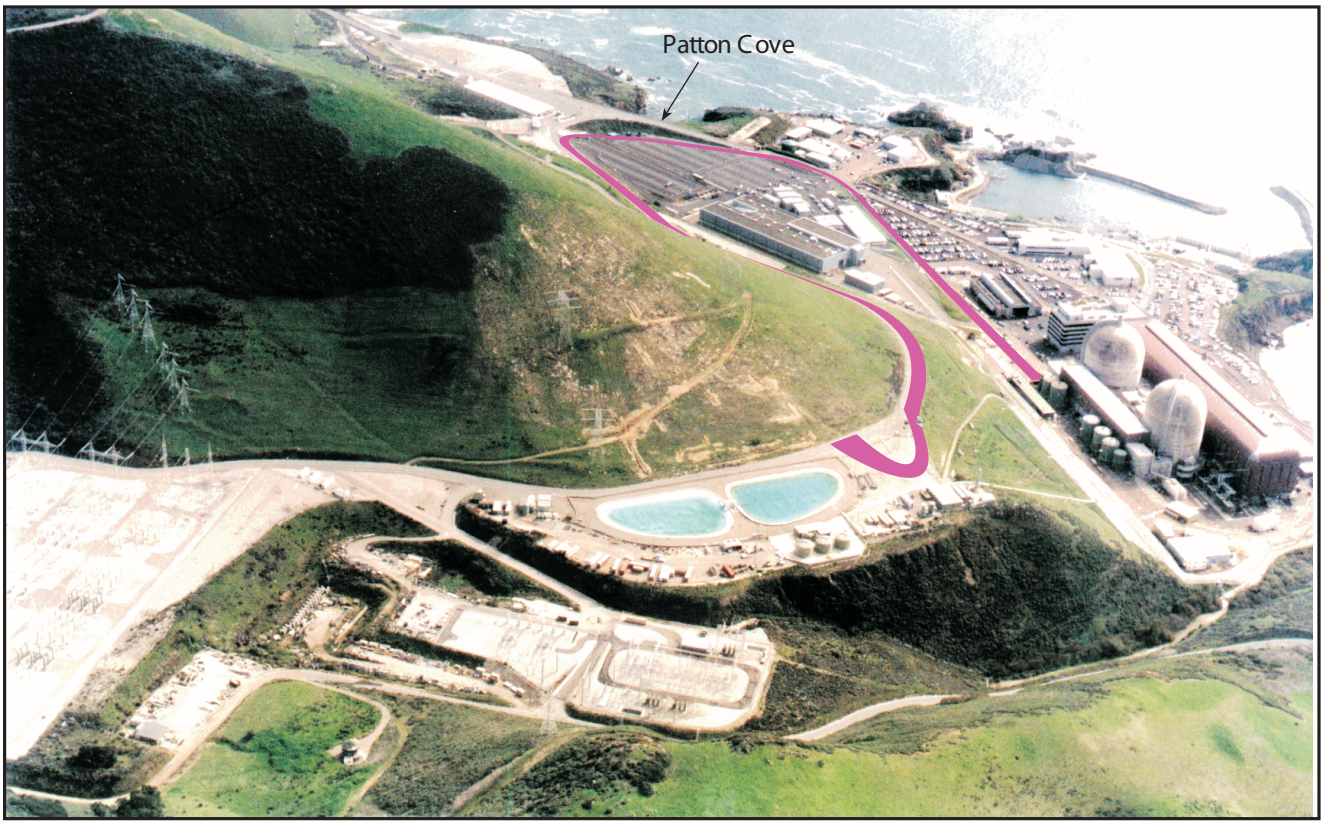


FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-1 LOCATION AND BOUNDARIES OF GEOLOGIC STUDY AREAS



Northeast view of Diablo Canyon Power Plant and the ISFSI and CTF sites. The ISFSI is at the base of the slope to the right of the raw water reservoir. The CTF is directly southwest of the reservoirs. The extent of the 1971 borrow area excavation is indicated by the rocky area on the slope above the reservoir. The power plant and adjacent facilities are constructed on a marine terrace that is covered by Quaternary fan deposits. Photo roll WDP-1.

