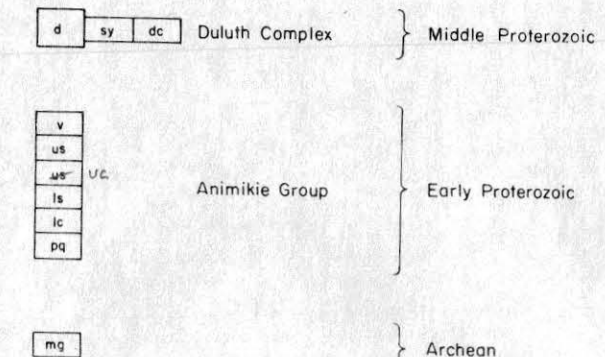


STRUCTURAL GEOLOGY  
East Mesabi District and Adjacent Basal Duluth Complex

Correlation of Map Units



References

**Published**  
Grap, P. F., and Endersby, T. M., 1919, The magnetic deposits of the eastern Mesabi Range, Minnesota, Minnesota Geological Survey Bulletin 17, 59 pp.  
Merrill, G. B., and Cooper, H. W., 1926, Map of Lakes-Keweenaw area, St. Louis and Lake Counties, northeastern Minnesota, Bureau of Geology and Mineral Resources, Minnesota Geological Survey, open-file map.  
White, D. A., 1954, The stratigraphic and structural of the Mesabi Range, Minnesota, Minnesota Geological Survey Bulletin 36, 122 pp.

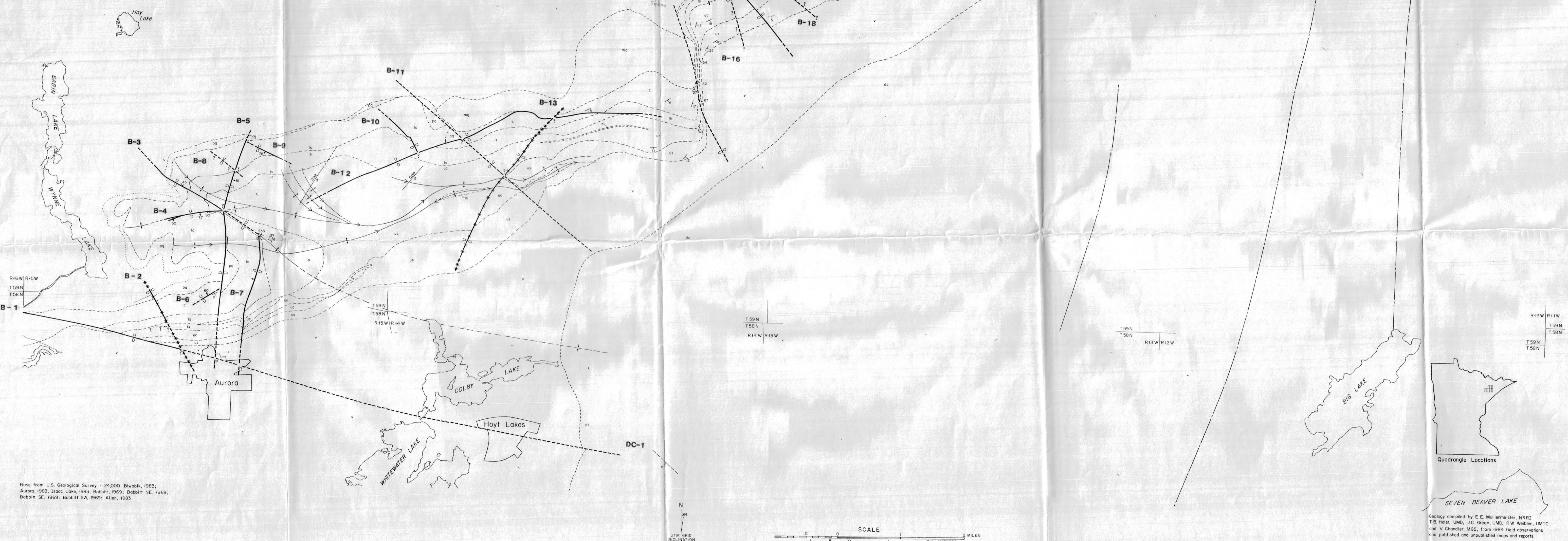
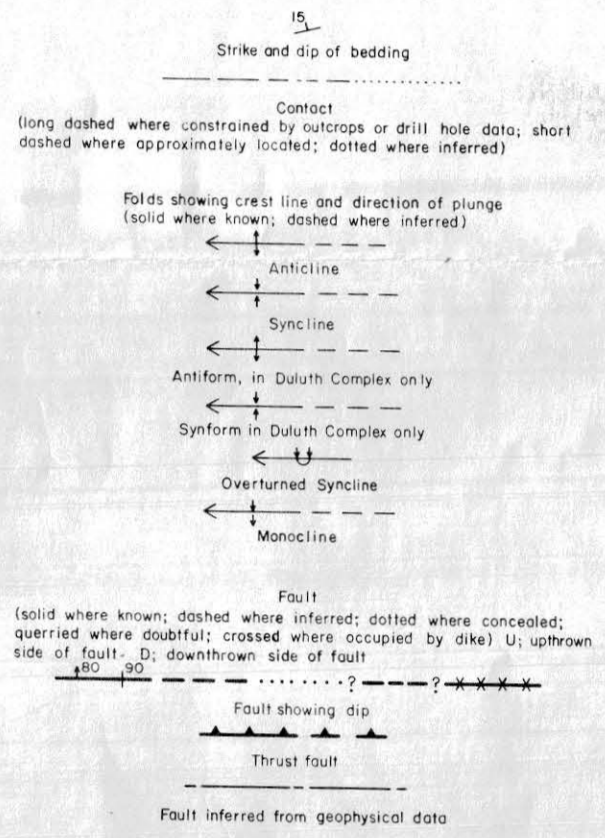
**Unpublished**  
Geologic data including drill hole logs and unpublished geologic maps and reports were provided by Marquette Mining Company, Erie Mining Company, LTV Steel Corporation, Pickands Mather and Company, Reserve Mining Company, United States Steel Corporation.  
Interpretation of the geologic data was facilitated by geologists from several mining companies including: 1. Emulation Reserve Mining Company; 2. E. E. Evers and B. S. Suter, Erie Mining Company; and 3. C. E. Mather, Pickands Mather and Company.

