UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Principal facts for gravity stations in Hunterdon, Mercer, Monmouth, and Somerset Counties, central New Jersey

By

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Reston, VA. [1]

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Explanation

Principal facts for 318 gravity measurements, recorded in eleven 1:24,000-scale quadrangles located in central New Jersey (fig. 1) are reported here. These new measurements were made in August and December of 1984 as part of ongoing geophysical and geologic investigations of the Mesozoic basins of the eastern United States. The objective of the gravity survey is to further define the shape of the Newark Basin and the contained diabase bodies.

Gravity observations were made using LaCoste and Romberg gravity meter G-159 at bench marks and spot elevations given on U.S. Geological Survey 1:24,000-scale topographic quadrangle maps (fig. 2). For spot elevations, the accuracy is assumed to be within three-tenths of the contour interval of the topographic map (U.S. Geological Survey, national map accuracy standards) or ± 6 feet (± 1.8 meter) for most of the maps surveyed. At a reduction density of 2.67 g/cc, this elevation uncertainty is equivalent to a maximum Bouguer gravity uncertainty of ± 0.36 milligals. Of a total of 186 bench marks and useful elevations used as stations, approximately 110 were not directly recovered as they were commonly buried 6 to 12 inches below ground. However, precise descriptions of their locations supplied by the U. S. Geological Survey, New Jersey Geodetic Control Survey, and the National Geodetic Survey allowed reasonably accurate recovery of the correct locations. For these stations the elevation accuracy is assumed to be comparable to that of the spot elevations. Accuracy for the recovered bench marks is assumed to be ± 0.5 feet, which produces an uncertainty of ± 0.03 milligals. However, errors in the estimation of terrain corrections give rise to the greatest uncertainty in Bouguer values. Computer-generated terrain corrections are generally accurate to within 1 milligal. Station latitude and longitude were digitized directly from the topographic maps to a precision of ± 0.01 minutes.

Two working bases were established (figs. 3 and 4). These base stations were directly tied to one base station in Reston, NC 17, at the U. S. Geological Survey building, Reston, Va. (location map fig. 5). Base NC 17 has an adopted gravity value of 980084.05 milligals (1971 datum), determined from ties to base station "Washington C" (IGB 11687c, 980103.63 milligals; Morelli, 1974, p. 45) at the U. S. Department of Commerce building on 14th Street, NW, Washington, DC. Tide corrections were applied but no drift correction was made in establishing the working bases because the distance is too large to close a loop within a reasonable time. The elapsed time between readings at NC 17 and the new bases was four hours.

Computer programs existing on the U.S. Geological Survey's Digital Equipment Corporation VAX 11-780 computer system were used to obtain principal facts and terrain-corrected gravity values. A program written by D. Daniels (U.S. Geological

Survey, unpub. program, 1985) was used to reduce gravity-meter readings to observed-gravity values by calculating and correcting for earth-tide and linear instrument-drift.

Terrain corrections were computed using a program written by R. Godson (U.S. Geological Survey, unpub. program, 1978), correcting for the gravity effects from each station to a radius of 166.7 km away from each station using the method of Plouff (1977). This program also calculates earth-curvature corrections and complete (terrain-corrected) Bouguer gravity anomaly values. These computed terrain corrections use mean-elevation data digitized on a 30-second grid for corrections from 0 to 5 km, 1-minute terrain data for corrections from 5 to 21 km, and 3-minute terrain data for corrections from 21 to 166.7 km. A density of 2.67 g/cc was used to calculate terrain corrections, giving the corrections and gravity anomaly values listed in Appendix 1. Anomalies were calculated using the 1967 formula of the Geodetic Reference System (International Association of Geodesy, 1971).

Selected References

International Association of Geodesy, 1971, Geodetic reference system 1967: International Association of Geodesy Special Publication No. 3, 116 p.

Morelli, C., (ed.) 1974, The international standardized net 1971 [IGSN 71]: International Association of Geodesy Special Publication No. 4, 149 p.

Plouff, Donald, 1977, Preliminary documentation for a FORTRAN program to compute gravity terrain corrections based on topography digitized on a geographic grid: U.S. Geological Survey Open-File Report 77-535.

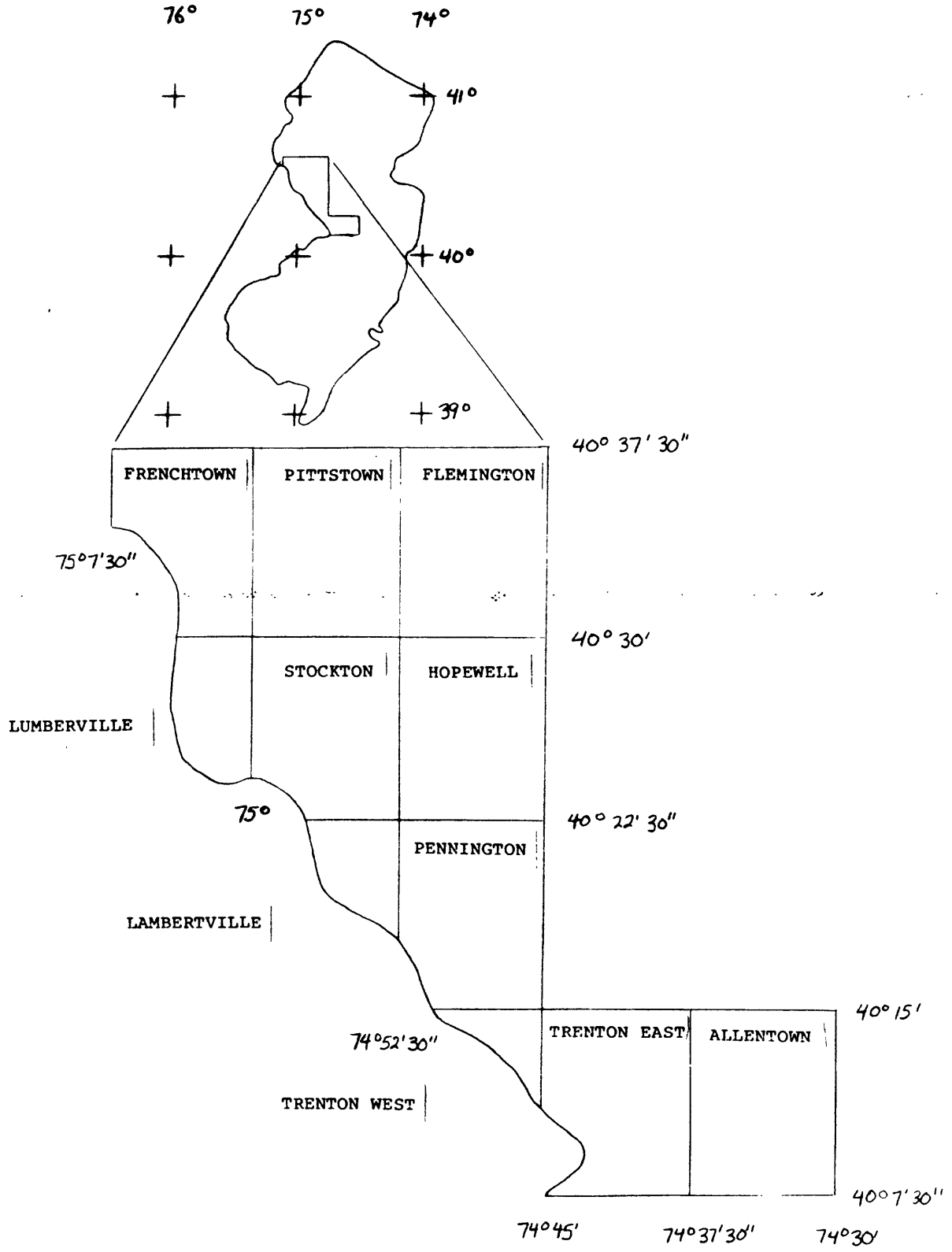

Fig. 1 Location of study area in state of New Jersey.

