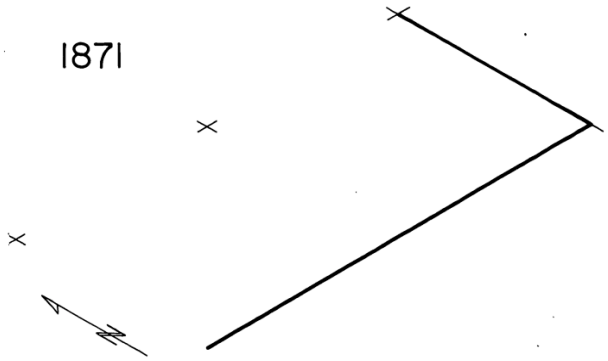
Chapter A

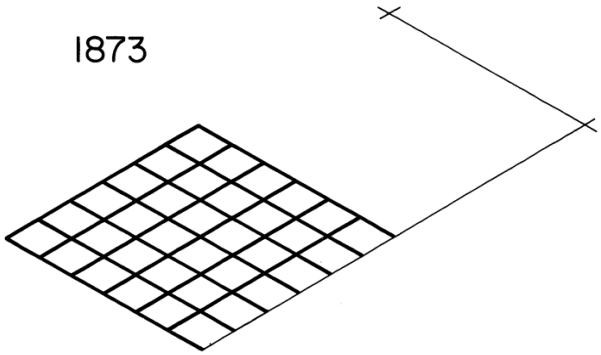
Irregular Boundary Adjustment in California

A7

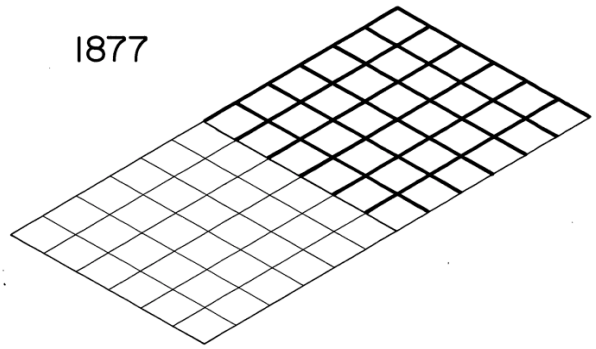
History of Survey



1871 Henry S. Bradley surveyed the south boundaries of T. 18 N., Rs. 8 and 9 E.



1873 A.W. Brown surveyed the east, west and north boundaries and subdivisional lines of T. 18 N., R. 8 E.



1877 L.D. Bond surveyed the north boundary and subdivisional lines of T. 18 N., R. 9 E. Bond could not close against portions of the previously surveyed west boundary (the Brown survey) and retraced the west boundaries of sections 6, 19 and 30. Bond's plat was approved July 24, 1878, shown in figure 1. This discussion involves only the restoration of the corner of sections 25, 30, 31 and 36 on the east boundary of T. 18 N., R. 8 E. Bond retraced the south half mile between sections 25 and 30. He ran south from the Brown 1/4 section corner and at 45.54 chains fell 11.44 chains west of the Brown corner of sections 25, 30, 31 and 36. Bond did not retrace between sections 31 and 36. The Brown record for that mile is North, 80.00 chains.

Reasons for Request of this Survey

T. 18 N., R. 8 E., is located in Yuba County, California, and in the Tahoe National Forest. The township contains intermingled public and private lands. Survey corners were difficult to find and there is considerable distortion. As part of a cooperative agreement, the Forest Service requested resurvey of the township as a photogrammetric project known as the Tahoe Test Project.

Special Instructions

Special Instructions for Group 421, California, were prepared on April 30, 1958. They provided for the dependent resurvey of T. 18 N., R. 8 E., as an experimental project in applying photogrammetric procedures to a dependent resurvey. Initial corner search, paneling and photography were already completed. The positions of panel points were determined by photogrammetry and the State Plane Coordinates determined, using California, Zone 11. The central meridian of the zone is 1221° 00' West longitude. Field work on the final phase began on May 1, 1958.