Funding and services for this project provided for by the Natural Resources Research Institute, the Department of Natural Resources and the Minnesota Geological Survey.

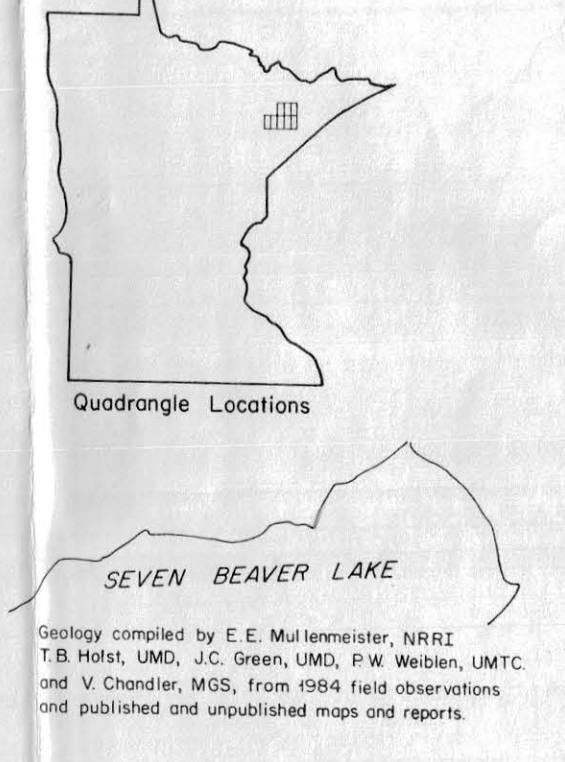
Description of Map Units

- 1. Duluth Complex, undivided, includes gabbro, iron-matrix, ironstone, quartzite, and felsic rocks
- 2. Aurora silt, siltstone, medium-grained
- 3. Duluth dikes and sills
- 4. Virginia Formation, gray argillite and marbles
- 5. Upper cherty member
- 6. Lower cherty member
- 7. Upper cherty member
- 8. Lower cherty member
- 9. Paleoproterozoic quartzite, fine-grained, unit includes minor amounts of argillite and felsitic graywacke
- 10. Metapelite and slate, undivided