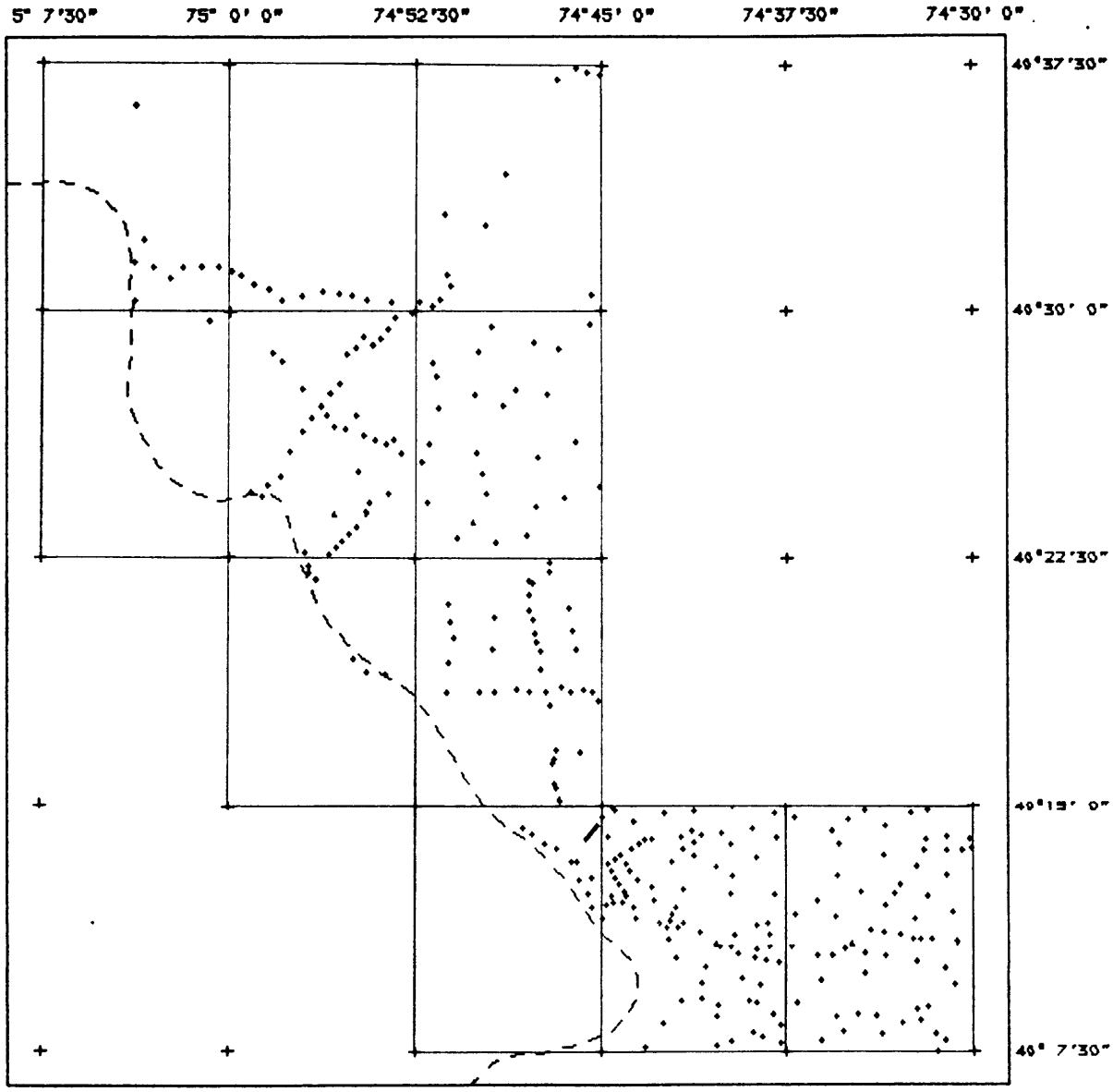

Fig. 2 Location of gravity measurements in this study.

U. S. Geological Survey Gravity Base Station

State:	New Jersey
Station name:	FLM6
Observed gravity:	980,162.74 mGals
Elevation:	188.29 feet
Latitude:	40° 32.63′
Longitude:	74° 49.67′
Nearest town:	Flemington, New Jersey

Date	Observer	Meter	Reference Base	Calculated Value
12/14/84	Bond	G-159	NC 17	980,162.72 mGals
12/19/84	Bond	G-159	NC 17	980,162.76 mGals

Description: Base is located in the Flemington quadrangle, approximately 3 miles northeast of the town center of Flemington, New Jersey, near the area known as Barley Sheaf, at the intersection of Hoffman Rd. and state route 523 leading east from Bartle's Corner. The station is immediately southeast of a standard Coast and Geodetic Survey disk, stamped M29 1942 and set in a concrete post, 34.5 feet southeast of the centerline of Route 523, 16 feet southwest of the centerline of Hoffman Rd., and about 2.5 feet above the road level.

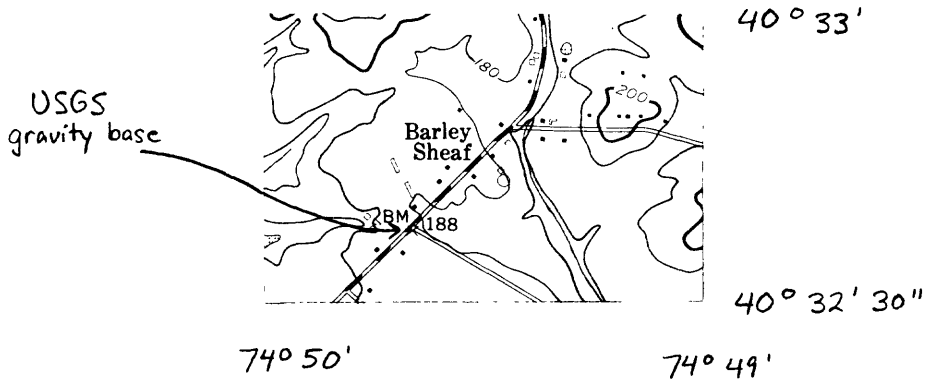

Fig. 3 Location of FLM6 gravity base near Flemington, New Jersey.

U. S. Geological Survey Gravity Base Station

State:	New Jersey
Station name:	7665
Observed gravity:	980,139.83 mGals
Elevation:	300.66 feet
Latitude:	40° 22.33′
Longitude:	74° 47.91′
Nearest town:	Pennington, New Jersey

Date	Observer	Meter	Reference Base	Calculated Value
12/14/84	Bond	G-159	NC 17	980,139.86 mGals
12/19/84	Bond	G-159	NC 17	980,139.78 mGals

Description: Base is located in the Pennington quadrangle, approximately 3 miles north of the town center of Pennington, New Jersey, along state route 31 (formerly Route 69), at the intersection of Mine Rd. The station is immediately west of a standard New Jersey Geodetic Control Survey disk, stamped 7665, set in a concrete post, 67 feet east of the centerline of Route 31, 19 feet north of the centerline of Mine Rd., and set flush with the ground.

