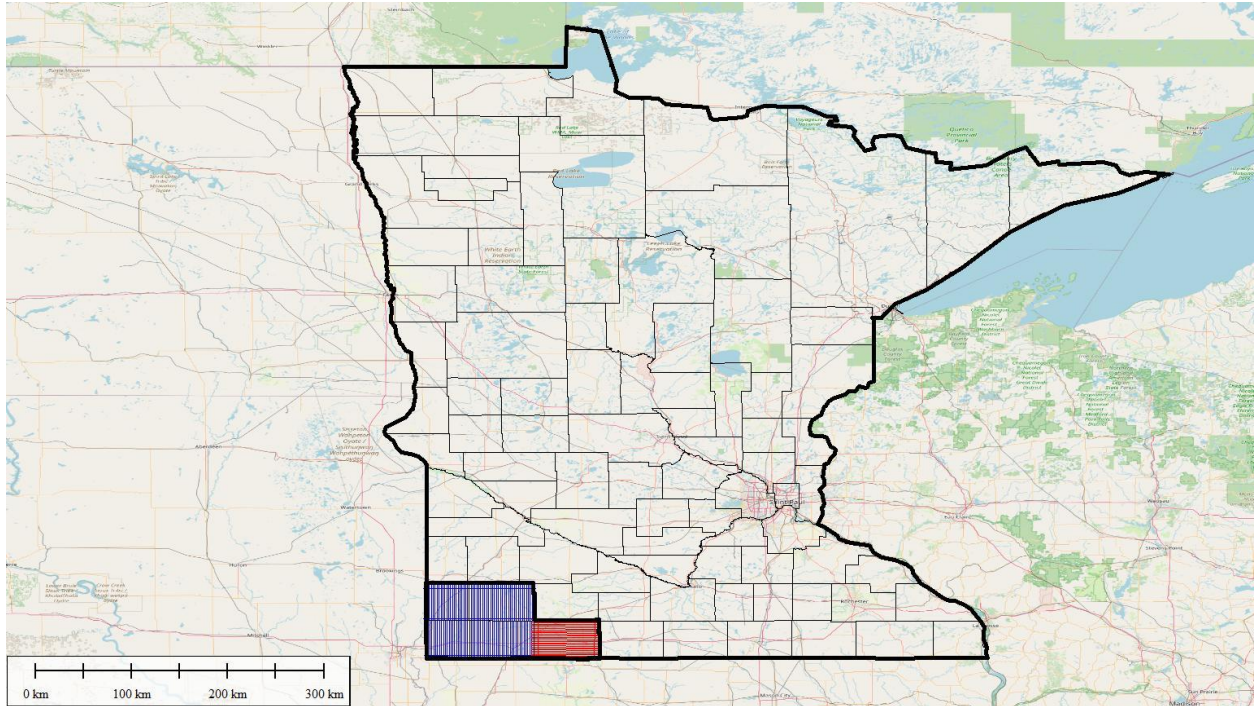


REPORT OF LIDAR SURVEY

Ground Control Report

SW Minnesota



Performed by:

TerraSurv

For:

Fugro Geospatial

Terrasurv Project Number: 22030

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REPORT OF SURVEY

SW MINNESOTA

INTRODUCTION

Terrasurv, Inc of Pittsburgh, PA was tasked by Fugro Geospatial with performing a control survey in support of LiDAR data collection for five counties in the SW corner of Minnesota. The project consisted of two parts: 32 ground control (calibration) points (GCP) and 160 quality control (QC: NVA/VVA/VVA-F), for a total of 192 new stations. The map in figure 1 shows the location of the Ground Control (GCP) and figure 2 shows the location of the QC points. The control symbology for figures 1 and 2 are listed in table 1. Also shown are the Continuously Operating Reference Stations used in the project via the [MNCORS](#) VRS/RTN Network.

Table 1 - Map Symbology and Control Quantity

Type	Symbol	VA Quantity
Ground Control (GCP)	Green Dot	32
Non-Vegetated (NVA)	Red Dot	91
Vegetated (VVA)	Red X	57
Woods (VVA-F)	Yellow X	12
CORS	White square with red "+"	7
NSRS (existing station)	Black +	1

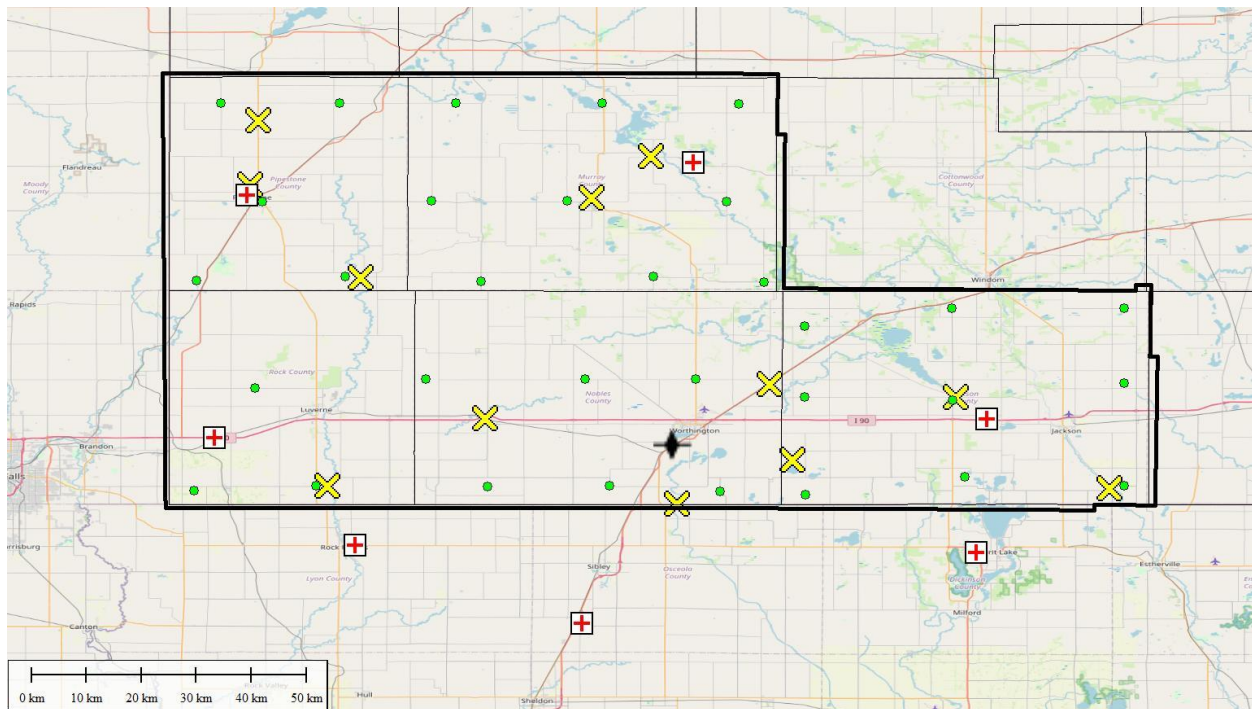


Figure 1 – GCP stations and CORS

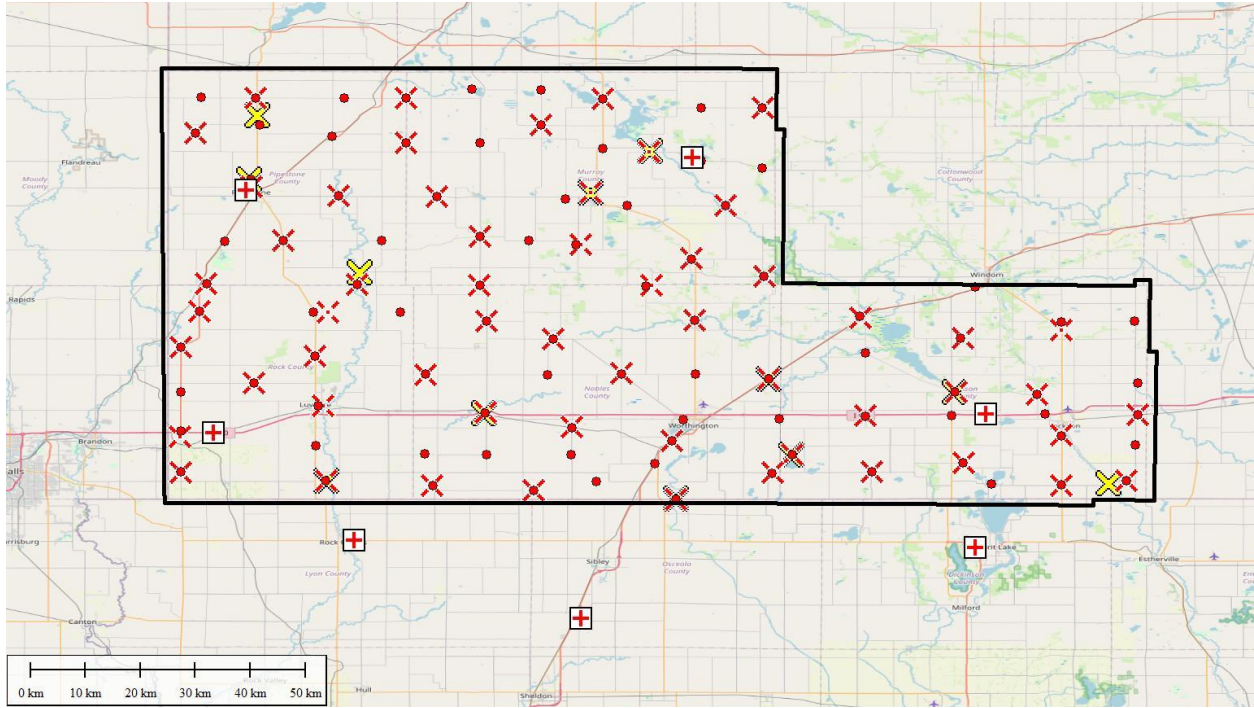


Figure 2 – Checkpoints

CONTROL

The National Spatial Reference System (NSRS) was used to provide control for the network. The [MNCORS](#) real time network (RTN) was utilized. The horizontal datum for processing was the North American Datum of 1983 – NAD83 (2011), epoch 2010.0. The vertical datum was the North American Vertical Datum of 1988 (NAVD88), realized with the GEOID18 geoid model from the National Geodetic Survey (NGS).

STATIONS

Table 2 lists the GCP and CP stations established in this survey, including the GCP, NVA, VVA, and VVA-F, as well as the CORS and the existing NSRS station.