Conditions Found on the Ground

The 1/4 section corner of sections 25 and 30 and the corner of Tps. 17 and 18 N., Rs. 8 and 9 E were found and paneled. No evidence could be found of the corner of sections 25, 30, 31 and 36, nor the 1/4 section corner of sections 31 and 36. The state plane coordinate of the 1/4 section corner of sections 25 and 30 is given as: X = 76,610.9, Y = 32,248.6. The coordinate of the township corner is: X = 76,664.8, Y = 23,840.9. The latitude of the township corner is 39° 22.5' N., longitude 121° 01.3' W. The Coast and Geodetic Survey Special Publication No. 253 lists the theta angle as + 0° 37' 15"; scale factor as 0.9999282. The average elevation above sea level is 2400 feet, so the resulting sea level factor is 0.999885.

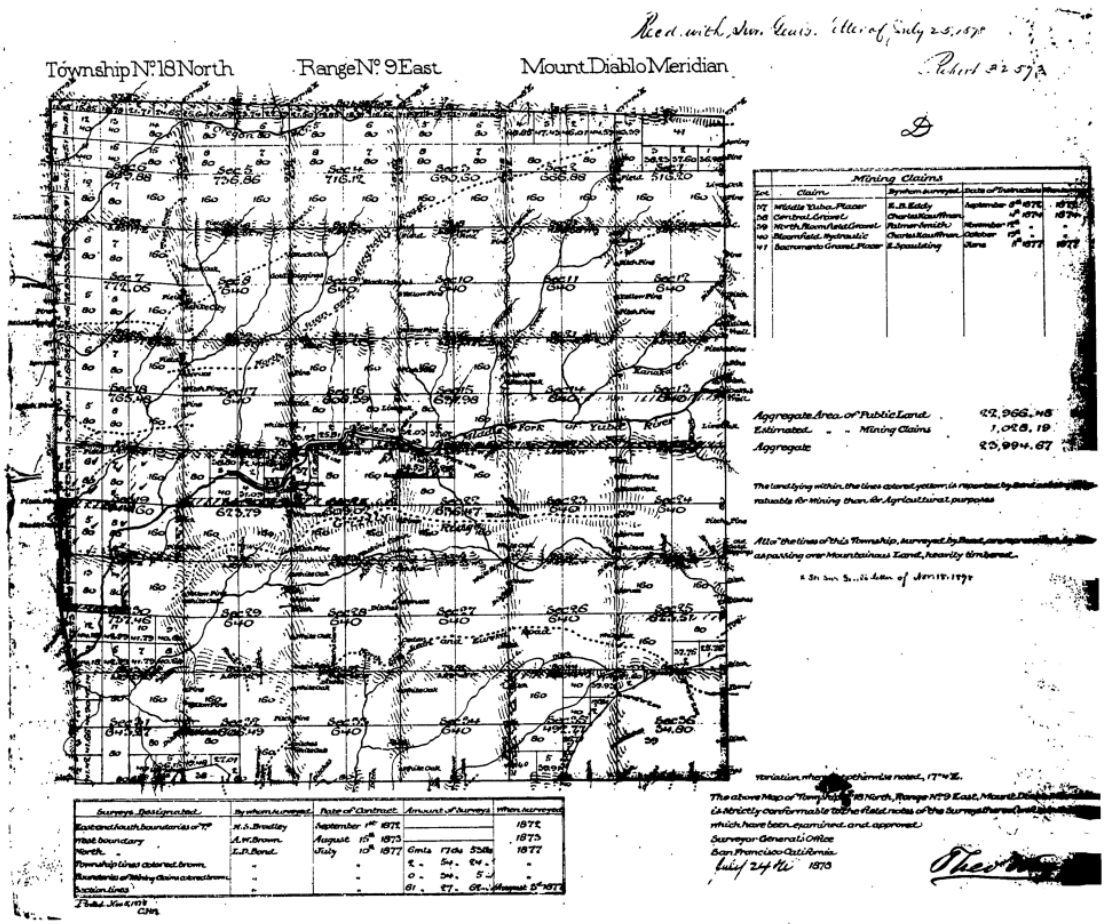


Figure 1a - Original Plat

Preliminary Statement of the Problem

The surveyor must restore the missing corner of sections 25, 30, 31 and 36 and 1/4 section corner of sections 31 and 36 by the appropriate methods.

Regulations

This survey illustrates the application of section 5-36 of the Manual of Surveying Instructions, 1973, Irregular Boundaries. Sections 5-43 and 5-44 are also considered.