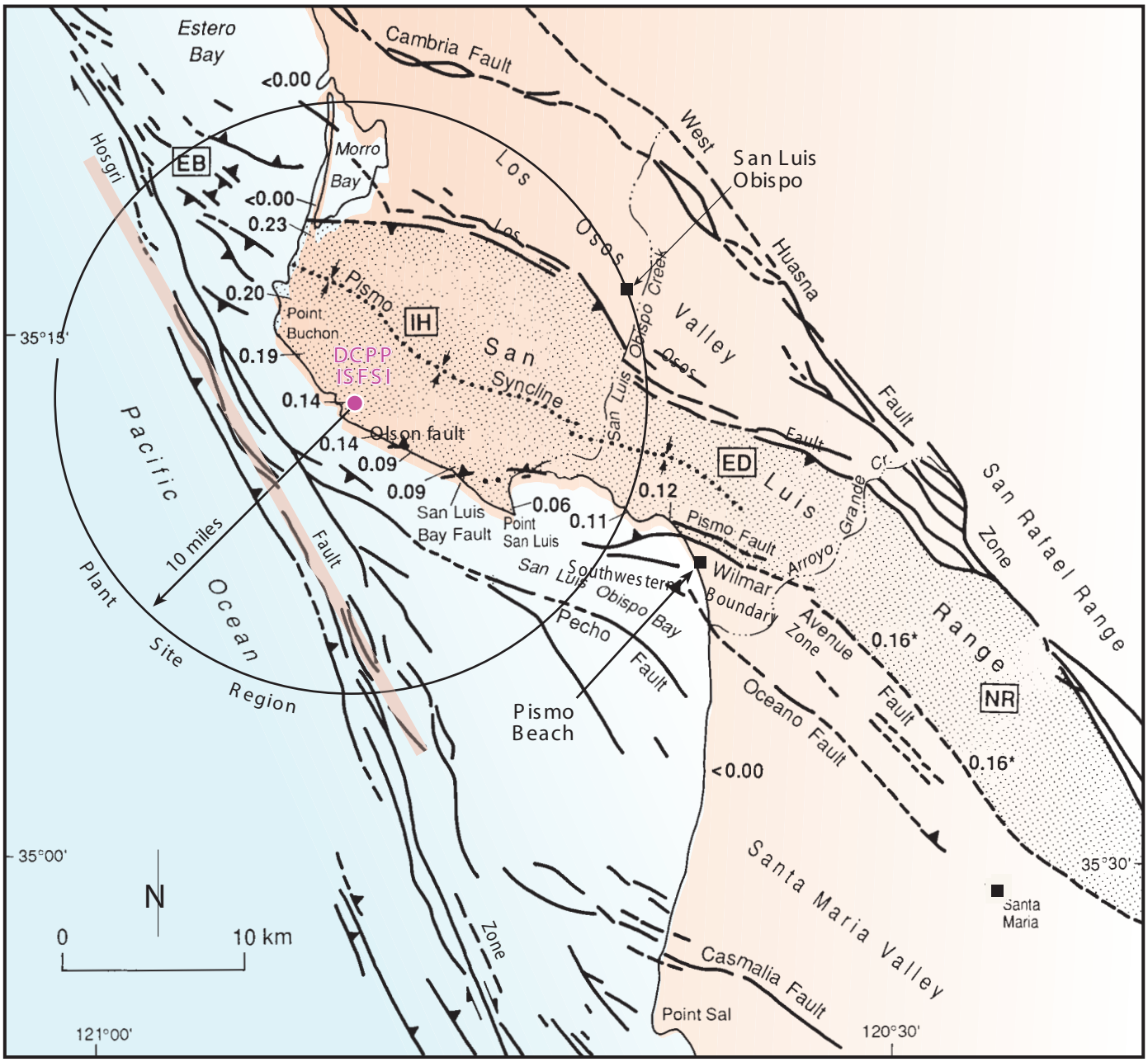
FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-2 DIABLO CANYON POWER PLANT AND THE ISFSI AND CTF SITES



Transport route

Southward view of the ISFSI study area and transport route. The ISFSI site is located at the base of the slope behind the raw water reservoir. The CTF site is in the flat area to the right of the reservoir. The transport route starts behind the power plant, crosses the marine terrace towards the coast, and curves back along the base of the ridge to the ISFSI pads. The extent of the 1971 borrow area excavation is indicated by brown grass and bedrock outcrops of the Obispo Formation above the reservoir. The natural steep slope of the canyon wall (with brushy vegetation) in the foreground is partly covered by the fill from the 230-kV switchyard below the reservoirs; the 500-kV switchyard is on the left. Photo roll JLB-1.

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-3 SOUTHWARD VIEW OF THE ISFSI AND CTF SITES AND TRANSPORT ROUTE



(from PG&E, 1988)