Table 2 - Station List

Station Name	GPSID	USGS Quadrangle	Description
MNBV	PRS136210256	VALLEY SPRINGS	MNDOT & National CORS
ROKR	PRS187812038	ROCK RAPIDS	IADOT
IAAS	PRS402375885	ASHTON	IADOT & National CORS
MNDV	PRS225271275	DOVRAY	MNDOT & National CORS
SPTL	PRS305719465	OKOBOJI	IADOT
MNLK	PRS375365075	LAKEFIELD NE	MNDOT & National CORS
PPST	PRS179870944	PIPESTONE NORTH	MNDOT
GCP01	22030AA	VALLEY SPRINGS	dirt road surface in SB lane of 30th Avenue at field entrance west
GCP02	22030AB	JASPER	dirt road surface on WB lane of 11th Street west of 30th Avenue
GCP03	22030AC	VERDI	gravel shoulder on west side of 50th Avenue just south of 211th Street
GCP04	22030AD	HILLS NE	dirt road surface in NB lane of 80th avenue just north of 141st Street
GCP05	22030AE	PIPESTONE SOUTH	paved shoulder on west side of US 75 just south of MN 30

Station Name	GPSID	USGS Quadrangle	Description
GCP06	22030AF	ASH CREEK	gravel shoulder on south side of Hwy 270 just west of US 75
GCP07	22030AG	EDGERTON SOUTH	dirt road surface on turn radius from 150th Avenue SB to 16th Street WB
GCP08	22030AH	RUTHTON NW	gravel on turn radius from 211th Street to access road to turbines south
GCP09	22030AI	MAGNOLIA	dirt road surface on WB lane of 200th Street west of Ahlers Avenue to the south
GCP10	22030AJ	EDGERTON NE	gravel access road on west side of 20th Avenue north of MN 30
GCP11	22030AK	CURRENT LAKE	dirt drive to silos in SW quadrant of intersection of 40th Avenue and 211th Street
GCP12	22030AL	ADRIAN SW	dirt road surface on turn radius from Dayton Avenue SB to 320th Street WB
GCP13	22030AM	SLAYTON SW	gravel road surface in EB lane of 11th Street on east side of MN 91
GCP14	22030AN	SLAYTON	gravel field entrance on east side of 130th Avenue just north of MN 30
GCP15	22030AO	ADRIAN NE	bare road surface in NB lane of King Avenue north of 200th Street
GCP16	22030AP	BIGELOW	bare road surface in NB lane of Lais Avenue just north of 320th Street and south of CR-4
GCP17	22030AQ	TRACY WEST	pavement in middle of cul-de-sac in park on east shore of lake and west of US 59
GCP18	22030AR	FULDA SW	pavement on turn radius from 16th Street WB to 200th Avenue NB
GCP19	22030AS	WORTHINGTON NORTH	old asphalt on west shoulder of US 59 just south of 200th Street
GCP20	22030AT	WORTHINGTON SOUTH	gravel field entrance on east side of CR-5
GCP21	22030AU	LIME CREEK	dirt road surface in EB lane of 101st Street on east side of 260th Avenue
GCP22	22030AV	TRACY EAST	dirt road surface on turn radius from 270th Avenue NB to 211th Street EB
GCP23	22030AW	DUNDEE	dirt road surface of SB lane of 290th Avenue just south of MN 62
GCP24	22030AX	ROUND LAKE	dirt road surface on turn radius from 710th Street WB to 330th Avenue NB
GCP25	22030AY	BREWSTER	dirt road surface in NB lane of 330th Avenue just north of 820th Street
GCP26	22030AZ	DUNDEE	dirt road surface on SB lane of 330th Avenue just south of 900th Street
GCP27	22030BA	LAKEFIELD	gravel area on north side of 8th Avenue S and east side of MN 86 just south of Cenex
GCP28	22030BB	WILDER	dirt road surface of EB lane of 920th Street east of Hwy 86
GCP29	22030BC	LAKEFIELD SW	center of 730th Street (dirt) just east of 460th Avenue
GCP30	22030BD	JACKSON	dirt road surface in SB lane of 590th Avenue just south of 720th Street
GCP31	22030BE	JACKSON NW	dirt and gravel road surface on wind turbine access road on east side of 590th Avenue
GCP32	22030BF	BERGEN	dirt road surface on turn radius from 920th Street WB to 590th Avenue NB
NVA01	22030BG	ELKTON	dirt road surface on NB lane of 35th Avenue just north of 211th Street
NVA02	22030BH	VERDI	gravel road surface on turn radius from 211th Street WB to gravel pit entrance NB
NVA03	22030BI	RUSHMORE	dirt road surface on EB lane of 320th Street just east of Knauf Avenue
NVA04	22030BJ	RUTHTON NW	gravel road surface in NB lane of 150th Avenue just north of 211th Street
NVA05	22030BK	CURRIE	pavement on turn radius from MN 30 WB to 160th Avenue NB
NVA06	22030BL	RUTHTON	gravel field entrance in NW quadrant of intersection of County Line Avenue and 211th Street

Station Name	GPSID	USGS Quadrangle	Description
NVA07	22030BM	OCHEYEDAN	center of Silver Avenue (dirt road) just south of 100th Street
NVA08	22030BN	CURRENT LAKE	dirt parking area at boat ramp at NW corner of lake
NVA09	22030BO	BALATON SW	dirt road surface in WB lane of 161st Street just east of MN 91
NVA10	22030BP	BALATON	dirt road surface on turn radius from 221st Street WB to 110th Avenue NB
NVA11	22030BQ	HADLEY	pavement on turn radius from 110th Avenue SB to 182st Street WB
NVA12	22030BR	WESTBROOK	dirt road surface in NB lane of 290th Avenue on north side of MN 30
NVA13	22030BS	TRACY WEST	dirt road surface on EB lane of 211th Street east of US 59 and opposite drive to the north
NVA14	22030BT	OKABENA	gravel area in fueling station in NE quadrant of intersection of Jackson Road and S Front Street
NVA15	22030BU	TRACY EAST	dirt road surface on SB lane of 240th Avenue just south of 201st Street
NVA16	22030BV	WALNUT GROVE	gravel drive to booster station on wet side of 290th Avenue
NVA17	22030BW	ELKTON SW	dirt road surface on turn radius from 171st Street WB to 30th Avenue NB
NVA18	22030BX	PIPESTONE NORTH	dirt and gravel on turn radius from 181st Street EB to entrance to grain storage facility on south side of road
NVA19	22030BY	WILDER	dirt field entrance on south side of 880th Street
NVA20	22030BZ	HOLLAND	gravel on turn radius from Superior Ave W northeast bound to Superior Avenue SB
NVA21	22030CA	WOODSTOCK	dirt road surface on turn radius from 161st Street EB to County Line Avenue SB
NVA22	22030CB	DOVRAY	dirt road surface in WB lane of 141st Street just east of 240th Avenue
NVA23	22030CC	PIPESTONE NORTH	concrete road surface on entrance drive to parking lot for college on west side of Hiawatha Avenue
NVA24	22030CD	RUSHMORE	dirt road surface on turn radius from Erickson Avenue SB to 330th Street WB
NVA25	22030CE	EDGERTON NORTH	pavement on turn radius from driveway NB to MN 30 EB
NVA26	22030CF	EDGERTON NE	dirt road surface on turn radius from N-S driveway to driveway west on south side of MN 30
NVA27	22030CG	SLAYTON	dirt road surface on turn radius from driveway EB to 130th Avenue SB
NVA28	22030CH	AVOCA	gravel road surface in NB lane of 180th Street just south of 91st Street
NVA29	22030CI	LIME CREEK	dirt road surface in WB lane of 91st Street on west side of 260th Avenue
NVA30	22030CJ	PIPESTONE SOUTH	dirt road surface on EB lane of 51st Street east of MN 23
NVA31	22030CK	PIPESTONE SOUTH	dirt road surface in SB lane of 100th Avenue just north of 51st Street and US 75
NVA32	22030CL	EDGERTON NE	dirt road surface in EB lane of 51st Street east of 180th Avenue
NVA33	22030CM	CHANDLER	gravel parking lot on west side of MN 91 and south side of Main Street
NVA34	22030CN	SLAYTON	gravel field entrance on north side of 51st Street opposite 100th Avenue to the south
NVA35	22030CO	SLAYTON	gravel drive on north side of McDonnell Avenue east of Cotter Street
NVA36	22030CP	LIME CREEK	gravel field entrance on south side of 31st Street just east of US 59
NVA37	22030CQ	DUNDEE	pavement on turn radius from MN 62 EB to driveway to farm on south side of highway
NVA38	22030CR	JASPER	old asphalt and gravel in NE corner of parking lot on east side of assisted living and west side of ball fields

Station Name	GPSID	USGS Quadrangle	Description
NVA39	22030CS	EDGERTON SOUTH	dirt road surface on turn radius from 1st Street WB to 160th Avenue NB
NVA40	22030CT	SLAYTON SW	dirt/sparse grass in small island in intersection of 1st Street and 60th Avenue
NVA41	22030CU	FULDA SW	pavement on turn radius from CR-63 EB to CR-7 SB
NVA42	22030CV	HERON LAKE	gravel parking lot on west side of 10th Street SW and south side of MN 60
NVA43	22030CW	WILDER	dirt field entrance on east side of 470th Avenue
NVA44	22030CX	BERGEN	bare ground on east side of 540th Avenue at dirt/gravel pull-off
NVA45	22030CY	BERGEN	dirt and gravel area at stockpile on south side of 900th Street and west side of 600th Avenue
NVA46	22030CZ	JASPER	dirt road surface on EB lane of 221st Street just east of MN 23
NVA47	22030DA	EDGERTON SOUTH	gravel road surface in WB lane of 221st Street west of US 75
NVA48	22030DB	KENNETH	gravel road surface on turn radius from 200th Avenue NB to 221st Street EB
NVA49	22030DC	SLAYTON SW	gravel shoulder on turn radius from MN 91 NB to 140th Street EB
NVA50	22030DD	WILMONT	pavement on WB lane of MN 266 just east of Sixth Avenue
NVA51	22030DE	READING	dirt in NW quadrant of intersection of McCall Avenue and 200th Street
NVA52	22030DF	WORTHINGTON NORTH	gravel shoulder on south side of 200th Street east of US 59
NVA53	22030DG	BREWSTER	dirt road surface on turn radius from Wass Avenue SB to 2nd Avenue WB
NVA54	22030DH	LAKEFIELD	gravel drive to vacant lot on south side of Mill Road E west of Milwaukee Street
NVA55	22030DI	LAKEFIELD NE	pavement on turn radius from 520th Street NB/WB to 820th Street EB
NVA56	22030DJ	ALPHA	dirt road surface in EB lane of 830th Street between two entrances to farm sheds
NVA57	22030DK	FULDA	pavement on apron on west side of US 59 and north side of 140th Street
NVA58	22030DL	GARRETSON EAST	dirt road surface in SB lane of 181st Street south of 20th Avenue
NVA59	22030DM	LUVERNE	gravel field entrance in NE quadrant of intersection of US 75 and 171st Street
NVA60	22030DN	MAGNOLIA	dirt road surface on WB lane of 200th Street opposite shortcut to Ahlers Avenue
NVA61	22030DO	ADRIAN NE	bare ground on east edge of Fellows Avenue at access road to wind turbines on south side of 200th Street
NVA62	22030DP	WORTHINGTON NORTH	asphalt parking lot on NE side of Diagonal Road at Public Utilities building
NVA63	22030DQ	BREWSTER	gravel field entrance on south side of 250th Street west of Hwy 264
NVA64	22030DR	OKABENA	gravel drive on west side of 380th Avenue opposite drive to farmhouse
NVA65	22030DS	LAKEFIELD	paved apron to private road on west side of MN 86 south of I90
NVA66	22030DT	LAKEFIELD NE	pavement on off ramp from I90 WB to rest area (closed)
NVA67	22030DU	ALPHA	gravel drive on east side of Main Street S and south of RR crossing
NVA68	22030DV	GARRETSON EAST	dirt road surface in EB lane of 131st Street just east of MN 23
NVA69	22030DW	HILLS NE	dirt road surface on NB lane of 80th Avenue south of 141st Street opposite drive to farm building
NVA70	22030DX	LUVERNE	old asphalt in parking lot in SE quadrant of intersection of W Warren Street and Cedar Street
NVA71	22030DY	ADRIAN	pavement in SW corner of parking lot on west side of gas station and east side of park