Final Statement of the Problem

The appropriate method for corner restoration must be selected according to existing regulations and coordinates of missing corners computed. The information desired in the field will consist of corrections or "moves," which are to be computed.

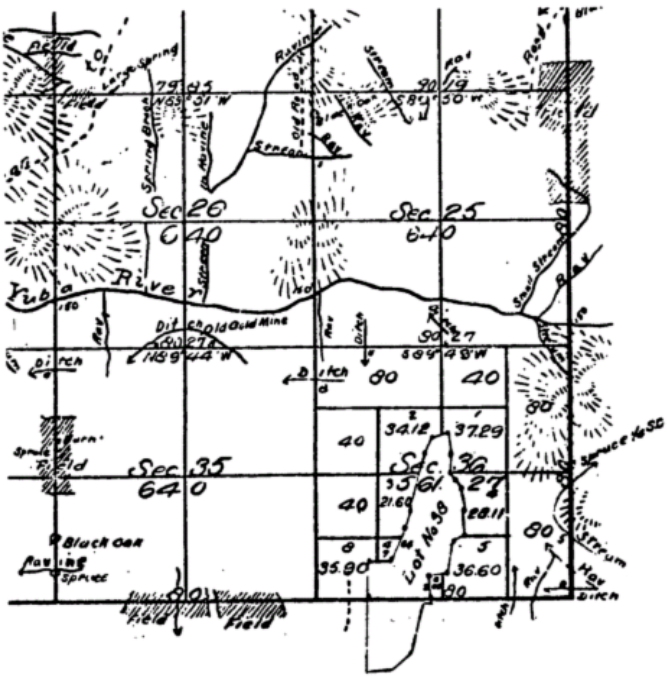


Figure 1b - Portion of Brown Plat

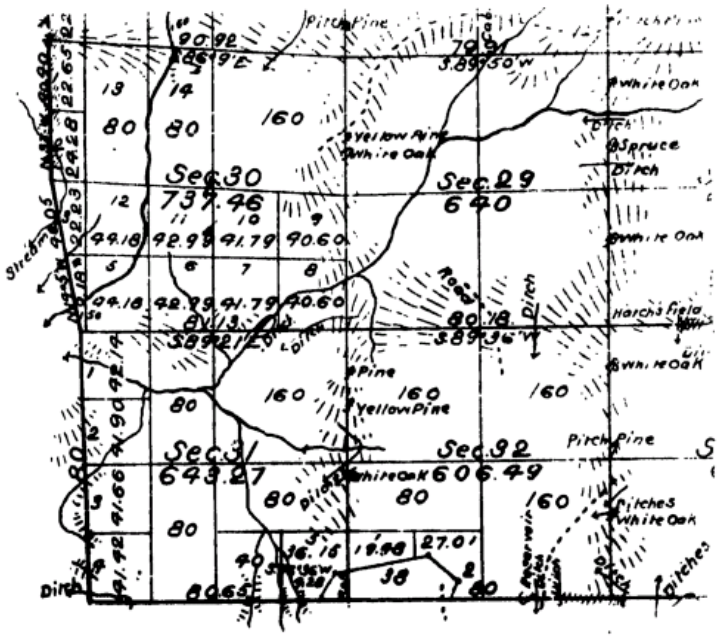


Figure 1c - Portion of Bond Plat

Solution

Figure 2a shows the record and retracement data and the computed "closing course." The grid bearing and distance between found corners has been converted to true bearing and distance by use of the given theta angle, scale factor and sea level factor. The "second term" is too small to be significant.