0.14

0.16*

EB

IH

ED

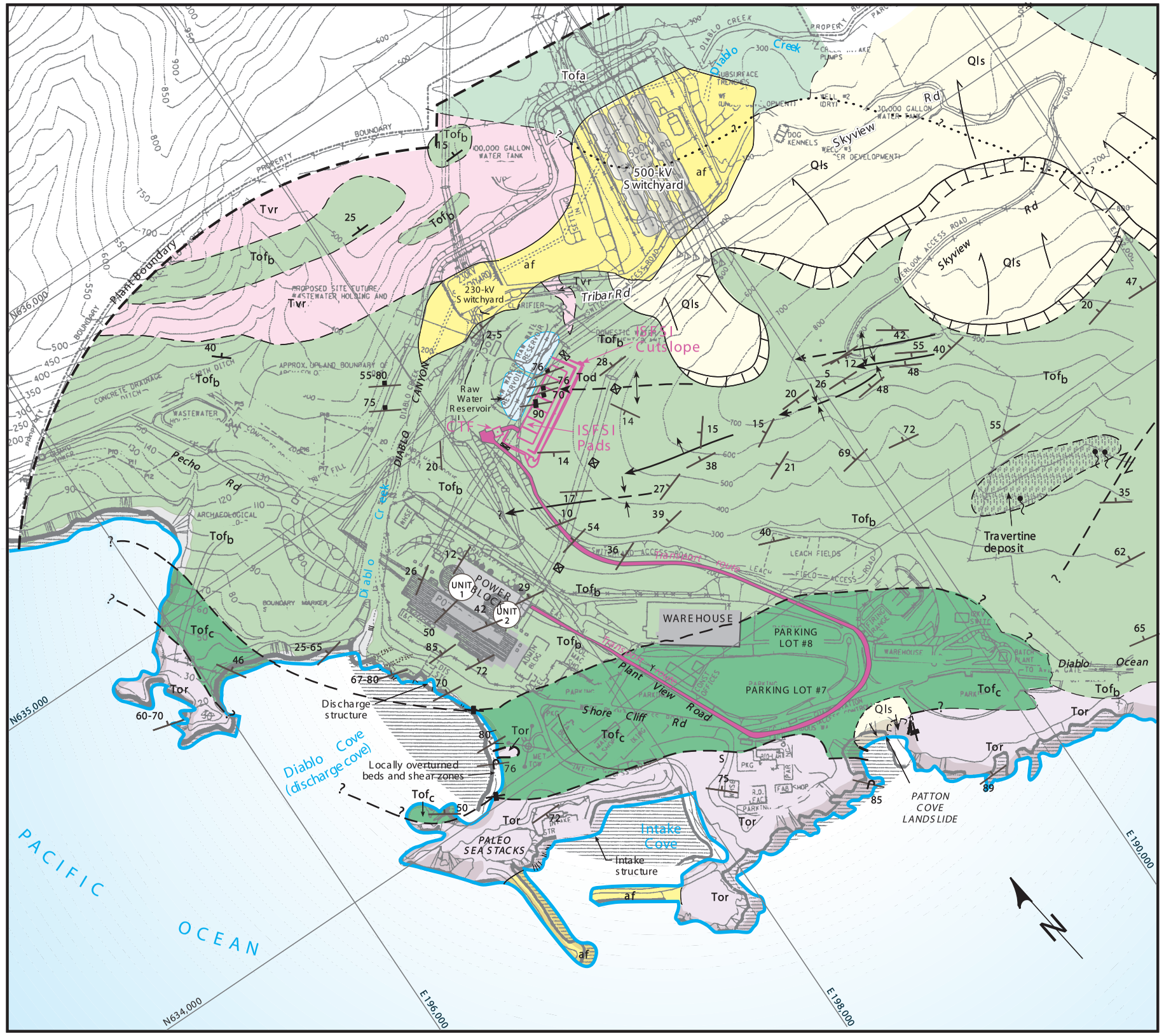
NR

Average fault trend (338°) used for ground motion analyses

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-4 REGIONAL STRUCTURE MAP

Photo of Obispo Formation dolomite and sandstone strata exposed on the hillslope above the transport route on Reservoir Road. The ISFSI site is to the right of the raw water reservoir. Bedding dips into the hillslope on the west limb of the regional Pismo syncline and extends beneath the power block (off photo to lower left). A small parasitic syncline is manifest as the U-shaped strata directly below the ridge crest in the middle of the photo. Several debris-flow chutes (↓) form the gullies on the slope above Reservoir Road. Photo roll JLB-2.

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-5 OBISPO FORMATION DOLOMITE AND SANDSTONE ON HILLSLOPE ABOVE RESERVOIR ROAD



Explanation

- **af** — Artificial fill (engineered), only major fills shown
- **Qls** — Quaternary landslide deposits
- **Tvr** — Volcanic rock (middle Miocene), diabase intrusive sills and dikes

Obispo Formation

(lower and middle Miocene) - bedded dolomitic sandstone, siltstone, and claystone with tuffaceous beds, locally calcareous, some chert and volcanic rock lenses

Member Tof - Sandstone and dolomite

- **Tof_a** — Unit a - diatomaceous siltstone and tuffaceous sandstone; yellow-brown to tan; thick to massive bedding
- **Tof_b** — Unit b - dolomite, dolomitic siltstone, dolomitic sandstone and sandstone, medium to very thick bedding
- **Tof_c** — Unit c - shale, claystone and siltstone, thin to medium bedding extensively sheared
- **Tor** — Member Tor - Volcanic rock, zeolitized and silicified tuff

Tertiary

- Bedrock fault or shear zone, dashed where approximate, queried where uncertain, arrows show sense of displacement
- Geologic contact, solid line where well-defined, dashed where approximate, queried and/or dotted where uncertain
- Cut or fill slope
- Large landslides. Arrows indicate direction of movement, hachures define head scarp. (Smaller landslides are not shown)
- 500-kV tower
- 10 — Generalized strike and dip of bedding
- Parasitic folds on south limb of Pismo syncline
  - Axis of anticline, plunge indicated by larger arrow, dashed where approximately located
  - Axis of syncline, plunge indicated by larger arrow, dashed where approximately located
  - Axis of monocline, plunge indicated by larger arrow, dashed where approximately located
- Steep sea cliff
- 65 — Strike and dip of fault
- Spring

Note: Except for small faults at and near the ISFSI site, only major geologic structures and bedrock units, and large landslides, are shown.

Data sources

Base Maps:
PG&E Civil Site Facilities Layout Plan (modified 1994)

Topography from PG&E, 1986 (and later revisions), Plot plan drawing 471124

Geology modified from:
C.A. Hall, Jr., W.G. Ernest, S. W. Prior, and J.W. Siese, 1979, Geologic map of the San Luis Obispo-San Simion region, U.S. Geological Survey Miscellaneous Investigation I-1097.

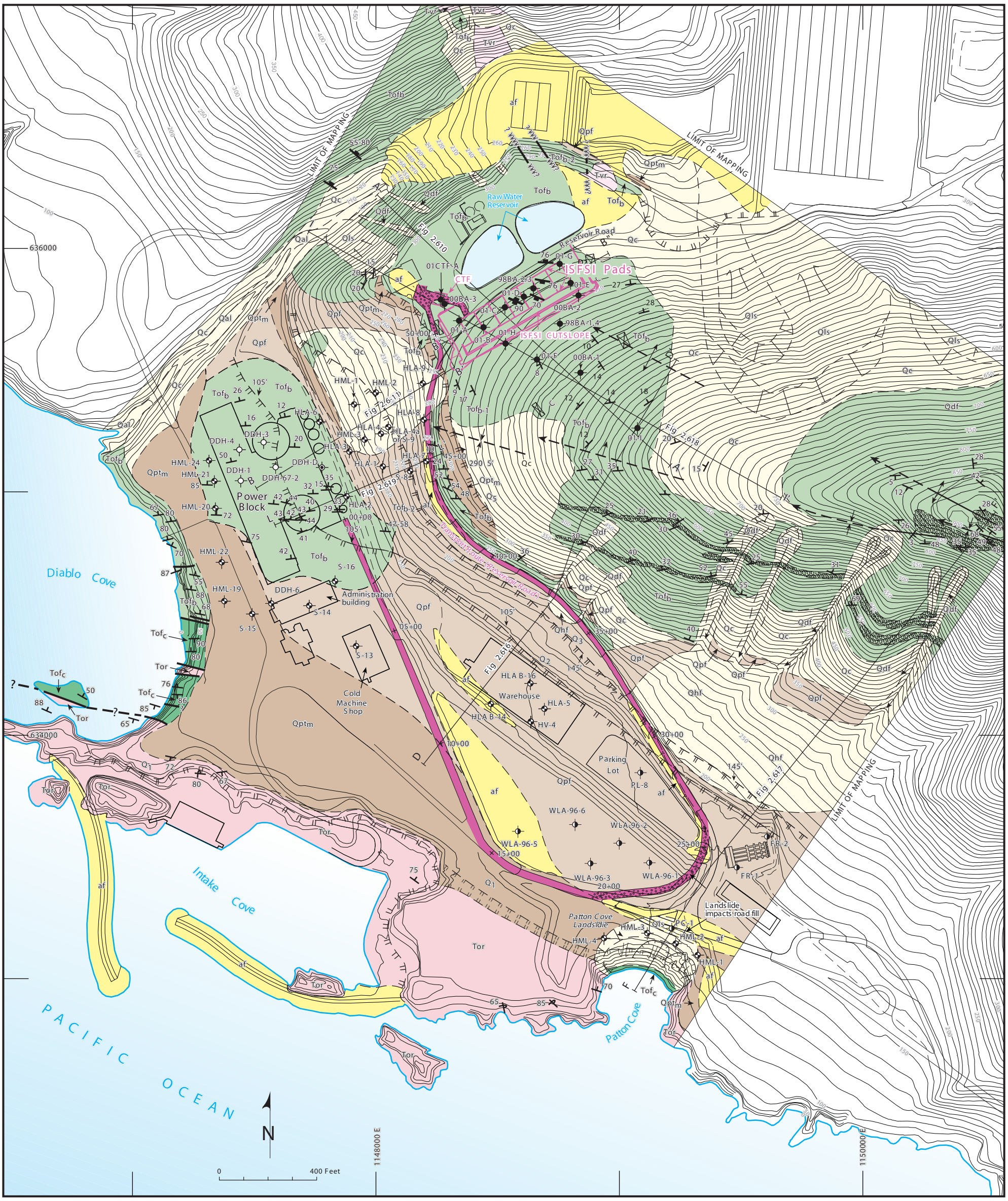
C.A. Hall Jr., 1973, Geolgoic map of the Morro Bay South and Port San Luis Quadranges, San Luis Obispo County, California, U.S. Geological Survey Miscellaneous Field Studies Map MF-511, scale 1:24,000.

