

Layer Name: National Geodetic Survey Geodetic Control Stations

File Name: ngs_geodetic_ctrl_stns

Layer Type: Point

Status: Complete

Geog. Extent: Hawaiian Islands (including Northwest Hawaiian Islands)

Projection: Universal Transverse Mercator, Zone 4 (Meters)

Datum: NAD 83 HARN

Please note - if you are using data in the [State's web services](#) or downloading from the [State's geoportal](#), the data is served and exported in WGS84 coordinates, although it is stored internally in UTM coordinates.

Description: This data contains a set of geodetic control stations maintained by the National Geodetic Survey. Each geodetic control station in this dataset has either a precise Latitude/Longitude used for horizontal control or a precise Orthometric Height used for vertical control, or both. The National Geodetic Survey (NGS) serves as the Nation's depository for geodetic data. The NGS distributes geodetic data worldwide to a variety of users. These geodetic data include the final results of geodetic surveys, software programs to format, compute, verify, and adjust original survey observations or to convert values from one geodetic datum to another, and publications that describe how to obtain and use Geodetic Data products and services.

Source: Downloaded by the Hawaii Statewide GIS Program from [NGS](#) on January 28, 2022.

Projected from WGS 84 NAD 83 HARN to UTM Zone 4, NAD 83 HARN

Note: This data was projected from WGS NAD 83 HARN to the State's standard projection/datum of UTM Zone 4, NAD 83 HARN for use in the State's GIS database. The State posts an un-projected version of the layer on its legacy site (<https://planning.hawaii.gov/gis/download-gis-data-expanded/#013>), or users can visit the National Geodetic Survey site directly, at https://www.ngs.noaa.gov/cgi-bin/sf_archive.prl.

For more information about this dataset please refer to [full metadata](#).

For attribute definitions, please see following pages.

Contact: Statewide GIS Program
Hawaii State Office of Planning and Sustainable Development
Phone: (808) 587-2846
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Attribute Definitions (note – not all attributes listed are found in this dataset):

The current attributes and their meanings are shown below (source: https://www.ngs.noaa.gov/INFO/pids2shapefile_metadata.html).

See also: <https://www.ngs.noaa.gov/DATASHEET/dsdata.pdf>

#FeatureId

Temporary unique ID assigned to this station.

DATA_DATE-

The date when this information was retrieved from the NGS database.

DATA_SRCE-

Data Source where the information for the mark came from.

You should use this link to obtain a full datasheet for the mark or obtain the datasheets from <http://www.ngs.noaa.gov/cgi-bin/datasheet.prl> if you intend to use the data for survey control.

DEC_LONG-

Decimal equivalent of the LONGITUDE

Always displayed to 10 decimal places, but you should see POS_SRCE and POS_ORDER to determine the true accuracy.

DEC_LAT-

Decimal equivalent of the LATITUDE

PID-

Permanent Identifier assigned by NGS to each mark

NAME-

Station Name (a.k.a. Designation)

STATE-

State Code

COUNTY-

County Name

QUAD-

USGS Topographic Quad Map Name

LATITUDE-

Latitude in Deg-Min-Sec format

LONGITUDE-

Longitude in Deg-Min-Sec format

POS_DATUM-

Datum of the LATITUDE, LONGITUDE

Should always be NAD83

DATUM_TAG-

Datum Tag of the LATITUDE, LONGITUDE

NAD83 (1986) indicates positions on the NAD83 datum for the

North American Adjustment, completed in 1986.
NAD83 (nnnn) indicates positions on the NAD83 datum for the North American Adjustment, but readjusted to a State High Accuracy Reference Network (HARN) on the date shown in (nnnn).
NAD83 (CORS) indicates positions which are part of the CORS network.

POS_SRCE-
Position Source for the LATITUDE, LONGITUDE

ADJUSTED = Least squares adjustment.
(Lat, Lon Rounded to 5 decimal places.)

HD_HELD1 = Differentially corrected hand held GPS observations.
(Lat, Lon Rounded to 2 decimal places.)

HD_HELD2 = Autonomous hand held GPS observations.
(Lat, Lon Rounded to 1 decimal places.)