Symbols



Base from U.S. Geological Survey 1:50,000 Blainville, 1983; Aurora, 1983; Isaac Lake, 1983; Babbitt, 1969; Babbitt NE, 1969; Babbitt SE, 1969; Babbitt SW, 1969; Allen, 1985



UPPER CONTACT  
of the  
LOWER SLATY MEMBER  
of the  
BIWABIK IRON FORMATION

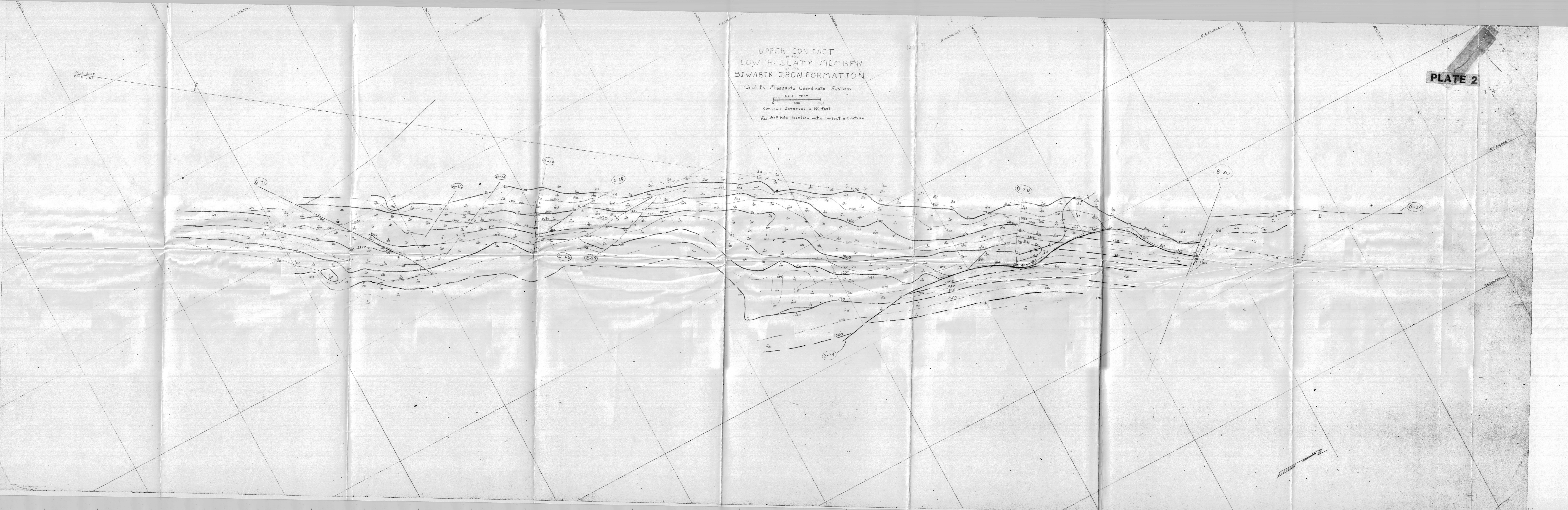
Grid Is Minnesota Coordinate System

SCALE 1 INCH = 400 FEET

Contour Interval = 100 feet