FSAR UPDATE

DIABLO CANYON ISFSI

FIGURE 2.6-6
GEOLOGIC MAP OF BEDROCK AND LANDSLIDES IN THE PLANT SITE AREA

Revision 0 June 2004



Explanation

Quaternary

- af — Artificial fill (engineered)
- Qal, Qdf, Qc, Qls, Qhf — Quaternary deposits - alluvium, debris flow, colluvium, landslide, Holocene colluvial fan
  NOTE: Only surficial deposits greater than about 5 feet thick shown
- Qpf — Pleistocene colluvial fan
- Qptm — Pleistocene marine terrace deposit (inferred)

Tertiary

- Tvr — Volcanic rock (middle Miocene), diabase intrusive sills and dikes
- *Obispo Formation (lower and middle Miocene)*
- Tofb — Member Tof, Unit b - dolomite, dolomitic siltstone, dolomitic sandstone, and sandstone, medium to thick bedded. (Prominent outcrops)
- Tofc — Member Tof, Unit c - shale, claystone and siltstone, thin to medium bedding, extensively sheared.
- Tor — Member Tor - volcanic rock, zeolitized and silicified tuff

Geologic contact, solid line where well-defined, dashed where approximate, queried where uncertain.

Fault, dashed where approximate, queried where uncertain

Landslides, arrows indicate direction of movement, hachures define headscarp region

Qdf — Debris flow path

Axis of syncline, larger arrow shows plunge, dashed where approximate

Axis of anticline, larger arrow shows plunge, dashed where approximate

Axis of monocline, larger arrow shows plunge, dashed where approximate

290' Q2 — Buried shoreline, angle of marine terrace wave cut platform; number and elevation indicated

Footprint of 500-kV tower

85 — Strike and dip of fault

10 — Strike and dip of bedding

85 — Overturned bedding

Horizontal bedding

Boring from 1967 power block study

1977 boring DDH-D at power block

Boring from previous HLA and HML studies

Boring for ISFSI investigations, WLA 1998 to 2001

Boring for ISFSI siting investigations, WLA 1996 to 1998

Transport route; stippled where transport route will be underlain by new engineered fill

