NAVD 88 Elevation on Station REILLY

Located at middle of NMSU "Horseshoe" - Las Cruces, NM

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The NAVD 88 elevation at station REILLY is computed from NAVD 88 first-order bench mark elevations, observed GPS ellipsoid height differences, and modeled ellipsoid heights. See article at http://www.globalcogo.com/ReilElev.pdf

Given: Known NAVD 88 elevation at Point A = H_A.

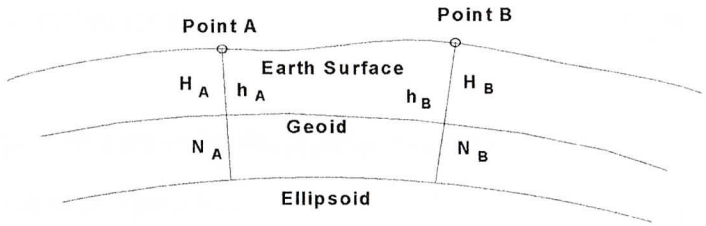
NAVD 88 elevation at A 245 = 1,186.626 m

NAVD 88 elevation at H 245 = 1,183.102 m

GPS derived ellipsoid heights at Points A & B, h_A and h_B.

Geoid heights are from NGS models, 03, 09, 12A, and 18.

NAVD 88 elevations of A245 and H245 have not changed in the NGS data base from 2005 until 2021.



$$H_B = H_A + (h_B - h_A) - (N_B - N_A)$$

New Pt	BM	H_A =	h_B =	h_A =	N_B =	N_A =	PT B (new)	REILLY
Case I:	REILLY NAD 83 (1992), 2005 GPS Survey, and Geoid03							
REILLY	A 245	1,186.626 m	1,166.570 m	1,162.649 m	-23.905 m	-23.957 m	1,190.495 m	**Mean =**
REILLY	H 245	1,183.102 m	1,166.570 m	1,159.122 m	-23.905 m	-23.954 m	1,190.501 m	1190.498 m
Case II:	REILLY NAD 83 (1992), 2005 GPS survey, and Geoid09							
REILLY	A 245	1,186.626 m	1,166.570 m	1,162.649 m	-23.931 m	-23.991 m	1,190.487 m	**Mean =**
REILLY	H 245	1,183.102 m	1,166.570 m	1,159.122 m	-23.931 m	-23.984 m	1,190.498 m	1190.492 m
Case III:	REILLY NAD 83 (1992), 2005 GPS survey, and Geoid12A							
REILLY	A 245	1,186.626 m	1,166.570 m	1,162.649 m	-23.943 m	-23.999 m	1,190.491 m	**Mean =**
REILLY	H 245	1,183.102 m	1,166.570 m	1,159.122 m	-23.943 m	-23.993 m	1,190.501 m	1190.496 m
Case IV:	REILLY NAD 83 (1992), 2005 GPS survey, and Geoid18							
REILLY	A 245	1,186.626 m	1,166.570 m	1,162.649 m	-23.943 m	-24.007 m	1,190.483 m	**Mean =**
REILLY	H 245	1,183.102 m	1,166.570 m	1,159.122 m	-23.943 m	-23.998 m	1,190.496 m	1190.489 m

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New Pt	BM	H_A =	h_B =	h_A =	N_B =	N_A =	New Pt.	REILLY
Case V:	REILLY NAD 83 (2011), 2005 GPS survey, and Geoid03							
REILLY	A 245	1,186.626 m	1,166.543 m	1,162.620 m	-23.905 m	-23.957 m	1,190.497 m	**Mean =**
REILLY	H 245	1,183.102 m	1,166.543 m	1,159.094 m	-23.905 m	-23.954 m	1,190.502 m	1190.500 m
Case VI:	REILLY NAD 83 (2011), 2005 GPS survey, and Geoid09							
REILLY	A 245	1,186.626 m	1,166.543 m	1,162.620 m	-23.931 m	-23.991 m	1,190.489 m	**Mean =**
REILLY	H 245	1,183.102 m	1,166.543 m	1,159.094 m	-23.931 m	-23.984 m	1,190.498 m	1190.494 m
Case VII:	REILLY NAD 83 (2011), 2005 GPS survey, and Geoid12A							
REILLY	A 245	1,186.626 m	1,166.543 m	1,162.620 m	-23.943 m	-23.999 m	1,190.493 m	**Mean =**
REILLY	H 245	1,183.102 m	1,166.543 m	1,159.094 m	-23.943 m	-23.993 m	1,190.501 m	**1190.497** m
Case VIII:	REILLY NAD 83 (2011), 2005 GPS survey, and Geoid18							
REILLY	A 245	1,186.626 m	1,166.543 m	1,162.620 m	-23.931 m	-24.007 m	1,190.473 m	**Mean =**
REILLY	H 245	1,183.102 m	1,166.543 m	1,159.094 m	-23.931 m	-23.998 m	1,190.484 m	1190.479 m

The orthometric heights for station REILLY above were computed using geoid height differences from stations A 245 and H 245.
The results using REILLY NAD 83 (1992) with Geoid03 were very close to results using REILLY NAD 83 (2011) and Geoid12A.
The implication is that performance of a given geoid model is tied to a particular network adjustment.

The following orhtometric heights were computed using the ellipsoid height at REILLY and the single geoid height at REILLY.

$$H = h - N$$

REILLY NAD 83 (1992)		h =	1,166.570 m	REILLY NAD 83 (2011)		h =	1,166.543 m
		H =				H =	
Geoid 03	N =	-23.905 m	1,190.475 m	Geoid 03	N =	-23.905 m	1,190.448 m
Geoid 09	N =	-23.931 m	1,190.501 m	Geoid 09	N =	-23.931 m	1,190.474 m
Geoid 12A	N =	-23.943 m	1,190.513 m	Geoid 12A	N =	-23.943 m	1,190.486 m
Geoid 18	N =	-23.943 m	1,190.513 m	Geoid 18	N =	-23.943 m	1,190.486 m

Note: Station REILLY is very stable. Will REILLY continue to "move" using geoids subsequent to publication of NAPGD2022?