Station Name	GPSID	USGS Quadrangle	Description
NVA72	22030DZ	RUSHMORE	bare ground in center of field entrance on east side of E East Avenue just south of RR crossing
NVA73	22030EA	BIGELOW	gravel drive to barn on SE side of US 59 opposite 270th Street
NVA74	22030EB	ROUND LAKE	dirt road surface on turn radius from 750th Street WB to 320th Avenue NB
NVA75	22030EC	LAKEFIELD SW	dirt road surface on turn radius from 460th Avenue SB to 740th Street WB
NVA76	22030ED	JACKSON	asphalt shoulder on west side of US 71 just south of drive into utility on west side of road
NVA77	22030EE	DUNNELL	dirt road surface on EB lane of 760th Street east of 600th Avenue
NVA78	22030EF	VALLEY SPRINGS	gravel pull-off on east side of Hwy 23
NVA79	22030EG	ASH CREEK	dirt road surface in EB lane of 71st Street east of US 75
NVA80	22030EH	ELLSWORTH	dirt road surface in NB lane of Ahlers Avenue just north of 290th Street
NVA81	22030EI	ADRIAN SW	dirt road surface in EB lane of 290th Street just east of CR 17
NVA82	22030EJ	RUSHMORE	dirt road surface in WB lane of 290th Street west of Jones Avenue
NVA83	22030EK	BIGELOW	gravel drive to pump station on NE side of 300th Street
NVA84	22030EL	ROUND LAKE	gravel area on east side of Rohrer Street between two large buildings and silos
NVA85	22030EM	SIOUX VALLEY	paved parking lot on south side of 730th Street and north side of church
NVA86	22030EN	LAKEFIELD SE	center of paved bike trail at east edge of dirt campground road
NVA87	22030EO	JACKSON	paved apron to vacant lot on west side of US 71 just north of 715th Street
NVA88	22030EP	JACKSON	gravel field entrance on north side of 720th Street
NVA89	22030EQ	VALLEY SPRINGS	dirt road surface in westbound lane of 41st Street on west side of Hwy 23
NVA90	22030ER	ASH CREEK	dirt road surface in EB lane of 31st Street on west side of 140th Avenue
NVA91	22030ES	ELLSWORTH	paved shoulder on south side of W Sherman Avenue just west of wider area and driveways south
VVAF01	22030ET	VERDI	woods on east side of US 75 and south of field
VVAF02	22030EU	LAKEFIELD	woods on south side of Mill Road E and west side of creek
VVAF03	22030EV	CURRIE	grass under large trees in church yard on west side of Mill Street and east side of Calvary Cemetery
VVAF04	22030EW	HADLEY	scrubby woods in SE quadrant of intersection of 150th Avenue and road to municipal dump site
VVAF05	22030EX	BREWSTER	woods in tree line on SE side of 2nd Avenue east of Wass Avenue
VVAF06	22030EY	ADRIAN	scattered trees in park on west side of N Indiana Avenue
VVAF07	22030EZ	ROUND LAKE	woods in SW quadrant of intersection of 750th Street and 320th Avenue
VVAF08	22030FA	ASH CREEK	woods line on east side of 140th Avenue opposite 31st Street
VVAF09	22030FB	WORTHINGTON SOUTH	woods on north side of 100th Street just west of Silver Avenue to the south
VVAF10	22030FC	EDGERTON SOUTH	woods on south side of Mill Street and near bank of creek and south of bridge
VVAF11	22030FD	PIPESTONE NORTH	woods on west side of parking lot for college buildings
VVAF12	22030FE	JACKSON	woods on south bank of Des Moines River and east side of boat ramp and boat parking area on east side of Petersburg Road
VVANF01	22030FF	VERDI	weeds on north side of 211th Street and east side of entrance road to gravel pit

Station Name	GPSID	USGS Quadrangle	Description
VVANF02	22030FG	WOODSTOCK	high grass in SE quadrant of intersection of County Line Avenue and 161st Street
VVANF03	22030FH	HADLEY	high grass in SW quadrant of intersection of 110th Avenue and 181st Street
VVANF04	22030FI	CURRIE	high grass on south side of MN 30 just west of field entrance
VVANF05	22030FJ	PIPESTONE NORTH	high grass in SW quadrant of intersection of 2nd Avenue NE and 9th Street NE
VVANF06	22030FK	EDGERTON NE	high grass in ditch on south side of MN 30 just west of driveway south
VVANF07	22030FL	SLAYTON	high grass on east side of 150th Avenue
VVANF08	22030FM	LIME CREEK	high grass in SE quadrant of intersection of 91st Street and 260th Avenue
VVANF09	22030FN	PIPESTONE SOUTH	high grass on west side of 100th Avenue and east side of US 75 just north of 51st Street
VVANF10	22030FO	CHANDLER	high grass on south side of Main Street and east side of stream
VVANF11	22030FP	SLAYTON	high grass on north side of 46th Street
VVANF12	22030FQ	LIME CREEK	high grass on NE side of US 59 and north side of 31st Street
VVANF13	22030FR	JASPER	grass on south side of park entrance road and east side of Robert Avenue
VVANF14	22030FS	EDGERTON SOUTH	high grass in NE quadrant of intersection of 160th Avenue and 251st Street and 1st Street
VVANF15	22030FT	SLAYTON SW	weeds on south side of 1st Street just west of 60th Avenue
VVANF16	22030FU	FULDA SW	high grass on south side of 1st Street and east side of 200th Avenue
VVANF17	22030FV	DUNDEE	high grass on north side of MN 62
VVANF18	22030FW	JASPER	grass in NE quadrant of intersection of 221st Street and MN 23
VVANF19	22030FX	EDGERTON SOUTH	grass in SE quadrant of intersection of 221st Street and 140th Avenue
VVANF20	22030FY	SLAYTON SW	high grass in SE quadrant of intersection of MN 91 and 140th Street
VVANF21	22030FZ	WILMONT	grass in flat bottomed ditch on north side of MN 266 and east side of Sixth Avenue
VVANF22	22030GA	HERON LAKE	high weeds on SE side of CR24 and NW side of RR tracks
VVANF23	22030GB	BERGEN	weeds in NW quadrant of intersection of US 71 and 890th Street
VVANF24	22030GC	GARRETSON EAST	grass ditch on NW side of 181st Street just south of 20th Avenue
VVANF25	22030GD	LUVERNE	grass on east side of US 75 and north side of field entrance on north side of 171st Street
VVANF26	22030GE	MAGNOLIA	grass in triangle formed by 200th Street and Ahlers Avenue and cutoff to Ahlers Avenue
VVANF27	22030GF	READING	fallow corn field on west side of McCall Avenue
VVANF28	22030GG	BREWSTER	grass on west side of Wass Avenue and north side of 2nd Avenue
VVANF29	22030GH	LAKEFIELD	high weeds on south side of Mill Road E east of Milwaukee Street
VVANF30	22030GI	ALPHA	high weeds between RR tracks east of Main Street
VVANF31	22030GJ	HILLS NE	grass in NW quadrant of intersection of 80th Avenue and 141st Street
VVANF32	22030GK	LUVERNE	grass on north side of road in park and west side of concrete trail crossing
VVANF33	22030GL	ADRIAN	un-mowed grass on north side of truck stop parking lot
VVANF34	22030GM	BIGELOW	high weeds on SE side of US 59 on NE side of 270th Street extended
VVANF35	22030GN	ROUND LAKE	high grass in SE quadrant of intersection of 320th Avenue and 750th Street
VVANF36	22030GO	LAKEFIELD SW	high grass in NE quadrant of intersection of 740th Street and 460th Avenue

Station Name	GPSID	USGS Quadrangle	Description
VVANF37	22030GP	JACKSON	high grass on west side of US 71 just north of drive to utility plant
VVANF38	22030GQ	JACKSON	regrowth vegetation in burned area on north side of 720th Street and on west side of stream
VVANF39	22030GR	VALLEY SPRINGS	high grass on south side of 81st Street west of Hwy 23
VVANF40	22030GS	ASH CREEK	high weeds on east side of 140th Avenue north of 31st Street
VVANF41	22030GT	ELLSWORTH	high grass in fallow field on south side of W Sherman Avenue
VVANF42	22030GU	ROUND LAKE	high weeds on south side of Amy Avenue
VVANF43	22030GV	SIOUX VALLEY	high grass in NE quadrant of intersection of 730th Street and 385th Avenue
VVANF44	22030GW	JACKSON	brush in flat bottomed ditch on south side of 715th Street just west of US 71
VVANF45	22030GX	RUTHTON	high grass in NW quadrant of intersection of County Line Avenue and 211th Street
VVANF46	22030GY	WALNUT GROVE	high grass in SE quadrant of intersection of 290th Avenue and 201st Street
VVANF47	22030GZ	WILDER	high weeds on north side of 880th Street west of 460th Avenue
VVANF48	22030HA	OKABENA	high weeds on south side of I90 and west side of 380th Avenue and north side of off ramp from I90 EB
VVANF49	22030HB	TRACY WEST	high grass on south side of 211th Street east of US 59
VVANF50	22030HC	RUSHMORE	high grass in NW quadrant of intersection of Erickson Avenue and 330th Street
VVANF51	22030HD	OCHEYEDAN	high grass on west side of Silver Avenue south of 100th Street
VVANF52	22030HE	FULDA	high grass in ditch on west side of US 59 and south of 140th Street
VVANF53	22030HF	ELKTON SW	high grass in field entrance in SE quadrant of intersection of 171st Street and 30th Avenue
VVANF54	22030HG	VALLEY SPRINGS	high grass in SW quadrant of intersection of Hwy 23 and 41st Street
VVANF55	22030HH	RUSHMORE	grass on north side of RR and southside of ditch on south side of 260th Street just east of E East Avenue
VVANF56	22030HI	LAKEFIELD NE	high grass on east side of 520th Avenue and south side of 820th Street
VVANF57	22030HJ	EDGERTON NORTH	grass in ditch on south side of MN 30 just west of driveway south
BASEF08	22030ZA	ASH CREEK	Temporary base for woods point
BASEF06	22030ZB	ADRIAN	Temporary base for woods point
BASEF09	22030ZC	OCHEYEDAN	Temporary base for woods point
BASEF07	22030ZD	ROUND LAKE	Temporary base for woods point
BASEF05	22030ZE	BREWSTER	Temporary base for woods point
BASEF02	22030ZF	LAKEFIELD	Temporary base for woods point
BASEF12	22030ZG	JACKSON	Temporary base for woods point
BASEF03	22030ZH	CURRIE	Temporary base for woods point
BASEF01	22030ZI	VERDI	Temporary base for woods point
BASEF11	22030ZJ	PIPESTONE NORTH	Temporary base for woods point
BASEF10	22030ZK	EDGERTON SOUTH	Temporary base for woods point
5305 L	DQ5099	BIGELOW	Existing NSRS station-rod mark on SE side of US 59 opposite 270th Street inside pipe

The stations were not permanently marked.

METHODOLOGY

The field survey was done by using a Trimble R10 and a Trimble R10-2 multi-frequency, multi-constellation GNSS receivers in a real time (RTK/VRS) mode. Corrections were obtained from the [MNCORS](#) network with corrections delivered over the cellular network. These corrections are applied in real time and used by the rover receiver to converge to a cm level solution. Each station was occupied once for a minimum of 2 minutes (120 epochs), then re-initialized and occupied a second time immediately after the first occupation. Additional observations were made if necessary to ensure agreement at the 0.033 m level. The woods checkpoints (VVA-F) were surveyed by first establishing a temporary base station nearby and positioning it using the MNCORS VRS. Then, a Real Time Kinematic (RTK) survey is performed using a radio link to transmit corrections to the receiver in the woods. The solutions are stored as vectors from the nearest physical CORS or temporary base. Table 3 summarizes the VRS/RTK occupations (precisions in meters). Observations which were rejected are shown in ~~red-strikethrough~~ font.