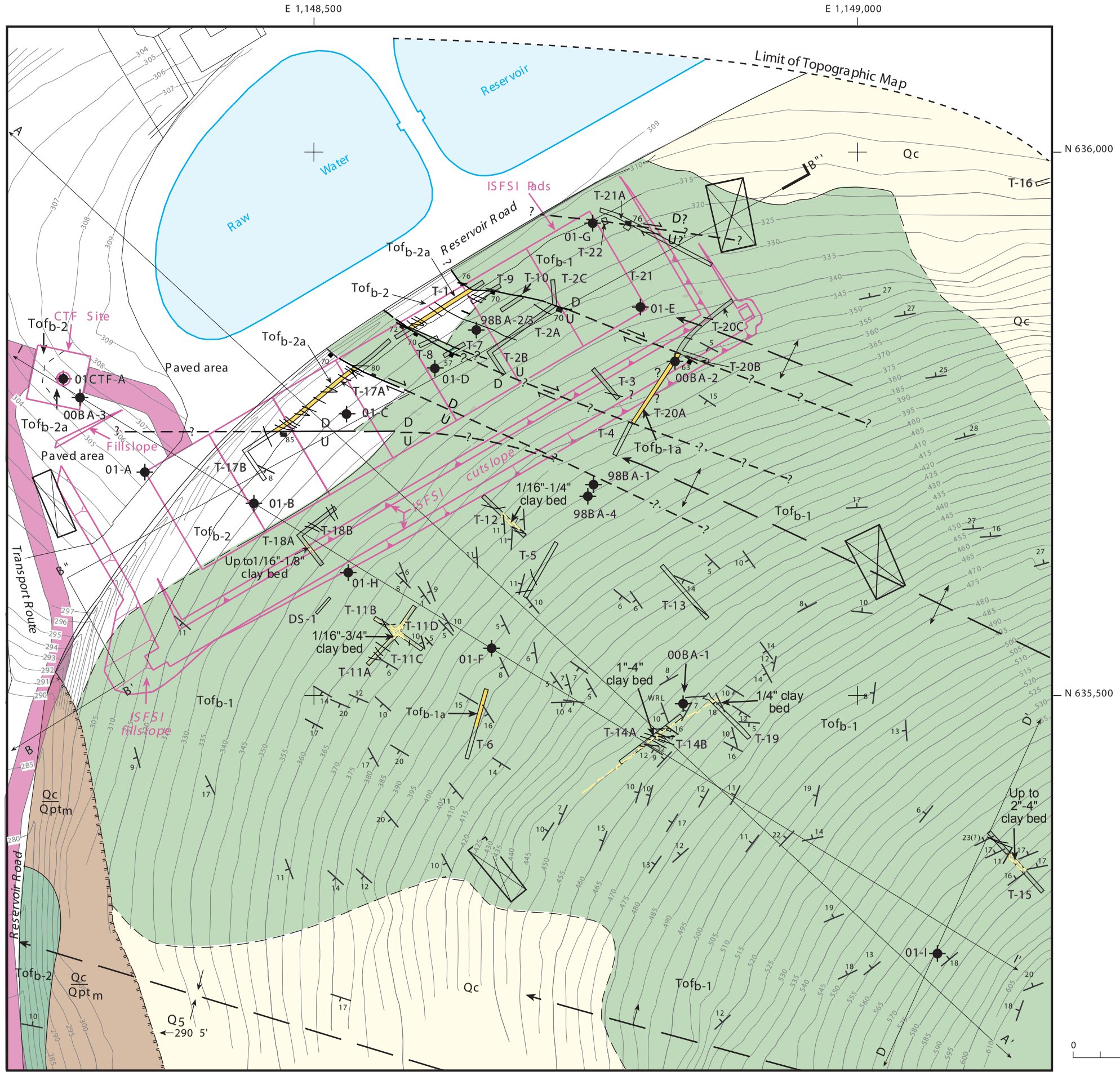
B — B' Geologic cross section

NOTE: The base topography for this map is a compilation of four different topographic maps: (1) the 1:2,400-scale Towill Corporation map based on 1966 aerial photography; (2) the 1986, 1:2,400-scale PG&E Plot Plan map; (3) 1970s era, 1:240-scale PG&E topographic/civil maps ("20-scale civil drawings"); and (4) the 2000-2001, 1:600 scale ISFSI Site map. These maps were merged and edited to eliminate map border conflicts and registered to the California State Coordinate System. Some of the maps listed above were received from PG&E Geoscience Department under letter of transmittal dated October 26, 2001 (PG&E Geosciences, 2001b).

FSAR UPDATE

DIABLO CANYON ISFSI

FIGURE 2.6-7
GEOLOGIC MAP OF THE ISFSI STUDY AREA AND TRANSPORT ROUTE VICINITY



Explanation

Qc — Colluvium

Qpt$_m$ — Marine terrace deposit (overlain by Qc)

Obispo Formation (lower and middle Miocene)

DOLOMITE UNIT

Tofb-1 — Dolomite, clayey dolomite, dolomitic siltstone to fine-grained dolomitic sandstone, and limestone. The unit contains occasional discontinuous to continuous (tens to hundreds of feet) clay beds that are generally 1/32- to 1/2-inch thick, but locally are thicker. Rocks in this unit are moderately to well cemented, moderately hard to hard, moderately to slightly weathered, brittle and typically medium strong.

Tofb-1a — Friable dolomite and dolomitic siltstone of unit Tofb-1. These rocks typically have low hardness, are very weak to weak, and occur as discontinuous zones where weathering and/or alteration has been concentrated. Inferred lateral extent of friable zones is schematic.

SANDSTONE UNIT

Tofb-2 — Fine to coarse-grained dolomitic sandstone and sandstone (arkosic to arenitic) with lesser dolomite beds. Detrital clasts are composed primarily of dolomitized feldspars, marine fossil fragments, and volcanic rock fragments. Discontinuous clay beds that are generally less than 1/2-inch thick occur locally within the unit. The rocks are of low to medium hardness, moderately to well cemented and typically medium strong.

Tofb-2a — Friable sandstone of unit Tofb-2. These rocks typically are of low hardness are very weak to weak, and occur as discontinuous zones where weathering and/or alteration has been concentrated. Inferred lateral extent of friable zones is schematic.

- Strike and dip of bedding
- Minor fault, dip indicated, dashed where inferred, queried where uncertain, arrows show relative sense of displacement, U-upthrown, D-downthrown
- Small, secondary faults exposed in trench
- Clay bed, thickness indicated
- Geologic contact, solid line where well-defined, dashed where approximate
- Boring for ISFSI, number indicated (initial number is year drilled, e.g. 01 was drilled in 2001)
- Geologic cross section, arrows indicate end of line is off the map area
- Exploratory trench, number indicated
- Discontinuity survey line in bulldozer cut
- Footprint of 500-kV tower
- Cutslope above and fill prism west of ISFSI pads
- Axis of anticline, larger arrow shows plunge, dashed where approximate
- Axis of syncline, larger arrow shows plunge, dashed where approximate
- Axis of monocline, larger arrow shows plunge, dashed where approximate
- Buried shoreline angle of marine terrace wave-cut platform, number and elevation indicated

Notes:

ISFSI geometry is based on PG&E Enercon Drwg. Base map from No. PGE-009-sk-001 dated 9/27/01.

Geology not shown in paved area and reservoir area.