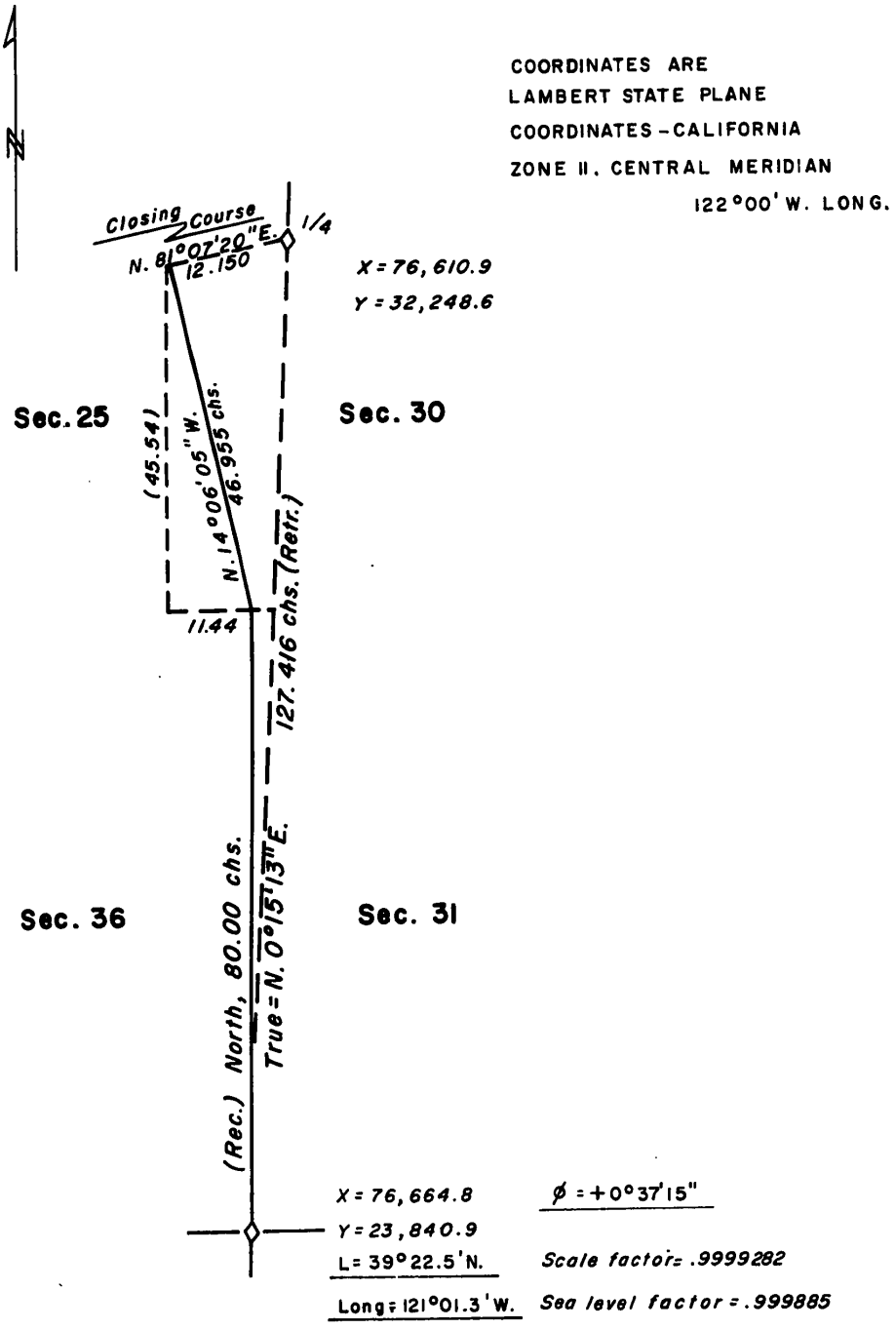


Figure 2a

Figure 2b illustrates application of the broken boundary (compass rule) adjustment described in section 5-43.

Figure 2c illustrates application of a Grant Boundary adjustment described in section 5-44.

Figure 2d illustrates the irregular boundary adjustment and State Plane Coordinates of the proportioned points at sea level.