Table 3 – VRS/RTK Occupation Summary

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
PRS1362102568	22030AA	05/10/2022 18:13:07	18:15:06	0.007	0.010	17	1.2
PRS1362102568	22030AA	05/10/2022 18:15:33	18:17:32	0.009	0.011	12	1.5
PRS179870944124	22030AB	05/13/2022 21:36:46	21:38:45	0.007	0.011	22	1.1
PRS179870944124	22030AB	05/13/2022 21:39:09	21:41:08	0.007	0.011	15	1.3
PRS179870944124	22030AC	05/13/2022 15:56:11	15:58:14	0.008	0.012	19	1.4
PRS179870944124	22030AC	05/13/2022 15:58:47	16:00:46	0.009	0.013	19	1.4
PRS1362102568	22030AD	05/13/2022 22:56:35	22:58:34	0.009	0.011	22	1.2
PRS1362102568	22030AD	05/13/2022 22:59:09	23:01:08	0.009	0.010	21	1.3
PRS179870944124	22030AE	05/13/2022 14:49:29	14:51:28	0.006	0.010	21	1.2
PRS179870944124	22030AE	05/13/2022 14:52:00	14:53:59	0.007	0.010	21	1.3
PRS187812038279	22030AF	05/10/2022 18:31:32	18:33:33	0.009	0.013	17	1.3
PRS187812038279	22030AF	05/10/2022 18:34:05	18:36:04	0.009	0.013	17	1.4
PRS179870944124	22030AG	05/13/2022 18:28:18	18:30:17	0.007	0.012	18	1.2
PRS179870944124	22030AG	05/13/2022 18:30:47	18:32:46	0.008	0.013	16	1.3
PRS179870944124	22030AH	05/13/2022 15:17:41	15:19:40	0.007	0.010	25	1.0
PRS179870944124	22030AH	05/13/2022 15:20:06	15:22:05	0.007	0.011	23	1.1
PRS1362102568	22030AI	05/13/2022 20:08:29	20:10:28	0.010	0.016	19	1.2
PRS1362102568	22030AI	05/13/2022 20:11:42	20:13:41	0.009	0.015	19	1.3
PRS179870944124	22030AJ	05/12/2022 21:06:32	21:08:31	0.012	0.017	20	1.2
PRS179870944124	22030AJ	05/12/2022 21:09:03	21:11:02	0.013	0.018	21	1.2
PRS22527127524	22030AK	05/12/2022 20:07:55	20:09:54	0.011	0.018	18	1.3
PRS22527127524	22030AK	05/12/2022 20:10:24	20:12:23	0.012	0.018	18	1.3
PRS187812038279	22030AL	05/10/2022 21:39:20	21:41:19	0.008	0.013	18	1.2
PRS187812038279	22030AL	05/10/2022 21:42:02	21:44:01	0.008	0.013	16	1.3
PRS179870944124	22030AM	05/13/2022 13:20:26	13:22:25	0.009	0.014	21	1.2
PRS179870944124	22030AM	05/13/2022 13:22:52	13:24:51	0.009	0.014	20	1.3
PRS22527127524	22030AN	05/12/2022 22:38:35	22:40:34	0.011	0.014	22	1.1
PRS22527127524	22030AN	05/12/2022 22:41:01	22:43:00	0.015	0.015	23	1.1
PRS187812038279	22030AO	05/10/2022 23:12:48	23:14:47	0.012	0.017	16	1.7
PRS187812038279	22030AO	05/10/2022 23:15:21	23:17:20	0.015	0.021	16	1.7
PRS402375885512	22030AP	05/10/2022 22:17:06	22:19:05	0.011	0.017	16	1.5
PRS402375885512	22030AP	05/10/2022 22:19:47	22:21:46	0.010	0.016	15	1.5
PRS22527127524	22030AQ	05/12/2022 18:32:40	18:34:39	0.009	0.012	18	1.3
PRS22527127524	22030AQ	05/12/2022 18:35:07	18:37:06	0.010	0.013	18	1.3
PRS22527127524	22030AR	05/12/2022 14:39:05	14:41:04	0.008	0.013	20	1.2
PRS22527127524	22030AR	05/12/2022 14:41:31	14:43:30	0.009	0.014	16	1.5
PRS22527127524	22030AS	05/10/2022 23:45:52	23:47:51	0.014	0.025	16	1.5
PRS22527127524	22030AS	05/10/2022 23:48:27	23:50:30	0.013	0.022	13	1.6

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
PRS402375885512	22030AT	05/11/2022 12:58:52	13:00:51	0.015	0.027	16	1.6
PRS402375885512	22030AT	05/11/2022 13:01:27	13:03:26	0.015	0.023	16	1.6
PRS22527127524	22030AU	05/12/2022 16:08:48	16:10:47	0.008	0.012	18	1.4
PRS22527127524	22030AU	05/12/2022 16:11:15	16:13:14	0.008	0.011	17	1.5
PRS22527127524	22030AV	05/12/2022 17:13:24	17:15:23	0.009	0.014	16	1.3
PRS22527127524	22030AV	05/12/2022 17:15:59	17:17:58	0.009	0.016	16	1.3
PRS22527127524	22030AW	05/12/2022 15:19:16	15:21:15	0.009	0.012	19	1.3
PRS22527127524	22030AW	05/12/2022 15:21:40	15:23:39	0.011	0.015	17	1.5
PRS30571946569	22030AX	05/11/2022 13:34:40	13:36:39	0.023	0.028	17	1.4
PRS30571946569	22030AX	05/11/2022 13:40:38	13:42:54	0.025	0.033	17	1.4
PRS375365075673	22030AY	05/11/2022 15:04:10	15:06:09	0.016	0.018	20	1.3
PRS375365075673	22030AY	05/11/2022 15:07:18	15:09:17	0.012	0.016	20	1.3
PRS375365075673	22030AZ	05/12/2022 13:39:14	13:41:13	0.011	0.016	19	1.5
PRS375365075673	22030AZ	05/12/2022 13:41:45	13:43:44	0.011	0.016	16	1.5
PRS375365075673	22030BA	05/11/2022 17:22:27	17:24:26	0.007	0.008	16	1.2
PRS375365075673	22030BA	05/11/2022 17:24:57	17:26:56	0.007	0.008	11	1.5
PRS375365075673	22030BB	05/11/2022 22:31:55	22:33:54	0.017	0.029	16	1.7
PRS375365075673	22030BE	05/11/2022 22:34:21	22:36:20	0.015	0.024	17	1.7
PRS375365075673	22030BC	05/11/2022 17:59:38	18:01:37	0.010	0.013	12	1.7
PRS375365075673	22030BC	05/11/2022 18:03:55	18:05:54	0.010	0.013	12	1.7
PRS375365075673	22030BC	05/11/2022 18:06:27	18:08:26	0.011	0.013	12	1.7
PRS375365075673	22030BC	05/11/2022 18:09:05	18:12:06	0.009	0.010	12	1.7
PRS375365075673	22030BD	05/11/2022 19:35:02	19:37:01	0.015	0.017	16	1.3
PRS375365075673	22030BD	05/11/2022 19:37:30	19:39:29	0.018	0.023	17	1.2
PRS375365075673	22030BE	05/11/2022 20:53:42	20:55:41	0.017	0.023	18	1.6
PRS375365075673	22030BE	05/11/2022 20:56:31	20:58:30	0.012	0.020	18	1.6
PRS375365075673	22030BE	05/11/2022 20:59:02	21:01:01	0.022	0.030	18	1.6
PRS375365075673	22030BF	05/11/2022 21:28:42	21:30:41	0.020	0.045	20	1.3
PRS375365075673	22030BF	05/11/2022 21:31:04	21:33:07	0.013	0.024	19	1.3
PRS375365075673	22030BF	05/11/2022 21:33:41	21:35:40	0.015	0.041	20	1.2
PRS375365075673	22030BF	05/11/2022 21:36:15	21:38:42	0.015	0.031	19	1.2
PRS179870944124	22030BG	05/13/2022 16:06:48	16:08:57	0.008	0.012	19	1.4
PRS179870944124	22030BG	05/13/2022 16:09:24	16:11:23	0.008	0.012	20	1.2
PRS179870944124	22030BH	05/13/2022 15:38:46	15:40:45	0.008	0.014	21	1.2
PRS179870944124	22030BH	05/13/2022 15:41:15	15:43:14	0.008	0.014	22	1.2
PRS402375885512	22030BI	05/10/2022 22:09:15	22:11:14	0.009	0.013	17	1.4
PRS402375885512	22030BI	05/10/2022 22:11:45	22:13:44	0.010	0.014	17	1.4
PRS179870944124	22030BJ	05/13/2022 15:24:44	15:26:43	0.008	0.012	25	1.0
PRS179870944124	22030BJ	05/13/2022 15:27:12	15:29:11	0.008	0.012	16	1.4
PRS22527127524	22030BK	05/12/2022 18:16:33	18:18:32	0.009	0.010	17	1.3
PRS22527127524	22030BK	05/12/2022 18:18:57	18:20:56	0.009	0.010	17	1.3
PRS179870944124	22030BL	05/12/2022 20:18:05	20:20:04	0.010	0.016	18	1.5
PRS179870944124	22030BL	05/12/2022 20:20:26	20:22:25	0.013	0.021	17	1.5
PRS402375885512	22030BM	05/11/2022 12:21:00	12:22:59	0.011	0.018	18	1.4
PRS402375885512	22030BM	05/11/2022 12:23:37	12:25:36	0.011	0.018	18	1.4
PRS22527127524	22030BN	05/12/2022 19:53:00	19:54:59	0.010	0.019	17	1.4
PRS22527127524	22030BN	05/12/2022 19:55:39	19:57:38	0.011	0.016	16	1.5
PRS22527127524	22030BN	05/12/2022 19:58:13	20:00:12	0.012	0.018	17	1.4
PRS22527127524	22030BO	05/12/2022 19:38:35	19:40:34	0.011	0.019	17	1.4
PRS22527127524	22030BO	05/12/2022 19:41:01	19:43:00	0.013	0.020	17	1.3
PRS22527127524	22030BP	05/12/2022 19:03:37	19:05:36	0.011	0.012	18	1.3
PRS22527127524	22030BP	05/12/2022 19:06:21	19:08:20	0.011	0.013	17	1.3
PRS22527127524	22030BQ	05/12/2022 19:15:42	19:17:41	0.009	0.012	19	1.2
PRS22527127524	22030BQ	05/12/2022 19:18:17	19:20:16	0.010	0.015	16	1.4
PRS22527127524	22030BR	05/12/2022 16:22:36	16:25:07	0.009	0.011	17	1.4
PRS22527127524	22030BR	05/12/2022 16:25:35	16:27:34	0.009	0.012	17	1.4
PRS22527127524	22030BS	05/12/2022 18:40:08	18:42:07	0.008	0.011	18	1.3
PRS22527127524	22030BS	05/12/2022 18:42:49	18:44:48	0.010	0.013	17	1.4
PRS375365075673	22030BT	05/12/2022 13:03:04	13:05:03	0.008	0.014	18	1.5
PRS375365075673	22030BT	05/12/2022 13:05:45	13:07:44	0.009	0.015	18	1.5
PRS22527127524	22030BU	05/12/2022 17:24:39	17:26:38	0.007	0.013	16	1.4
PRS22527127524	22030BU	05/12/2022 17:27:06	17:29:05	0.008	0.013	12	1.5
PRS22527127524	22030BV	05/12/2022 16:56:36	16:58:35	0.010	0.013	17	1.2
PRS22527127524	22030BV	05/12/2022 16:59:12	17:01:11	0.008	0.010	17	1.2