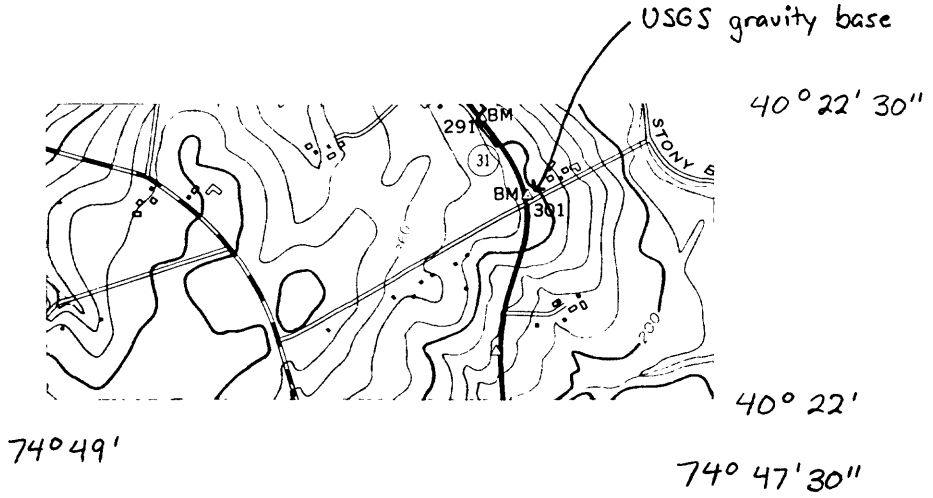

Fig. 4 Location of 7665 gravity base near Pennington, New Jersey.

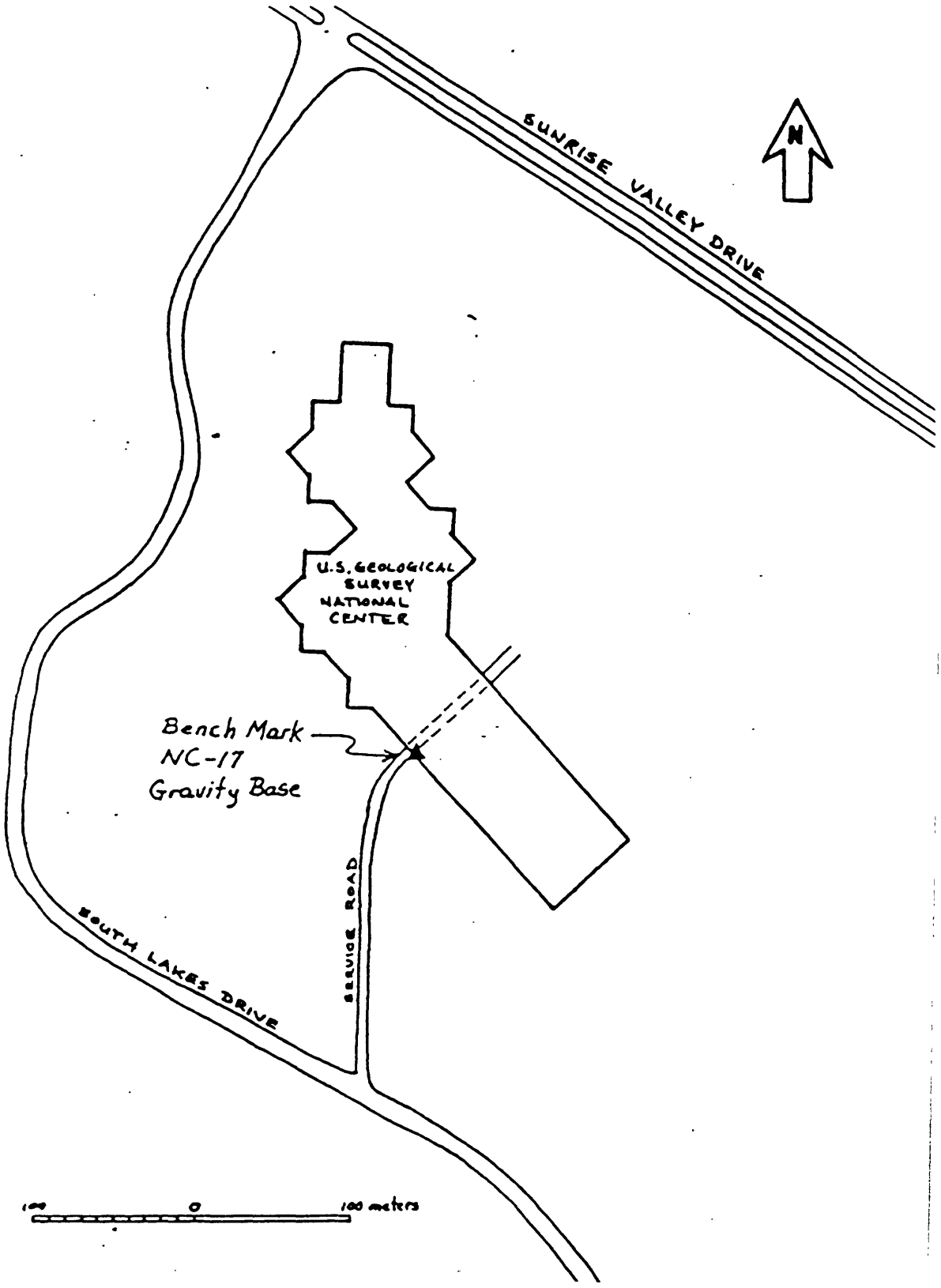

Fig. 5 Location of gravity base station NC-17 at the U.S. Geological Survey National Center in Reston, Virginia.

Appendix A: Principal facts of gravity data

Explanation of headings

Identification

station id	Gravity station quadrangle and identification number. ALL : Allentown quadrangle FLM : Flemington quadrangle FRE : Frenchtown quadrangle HOP : Hopewell quadrangle LAM : Lambertville quadrangle LUM : Lumberville quadrangle PEN : Pennington quadrangle PIT : Pittstown quadrangle STO : Stockton quadrangle TRE : Trenton East quadrangle TRW : Trenton West quadrangle

Location

latitude	North latitude in degrees, decimal minutes.
longitude	West longitude in degrees, decimal minutes.
elev	Station elevation in feet.

Gravity

observed gravity	Observed gravity in milligals.

Corrections

Terrain	Terrain correction, 166.7 km radius, in milligals.
Bouguer	Simple Bouguer slab correction in milligals.
curv	Curvature correction in milligals.

Anomalies

free-air	Free-air anomaly in milligals.
complete-Bouguer	Complete Bouguer anomaly in milligals for density 2.67 g/cc.