N

0 50 100 150 200

Contour interval = 5 feet

FSAR UPDATE

DIABLO CANYON ISFSI

FIGURE 2.6-8

GEOLOGIC MAP OF ISFSI AND CTF SITES

Explanation

Geology

Quaternary

- **af** — Artificial fill (engineered)
- **Qal, Qdf, Qc, Qls, Qhf** — Quaternary deposits - alluvium (Qal), debris flow (Qdf), colluvium (Qc), landslide (Qls), Holocene colluvial fan (Qhf)
- **Qpf** — Pleistocene colluvial fan
- **Qptm** — Pleistocene marine terrace deposit (inferred)

Tertiary

- **Tvr** — Volcanic rock (middle Miocene), diabase intrusive sills and dikes

Obispo Formation (lower and middle Miocene)

- **Tofb** — Member Tof, unit b - dolomite, dolomitic siltstone, dolomitic sandstone, and sandstone: medium to thick bedding
- **Tofc** — Member Tof, unit c - shale, claystone and siltstone, thin to medium bedding, extensively sheared
- **Tor** — Member Tor - volcanic rock, zeolitized and silicified tuff

DOLOMITE SUBUNIT

- **Tofb-1** — Dolomite, clayey dolomite, dolomitic siltstone to fine-grained dolomitic sandstone, and limestone. The unit contains occasional discontinuous to continuous (tens to hundreds of feet) clay beds that are generally 1/32- to 1/2-inch thick, but locally are thicker. Rocks in this unit are moderately to well cemented, moderately hard to hard, moderately to slightly weathered, brittle and typically medium strong.
- **Tofb-1a** — Friable dolomite and dolomitic siltstone of unit Tof_{b-1}. These rocks typically have low hardness, are very weak to weak, and occur as discontinuous zones where weathering and/or alteration has been concentrated. Inferred lateral extent of friable zones is schematic.

SANDSTONE SUBUNIT

- **Tofb-2** — Fine to coarse-grained dolomitic sandstone and sandstone (arkosic to arenitic) with lesser dolomite beds. Detrital clasts are composed primarily of dolomitized feldspars, marine fossil fragments, and volcanic rock fragments. Discontinuous clay beds that are generally less than 1/2-inch thick occur locally within the unit. The rocks are of low to medium hardness, moderately to well cemented and typically medium strong.
- **Tofb-2a** — Friable sandstone of unit Tof_{b-2}. These rocks typically are of low hardness, are very weak to weak, and occur as discontinuous zones where weathering and/or alteration has been concentrated. Inferred lateral extent of friable zones is schematic.

Symbols

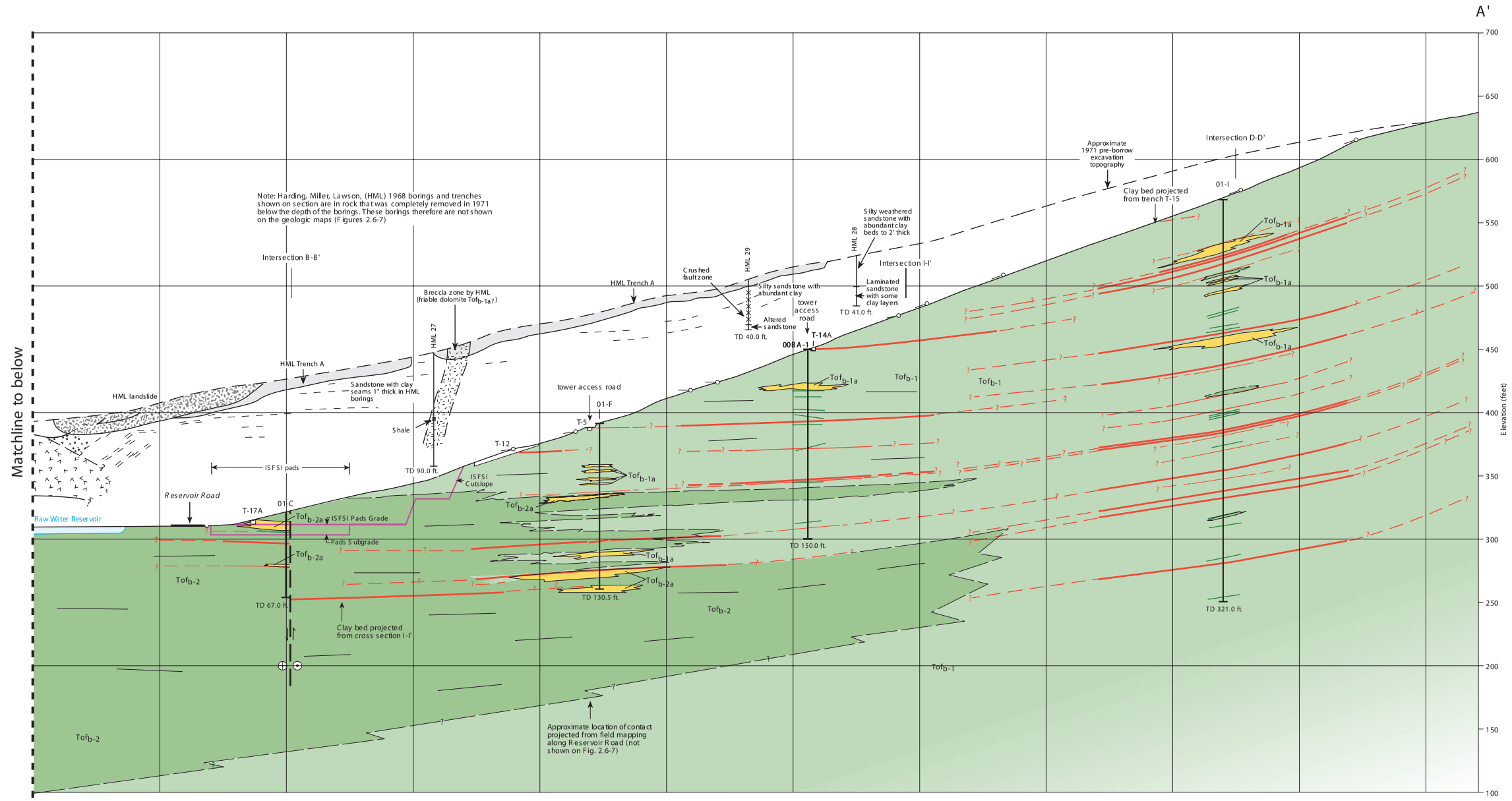
- Apparent dip of bedding
- Apparent dip of bedding measured in boring
- Bedding shown schematically and inferred from projection of nearby surface outcrops or borehole surveys
- ? Lithologic contact, inferred except where encountered in boreholes and surface mapping, queried where uncertain
- Fault - location based on projection of trench or surface exposure. Vertical projection is inferred. Dip of fault assumed to be vertical unless well constrained by multiple surface attitudes. Queried where uncertain. Sense of vertical separation is indicated by arrows and inferred horizontal right-slip displacement by ⊕ (moving away from viewer) and ⊙ (moving toward viewer).
- Clay, silty and sandy, tan to brown, some angular fragments within clay matrix, locally contains foraminifera, generally thin (1/16 to 1/2 inch). Clay beds more common and more laterally continuous in dolomite unit than in the sandstone unit.
- <1/8", 1/8"-1/4", >1/4" — Clay bed - weight of solid line indicates bed thickness where encountered in borings or trenches, dashed line where inferred (no thickness indicated); queried where uncertain, clay beds projected beyond borings or trenches based on thickness (>1/4-inch thick beds projected 100 feet as solid line and 100 feet as dashed line, 1/8-inch to 1/4-inch thick beds projected 50 feet solid and 50 feet dashed, <1/8-inch thick beds projected 25 feet solid and 25 feet dashed) unless constrained to be shorter on adjoining boreholes and trenches.
- 01-H, TD 30.5 ft. — Exploration boring, number (01-H, initial number indicates year drilled) and depth (TD 30.5 feet) indicated
- T-18 — Exploration trench, number indicated; trenches are shown open if they cross section line, filled if projected into section line
- Groundwater elevation and date of measurement indicated