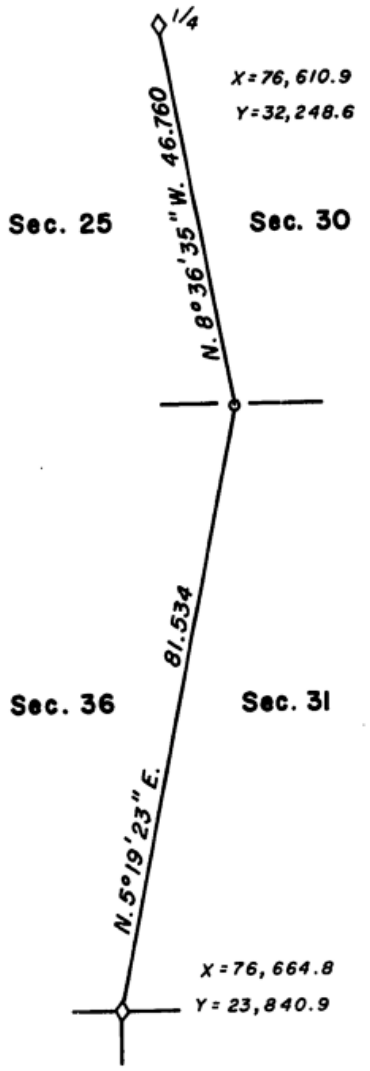


Figure 2b - Broken Boundary

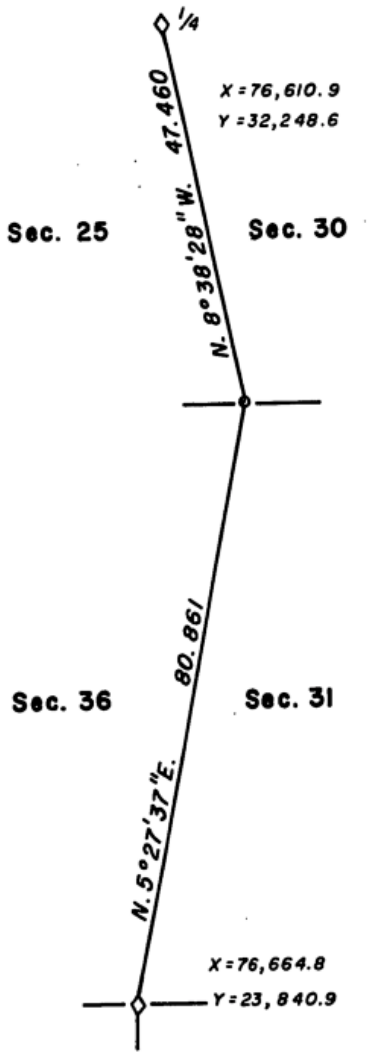


Figure 2c - Grant Boundary

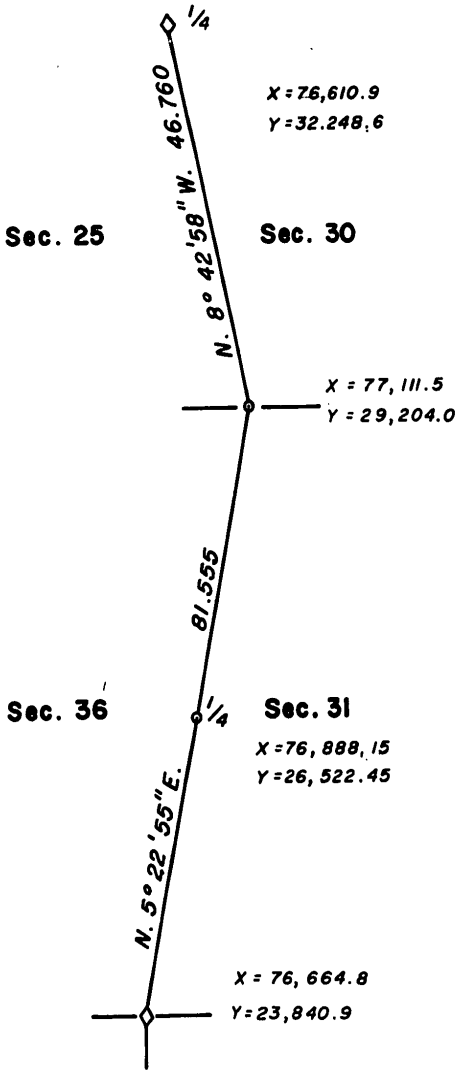


Figure 2d - Irregular Boundary

The irregular boundary adjustment is a single proportionate measurement of the closing error, first the latitudinal single proportion and then a single proportionment of the departure, determined by the proportioned latitudinal distance from the starting point, (in this case the township corner).

Legal theory, in support for application of proportionment measurement methods demands that equal weight be given each part of the survey. The implication is that all of the original survey was performed by the same man at the same time and using the same equipment and methods. Although there were two different surveyors in this instance, the original surveyor, Brown, and the retracement by Bond, their work is property combined in this adjustment which uses the best available evidence.

The plat of T. 18 N., R. 8 E., was accepted May 29, 1963, and is shown in figure 3.