1250 drill hole location with contact elevation

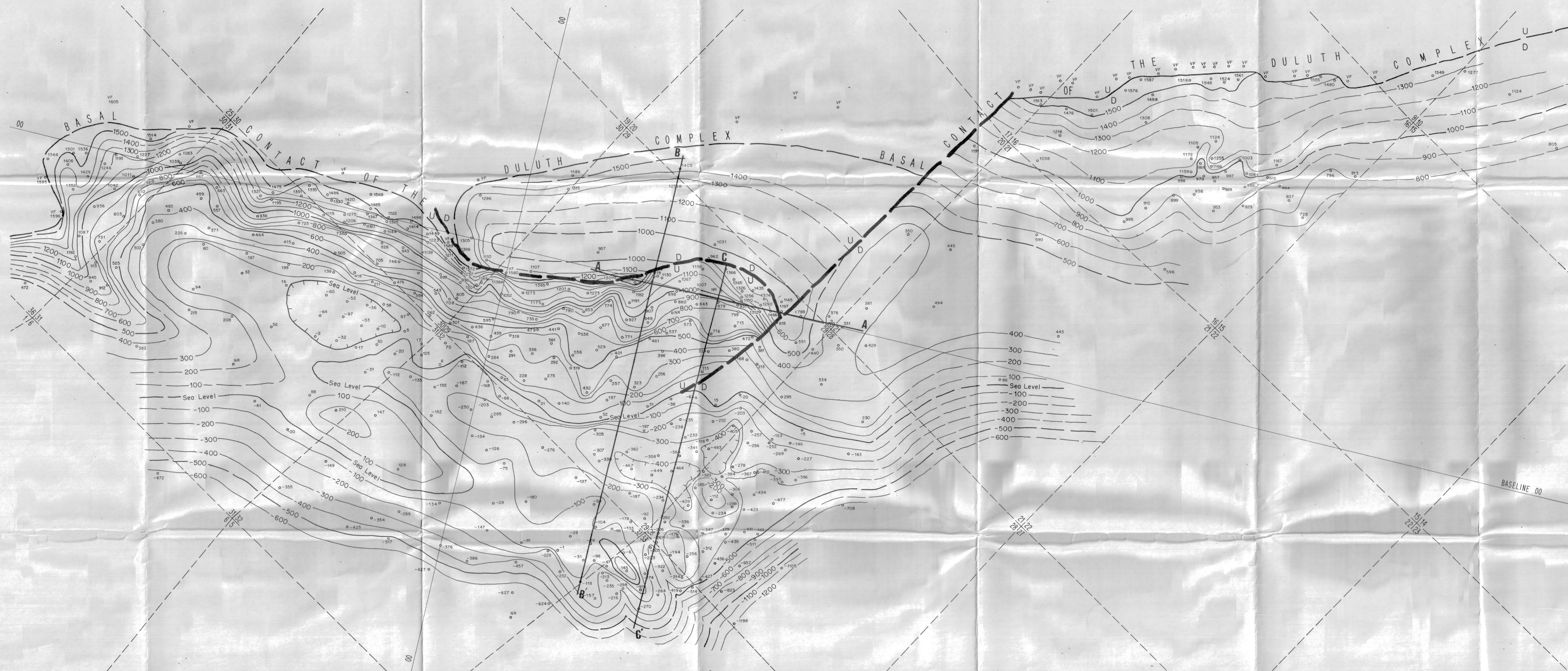
PLATE 2



# STRUCTURE CONTOUR MAP

## BASAL CONTACT OF THE DULUTH COMPLEX, MINNAMAX COPPER-NICKEL PROSPECT, BABBITT, MINNESOTA

PLATE 3



Topographic base map from Mark Hurd Aerial Surveys Inc. at 1" = 500' from aerial photography taken in November, 1967

Drill hole information used in constructing this map was provided by Bear Creek Mining Company.