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
PRS179870944124	22030BW	05/13/2022 16:21:20	16:23:19	0.008	0.014	21	1.1
PRS179870944124	22030BW	05/13/2022 16:23:49	16:25:48	0.008	0.014	21	1.1
PRS179870944124	22030BX	05/13/2022 16:43:40	16:45:39	0.006	0.008	18	1.2
PRS179870944124	22030BX	05/13/2022 16:46:11	16:48:10	0.007	0.008	17	1.3
PRS375365075673	22030BY	05/11/2022 22:54:24	22:56:23	0.016	0.019	18	1.5
PRS375365075673	22030BY	05/11/2022 22:56:58	22:58:57	0.016	0.019	18	1.5
PRS179870944124	22030BZ	05/13/2022 15:06:40	15:08:39	0.008	0.010	23	1.1
PRS179870944124	22030BZ	05/13/2022 15:09:09	15:11:08	0.007	0.010	20	1.2
PRS179870944124	22030CA	05/12/2022 20:41:56	20:43:55	0.012	0.017	18	1.4
PRS179870944124	22030CA	05/12/2022 20:44:25	20:46:24	0.012	0.016	17	1.5
PRS22527127524	22030CB	05/12/2022 16:35:19	16:37:18	0.007	0.011	16	1.4
PRS22527127524	22030CB	05/12/2022 16:38:19	16:40:18	0.007	0.011	17	1.3
PRS179870944124	22030CC	05/13/2022 17:14:22	17:16:21	0.006	0.008	18	1.2
PRS179870944124	22030CC	05/13/2022 17:16:42	17:18:41	0.006	0.008	12	1.4
PRS187812038279	22030CD	05/10/2022 21:51:55	21:53:54	0.011	0.016	19	1.2
PRS187812038279	22030CD	05/10/2022 21:54:31	21:56:30	0.010	0.015	19	1.2
PRS179870944124	22030CE	05/13/2022 14:30:19	14:32:18	0.008	0.013	21	1.3
PRS179870944124	22030CE	05/13/2022 14:32:58	14:34:57	0.008	0.011	21	1.3
PRS179870944124	22030CF	05/12/2022 21:14:30	21:16:29	0.015	0.019	21	1.2
PRS179870944124	22030CF	05/12/2022 21:19:09	21:21:09	0.012	0.017	21	1.2
PRS22527127524	22030CG	05/12/2022 22:31:43	22:33:42	0.015	0.025	19	1.4
PRS22527127524	22030CG	05/12/2022 22:34:09	22:36:08	0.013	0.019	20	1.2
PRS22527127524	22030CH	05/13/2022 13:59:23	14:01:22	0.007	0.009	20	1.2
PRS22527127524	22030CH	05/13/2022 14:01:55	14:03:54	0.007	0.008	20	1.2
PRS22527127524	22030CI	05/12/2022 16:01:26	16:03:25	0.006	0.009	18	1.5
PRS22527127524	22030CI	05/12/2022 16:03:51	16:05:50	0.008	0.012	17	1.5
PRS179870944124	22030CJ	05/13/2022 21:19:31	21:21:30	0.007	0.010	21	1.1
PRS179870944124	22030CJ	05/13/2022 21:24:05	21:26:04	0.006	0.009	23	1.1
PRS179870944124	22030CK	05/13/2022 18:05:10	18:07:14	0.007	0.009	18	1.1
PRS179870944124	22030CK	05/13/2022 18:07:58	18:09:57	0.007	0.009	18	1.1
PRS179870944124	22030CL	05/13/2022 19:01:23	19:03:22	0.009	0.012	18	1.2
PRS179870944124	22030CL	05/13/2022 19:03:47	19:05:46	0.010	0.013	17	1.2
PRS22527127524	22030CM	05/12/2022 21:37:21	21:39:20	0.013	0.018	21	1.2
PRS22527127524	22030CM	05/12/2022 21:39:48	21:41:47	0.014	0.020	21	1.2
PRS22527127524	22030CN	05/12/2022 21:56:00	21:57:59	0.022	0.020	19	1.4
PRS22527127524	22030CN	05/12/2022 21:58:36	22:00:07	0.048	0.044	19	1.4
PRS22527127524	22030CN	05/12/2022 22:00:39	22:02:38	0.023	0.040	19	1.4
PRS22527127524	22030CO	05/12/2022 22:09:37	22:11:36	0.018	0.033	19	1.3
PRS22527127524	22030CO	05/12/2022 22:12:14	22:14:13	0.016	0.022	20	1.2
PRS22527127524	22030CP	05/12/2022 14:52:35	14:54:34	0.008	0.011	20	1.3
PRS22527127524	22030CP	05/12/2022 14:54:55	14:56:54	0.009	0.014	9	2.1
PRS22527127524	22030CQ	05/12/2022 15:34:30	15:36:29	0.009	0.013	19	1.3
PRS22527127524	22030CQ	05/12/2022 15:38:12	15:40:11	0.010	0.013	18	1.3
PRS179870944124	22030CR	05/13/2022 21:47:08	21:49:07	0.008	0.014	23	1.1
PRS179870944124	22030CR	05/13/2022 21:49:44	21:51:43	0.009	0.013	16	1.5
PRS179870944124	22030CS	05/13/2022 19:16:15	19:18:14	0.009	0.012	18	1.2
PRS179870944124	22030CS	05/13/2022 19:18:39	19:20:38	0.009	0.012	18	1.2
PRS179870944124	22030CT	05/13/2022 13:04:18	13:06:17	0.010	0.017	21	1.1
PRS179870944124	22030CT	05/13/2022 13:06:51	13:08:50	0.009	0.015	21	1.1
PRS22527127524	22030CU	05/12/2022 14:21:48	14:23:47	0.009	0.014	21	1.1
PRS22527127524	22030CU	05/12/2022 14:24:25	14:26:24	0.009	0.014	21	1.1
PRS375365075673	22030CV	05/12/2022 13:16:41	13:18:40	0.009	0.015	19	1.4
PRS375365075673	22030CV	05/12/2022 13:19:49	13:21:48	0.010	0.016	19	1.4
PRS375365075673	22030CW	05/11/2022 22:18:20	22:20:19	0.018	0.039	17	1.3
PRS375365075673	22030CW	05/11/2022 22:20:48	22:22:47	0.016	0.031	17	1.3
PRS375365075673	22030CW	05/11/2022 22:23:29	22:25:28	0.013	0.022	17	1.3
PRS375365075673	22030CX	05/11/2022 21:51:09	21:53:08	0.012	0.024	16	1.5
PRS375365075673	22030CX	05/11/2022 21:53:36	21:55:35	0.010	0.019	16	1.5
PRS375365075673	22030CY	05/11/2022 21:12:04	21:14:03	0.012	0.021	18	1.5
PRS375365075673	22030CY	05/11/2022 21:14:31	21:16:30	0.012	0.024	15	1.7
PRS375365075673	22030CY	05/11/2022 21:17:19	21:19:18	0.016	0.027	19	1.5
PRS375365075673	22030CY	05/11/2022 21:20:02	21:22:01	0.011	0.023	19	1.5
PRS179870944124	22030CZ	05/13/2022 22:05:31	22:07:30	0.010	0.014	20	1.3
PRS179870944124	22030CZ	05/13/2022 22:08:03	22:10:02	0.011	0.016	20	1.3

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
PRS1362102568	22030DA	05/13/2022 20:45:50	20:47:49	0.011	0.021	19	1.5
PRS1362102568	22030DA	05/13/2022 20:49:24	20:51:23	0.009	0.017	19	1.6
PRS179870944124	22030DB	05/13/2022 19:37:18	19:39:17	0.009	0.014	18	1.4
PRS179870944124	22030DB	05/13/2022 19:39:52	19:41:51	0.010	0.015	15	1.7
PRS22527127524	22030DC	05/13/2022 12:43:35	12:45:34	0.010	0.022	17	1.7
PRS22527127524	22030DC	05/13/2022 12:46:09	12:48:08	0.010	0.023	17	1.7
PRS22527127524	22030DD	05/13/2022 12:22:58	12:24:57	0.011	0.022	14	1.9
PRS22527127524	22030DD	05/13/2022 12:26:09	12:28:08	0.011	0.021	16	1.7
PRS22527127524	22030DE	05/10/2022 23:22:58	23:24:57	0.013	0.022	16	1.7
PRS22527127524	22030DE	05/10/2022 23:27:35	23:29:34	0.012	0.020	16	1.6
PRS375365075673	22030DF	05/13/2022 23:55:22	23:57:21	0.012	0.021	17	1.4
PRS375365075673	22030DF	05/13/2022 23:57:45	23:59:44	0.011	0.019	14	1.7
PRS375365075673	22030DG	05/11/2022 15:18:55	15:20:54	0.011	0.015	21	1.2
PRS375365075673	22030DG	05/11/2022 15:21:49	15:23:48	0.011	0.016	20	1.2
PRS375365075673	22030DH	05/11/2022 17:06:11	17:08:10	0.007	0.008	16	1.3
PRS375365075673	22030DH	05/11/2022 17:08:37	17:10:36	0.007	0.009	14	1.3
PRS375365075673	22030DI	05/12/2022 12:32:39	12:34:38	0.006	0.012	18	1.5
PRS375365075673	22030DI	05/12/2022 12:35:11	12:37:10	0.006	0.010	19	1.4
PRS375365075673	22030DJ	05/11/2022 20:43:40	20:45:39	0.013	0.021	19	1.4
PRS375365075673	22030DJ	05/11/2022 20:46:11	20:48:10	0.013	0.022	18	1.5
PRS22527127524	22030DK	05/12/2022 14:01:19	14:03:18	0.011	0.014	19	1.3
PRS22527127524	22030DK	05/12/2022 14:03:53	14:05:52	0.010	0.014	19	1.3
PRS1362102568	22030DL	05/13/2022 22:24:30	22:26:29	0.010	0.013	19	1.6
PRS1362102568	22030DL	05/13/2022 22:27:58	22:29:57	0.011	0.014	19	1.6
PRS1362102568	22030DM	05/13/2022 20:28:53	20:30:52	0.008	0.012	20	1.4
PRS1362102568	22030DM	05/13/2022 20:31:15	20:33:14	0.008	0.014	16	1.6
PRS1362102568	22030DN	05/13/2022 19:55:47	19:57:46	0.011	0.016	20	1.2
PRS1362102568	22030DN	05/13/2022 19:58:18	20:00:17	0.010	0.015	19	1.2
PRS187812038279	22030DO	05/10/2022 23:02:51	23:04:50	0.012	0.017	18	1.4
PRS187812038279	22030DO	05/10/2022 23:05:35	23:07:34	0.011	0.013	19	1.3
PRS402375885512	22030DP	05/11/2022 00:00:57	00:03:15	0.011	0.021	17	1.4
PRS402375885512	22030DP	05/11/2022 00:03:58	00:05:57	0.012	0.020	16	1.6
PRS375365075673	22030DQ	05/11/2022 14:51:47	14:53:46	0.011	0.014	18	1.4
PRS375365075673	22030DQ	05/11/2022 14:54:15	14:56:14	0.011	0.014	18	1.4
PRS375365075673	22030DR	05/11/2022 16:00:06	16:02:05	0.009	0.013	17	1.4
PRS375365075673	22030DR	05/11/2022 16:02:43	16:04:42	0.010	0.014	17	1.4
PRS375365075673	22030DS	05/11/2022 17:32:20	17:34:19	0.006	0.008	15	1.4
PRS375365075673	22030DS	05/11/2022 17:34:44	17:36:43	0.006	0.008	12	1.6
PRS375365075673	22030DT	05/12/2022 12:16:24	12:18:23	0.008	0.013	18	1.5
PRS375365075673	22030DT	05/12/2022 12:18:51	12:20:50	0.008	0.013	16	1.8
PRS375365075673	22030DU	05/11/2022 20:21:30	20:23:29	0.013	0.018	17	1.5
PRS375365075673	22030DU	05/11/2022 20:24:07	20:26:06	0.013	0.019	17	1.5
PRS1362102568	22030DV	05/13/2022 22:42:34	22:44:33	0.009	0.012	19	1.4
PRS1362102568	22030DV	05/13/2022 22:45:06	22:47:05	0.009	0.012	19	1.3
PRS1362102568	22030DW	05/13/2022 23:08:37	23:10:36	0.008	0.009	21	1.2
PRS1362102568	22030DW	05/13/2022 23:11:34	23:13:33	0.009	0.010	21	1.2
PRS1362102568	22030DX	05/10/2022 19:38:42	19:40:41	0.008	0.011	16	1.4
PRS1362102568	22030DX	05/10/2022 19:42:22	19:44:21	0.008	0.010	17	1.4
PRS187812038279	22030DY	05/10/2022 20:11:48	20:13:47	0.011	0.016	17	1.3
PRS187812038279	22030DY	05/10/2022 20:14:15	20:16:14	0.011	0.019	17	1.2
PRS402375885512	22030DZ	05/10/2022 22:39:12	22:41:11	0.012	0.018	15	1.7
PRS402375885512	22030DZ	05/10/2022 22:41:56	22:43:55	0.014	0.019	16	1.6
PRS402375885512	22030EA	05/11/2022 00:14:41	00:16:40	0.013	0.024	18	1.4
PRS402375885512	22030EA	05/11/2022 00:17:13	00:19:12	0.014	0.029	18	1.4
PRS375365075673	22030EB	05/11/2022 14:19:14	14:21:13	0.012	0.017	20	1.2
PRS375365075673	22030EB	05/11/2022 14:21:46	14:23:45	0.014	0.019	16	1.3
PRS375365075673	22030EC	05/11/2022 17:45:28	17:47:27	0.009	0.013	14	1.7
PRS375365075673	22030EC	05/11/2022 17:47:57	17:49:57	0.010	0.015	12	2.0
PRS375365075673	22030ED	05/12/2022 11:56:53	11:58:52	0.005	0.008	16	1.8
PRS375365075673	22030ED	05/12/2022 11:59:26	12:01:25	0.006	0.011	19	1.3
PRS375365075673	22030EE	05/11/2022 20:04:23	20:06:22	0.015	0.020	17	1.4
PRS375365075673	22030EE	05/11/2022 20:06:53	20:11:29	0.012	0.017	16	1.4
PRS1362102568	22030EF	05/10/2022 17:32:47	17:34:59	0.006	0.008	13	1.4