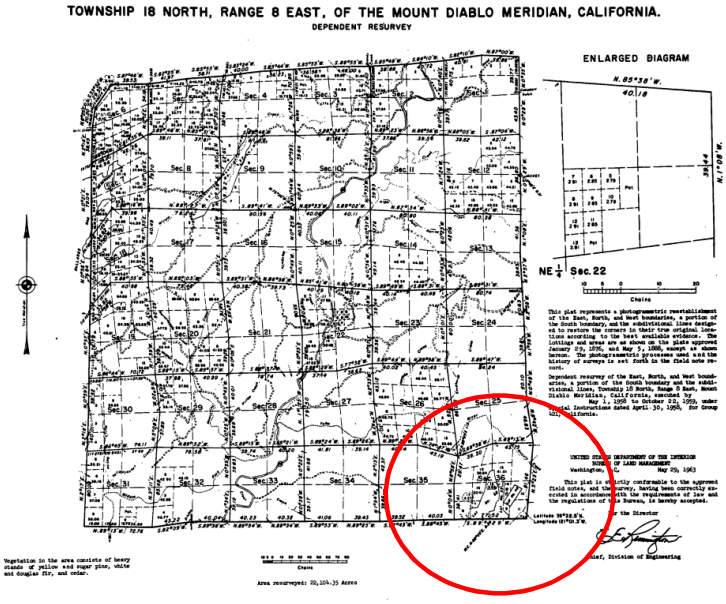
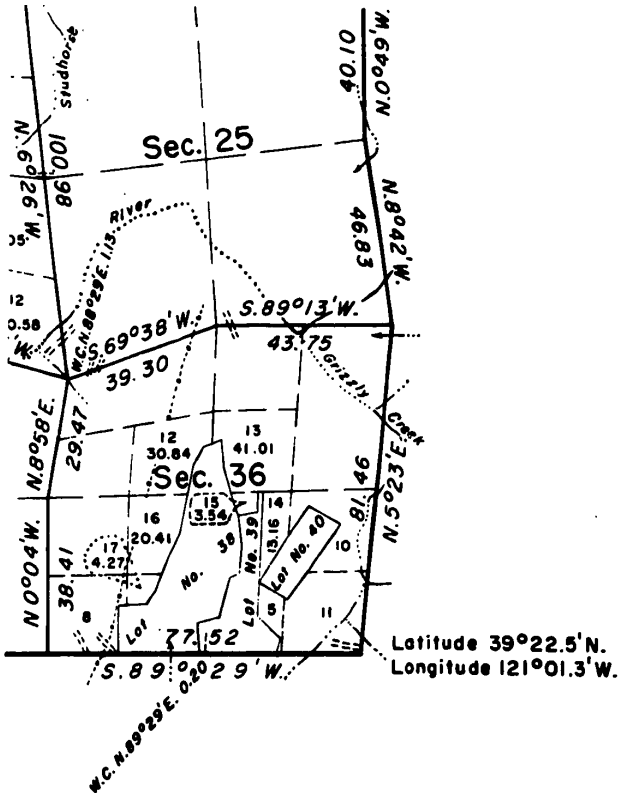