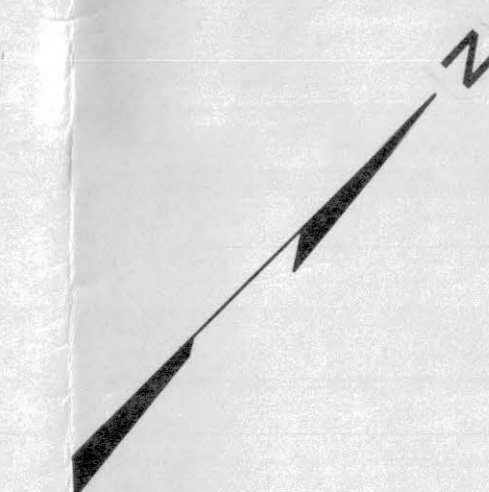
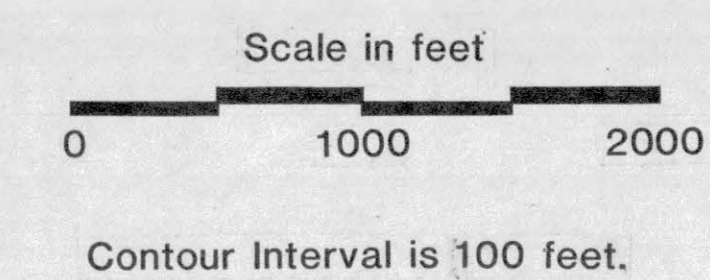
Funding and services for this project provided by the Natural Resources Research Institute, the Minnesota Department of Natural Resources and the Minnesota Geological Survey.

Final cartography by William W. Porter

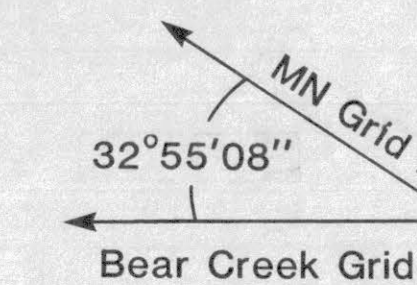
Compiled by E. E. Mullenmeister NRRI  
With T. B. Holst UMD, J. C. Green UMD,  
P. W. Weiblen UMTC  
and V. W. Chandler MGS.

### LEGEND

- U — Fault (inferred)
- D — Structure Contour (Solid where control is good, dashed where control is poor)
- 227 ○ Approximate point of drill hole intersect with the base of the Duluth Complex with contact elevation.
- VF ○ Location of drill hole collared in the Virginia Formation with collar elevation
- Depression



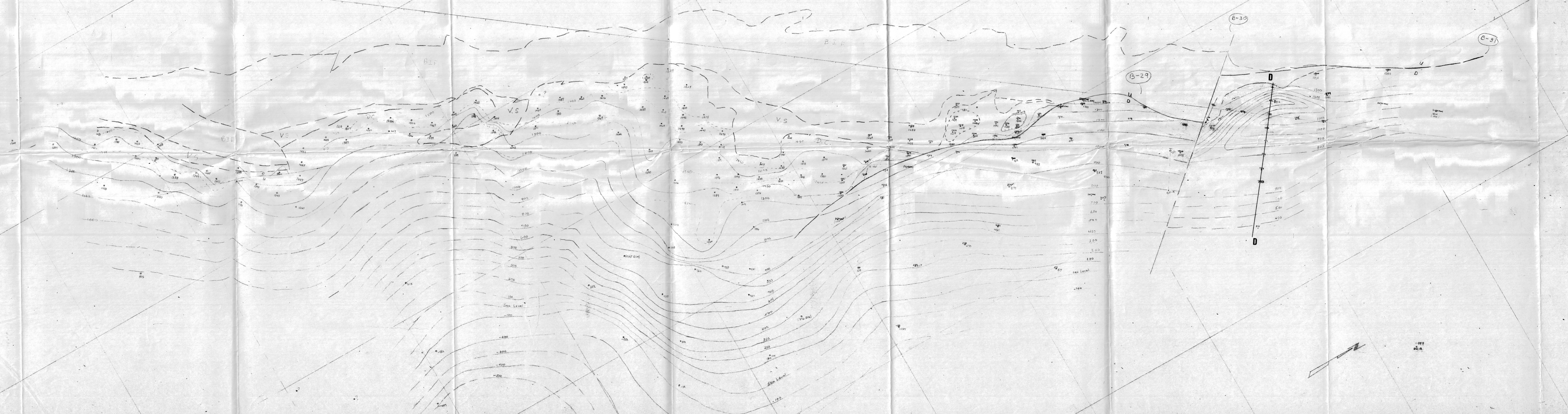
Baseline 00: Bear Creek Mining Company, Babbitt grid No. 1