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
PRS1362102568	22030EF	05/10/2022 17:35:26	17:37:25	0.006	0.008	7	1.8
PRS1362102568	22030EG	05/10/2022 19:20:10	19:22:09	0.008	0.010	17	1.3
PRS1362102568	22030EG	05/10/2022 19:22:37	19:24:36	0.008	0.010	16	1.3
PRS187812038279	22030EH	05/10/2022 21:03:08	21:05:07	0.011	0.018	17	1.8
PRS187812038279	22030EH	05/10/2022 21:05:55	21:07:54	0.011	0.019	17	1.8
PRS187812038279	22030EI	05/10/2022 20:51:18	20:53:17	0.011	0.021	17	1.7
PRS187812038279	22030EI	05/10/2022 20:54:02	20:56:01	0.009	0.017	17	1.7
PRS402375885512	22030EJ	05/10/2022 22:29:43	22:31:42	0.009	0.017	17	1.7
PRS402375885512	22030EJ	05/10/2022 22:32:08	22:34:09	0.010	0.018	15	1.9
PRS402375885512	22030EK	05/11/2022 12:03:37	12:05:36	0.011	0.016	15	1.8
PRS402375885512	22030EK	05/11/2022 12:07:12	12:09:11	0.012	0.017	17	1.5
PRS30571946569	22030EL	05/11/2022 13:14:20	13:16:19	0.013	0.024	17	1.4
PRS30571946569	22030EL	05/11/2022 13:16:47	13:18:46	0.014	0.022	17	1.4
PRS375365075673	22030EM	05/11/2022 13:55:52	13:57:51	0.012	0.014	19	1.2
PRS375365075673	22030EM	05/11/2022 13:58:20	14:00:19	0.011	0.014	18	1.3
PRS375365075673	22030EN	05/11/2022 18:23:03	18:25:02	0.010	0.015	10	1.7
PRS375365075673	22030EN	05/11/2022 18:25:28	18:27:27	0.011	0.015	12	1.6
PRS30571946569	22030EO	05/11/2022 18:36:29	18:37:11	0.016	0.029	15	1.3
PRS30571946569	22030EO	05/11/2022 18:39:29	18:41:28	0.016	0.023	15	1.3
PRS30571946569	22030EO	05/11/2022 18:42:17	18:44:16	0.012	0.017	15	1.3
PRS30571946569	22030EO	05/11/2022 18:44:52	18:47:49	0.009	0.015	14	1.5
PRS375365075673	22030EP	05/11/2022 19:42:01	19:44:00	0.022	0.027	16	1.5
PRS375365075673	22030EP	05/11/2022 19:44:35	19:46:35	0.017	0.022	16	1.5
PRS375365075673	22030EP	05/11/2022 19:47:52	19:49:51	0.014	0.017	16	1.5
PRS1362102568	22030EQ	05/10/2022 17:55:19	17:57:18	0.008	0.014	14	1.6
PRS1362102568	22030EQ	05/10/2022 17:57:57	17:59:56	0.007	0.013	15	1.3
PRS187812038279	22030ER	05/10/2022 18:40:04	18:42:03	0.013	0.017	16	1.4
PRS187812038279	22030ER	05/10/2022 18:42:34	18:44:35	0.010	0.012	17	1.4
PRS187812038279	22030ES	05/10/2022 21:15:26	21:18:05	0.009	0.012	19	1.3
PRS187812038279	22030ES	05/10/2022 21:18:34	21:20:33	0.009	0.012	19	1.3
22030ZI	22030ET	05/13/2022 16:59:14	17:01:13	0.005	0.008	23	1.1
22030ZI	22030ET	05/13/2022 17:01:39	17:03:38	0.006	0.009	22	1.2
22030ZF	22030EU	05/11/2022 16:59:24	17:01:32	0.012	0.012	16	1.6
22030ZF	22030EU	05/11/2022 17:02:15	17:04:14	0.012	0.012	20	1.2
22030ZH	22030EV	05/12/2022 17:51:08	17:53:07	0.009	0.014	19	1.3
22030ZH	22030EV	05/12/2022 17:55:25	17:56:18	0.019	0.024	20	1.4
22030ZH	22030EV	05/12/2022 17:59:21	18:01:20	0.009	0.013	21	1.2
PRS22527127524	22030EW	05/13/2022 13:46:18	13:48:17	0.007	0.009	19	1.3
PRS22527127524	22030EW	05/13/2022 13:48:44	13:50:43	0.009	0.012	19	1.3
22030ZE	22030EX	05/11/2022 15:39:00	15:41:13	0.041	0.018	24	1.1
22030ZE	22030EX	05/11/2022 15:41:48	15:43:47	0.010	0.012	25	1.2
22030ZB	22030EY	05/10/2022 20:26:19	20:28:36	0.007	0.010	17	1.7
22030ZB	22030EY	05/10/2022 20:29:19	20:31:18	0.006	0.009	19	1.4
22030ZD	22030EZ	05/11/2022 14:36:55	14:39:54	0.005	0.007	24	1.2
22030ZD	22030EZ	05/11/2022 14:40:34	14:42:33	0.006	0.009	24	1.1
22030ZA	22030FA	05/10/2022 19:07:45	19:09:44	0.005	0.010	21	1.2
22030ZA	22030FA	05/10/2022 19:10:22	19:12:21	0.005	0.011	23	1.1
22030ZC	22030FB	05/11/2022 12:41:49	12:43:48	0.007	0.010	20	1.3
22030ZC	22030FB	05/11/2022 12:44:15	12:46:14	0.006	0.008	24	1.2
22030ZK	22030FC	05/13/2022 18:46:30	18:48:29	0.006	0.008	22	1.2
22030ZK	22030FC	05/13/2022 18:49:16	18:51:15	0.007	0.009	21	1.3
22030ZJ	22030FD	05/13/2022 17:29:21	17:31:20	0.006	0.011	20	1.4
22030ZJ	22030FD	05/13/2022 17:31:47	17:33:46	0.008	0.014	19	1.5
22030ZG	22030FE	05/11/2022 19:17:32	19:19:31	0.011	0.013	16	1.8
22030ZG	22030FE	05/11/2022 19:20:21	19:22:20	0.013	0.014	17	1.7
PRS179870944124	22030FF	05/13/2022 15:44:12	15:46:11	0.007	0.012	21	1.3
PRS179870944124	22030FF	05/13/2022 15:46:39	15:48:38	0.008	0.014	18	1.4
PRS179870944124	22030FG	05/12/2022 20:47:58	20:49:57	0.011	0.014	18	1.5
PRS179870944124	22030FG	05/12/2022 20:50:40	20:52:39	0.012	0.016	18	1.5
PRS179870944124	22030FG	05/12/2022 20:53:15	20:55:14	0.011	0.017	17	1.6
PRS22527127524	22030FH	05/12/2022 19:22:28	19:24:27	0.013	0.016	16	1.4
PRS22527127524	22030FH	05/12/2022 19:24:54	19:26:54	0.012	0.013	15	1.4
PRS22527127524	22030FI	05/12/2022 18:05:10	18:07:09	0.007	0.010	16	1.4

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
PRS22527127524	22030FI	05/12/2022 18:07:36	18:09:36	0.007	0.009	16	1.4
PRS179870944124	22030FJ	05/13/2022 17:39:59	17:41:58	0.003	0.005	15	1.6
PRS179870944124	22030FJ	05/13/2022 17:42:19	17:44:18	0.004	0.005	10	2.2
PRS179870944124	22030FK	05/12/2022 21:22:13	21:24:12	0.010	0.015	21	1.2
PRS179870944124	22030FK	05/12/2022 21:24:39	21:26:38	0.016	0.022	21	1.2
PRS22527127524	22030FL	05/12/2022 22:48:07	22:50:06	0.021	0.046	21	1.1
PRS22527127524	22030FL	05/12/2022 22:50:38	22:52:37	0.015	0.023	21	1.1
PRS22527127524	22030FL	05/12/2022 22:53:10	22:54:30	0.020	0.027	21	1.1
PRS22527127524	22030FM	05/12/2022 15:55:11	15:57:38	0.006	0.009	18	1.5
PRS22527127524	22030FM	05/12/2022 15:58:03	16:00:02	0.008	0.010	17	1.5
PRS179870944124	22030FN	05/13/2022 18:12:01	18:14:00	0.008	0.010	17	1.2
PRS179870944124	22030FN	05/13/2022 18:14:24	18:16:23	0.007	0.010	16	1.5
PRS22527127524	22030FO	05/12/2022 21:44:01	21:46:00	0.012	0.016	20	1.3
PRS22527127524	22030FO	05/12/2022 21:46:42	21:48:41	0.016	0.020	20	1.3
PRS22527127524	22030FP	05/12/2022 22:17:55	22:19:54	0.016	0.020	20	1.2
PRS22527127524	22030FP	05/12/2022 22:20:27	22:22:26	0.033	0.042	20	1.2
PRS22527127524	22030FQ	05/12/2022 14:59:26	15:01:25	0.008	0.011	19	1.4
PRS22527127524	22030FQ	05/12/2022 15:01:57	15:03:56	0.010	0.015	19	1.4
PRS179870944124	22030FR	05/13/2022 21:53:46	21:56:15	0.008	0.013	21	1.2
PRS179870944124	22030FR	05/13/2022 21:56:45	21:58:44	0.009	0.014	15	1.6
PRS179870944124	22030FS	05/13/2022 19:21:37	19:23:36	0.008	0.010	19	1.2
PRS179870944124	22030FS	05/13/2022 19:24:06	19:26:05	0.010	0.012	19	1.2
PRS179870944124	22030FT	05/13/2022 13:10:11	13:12:10	0.009	0.013	19	1.3
PRS179870944124	22030FT	05/13/2022 13:12:44	13:14:43	0.011	0.017	19	1.3
PRS179870944124	22030FT	05/13/2022 13:15:05	13:17:04	0.009	0.014	13	1.9
PRS22527127524	22030FU	05/12/2022 14:29:34	14:31:53	0.009	0.014	20	1.2
PRS22527127524	22030FU	05/12/2022 14:32:21	14:34:20	0.010	0.017	14	1.6
PRS22527127524	22030FV	05/12/2022 15:27:22	15:29:21	0.008	0.013	19	1.3
PRS22527127524	22030FV	05/12/2022 15:30:23	15:32:22	0.011	0.014	19	1.3
PRS179870944124	22030FW	05/13/2022 22:11:17	22:13:16	0.008	0.014	20	1.3
PRS179870944124	22030FW	05/13/2022 22:13:46	22:15:45	0.009	0.014	14	1.6
PRS1362102568	22030FX	05/13/2022 20:55:37	20:57:36	0.009	0.018	18	1.7
PRS1362102568	22030FX	05/13/2022 20:58:00	20:59:59	0.011	0.021	14	1.7
PRS22527127524	22030FY	05/13/2022 12:49:49	12:51:48	0.010	0.021	18	1.5
PRS22527127524	22030FY	05/13/2022 12:52:21	12:54:20	0.012	0.023	18	1.5
PRS22527127524	22030FZ	05/13/2022 12:29:26	12:31:25	0.010	0.018	19	1.4
PRS22527127524	22030FZ	05/13/2022 12:31:59	12:33:58	0.013	0.027	18	1.6
PRS375365075673	22030GA	05/12/2022 13:25:48	13:27:47	0.009	0.014	19	1.4
PRS375365075673	22030GA	05/12/2022 13:28:08	13:30:07	0.010	0.015	15	1.7
PRS375365075673	22030GB	05/11/2022 21:59:59	22:01:58	0.012	0.024	18	1.3
PRS375365075673	22030GB	05/11/2022 22:02:42	22:04:41	0.012	0.019	18	1.3
PRS1362102568	22030GC	05/13/2022 22:31:07	22:33:06	0.009	0.011	19	1.6
PRS1362102568	22030GC	05/13/2022 22:33:32	22:35:31	0.010	0.013	14	2.0
PRS1362102568	22030GD	05/13/2022 20:34:18	20:36:17	0.007	0.011	20	1.4
PRS1362102568	22030GD	05/13/2022 20:36:54	20:38:53	0.011	0.019	20	1.4
PRS1362102568	22030GE	05/13/2022 20:01:31	20:03:45	0.009	0.014	19	1.2
PRS1362102568	22030GE	05/13/2022 20:04:21	20:06:20	0.011	0.019	18	1.3
PRS22527127524	22030GF	05/10/2022 23:32:05	23:34:04	0.011	0.022	16	1.6
PRS22527127524	22030GF	05/10/2022 23:35:05	23:37:04	0.012	0.022	17	1.4
PRS375365075673	22030GG	05/11/2022 15:25:08	15:27:07	0.010	0.015	20	1.2
PRS375365075673	22030GG	05/11/2022 15:27:36	15:29:35	0.014	0.019	19	1.3
PRS375365075673	22030GH	05/11/2022 17:13:35	17:15:34	0.007	0.009	15	1.3
PRS375365075673	22030GH	05/11/2022 17:16:17	17:18:16	0.007	0.008	16	1.2
PRS375365075673	22030GI	05/11/2022 20:28:26	20:30:25	0.012	0.017	17	1.5
PRS375365075673	22030GI	05/11/2022 20:31:00	20:32:59	0.013	0.020	18	1.5
PRS375365075673	22030GI	05/11/2022 20:33:46	20:35:45	0.015	0.020	17	1.5
PRS1362102568	22030GJ	05/13/2022 23:02:15	23:04:14	0.007	0.008	21	1.3
PRS1362102568	22030GJ	05/13/2022 23:04:43	23:06:42	0.008	0.009	17	1.5
PRS1362102568	22030GK	05/10/2022 19:48:02	19:50:01	0.009	0.013	17	1.4
PRS1362102568	22030GK	05/10/2022 19:50:40	19:52:39	0.010	0.013	17	1.4
PRS187812038279	22030GL	05/10/2022 20:35:15	20:37:14	0.013	0.024	15	1.9
PRS187812038279	22030GL	05/10/2022 20:37:41	20:39:40	0.012	0.028	16	1.7
PRS187812038279	22030GL	05/10/2022 20:40:30	20:42:29	0.011	0.022	16	1.7
PRS402375885512	22030GM	05/11/2022 00:20:42	00:22:41	0.015	0.030	18	1.4