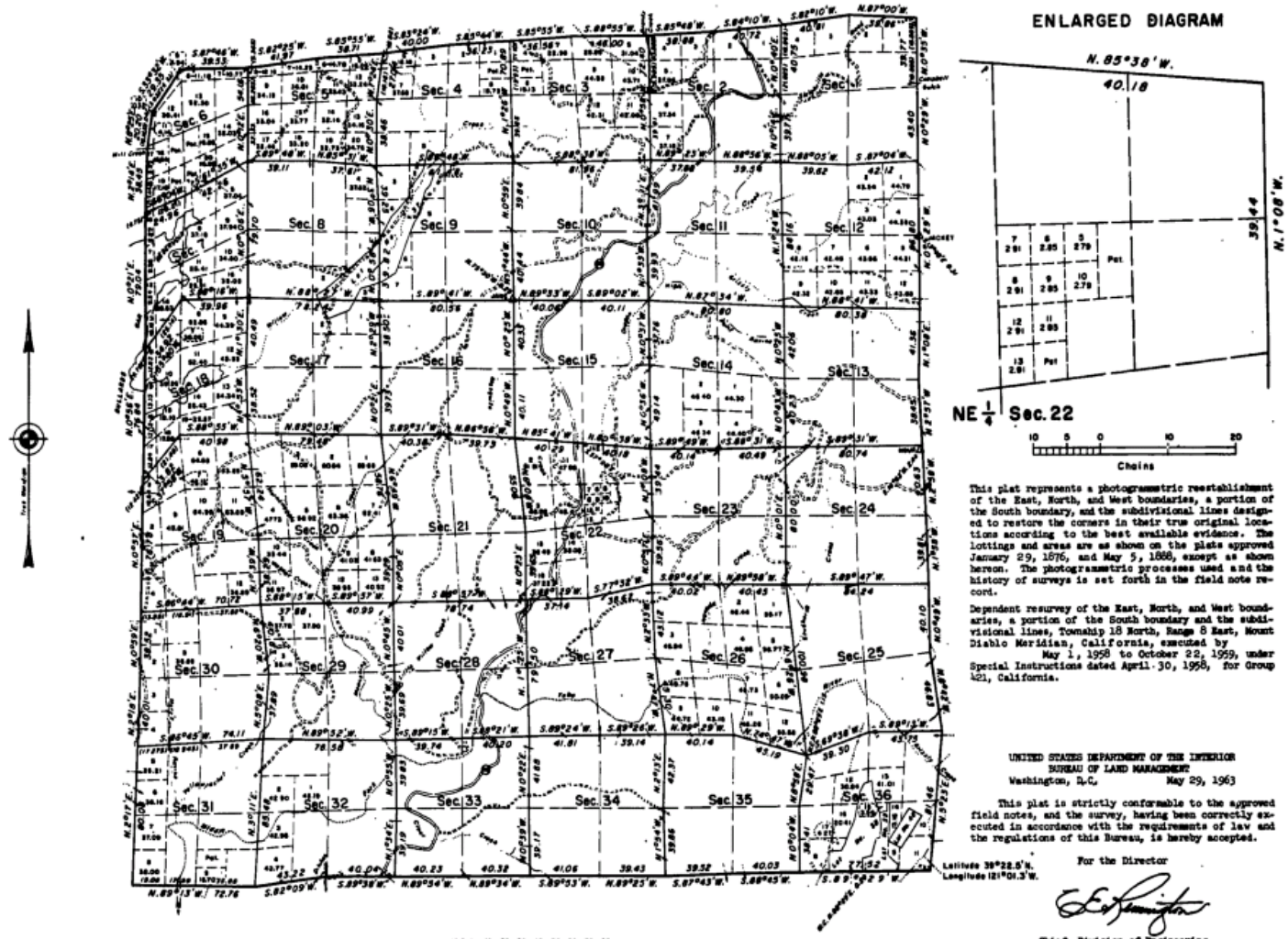
Figure 3 - Accepted Plat

See plat enlargement next page.



TOWNSHIP 18 NORTH, RANGE 8 EAST, OF THE MOUNT DIABLO MERIDIAN, CALIFORNIA.

DEPENDENT RESURVEY



This plat represents a photogrammetric reestablishment of the East, North, and West boundaries, a portion of the South boundary, and the subdivisional lines designed to restore the corners in their true original locations according to the best available evidence. The lottings and areas are as shown on the plats approved January 29, 1876, and May 5, 1888, except as shown hereon. The photogrammetric processes used and the history of surveys is set forth in the field note record.

Dependent resurvey of the East, North, and West boundaries, a portion of the South boundary and the subdivisional lines, Township 18 North, Range 8 East, Mount Diablo Meridian, California, executed by May 1, 1958 to October 22, 1959, under Special Instructions dated April 30, 1958, for Group 421, California.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. May 29, 1963

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Chief, Division of Engineering

Vegetation in the area consists of heavy stands of yellow and sugar pine, white and douglas fir, and cedar.

Area resurveyed: 22,104.35 Acres

Figure 3 - Accepted Plat

Supplemental Topic

Although the bearings of the two line segments returned on the accepted plat agree with an irregular boundary adjustment, for some inexplicable reason the proportions were based on an overall record distance of 125.66 chains, with the intermediate distances of 40.00, 80.00 and 45.66 chains, and with a retracement distance of 127.392 chains, which is the grid distance at sea level without any correction for scale factor or sea level correction to the ground surface.