Newark basin - central New Jersey

STATION ID	LOCATIONS LATITUDE deg min	LONGITUDE deg min	ELEV (in ft)	OBSERVED GRAVITY (mgals)	CORRECTIONS TERRAIN (dens=2.67)	CURV	ANOMALIES FREE AIR	COMPLETE BOUGUER
ALL 1	40 9.05	74 37.09	84.0	980204.74	-0.05	-0.04	30.23	27.28
ALL 2	40 7.85	74 36.13	92.0	980207.42	-0.05	-0.04	35.44	32.22
ALL 3	40 8.13	74 35.20	94.0	980208.60	-0.05	-0.04	36.40	33.10
ALL 4	40 8.63	74 35.52	77.0	980208.88	-0.05	-0.03	34.34	31.63
ALL 5	40 8.67	74 34.65	88.0	980209.27	-0.05	-0.04	35.70	32.61
ALL 6	40 8.60	74 33.84	88.0	980209.77	-0.05	-0.04	36.31	33.22
ALL 7	40 8.05	74 33.63	56.0	980213.19	-0.03	-0.02	37.53	35.56
ALL 8	40 8.39	74 32.82	98.0	980210.26	-0.04	-0.04	38.05	34.62
ALL 9	40 8.47	74 32.08	128.0	980209.11	-0.02	-0.06	39.60	35.15
ALL10	40 8.08	74 31.52	134.0	980208.05	-0.01	-0.06	39.69	35.05
ALL11	40 7.83	74 31.12	138.0	980207.40	0.01	-0.06	39.78	35.02
ALL12	40 7.53	74 31.45	115.0	980209.10	-0.03	-0.05	39.76	35.76
ALL13	40 8.82	74 32.27	108.8	980210.49	-0.04	-0.05	38.66	34.86
ALL14	40 8.88	74 31.82	141.0	980208.04	0.02	-0.06	39.15	34.29
ALL15	40 9.57	74 30.73	146.0	980209.97	-0.01	-0.06	40.52	35.46
ALL16	40 10.05	74 31.10	122.0	980211.76	-0.02	-0.05	39.34	35.10
ALL17	40 10.22	74 32.22	107.0	980211.01	-0.04	-0.05	36.93	33.19
ALL18	40 10.42	74 33.48	104.0	980209.61	-0.04	-0.05	34.95	31.32
ALL19	40 10.42	74 35.66	100.4	980205.54	-0.05	-0.04	30.55	27.03
ALL20	40 10.67	74 35.09	82.3	980207.47	-0.06	-0.04	30.40	27.49
ALL21	40 10.55	74 34.32	101.0	980207.79	-0.05	-0.04	32.66	29.12
ALL22	40 9.93	74 34.33	102.0	980209.56	-0.04	-0.05	35.44	31.88
ALL23	40 9.68	74 36.13	103.0	980205.11	-0.05	-0.05	31.45	27.84
ALL24	40 10.47	74 36.25	83.0	980205.65	-0.05	-0.04	28.94	26.02
ALL25	40 10.75	74 37.28	96.0	980200.81	-0.05	-0.04	24.91	21.54
ALL26	40 11.67	74 37.12	110.0	980196.44	-0.05	-0.05	20.48	16.63
ALL27	40 10.80	74 34.87	90.0	980206.87	-0.05	-0.04	30.32	27.16
ALL28	40 11.23	74 34.07	116.0	980204.83	-0.03	-0.05	30.09	26.05
ALL29	40 11.97	74 33.47	122.7	980202.48	-0.03	-0.05	27.28	23.01
ALL30	40 12.33	74 33.09	111.0	980201.72	-0.05	-0.05	24.87	20.99
ALL31	40 12.60	74 32.88	114.0	980200.67	-0.04	-0.05	23.71	19.73
ALL32	40 12.23	74 31.82	126.0	980205.59	-0.02	-0.06	30.30	25.93
ALL33	40 11.77	74 30.83	130.0	980209.20	-0.02	-0.06	34.98	30.47
ALL34	40 10.88	74 30.70	145.0	980211.63	-0.01	-0.06	40.14	35.12
ALL35	40 10.92	74 31.62	133.0	980209.47	-0.01	-0.06	36.79	32.19
ALL36	40 10.97	74 32.09	125.0	980208.86	-0.02	-0.06	35.36	31.02
ALL37	40 10.97	74 32.40	141.0	980206.86	0.00	-0.06	34.86	29.99
ALL38	40 11.05	74 32.90	142.0	980206.08	0.00	-0.06	34.06	29.15
ALL39	40 11.12	74 33.58	120.0	980206.11	-0.03	-0.05	31.91	27.74
ALL40	40 11.58	74 32.30	115.0	980207.69	-0.03	-0.05	32.34	28.33
ALL41	40 12.88	74 31.02	115.0	980205.65	-0.04	-0.05	28.37	24.35
ALL42	40 13.98	74 31.88	127.0	980197.23	-0.03	-0.06	19.44	15.02
ALL43	40 13.58	74 31.93	119.0	980198.46	-0.04	-0.05	20.51	16.35
ALL44	40 13.10	74 32.23	98.0	980200.92	-0.05	-0.04	21.71	18.28
ALL45	40 14.02	74 31.08	134.0	980199.01	-0.02	-0.06	21.82	17.17
ALL46	40 13.57	74 31.03	118.0	980203.02	-0.03	-0.05	24.99	20.88
ALL47	40 13.63	74 30.45	136.0	980203.37	-0.01	-0.06	26.95	22.24
ALL48	40 13.65	74 30.08	132.0	980204.76	-0.02	-0.06	27.93	23.35
ALL49	40 13.97	74 30.13	138.0	980202.71	0.00	-0.06	25.96	21.20
ALL50	40 14.85	74 31.80	149.0	980196.29	0.02	-0.07	19.28	14.15
ALL51	40 14.75	74 32.48	131.0	980196.37	-0.02	-0.06	17.81	13.27
ALL52	40 14.35	74 33.48	132.0	980195.15	-0.02	-0.06	17.28	12.70
ALL53	40 13.45	74 33.58	110.0	980196.69	-0.05	-0.05	18.09	14.24
ALL54	40 14.82	74 34.32	116.0	980192.81	-0.04	-0.05	12.73	8.69
ALL55	40 14.57	74 34.97	111.5	980192.40	-0.05	-0.05	12.27	8.37
ALL56	40 14.20	74 35.65	108.0	980191.98	-0.05	-0.05	12.07	8.29
ALL57	40 14.65	74 37.12	94.0	980190.10	-0.06	-0.04	8.21	4.91
ALL58	40 13.80	74 35.33	108.0	980194.69	-0.05	-0.05	15.38	11.60
ALL59	40 12.35	74 34.50	140.0	980197.03	0.01	-0.06	22.88	18.06
ALL60	40 11.62	74 35.52	110.0	980200.86	-0.05	-0.05	24.98	21.13
ALL61	40 12.08	74 36.25	146.0	980194.19	0.03	-0.06	21.01	16.00
ALL62	40 12.83	74 35.41	112.0	980195.43	-0.05	-0.05	17.94	14.02
FLM 1	40 34.18	74 48.85	186.9	980166.05	-0.01	-0.08	-36.16	-42.63
FLM 2	40 37.07	74 46.80	170.0	980174.50	0.02	-0.07	-33.61	-39.46
FLM 3	40 37.28	74 45.57	203.0	980172.94	-0.01	-0.09	-32.38	-39.40