### BASAL CONTACT of the DULUTH COMPLEX

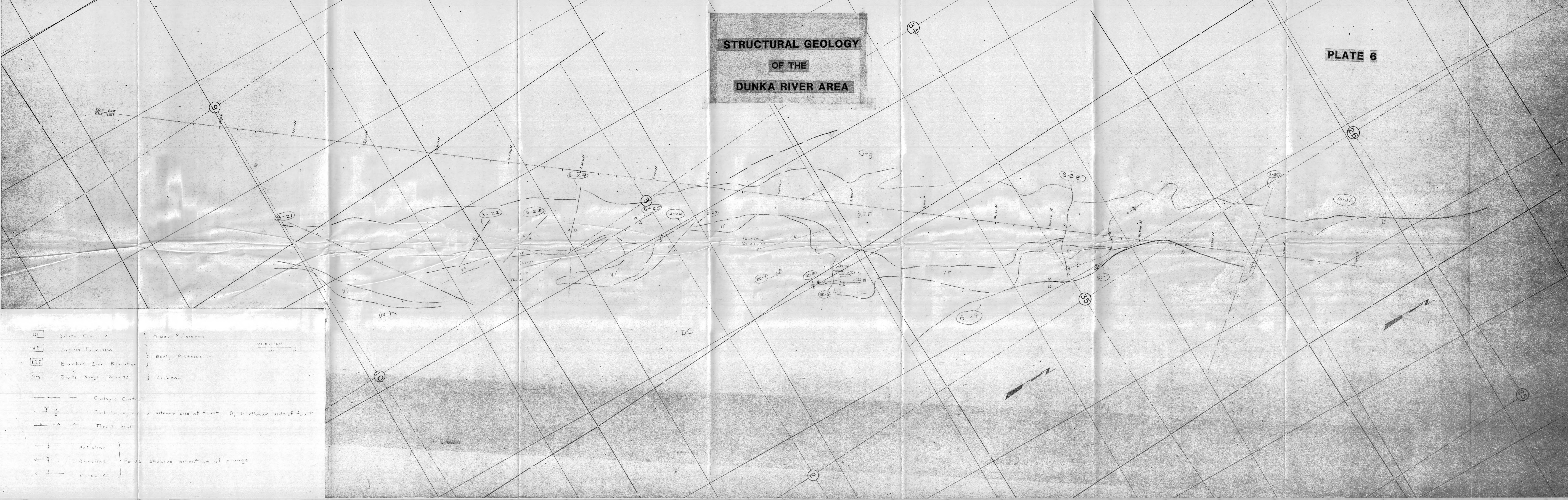
Grid is Minnesota Coordinate System  
SCALE: 1" = 1000'  
Contour Interval = 100ft  
— indicates a surface geologic contact  
○ indicates a drill hole location with contact elevation

3000 EAST  
BASE LINE



**STRUCTURAL GEOLOGY  
OF THE  
DUNKA RIVER AREA**

**PLATE 6**



- DC Diluth Complex
- VF Virginia Formation
- BIF Biwok Iron Formation
- Grg Giants Range Granite

Middle Proterozoic  
 Early Proterozoic  
 Archean

- Geologic Contact
  - Fault showing up U, upthrown side of fault; D, downthrown side of fault
  - Thrust Fault
  - Anticline
  - Syncline
  - Monocline
- Folds showing direction of plunge