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
PRS402375885512	22030GM	05/11/2022 00:23:13	00:25:12	0.015	0.024	18	1.4
PRS375365075673	22030GN	05/11/2022 14:24:43	14:26:42	0.011	0.014	21	1.1
PRS375365075673	22030GN	05/11/2022 14:27:12	14:29:11	0.010	0.015	21	1.1
PRS375365075673	22030GO	05/11/2022 17:51:37	17:53:36	0.009	0.014	14	1.7
PRS375365075673	22030GO	05/11/2022 17:54:11	17:56:12	0.010	0.014	10	2.2
PRS375365075673	22030GP	05/12/2022 12:03:27	12:05:26	0.005	0.009	19	1.4
PRS375365075673	22030GP	05/12/2022 12:06:00	12:07:59	0.006	0.011	19	1.4
PRS375365075673	22030GQ	05/11/2022 19:52:15	19:54:21	0.012	0.015	16	1.5
PRS375365075673	22030GQ	05/11/2022 19:54:51	19:56:50	0.015	0.020	16	1.5
PRS1362102568	22030GR	05/10/2022 17:43:24	17:45:23	0.006	0.008	15	1.5
PRS1362102568	22030GR	05/10/2022 17:45:56	17:47:55	0.006	0.010	14	1.5
PRS187812038279	22030GS	05/10/2022 18:47:09	18:49:08	0.009	0.012	17	1.4
PRS187812038279	22030GS	05/10/2022 18:50:20	18:52:19	0.015	0.020	17	1.4
PRS187812038279	22030GT	05/10/2022 21:23:59	21:25:58	0.008	0.012	19	1.3
PRS187812038279	22030GT	05/10/2022 21:26:43	21:28:42	0.007	0.011	19	1.3
PRS30571946569	22030GU	05/11/2022 13:21:57	13:23:56	0.012	0.017	16	1.6
PRS30571946569	22030GU	05/11/2022 13:24:33	13:26:32	0.019	0.026	16	1.6
PRS375365075673	22030GV	05/11/2022 14:02:28	14:04:43	0.009	0.012	19	1.2
PRS375365075673	22030GV	05/11/2022 14:05:52	14:07:51	0.011	0.015	19	1.2
PRS30571946569	22030GW	05/11/2022 18:54:09	18:56:08	0.010	0.015	15	1.4
PRS30571946569	22030GW	05/11/2022 18:56:26	18:58:25	0.012	0.018	12	1.7
PRS179870944124	22030GX	05/12/2022 20:23:13	20:25:12	0.012	0.021	18	1.5
PRS179870944124	22030GX	05/12/2022 20:25:39	20:27:38	0.012	0.019	17	1.5
PRS179870944124	22030GX	05/12/2022 20:28:31	20:30:30	0.010	0.015	18	1.4
PRS22527127524	22030GY	05/12/2022 17:02:10	17:04:09	0.007	0.009	16	1.3
PRS22527127524	22030GY	05/12/2022 17:04:39	17:06:38	0.011	0.014	13	1.5
PRS375365075673	22030GZ	05/11/2022 22:47:15	22:49:14	0.011	0.015	17	1.6
PRS375365075673	22030GZ	05/11/2022 22:49:57	22:51:48	0.035	0.067	17	1.6
PRS375365075673	22030HA	05/11/2022 16:08:23	16:10:52	0.011	0.015	17	1.3
PRS375365075673	22030HA	05/11/2022 16:11:48	16:13:47	0.011	0.015	17	1.3
PRS22527127524	22030HB	05/12/2022 18:46:22	18:48:21	0.009	0.011	18	1.3
PRS187812038279	22030HC	05/10/2022 21:57:36	21:59:35	0.009	0.015	19	1.2
PRS402375885512	22030HD	05/11/2022 12:26:57	12:28:59	0.009	0.016	18	1.4
PRS402375885512	22030HD	05/11/2022 12:29:29	12:31:28	0.013	0.020	18	1.4
PRS22527127524	22030HE	05/12/2022 14:07:07	14:09:06	0.008	0.012	19	1.2
PRS22527127524	22030HE	05/12/2022 14:09:42	14:11:41	0.009	0.014	19	1.2
PRS179870944124	22030HF	05/13/2022 16:27:15	16:29:17	0.007	0.012	19	1.2
PRS179870944124	22030HF	05/13/2022 16:29:43	16:31:42	0.009	0.014	18	1.2
PRS1362102568	22030HG	05/10/2022 18:01:57	18:03:56	0.006	0.010	15	1.3
PRS1362102568	22030HG	05/10/2022 18:04:33	18:06:32	0.007	0.011	16	1.2
PRS402375885512	22030HH	05/10/2022 22:46:29	22:48:34	0.012	0.019	15	1.6
PRS402375885512	22030HH	05/10/2022 22:49:03	22:51:03	0.013	0.019	13	1.9
PRS375365075673	22030HI	05/12/2022 12:38:13	12:40:12	0.005	0.009	19	1.4
PRS375365075673	22030HI	05/12/2022 12:40:48	12:42:47	0.006	0.009	19	1.4
PRS179870944124	22030HJ	05/13/2022 14:36:20	14:38:19	0.007	0.010	21	1.3
PRS179870944124	22030HJ	05/13/2022 14:38:47	14:40:46	0.008	0.012	20	1.3
PRS187812038279	22030ZA	05/10/2022 19:00:45	19:02:44	0.008	0.010	14	1.7
PRS187812038279	22030ZA	05/10/2022 19:03:19	19:05:18	0.008	0.011	8	1.9
PRS187812038279	22030ZB	05/10/2022 20:20:07	20:22:06	0.007	0.014	16	1.6
PRS187812038279	22030ZB	05/10/2022 20:22:28	20:24:27	0.006	0.012	12	1.8
PRS402375885512	22030ZC	05/11/2022 12:34:45	12:36:46	0.005	0.010	6	3.1
PRS402375885512	22030ZC	05/11/2022 12:37:06	12:39:05	0.005	0.010	7	2.8
PRS375365075673	22030ZD	05/11/2022 14:30:39	14:32:38	0.005	0.008	16	1.5
PRS375365075673	22030ZD	05/11/2022 14:33:07	14:35:06	0.005	0.008	17	1.4
PRS375365075673	22030ZE	05/11/2022 15:31:17	15:33:16	0.005	0.007	18	1.3
PRS375365075673	22030ZE	05/11/2022 15:33:44	15:35:43	0.005	0.007	19	1.3
PRS375365075673	22030ZF	05/11/2022 16:51:48	16:53:47	0.006	0.008	11	1.7
PRS375365075673	22030ZF	05/11/2022 16:54:42	16:56:41	0.006	0.008	10	2.0
PRS375365075673	22030ZG	05/11/2022 19:06:27	19:08:26	0.011	0.018	13	1.7
PRS375365075673	22030ZG	05/11/2022 19:09:09	19:11:08	0.009	0.015	12	2.2
PRS375365075673	22030ZG	05/11/2022 19:11:38	19:13:07	0.009	0.015	9	3.1
PRS22527127524	22030ZH	05/12/2022 17:42:41	17:44:42	0.004	0.008	10	2.2
PRS22527127524	22030ZH	05/12/2022 17:45:11	17:47:10	0.003	0.007	10	2.2
PRS179870944124	22030ZI	05/13/2022 16:52:42	16:54:41	0.004	0.006	18	1.2

GPS BASE	GPSID	UTC Start	UTC End	Horz Prec	Vert Prec	# of SV's	PDOP
PRS179870944124	22030ZI	05/13/2022 16:55:13	16:57:12	0.004	0.006	19	1.1
PRS179870944124	22030ZJ	05/13/2022 17:22:38	17:24:37	0.003	0.004	15	1.4
PRS179870944124	22030ZK	05/13/2022 17:25:13	17:27:12	0.003	0.004	16	1.4
PRS179870944124	22030ZL	05/13/2022 18:37:22	18:39:21	0.007	0.011	15	1.6
PRS179870944124	22030ZM	05/13/2022 18:39:48	18:41:47	0.006	0.010	15	1.6
PRS402375885512	DQ5099	05/11/2022 00:27:13	00:29:12	0.012	0.020	19	1.3
PRS402375885512	DQ5099	05/11/2022 00:29:44	00:31:43	0.018	0.028	19	1.3
PRS402375885512	DQ5099	05/11/2022 00:32:11	00:34:11	0.015	0.025	18	1.3

As mentioned, each station was occupied twice (or more if needed) in succession. The Earth Centered Earth Fixed (ECEF) vector differences were rotated into a local horizon system (N, E, Up) for analysis. Stations which had observations that differed by more than 0.033 m in the vertical component were re-observed until agreement was achieved. Figure 3 summarizes the repeat baseline analysis (rejected observations not shown).