SCALED = Scaled from a topographic map.
(Lat, Lon Rounded to 0 decimal places.)

ORTHO_HT-
Present if available.
The Orthometric Height in METERS indicating the height above the Geoid.

VERT_DATUM-
Datum of the ORTHO_HT

VERT_SRCE-
Vertical Source for the ORTHO_HT

ADJUSTED = Direct Digital Output from Least Squares Adjustment of Precise Leveling.
(Rounded to 3 decimal places.)

ADJ UNCH = Manually Entered (and NOT verified) Output of Least Squares Adjustment of Precise Leveling.
(Rounded to 3 decimal places.)

POSTED = Pre-1991 Precise Leveling Adjusted to the NAVD 88 Network After Completion of the NAVD 88 General Adjustment of 1991.
(Rounded to 3 decimal places.)

READJUST = Precise Leveling Readjusted as Required by Crustal Motion or Other Cause.
(Rounded to 2 decimal places.)

N HEIGHT = Computed from Precise Leveling Connected at Only One Published Bench Mark.
(Rounded to 2 decimal places.)

RESET = Reset Computation of Precise Leveling.
(Rounded to 2 decimal places.)

COMPUTED = Computed from Precise Leveling Using
Non-rigorous Adjustment Technique.
(Rounded to 2 decimal places.)

LEVELING = Precise Leveling Performed by Horizontal
Field Party.
(Rounded to 2 decimal places.)

H LEVEL = Level between control points not connected
to bench mark.
(Rounded to 1 decimal places.)

GPS OBS = Computed from GPS Observations.
(Rounded to 1 decimal places.)

VERT ANG = Computed from Vertical Angle Observations.
(Rounded to 1 decimal place;
If No Check, to 0 decimal places.)

SCALED = Scaled from a Topographic Map.
(Rounded to 0 decimal places.)

U HEIGHT = Unvalidated height from precise leveling
connected at only one NSRS point.
(Rounded to 2 decimal places.)

VERTCON = The NAVD 88 height was computed by applying the
VERTCON shift value to the NGVD 29 height.
(Rounded to 0 decimal places.)

ELLIP_HT-
Present if available.
The ellipsoid height in METERS referenced to GRS80 ellipsoid.

POS_ORDER-
Order of accuracy for the LATITUDE, LONGITUDE
Should be one of the following-
A, B, 1, 2, 3

Order and class for Orders 1, 2, and 3
are defined in the Federal Geodetic Control Committee publication
"Standards and Specifications for Geodetic Control Networks".

In addition-
Order A stations have a relative accuracy of
5 mm +/- 1-10,000,000 relative to other A-order stations.

Order B stations have a relative accuracy of
8 mm +/- 1-1,000,000 relative to other A- and B-order stations.

VERT_ORDER-
Order of accuracy for the ORTHO_HT
Should be 1, 2, or 3 for Vertical Control Stations.
Will be blank for stations used for Horizontal Control only.

Also see attribute DIST_RATE which is used for some vertical control stations.

Vertical order and class for 1, 2, and 3 are defined in the Federal Geodetic Control Committee publication "Standards and Specifications for Geodetic Control Networks". In addition-

Vertical control which were determined only for the purpose of supplying a height for Horizontal Distance Reductions are assigned an order of 3.

Class 0 is used for special cases of orthometric vertical control as follows-

Vertical Order/Class	Tolerance Factor
-----	-----
1 class 0	2.0 mm or less
2 class 0	8.4 mm or less
3 class 0	12.0 mm or less

VERT_CLASS-
Should be 0, 1, or 2
See details under ELEV_ORDER

DIST_RATE-
Distribution rate for POSTED and READJUSTED benchmarks which do not have an Order and Class are as follows
"Posted bench marks" are vertical control points in the NGS data base which were excluded from the NAVD 88 general adjustment. Some of the bench marks were excluded due to large adjustment residuals, possibly caused by vertical movement of the bench marks during the time interval between different leveling epochs. Adjusted NAVD 88 are computed for posted bench marks by supplemental adjustments.