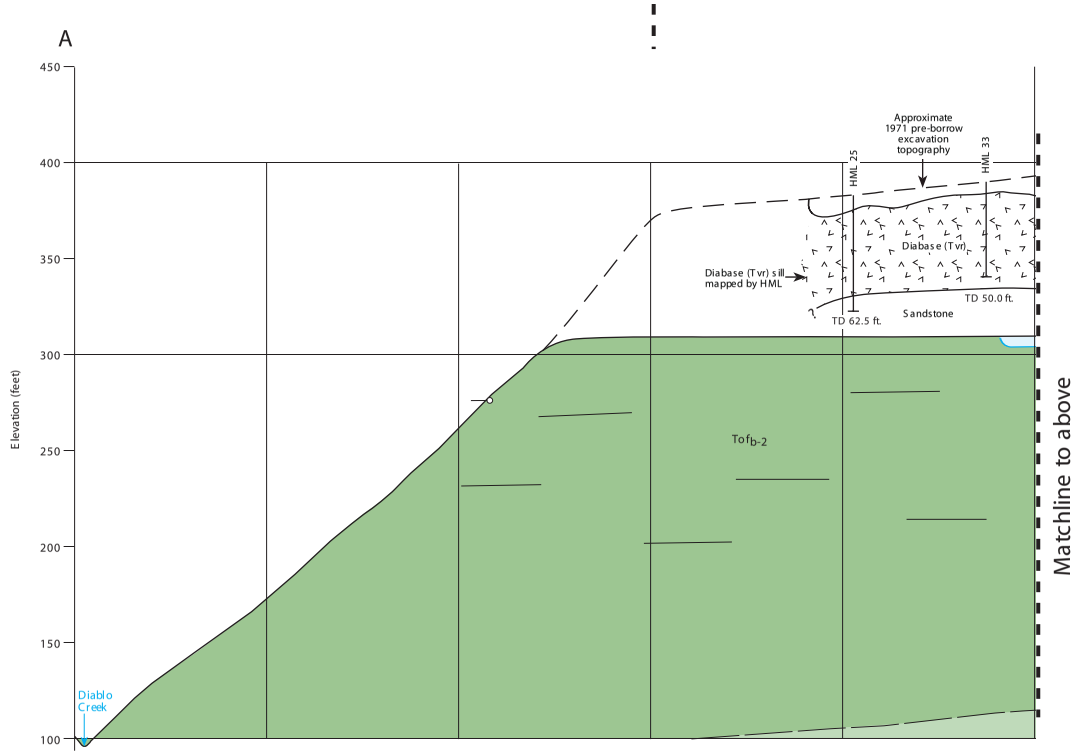
*Pleistocene Marine Terraces Designation**

- Q_1 Oxygen Isotope Stage 5a marine terrace (80,000 years old)
- Q_2 Oxygen Isotope Stage 5e marine terrace (120,000 years old)
- Q_3 Oxygen Isotope Stage 7 marine terrace (210,000 years old)
- Q_4 Oxygen Isotope Stage 9 marine terrace (330,000 years old)
- Q_5 Oxygen Isotope Stage 11 marine terrace (430,000 years old)

* *Ages and correlation of marine terraces based on K.L., Hansen, J.R. Wesling, W.R. Lettis, K.I. Kelson and L. Mezger, 1994. Correlation, ages, and uplift rates of Quaternary marine terraces, in Alterman, I.B., McMullen, R.B., Cluff, L.S., and Slemmons, D.B., eds., Seismotectonics of the Central California Coast Ranges: Boulder, Colorado, Geological Society of America Special Paper 292.*

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-9
EXPLANATION FOR CROSS SECTIONS