Newark basin - central New Jersey

STATION ID	LOCATIONS LATITUDE deg min	LONGITUDE deg min	ELEV (in ft)	OBSERVED GRAVITY (mgals)	CORRECTIONS TERRAIN (dens=2.67)	CURV	ANOMALIES FREE AIR	COMPLETE BOUGUER
FLM 4	40 37.18	74 45.03	215.0	980173.22	0.01	-0.09	-30.82	-38.24
FLM 5	40 37.40	74 46.02	122.0	980177.91	0.02	-0.05	-35.20	-39.40
FLM 6	40 32.63	74 49.67	188.2	980162.70	-0.04	-0.08	-37.09	-43.63
FLM 8	40 30.32	74 51.52	188.0	980158.65	-0.02	-0.08	-37.71	-44.23
FLM 9	40 31.08	74 51.25	139.9	980162.15	0.00	-0.06	-39.87	-44.70
FLM10	40 30.75	74 51.10	148.0	980161.93	-0.02	-0.07	-38.84	-43.97
FLM11	40 30.10	74 51.85	179.0	980158.76	-0.02	-0.08	-38.13	-44.33
FLM12	40 30.25	74 52.32	201.0	980156.38	0.01	-0.09	-38.66	-45.59
FLM13	40 30.52	74 45.38	87.7	980168.80	-0.05	-0.04	-37.30	-40.38
FRE 1	40 31.30	75 0.42	503.1	980133.54	0.10	-0.22	-34.65	-51.92
FRE 2	40 31.35	75 1.85	452.0	980136.86	0.20	-0.19	-36.21	-51.62
FRE 3	40 31.35	75 1.13	462.0	980135.83	0.11	-0.20	-36.30	-52.14
FRE 4	40 31.35	75 3.02	170.0	980152.01	0.15	-0.07	-47.58	-53.30
FRE 5	40 31.42	75 3.80	120.7	980154.71	0.24	-0.05	-49.62	-53.55
FRE 6	40 30.28	75 3.82	117.0	980152.43	0.22	-0.05	-50.56	-54.38
HOP 1	40 25.98	74 51.98	246.0	980148.79	0.00	-0.11	-35.66	-44.16
HOP 2	40 25.38	74 52.23	199.0	980150.14	0.00	-0.09	-37.83	-44.71
HOP 3	40 27.07	74 51.55	248.0	980151.02	0.01	-0.11	-34.86	-43.42
HOP 4	40 28.00	74 51.65	202.0	980155.40	-0.05	-0.09	-36.19	-43.22
HOP 5	40 28.45	74 51.85	159.0	980158.43	-0.02	-0.07	-37.88	-43.39
HOP 6	40 28.77	74 49.97	160.0	980158.91	-0.04	-0.07	-37.78	-43.34
HOP 7	40 29.52	74 49.45	180.0	980159.90	-0.05	-0.08	-36.03	-42.30
HOP 8	40 27.45	74 50.08	180.0	980153.52	-0.05	-0.08	-39.33	-45.60
HOP 9	40 27.12	74 49.00	120.0	980159.99	0.08	-0.05	-38.01	-42.07
HOP10	40 27.58	74 48.45	140.0	980160.41	-0.03	-0.06	-36.39	-41.25
HOP11	40 27.50	74 47.15	160.0	980160.65	0.02	-0.07	-34.15	-39.66
HOP12	40 26.02	74 46.03	540.0	980135.16	0.36	-0.23	-21.70	-39.99
HOP13	40 24.70	74 45.10	380.0	980140.86	0.15	-0.16	-29.08	-42.06
HOP14	40 25.53	74 47.57	480.0	980138.97	0.32	-0.21	-22.81	-39.06
HOP15	40 24.32	74 46.47	360.0	980140.79	0.10	-0.16	-30.47	-42.80
HOP16	40 24.07	74 47.62	380.0	980137.78	0.10	-0.16	-31.23	-44.25
HOP17	40 23.13	74 47.98	220.0	980146.29	0.05	-0.10	-36.37	-43.92
HOP18	40 22.97	74 49.28	240.0	980143.16	0.01	-0.11	-37.37	-45.65
HOP19	40 23.58	74 50.17	300.0	980139.07	0.02	-0.13	-36.73	-47.07
HOP20	40 23.08	74 50.83	360.0	980135.05	0.07	-0.16	-34.36	-46.72
HOP21	40 24.20	74 52.02	380.0	980138.27	0.07	-0.16	-30.92	-43.98
HOP22	40 24.47	74 49.63	460.0	980136.54	0.28	-0.20	-25.54	-41.15
HOP23	40 25.05	74 49.78	280.0	980147.62	0.05	-0.12	-32.24	-41.87
HOP24	40 25.70	74 50.03	180.0	980151.64	0.02	-0.08	-38.60	-44.79
HOP25	40 29.58	74 45.47	120.0	980166.06	-0.04	-0.05	-35.60	-39.78
HOP26	40 28.87	74 46.77	120.0	980164.13	-0.04	-0.05	-36.47	-40.65
HOP27	40 29.03	74 47.75	200.0	980159.12	-0.03	-0.09	-34.20	-41.13
LAM 1	40 22.23	74 56.82	78.0	980149.62	0.07	-0.03	-45.04	-47.67
LAM 2	40 22.03	74 56.75	78.0	980150.04	0.08	-0.03	-44.33	-46.94
LAM 3	40 21.87	74 56.50	81.0	980151.33	0.17	-0.04	-42.52	-45.15
LAM 4	40 19.42	74 55.00	67.0	980151.33	0.01	-0.03	-40.19	-42.50
LAM 5	40 19.07	74 54.45	52.5	980153.29	0.11	-0.02	-39.08	-40.78
LAM 6	40 18.96	74 53.73	65.0	980153.41	0.09	-0.03	-37.62	-39.78
LUM 1	40 29.32	75 3.67	113.0	980150.28	0.41	-0.05	-51.65	-55.14
LUM 2	40 28.18	75 3.78	109.0	980148.03	0.74	-0.05	-52.58	-55.61
LUM 3	40 27.43	75 4.15	106.0	980146.52	0.45	-0.05	-53.26	-56.47
LUM 4	40 26.25	75 3.80	101.0	980145.51	0.95	-0.04	-52.98	-55.52
LUM 5	40 25.13	75 3.47	93.5	980146.72	0.33	-0.04	-50.81	-53.71
LUM 6	40 24.82	75 2.38	93.0	980145.62	0.29	-0.04	-51.49	-54.42
LUM 7	40 24.47	75 0.83	89.0	980148.34	0.18	-0.04	-48.63	-51.53
PEN 1	40 15.17	74 46.65	104.0	980168.94	-0.07	-0.05	-12.78	-16.45
PEN 2	40 15.48	74 46.80	116.0	980166.69	-0.05	-0.05	-14.36	-18.42
PEN 3	40 21.78	74 47.93	218.0	980145.91	0.01	-0.10	-34.92	-42.44
PEN 4	40 21.72	74 47.73	226.0	980146.26	0.00	-0.10	-33.73	-41.54
PEN 5	40 22.08	74 47.08	201.7	980148.86	-0.02	-0.09	-33.96	-40.95
PEN 6	40 22.33	74 47.12	210.0	980148.54	-0.02	-0.09	-33.86	-41.14
PEN 7	40 21.38	74 47.93	206.0	980147.39	0.00	-0.09	-33.97	-41.09
PEN 8	40 20.90	74 47.87	200.0	980148.05	-0.02	-0.09	-33.17	-40.10
PEN 9	40 20.60	74 47.78	197.4	980148.58	-0.04	-0.09	-32.44	-39.29
PEN10	40 20.21	74 47.65	210.0	980148.02	-0.03	-0.09	-31.23	-38.52