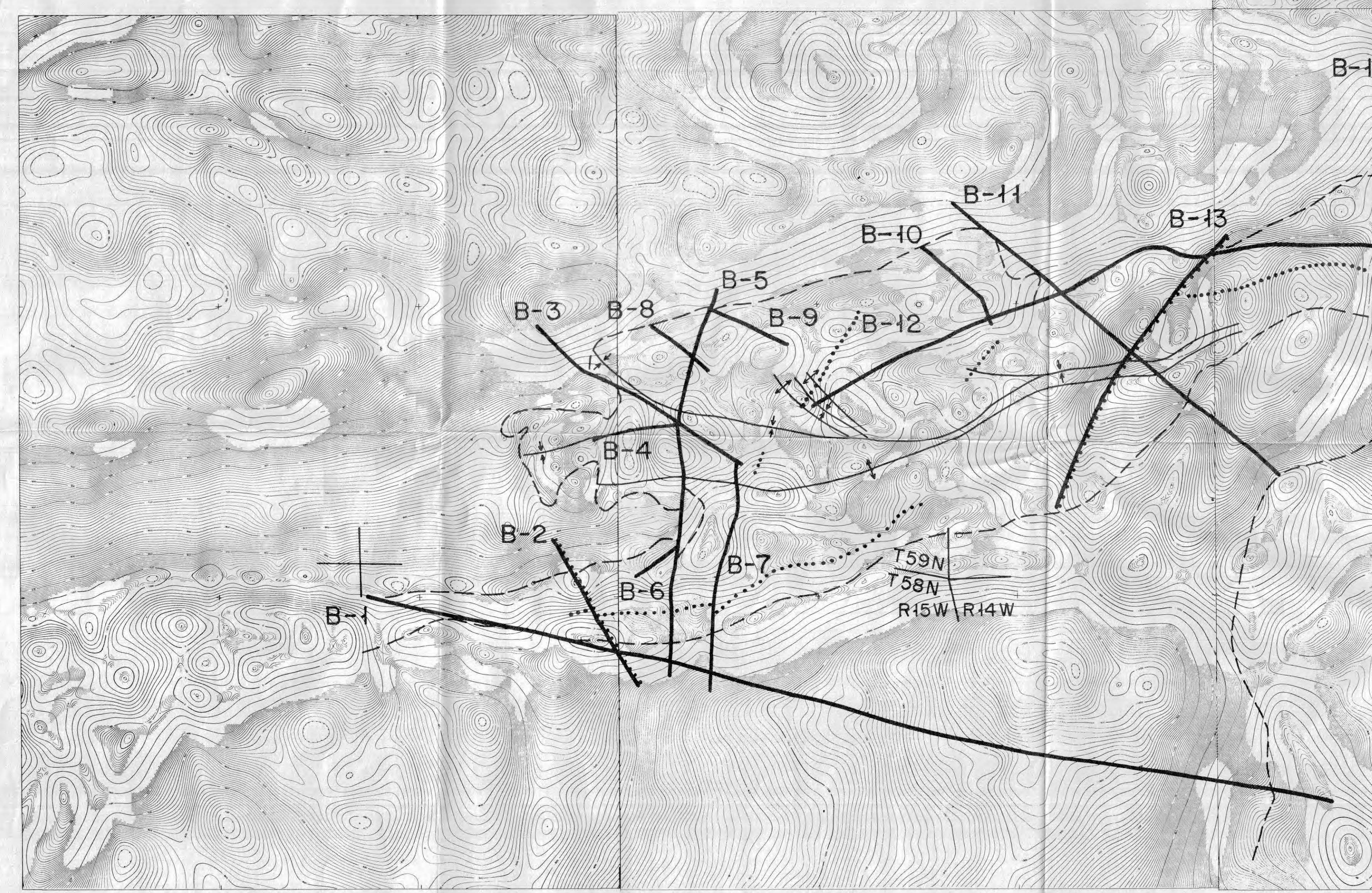
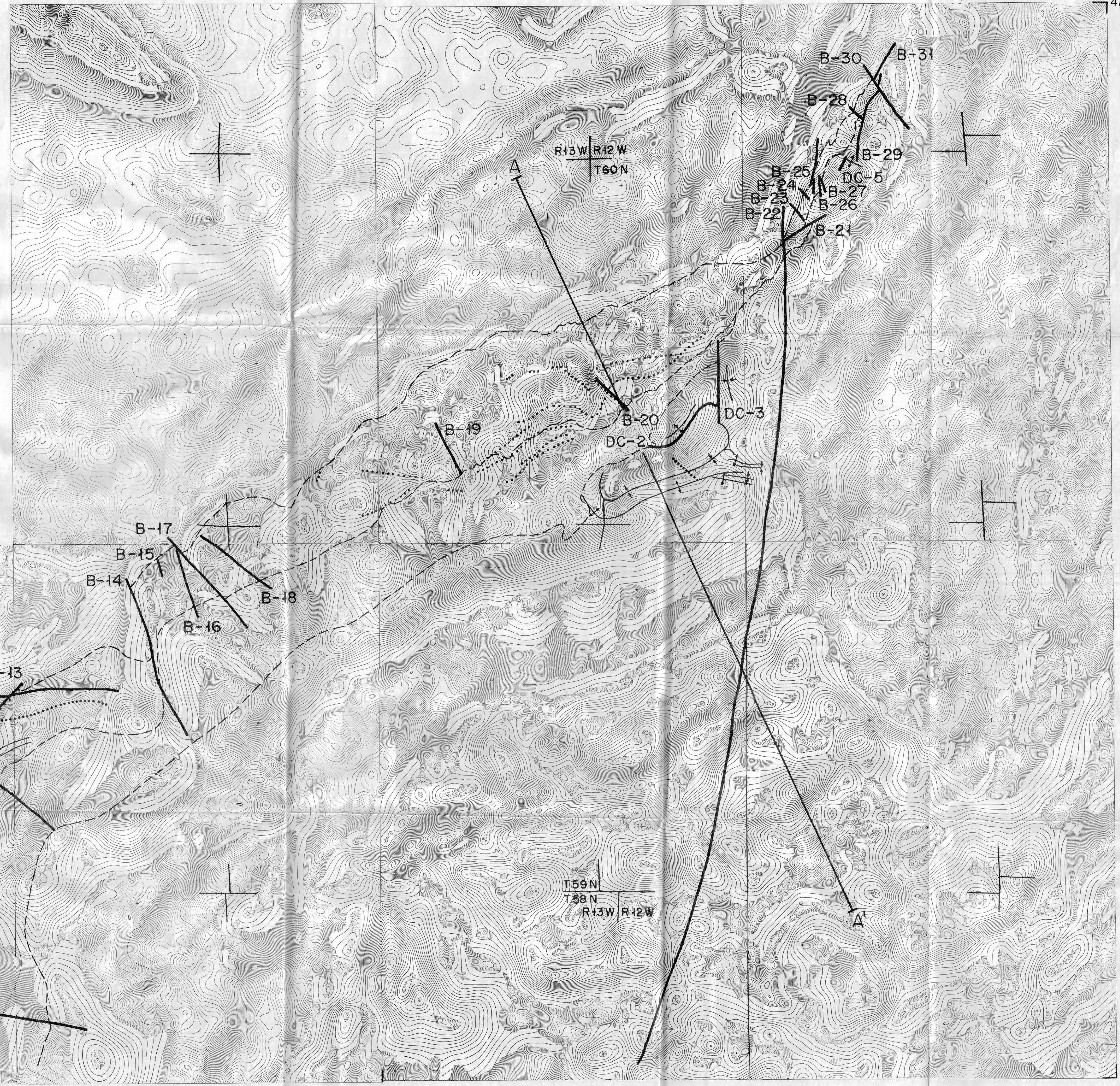
SCALE IN FEET

# AEROMAGNETIC ANOMALY AND GENERALIZED STRUCTURAL GEOLOGY

EAST MESABI DISTRICT AND ADJACENT BASAL DULUTH COMPLEX, MINNESOTA

- ..... Keweenaw Dike or Sill
  - Geologic Contact
  - Fault
  - ⌒⌒⌒ Fold Axes
- } See Plate 1 for more information

0 1 2 3 Kilometers



92°15'

92°

47°30' 91°45'