A range of mean distribution rate corrections is listed for each posted bench mark in the data portion of the publication. A summary table of the mean distribution rates and their codes is listed below. The mean distribution rate corrections which were applied to the original leveling observations is a good indication of the usefulness of the posted bench marks' adjusted NAVD 88 heights.

Distribution Rate Code	Distribution Rate Correction
-----	-----
"a"	0.0 thru 1.0 mm/km
"b"	1.1 thru 2.0 "
"c"	2.1 thru 3.0 "
"d"	3.1 thru 4.0 "
"e"	4.1 thru 8.0 "
"f"	greater than 8.0 mm/km

POSTED BENCH MARKS SHOULD BE USED WITH CAUTION. As is the case for all leveling projects, the mandatory FGCS check leveling two-mark or three-mark tie procedure will usually detect any isolated movement (or other problem) at an individual bench mark. Of course, regional movement affecting all the marks equally is not detected by the two- or three-mark tie procedure.

FIRST_RECV-

Date when the station was first monumented or in the case of landmarks, first observed.

LAST_RECV-

Date when the station was last recovered.

LAST_COND-

Last recovered condition of the mark.

Should be one of the following-

MONUMENTED

FIRST OBSERVED

GOOD

POOR

MARK NOT FOUND

SEE DESCRIPTION

DESTROYED

LAST_RECBY-

Agency who reported the last condition of the mark.

STABILITY-

The stability of the mark may have 1 of 4 codes as indicated below-

A = MOST RELIABLE AND EXPECTED TO HOLD POSITION/ELEVATION WELL

B = PROBABLY HOLD POSITION/ELEVATION WELL

C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO SURFACE MOTION

- E.G. FROST HEAVE, ETC

D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY

HT_MOD-

Designates if this site is a Height Modernization site. Y - Yes.

CORS_ID-

Continuously Operating Reference Stations (CORS) site ID.

PACS_SACS-

Designates whether this is a Primary Airport Control Station (PACS) or Secondary Airport Control Station (SACS).

GEOID_HT-

Present if available. The geoid height in METERS referenced to the geoid model attribute.

N_ACC_HZ-

Horizontal network accuracy at the 95 percent confidence level (cm).

N_ACC_EL-

Ellipsoid height network accuracy at the 95 percent confidence level (cm).

N_ACC_STD_N-

North component of coordinate standard deviation (latitude), used to compute horizontal network accuracy (cm).

N_ACC_STD_E-

East component of coordinate standard deviation (longitude), used to compute horizontal network accuracy (cm).

N_ACC_STD_H-

Up component of coordinate standard deviation (ellipsoid height), used to compute ellipsoid height network accuracy (cm).

N_ACC_CORR-

Correlation coefficient between north and east components of coordinate standard deviation (latitude and longitude), used to compute horizontal network accuracy (unitless).

ECEF_X-

The computed Earth-Centered, Earth-Fixed X position.

ECEF_Y-

The computed Earth-Centered, Earth-Fixed Y position.

ECEF_Z-

The computed Earth-Centered, Earth-Fixed Z position.

SPC_ZONE-

The State Plane Coordinate Zone.

SPC_NORTH-

The State Plane Coordinate Northing.

SPC_EAST-

The State Plane Coordinate Easting.

SPC_CONV-

The State Plane Coordinate Convergence Angle.

SPC_CSF-

The State Plane Coordinate Combined Scale Factor.

UTM_ZONE-

The Universal Transverse Mercator Zone.

UTM_NORTH-

The Universal Transverse Mercator Northing.

UTM_EAST-

The Universal Transverse Mercator Easting.

UTM_CONV-

The Universal Transverse Mercator Convergence Angle.

UTM_CSF-

The Universal Transverse Mercator Combined Scale Factor.

DYNAMIC_HT-

The computed dynamic height at a bench mark using the orthometric height referenced the NAVD 88 and a gravity value.

MODELEDGRAV-

The interpolated gravity value which was used in the NAVD 88 general adjustment.

MARKER-

Identifies the type of marker.

SETTING-

Identifies the type of setting.

STAMPING-

Identifies the stamping on the disk.