Newark basin - central New Jersey

STATION ID	LOCATIONS LATITUDE deg min	LONGITUDE deg min	ELEV (in ft)	OBSERVED GRAVITY (mgals)	CORRECTIONS TERRAIN (dens=2.67)	CURV	ANOMALIES FREE AIR	COMPLETE BOUGUER
PEN11	40 19.95	74 47.57	180.0	980149.89	-0.04	-0.08	-31.79	-38.05
PEN12	40 19.68	74 47.47	210.0	980148.29	-0.03	-0.09	-30.18	-37.46
PEN13	40 19.10	74 47.43	208.0	980148.63	-0.03	-0.09	-29.15	-36.37
PEN14	40 18.57	74 46.62	206.0	980150.33	-0.03	-0.09	-26.85	-34.00
PEN15	40 18.46	74 46.25	215.0	980150.53	0.01	-0.09	-25.65	-33.06
PEN16	40 18.48	74 45.38	214.0	980152.47	0.02	-0.09	-23.83	-31.20
PEN17	40 18.20	74 45.10	191.0	980155.13	0.00	-0.08	-22.92	-29.52
PEN18	40 18.50	74 45.75	227.0	980150.79	0.02	-0.10	-24.31	-32.14
PEN19	40 19.73	74 46.00	160.0	980153.00	-0.01	-0.07	-30.23	-35.77
PEN20	40 20.33	74 46.15	180.0	980151.17	-0.03	-0.08	-31.08	-37.32
PEN21	40 20.98	74 46.37	180.0	980150.11	-0.03	-0.08	-33.11	-39.36
PEN22	40 18.46	74 47.23	197.5	980150.34	-0.03	-0.09	-27.48	-34.33
PEN23	40 18.00	74 47.07	222.0	980149.88	0.02	-0.10	-24.95	-32.60
PEN24	40 16.65	74 46.85	140.2	980159.69	-0.03	-0.06	-20.83	-25.70
PEN25	40 16.40	74 46.90	119.1	980162.08	-0.05	-0.05	-20.05	-24.21
PEN26	40 16.27	74 47.02	118.0	980162.32	-0.05	-0.05	-19.72	-23.85
PEN27	40 15.67	74 46.88	116.0	980165.69	-0.05	-0.05	-15.64	-19.70
PEN28	40 16.60	74 45.87	120.0	980163.04	-0.05	-0.05	-19.31	-23.50
PEN29	40 18.46	74 47.92	230.0	980147.25	0.01	-0.10	-27.51	-35.44
PEN30	40 18.53	74 48.45	174.0	980150.24	-0.03	-0.08	-29.90	-35.94
PEN31	40 18.46	74 49.28	121.0	980152.78	-0.04	-0.05	-32.23	-36.45
PEN32	40 18.42	74 49.87	128.0	980151.89	-0.05	-0.06	-32.41	-36.88
PEN33	40 20.70	74 49.33	280.0	980141.76	0.03	-0.12	-31.63	-41.28
PEN34	40 20.52	74 51.08	255.0	980142.29	0.02	-0.11	-33.19	-41.98
PEN35	40 21.10	74 51.18	280.0	980138.86	0.01	-0.12	-35.13	-44.79
PEN36	40 20.10	74 50.97	280.0	980143.01	0.04	-0.12	-29.49	-39.12
PEN37	40 19.33	74 51.18	260.0	980142.97	0.10	-0.11	-30.27	-39.15
PEN38	40 19.75	74 49.42	200.0	980147.94	-0.03	-0.09	-31.56	-38.50
PEN39	40 18.43	74 51.28	188.0	980147.51	0.02	-0.08	-31.16	-37.63
PIT 1	40 30.25	74 53.45	395.0	980143.72	0.19	-0.17	-33.07	-46.52
PIT 2	40 30.35	74 54.45	532.0	980134.39	0.26	-0.23	-29.66	-47.77
PIT 3	40 30.45	74 55.05	526.0	980134.21	0.15	-0.23	-30.56	-48.57
PIT 4	40 30.50	74 55.60	524.0	980133.66	0.12	-0.22	-31.37	-49.35
PIT 5	40 30.57	74 56.25	499.1	980134.16	0.08	-0.21	-33.31	-50.47
PIT 6	40 30.47	74 57.07	515.5	980132.35	0.09	-0.22	-33.44	-51.15
PIT 7	40 30.35	74 57.88	555.0	980129.19	0.19	-0.24	-32.70	-51.68
PIT 8	40 30.63	74 58.43	533.3	980131.03	0.12	-0.23	-33.32	-51.62
PIT 9	40 30.80	74 59.02	493.0	980133.75	0.06	-0.21	-34.64	-51.61
PIT10	40 31.03	74 59.53	487.0	980134.32	0.05	-0.21	-34.98	-51.75
PIT11	40 31.20	74 59.90	489.0	980134.52	0.06	-0.21	-34.84	-51.67
STO 1	40 24.48	74 59.13	80.0	980150.59	0.15	-0.04	-47.24	-49.86
STO 2	40 24.72	74 58.42	246.0	980141.44	0.01	-0.11	-41.13	-49.62
STO 3	40 25.00	74 57.95	325.0	980137.34	0.07	-0.14	-38.22	-49.38
STO 4	40 25.73	74 57.58	305.0	980139.96	0.01	-0.13	-38.56	-49.09
STO 5	40 26.32	74 57.00	284.1	980142.23	0.00	-0.12	-39.14	-48.95
STO 6	40 26.75	74 56.67	345.5	980139.76	0.03	-0.15	-36.47	-48.38
STO 7	40 27.13	74 56.28	427.0	980135.24	0.17	-0.18	-33.90	-48.48
STO 8	40 27.63	74 57.03	510.9	980130.76	0.26	-0.22	-31.23	-48.62
STO 9	40 28.50	74 57.85	435.7	980134.97	0.06	-0.19	-35.39	-50.38
STO10	40 28.77	74 58.22	477.7	980132.07	0.11	-0.21	-34.74	-51.13
STO11	40 27.52	74 55.93	405.0	980137.45	0.11	-0.18	-34.34	-48.22
STO12	40 27.83	74 55.53	380.5	980139.75	0.12	-0.17	-34.80	-47.82
STO13	40 28.90	74 54.92	530.0	980132.89	0.42	-0.23	-29.19	-47.08
STO14	40 28.68	74 55.23	535.0	980132.16	0.40	-0.23	-29.13	-47.21
STO15	40 29.22	74 54.60	532.0	980133.19	0.45	-0.23	-29.19	-47.11
STO16	40 28.97	74 54.20	316.0	980146.15	0.08	-0.14	-36.16	-47.00
STO17	40 29.15	74 53.90	305.0	980147.41	0.09	-0.13	-36.20	-46.65
STO18	40 29.47	74 53.62	261.0	980150.50	0.07	-0.11	-37.73	-46.68
STO19	40 29.80	74 53.32	239.0	980152.42	0.07	-0.10	-38.37	-46.56
STO20	40 29.95	74 52.63	180.0	980157.04	0.03	-0.08	-39.52	-45.71
STO21	40 26.82	74 56.07	346.0	980139.99	0.04	-0.15	-36.31	-48.22
STO22	40 26.48	74 55.80	300.0	980142.80	0.01	-0.13	-37.32	-47.67
STO23	40 26.43	74 55.35	263.0	980145.46	-0.01	-0.12	-38.06	-47.15
STO24	40 24.42	74 53.62	188.0	980148.49	0.02	-0.08	-39.09	-45.56
STO25	40 24.17	74 54.32	156.0	980149.01	0.05	-0.07	-41.21	-46.55