Notes

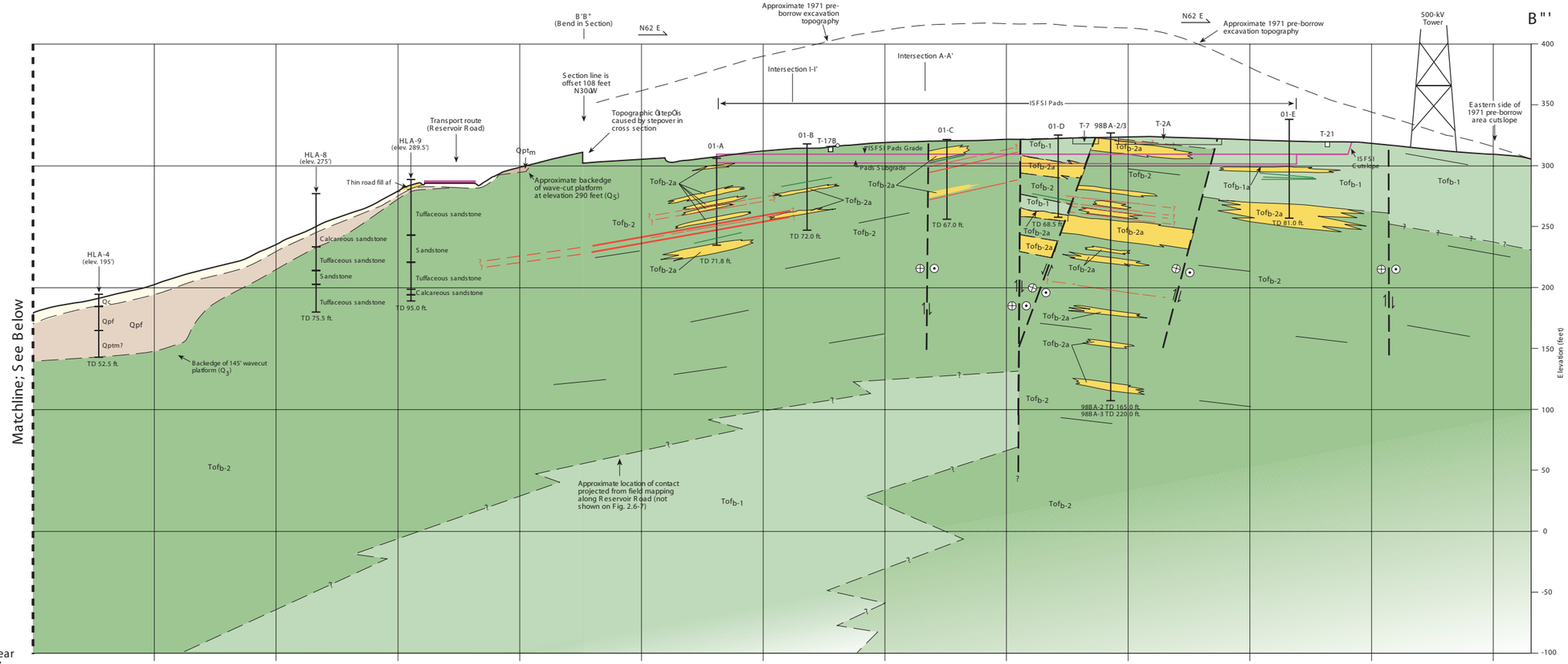
1. Location of cross section shown on Figures 2.6-7 and 2.6-8. Nearby borings are projected to cross section.
2. See Figure 2.6-9 for explanation of geologic units.
3. Horizontal scale = vertical scale.

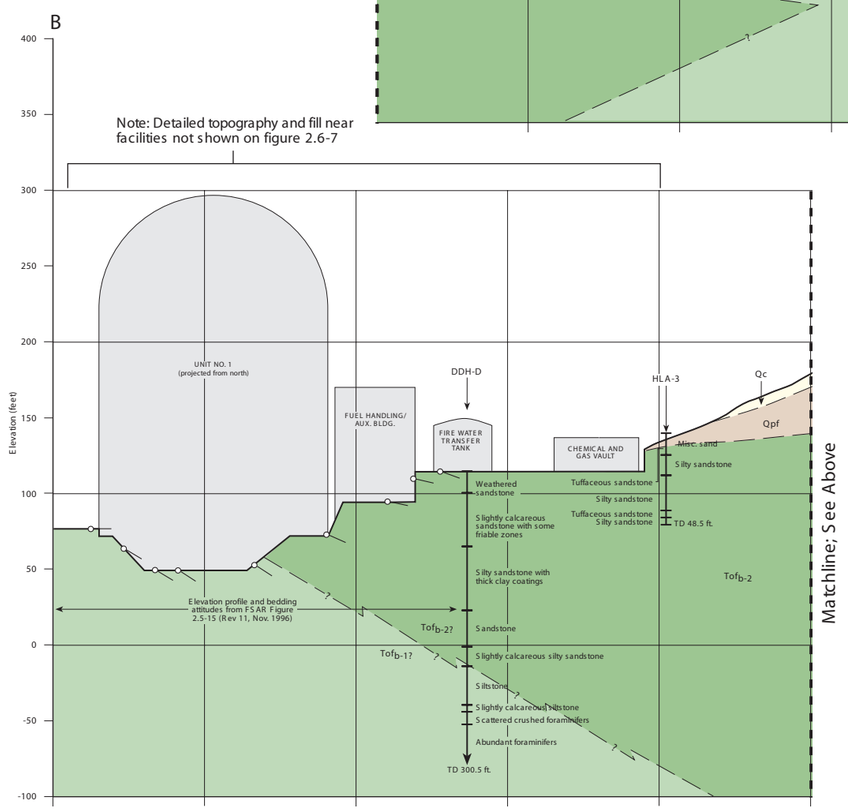
FSAR UPDATE

DIABLO CANYON ISFSI

FIGURE 2.6-10
CROSS SECTION A-A'

Revision 0 June 2004





Notes

1. Location of cross section shown on Figures 2.6-7 and 2.6-8. Nearby borings are projected to cross section.
2. See Figure 2.6-9 for explanation of geologic units.
3. Hortizontal scale = vertical scale.

FSAR UPDATE

DIABLO CANYON ISFSI

FIGURE 2.6-11
CROSS SECTION B-B'

Revision 0 June 2004

Southward view of the ISFSI site, above the raw water reservoir. The 1971 borrow area cutslope is indicated by areas of bedrock exposure and brown grass. Trenches excavated for the ISFSI investigations are shown (trenches backfilled in April 2001). Trench T-16 is located to the left of the photo. Photo roll AR 3-25.

FSAR UPDATE
DIABLO CANYON ISFSI
FIGURE 2.6-12 SOUTHWARD VIEW OF ISFSI STUDY AREA