Newark basin - central New Jersey

STATION ID	LOCATIONS LATITUDE deg min	LONGITUDE deg min	ELEV (in ft)	OBSERVED GRAVITY (mgals)	CORRECTIONS TERRAIN (dens=2.67)	CURV	ANOMALIES FREE AIR	COMPLETE BOUGUER
ST026	40 23.85	74 55.75	119.2	980147.98	0.17	-0.05	-45.22	-49.17
ST027	40 25.12	74 54.80	181.7	980148.05	-0.03	-0.08	-41.17	-47.48
ST028	40 25.70	74 53.07	243.0	980146.98	0.01	-0.11	-37.34	-45.72
ST029	40 23.90	74 54.47	240.0	980142.93	-0.01	-0.11	-38.99	-47.29
ST030	40 23.38	74 54.82	307.0	980139.19	0.04	-0.13	-35.65	-46.22
ST031	40 23.20	74 55.17	290.0	980139.46	0.03	-0.13	-36.71	-46.70
ST032	40 23.02	74 55.47	270.0	980140.25	0.02	-0.12	-37.54	-46.84
ST033	40 22.82	74 55.70	277.0	980139.95	0.05	-0.12	-36.89	-46.41
ST034	40 22.58	74 56.00	251.0	980141.36	0.03	-0.11	-37.56	-46.20
ST035	40 24.35	74 58.68	84.2	980150.76	0.12	-0.04	-46.48	-49.27
ST036	40 26.83	74 54.85	200.0	980150.00	-0.01	-0.09	-40.04	-46.96
ST037	40 26.07	74 53.38	247.0	980147.15	0.02	-0.11	-37.34	-45.85
ST038	40 25.97	74 53.65	269.0	980145.57	0.07	-0.12	-36.70	-45.93
ST039	40 26.12	74 54.10	208.0	980149.20	-0.04	-0.09	-39.03	-46.25
ST040	40 26.25	74 54.55	242.0	980147.18	0.01	-0.11	-38.05	-46.40
ST041	40 22.67	74 56.95	72.0	980149.08	0.06	-0.03	-46.81	-49.24
TRE 1	40 14.63	74 44.95	98.0	980175.32	-0.05	-0.04	-6.16	-9.60
TRE 2	40 14.98	74 44.58	83.0	980175.86	-0.07	-0.04	-7.55	-10.49
TRE 3	40 14.82	74 44.43	100.8	980175.59	-0.05	-0.04	-5.92	-9.45
TRE 4	40 13.97	74 44.72	51.5	980179.80	-0.08	-0.02	-5.08	-6.94
TRE 5	40 13.43	74 44.25	54.0	980181.08	-0.08	-0.02	-2.76	-4.71
TRE 6	40 13.17	74 44.00	55.0	980181.36	-0.08	-0.02	-2.00	-3.98
TRE 7	40 13.00	74 43.82	54.2	980181.46	-0.08	-0.02	-1.72	-3.67
TRE 8	40 12.72	74 43.52	53.9	980182.01	-0.08	-0.02	-0.78	-2.73
TRE 9	40 12.50	74 42.95	65.0	980182.96	-0.07	-0.03	1.54	-0.78
TRE10	40 12.07	74 42.87	59.0	980184.83	-0.07	-0.03	3.48	1.38
TRE11	40 11.43	74 41.65	90.0	980187.15	-0.05	-0.04	9.67	6.51
TRE12	40 11.42	74 42.65	81.0	980185.29	-0.06	-0.04	6.98	4.12
TRE13	40 11.57	74 43.63	62.0	980184.12	-0.07	-0.03	3.80	1.58
TRE14	40 11.87	74 43.73	55.0	980183.07	-0.07	-0.02	1.65	-0.32
TRE15	40 12.20	74 43.98	52.0	980182.75	-0.08	-0.02	0.55	-1.33
TRE16	40 12.35	74 44.08	50.2	980182.27	-0.08	-0.02	-0.32	-2.14
TRE17	40 12.57	74 44.27	55.0	980181.15	-0.08	-0.02	-1.31	-3.29
TRE18	40 12.77	74 44.42	56.9	980180.70	-0.08	-0.03	-1.89	-3.93
TRE19	40 13.00	74 44.60	61.0	980180.44	-0.08	-0.03	-2.10	-4.28
TRE20	40 13.18	74 44.72	65.5	980179.51	-0.06	-0.03	-2.88	-5.20
TRE21	40 13.32	74 44.45	54.0	980180.87	-0.08	-0.02	-2.81	-4.75
TRE22	40 13.67	74 43.77	51.0	980181.95	-0.07	-0.02	-2.53	-4.36
TRE23	40 13.80	74 43.48	49.0	980182.76	-0.07	-0.02	-2.10	-3.86
TRE24	40 13.92	74 43.25	49.0	980181.63	-0.07	-0.02	-3.41	-5.17
TRE25	40 13.93	74 42.97	54.0	980181.78	-0.08	-0.02	-2.80	-4.75
TRE26	40 14.75	74 42.42	55.0	980182.79	-0.08	-0.02	-2.92	-4.90
TRE27	40 14.47	74 43.67	62.0	980180.70	-0.08	-0.03	-3.93	-6.15
TRE28	40 12.23	74 44.57	52.0	980181.50	-0.08	-0.02	-0.74	-2.62
TRE29	40 12.05	74 44.15	53.9	980181.73	-0.07	-0.02	-0.07	-2.00
TRE30	40 11.98	74 44.53	42.2	980182.05	-0.08	-0.02	-0.75	-2.28
TRE31	40 11.95	74 44.82	47.5	980180.96	-0.08	-0.02	-1.29	-3.01
TRE32	40 11.53	74 44.93	39.0	980181.40	-0.08	-0.02	-1.03	-2.46
TRE33	40 11.28	74 42.32	97.0	980185.48	-0.04	-0.04	8.88	5.49
TRE34	40 11.50	74 42.20	94.1	980185.37	-0.05	-0.04	8.17	4.87
TRE35	40 11.68	74 42.10	94.1	980184.56	-0.04	-0.04	7.09	3.80
TRE36	40 11.85	74 42.00	91.0	980184.60	-0.05	-0.04	6.60	3.40
TRE37	40 12.45	74 41.72	90.0	980183.99	-0.05	-0.04	4.99	1.83
TRE38	40 13.27	74 42.17	60.0	980184.29	-0.08	-0.03	1.25	-0.90
TRE39	40 13.63	74 41.68	72.0	980184.02	-0.07	-0.03	1.57	-0.98
TRE40	40 13.48	74 41.23	85.0	980184.16	-0.06	-0.04	3.16	0.16
TRE41	40 13.90	74 41.25	78.0	980183.45	-0.07	-0.03	1.16	-1.60
TRE42	40 14.10	74 40.93	89.0	980184.20	-0.06	-0.04	2.65	-0.49
TRE43	40 14.18	74 41.30	90.0	980183.04	-0.06	-0.04	1.47	-1.70
TRE44	40 14.03	74 41.75	79.3	980183.16	-0.07	-0.04	0.81	-2.00
TRE45	40 14.95	74 39.70	80.0	980185.74	-0.07	-0.04	2.09	-0.75
TRE46	40 14.80	74 41.22	60.0	980184.13	-0.08	-0.03	-1.19	-3.34
TRE47	40 14.15	74 40.12	82.0	980186.39	-0.07	-0.04	4.12	1.21
TRE48	40 13.78	74 39.72	107.3	980185.74	-0.06	-0.05	6.39	2.62
TRE49	40 14.30	74 38.87	95.0	980187.86	-0.06	-0.04	6.58	3.24

Newark basin - central New Jersey

STATION ID	LOCATIONS LATITUDE deg min	LONGITUDE deg min	ELEV (in ft)	OBSERVED GRAVITY (mgals)	CORRECTIONS (dens=2.67) TERRAIN	CURV	ANOMALIES FREE AIR	COMPLETE BOUGUER
TRE50	40 14.78	74 37.95	100.0	980187.61	-0.06	-0.04	6.09	2.58
TRE51	40 13.43	74 38.72	100.0	980187.75	-0.06	-0.04	8.24	4.72
TRE52	40 14.02	74 37.88	96.0	980189.16	-0.06	-0.04	8.39	5.02
TRE53	40 12.85	74 39.65	85.0	980187.80	-0.06	-0.04	7.73	4.74
TRE54	40 13.15	74 40.38	102.0	980185.11	-0.06	-0.05	6.20	2.61
TRE55	40 12.27	74 39.73	93.0	980188.62	-0.06	-0.04	10.18	6.91
TRE56	40 11.33	74 38.68	62.0	980196.35	-0.07	-0.03	16.38	14.17
TRE57	40 11.43	74 38.30	69.0	980196.37	-0.06	-0.03	16.91	14.46
TRE58	40 11.07	74 38.20	56.0	980198.89	-0.06	-0.02	18.75	16.75
TRE59	40 10.73	74 38.20	66.0	980200.06	-0.06	-0.03	21.37	19.02
TRE60	40 10.65	74 38.72	66.0	980199.26	-0.06	-0.03	20.68	18.34
TRE61	40 10.35	74 38.80	62.0	980200.71	-0.06	-0.03	22.20	20.00
TRE62	40 10.30	74 38.34	91.3	980199.94	-0.04	-0.04	24.26	21.06
TRE63	40 10.22	74 37.80	84.1	980202.10	-0.06	-0.04	25.87	22.90
TRE64	40 9.55	74 38.52	59.0	980203.95	-0.07	-0.03	26.35	24.24
TRE65	40 9.08	74 38.97	76.0	980201.75	-0.06	-0.03	26.44	23.76
TRE66	40 9.05	74 38.70	86.0	980202.61	-0.05	-0.04	28.29	25.27
TRE67	40 8.70	74 38.03	91.0	980203.79	-0.04	-0.04	30.46	27.28
TRE68	40 8.35	74 37.75	87.0	980205.08	-0.04	-0.04	31.89	28.85
TRE69	40 7.78	74 37.77	70.0	980206.87	-0.06	-0.03	32.93	30.45
TRE70	40 8.02	74 38.50	89.0	980204.14	-0.04	-0.04	31.63	28.52
TRE71	40 8.13	74 38.83	89.0	980203.64	-0.04	-0.04	30.97	27.86
TRE72	40 7.83	74 39.73	111.0	980200.19	-0.02	-0.05	30.03	26.18
TRE73	40 7.73	74 40.32	124.0	980198.86	-0.02	-0.05	30.07	25.77
TRE74	40 8.58	74 40.30	98.0	980198.94	-0.04	-0.04	26.45	23.02
TRE75	40 9.14	74 40.97	104.0	980195.82	-0.04	-0.05	23.06	19.43
TRE76	40 8.93	74 40.27	101.0	980198.39	-0.04	-0.04	25.66	22.13
TRE77	40 9.63	74 40.95	71.0	980196.63	-0.06	-0.03	20.04	17.52
TRE78	40 10.08	74 40.82	62.0	980196.41	-0.07	-0.03	18.30	16.09
TRE79	40 9.78	74 39.28	68.0	980202.22	-0.06	-0.03	25.12	22.71
TRE80	40 10.50	74 39.41	60.0	980198.63	-0.07	-0.03	19.70	17.56
TRE81	40 10.70	74 39.78	64.0	980196.26	-0.07	-0.03	17.42	15.14
TRE82	40 10.73	74 40.16	57.0	980195.65	-0.07	-0.03	16.11	14.07
TRE83	40 10.78	74 40.38	60.0	980195.20	-0.07	-0.03	15.86	13.72
TRE84	40 11.13	74 41.02	58.0	980195.86	-0.07	-0.03	15.81	13.74
TRE85	40 11.27	74 41.90	67.0	980188.94	-0.07	-0.03	9.54	7.15
TRE86	40 10.92	74 42.30	16.0	980192.51	-0.02	-0.01	8.83	8.25
TRE87	40 10.37	74 41.98	70.3	980191.58	-0.07	-0.03	13.82	11.33
TRE88	40 9.05	74 41.77	79.0	980196.15	-0.06	-0.04	21.17	18.38
TRE89	40 8.37	74 42.47	61.0	980197.61	-0.07	-0.03	21.94	19.77
TRE90	40 7.65	74 43.20	92.0	980196.83	-0.05	-0.04	25.15	21.92
TRE91	40 11.08	74 39.58	67.0	980194.86	-0.07	-0.03	15.74	13.35
TRE92	40 12.30	74 37.98	88.0	980192.74	-0.06	-0.04	13.78	10.68
TRW 1	40 13.93	74 45.65	100.0	980174.67	-0.04	-0.04	-5.59	-9.08
TRW 2	40 14.08	74 45.50	97.0	980174.99	-0.05	-0.04	-5.77	-9.18
TRW 3	40 14.22	74 45.37	101.0	980174.94	-0.04	-0.04	-5.65	-9.18
TRW 4	40 14.37	74 45.20	100.3	980175.44	-0.03	-0.04	-5.44	-8.94
TRW 5	40 11.85	74 45.40	44.3	980180.44	-0.08	-0.02	-1.96	-3.57
TRW 6	40 12.30	74 45.52	33.8	980181.26	-0.07	-0.02	-2.80	-4.03
TRW 7	40 12.80	74 45.40	52.9	980179.07	-0.07	-0.02	-3.94	-5.83
TRW 8	40 12.72	74 45.93	29.0	980179.83	-0.05	-0.01	-5.31	-6.36
TRW 9	40 13.25	74 46.22	49.4	980178.41	-0.05	-0.02	-5.60	-7.36
TRW10	40 13.22	74 45.97	50.0	980179.44	-0.07	-0.02	-4.46	-6.26
TRW11	40 13.62	74 46.80	52.0	980177.22	-0.03	-0.02	-7.09	-8.92
TRW12	40 13.82	74 47.27	37.0	980176.64	0.01	-0.02	-9.37	-10.64
TRW13	40 14.07	74 47.77	36.0	980174.99	0.01	-0.02	-11.50	-12.73
TRW14	40 14.30	74 48.20	59.0	980171.97	-0.04	-0.03	-12.70	-14.78