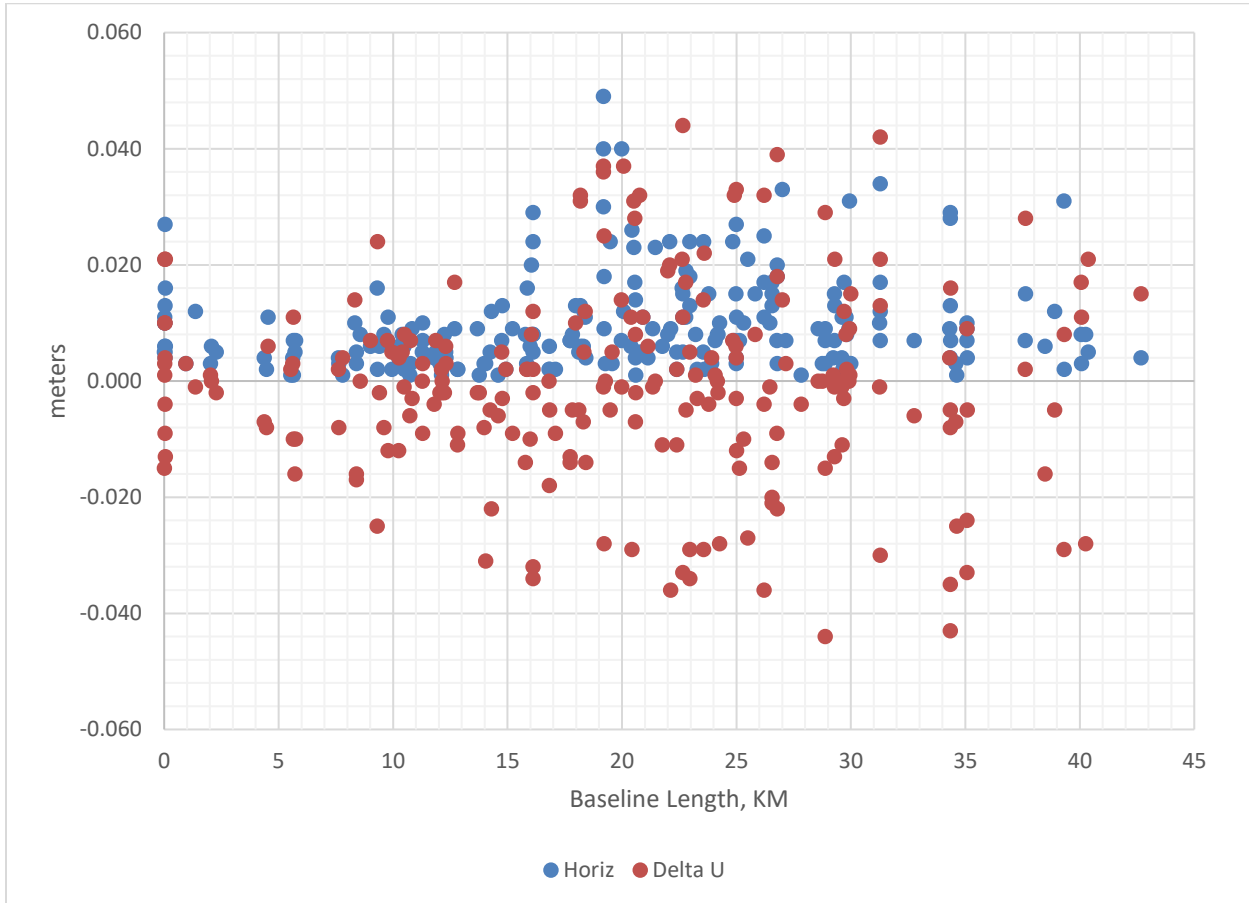


Figure 3 - Repeat Baseline Analysis

LEAST SQUARES ADJUSTMENTS

Geolab was used to adjust the VRS and RTK vectors. No scaling of the a priori GPS statistics was done. Station errors (centering, HI and HT) of 0.005 m were input. The GEOID18 model was used.

The adjustment constrained the VRS CORS positions (as computed and broadcast by the network) in all three dimensions (NAD83 (2011) latitude, longitude, and ellipsoidal height). The error factor was 0.32. This adjustment provided the adjusted positions (NAD83 (2011) epoch 2010.0) and GPS derived orthometric heights (NAVD88) for the stations in the network. The adjusted latitude/longitudes were transformed to UTM Zone 14 and Zone 15 grid coordinates. The vertical misclosure at the existing NSRS station **5305 L** was -0.016 m. Table 4 lists the error ellipses at the 95% level.

Table 4 - Station Error Ellipses - 95% meters

Station Name	Semi-Major Axis	Azimuth	Semi-Minor Axis	Vertical
22030AA	0.009	151	0.009	0.010
22030AB	0.009	158	0.008	0.010
22030AC	0.009	8	0.008	0.011
22030AD	0.010	8	0.008	0.010
22030AE	0.009	3	0.008	0.010
22030AF	0.010	0	0.009	0.011
22030AG	0.009	151	0.009	0.011
22030AH	0.009	175	0.008	0.010
22030AI	0.010	159	0.009	0.013
22030AJ	0.012	162	0.009	0.015
22030AK	0.011	18	0.010	0.015
22030AL	0.010	156	0.008	0.012
22030AM	0.010	172	0.009	0.012
22030AN	0.012	7	0.010	0.012
22030AO	0.013	155	0.010	0.016
22030AP	0.011	151	0.009	0.014
22030AQ	0.010	147	0.009	0.011
22030AR	0.010	179	0.008	0.012
22030AS	0.012	132	0.011	0.019
22030AT	0.014	167	0.010	0.020
22030AU	0.009	0	0.009	0.011
22030AV	0.009	100	0.009	0.013
22030AW	0.011	171	0.009	0.012
22030AX	0.023	164	0.010	0.025
22030AY	0.013	17	0.010	0.014
22030AZ	0.012	169	0.009	0.014
22030BA	0.008	103	0.008	0.009
22030BB	0.015	5	0.011	0.021
22030BC	0.010	1	0.009	0.011
22030BD	0.016	154	0.010	0.016
22030BE	0.012	144	0.009	0.015
22030BF	0.013	26	0.012	0.028
22030BG	0.009	4	0.008	0.011
22030BH	0.010	11	0.008	0.012
22030BI	0.010	151	0.008	0.012
22030BJ	0.009	4	0.008	0.011
22030BK	0.009	5	0.009	0.010
22030BL	0.011	163	0.010	0.016
22030BM	0.011	3	0.010	0.015
22030BN	0.009	158	0.008	0.012
22030BO	0.012	158	0.009	0.016
22030BP	0.011	142	0.010	0.011
22030BQ	0.010	160	0.009	0.012
22030BR	0.010	134	0.009	0.011

Station Name	Semi-Major Axis	Azimuth	Semi-Minor Axis	Vertical
22030BS	0.009	178	0.009	0.011
22030BT	0.010	169	0.009	0.012
22030BU	0.009	53	0.008	0.012
22030BV	0.010	120	0.009	0.010
22030BW	0.009	5	0.009	0.012
22030BX	0.008	98	0.008	0.008
22030BY	0.015	20	0.010	0.016
22030BZ	0.009	178	0.008	0.010
22030CA	0.012	163	0.010	0.014
22030CB	0.009	153	0.008	0.010
22030CC	0.008	49	0.008	0.008
22030CD	0.011	154	0.008	0.013
22030CE	0.010	7	0.008	0.011
22030CF	0.013	152	0.010	0.015
22030CG	0.013	159	0.011	0.018
22030CH	0.009	178	0.008	0.009
22030CI	0.009	159	0.008	0.010
22030CJ	0.008	166	0.008	0.009
22030CK	0.008	64	0.008	0.009
22030CL	0.010	154	0.009	0.011
22030CM	0.013	164	0.010	0.016
22030CN	0.019	144	0.010	0.019
22030CO	0.016	166	0.011	0.021
22030CP	0.010	178	0.008	0.011
22030CQ	0.010	4	0.009	0.012
22030CR	0.010	171	0.009	0.012
22030CS	0.010	156	0.009	0.011
22030CT	0.010	153	0.009	0.014
22030CU	0.010	4	0.008	0.012
22030CV	0.011	161	0.009	0.013
22030CW	0.011	31	0.009	0.018
22030CX	0.011	22	0.010	0.018
22030CY	0.011	167	0.010	0.018
22030CZ	0.011	0	0.009	0.013
22030DA	0.011	147	0.009	0.015
22030DB	0.010	160	0.009	0.012
22030DC	0.010	144	0.009	0.019
22030DD	0.011	169	0.010	0.018
22030DE	0.012	9	0.010	0.017
22030DF	0.012	12	0.010	0.016
22030DG	0.011	8	0.010	0.014
22030DH	0.009	105	0.008	0.009
22030DI	0.008	176	0.008	0.010
22030DJ	0.013	160	0.010	0.018
22030DK	0.011	159	0.009	0.012
22030DL	0.011	178	0.009	0.012
22030DM	0.009	167	0.008	0.011
22030DN	0.011	161	0.009	0.013
22030DO	0.011	152	0.010	0.013
22030DP	0.011	177	0.010	0.017
22030DQ	0.011	11	0.009	0.012
22030DR	0.010	144	0.009	0.012
22030DS	0.008	55	0.008	0.008
22030DT	0.009	164	0.009	0.012
22030DU	0.013	161	0.009	0.016
22030DV	0.011	179	0.008	0.011
22030DW	0.010	8	0.008	0.009
22030DX	0.009	161	0.008	0.010
22030DY	0.011	162	0.009	0.015
22030DZ	0.013	151	0.010	0.016
22030EA	0.012	158	0.011	0.021
22030EB	0.013	0	0.010	0.015
22030EC	0.010	28	0.010	0.012
22030ED	0.008	171	0.008	0.009

Station Name	Semi-Major Axis	Azimuth	Semi-Minor Axis	Vertical
22030EE	0.013	160	0.010	0.015
22030EF	0.009	36	0.008	0.008
22030EG	0.009	6	0.009	0.009
22030EH	0.011	141	0.009	0.016
22030EI	0.011	138	0.009	0.015
22030EJ	0.010	175	0.009	0.015
22030EK	0.011	164	0.010	0.014
22030EL	0.013	173	0.010	0.019
22030EM	0.013	171	0.009	0.012
22030EN	0.010	125	0.010	0.013
22030EO	0.009	154	0.008	0.012
22030EP	0.014	160	0.010	0.016
22030EQ	0.009	58	0.009	0.012
22030ER	0.011	137	0.010	0.012
22030ES	0.010	149	0.008	0.011
22030ET	0.011	94	0.011	0.011
22030EU	0.016	112	0.011	0.014
22030EV	0.012	21	0.012	0.014
22030EW	0.010	175	0.008	0.010
22030EX	0.016	59	0.012	0.015
22030EY	0.012	7	0.011	0.015
22030EZ	0.012	0	0.011	0.012
22030FA	0.012	153	0.011	0.014
22030FB	0.012	170	0.011	0.013
22030FC	0.012	34	0.011	0.013
22030FD	0.011	76	0.011	0.013
22030FE	0.017	165	0.012	0.019
22030FF	0.009	8	0.008	0.011
22030FG	0.010	166	0.007	0.011
22030FH	0.013	153	0.009	0.013
22030FI	0.009	15	0.008	0.009
22030FJ	0.007	30	0.007	0.007
22030FK	0.012	158	0.010	0.015
22030FL	0.016	175	0.011	0.020
22030FM	0.009	160	0.008	0.009
22030FN	0.009	36	0.008	0.009
22030FO	0.014	170	0.010	0.015
22030FP	0.016	152	0.014	0.020
22030FQ	0.010	6	0.008	0.011
22030FR	0.010	173	0.008	0.012
22030FS	0.010	156	0.008	0.010
22030FT	0.008	156	0.007	0.010
22030FU	0.010	3	0.008	0.013
22030FV	0.010	2	0.009	0.012
22030FW	0.010	179	0.008	0.012
22030FX	0.011	150	0.009	0.016
22030FY	0.011	138	0.009	0.018
22030FZ	0.012	150	0.009	0.018
22030GA	0.011	162	0.009	0.012
22030GB	0.011	160	0.010	0.017
22030GC	0.010	178	0.008	0.011
22030GD	0.010	148	0.008	0.012
22030GE	0.011	162	0.009	0.014
22030GF	0.011	15	0.010	0.018
22030GG	0.011	5	0.010	0.014
22030GH	0.009	96	0.008	0.009
22030GI	0.012	162	0.009	0.015
22030GJ	0.009	7	0.008	0.009
22030GK	0.010	158	0.009	0.012
22030GL	0.009	137	0.008	0.016
22030GM	0.013	146	0.011	0.021
22030GN	0.011	171	0.009	0.013
22030GO	0.010	39	0.009	0.012
22030GP	0.008	22	0.008	0.009

Station Name	Semi-Major Axis	Azimuth	Semi-Minor Axis	Vertical
22030GQ	0.013	155	0.010	0.015
22030GR	0.008	119	0.008	0.009
22030GS	0.011	132	0.010	0.013
22030GT	0.009	154	0.008	0.010
22030GU	0.014	174	0.010	0.017
22030GV	0.011	176	0.009	0.012
22030GW	0.011	139	0.009	0.014
22030GX	0.009	175	0.008	0.012
22030GY	0.010	115	0.009	0.010
22030GZ	0.015	16	0.011	0.017
22030HA	0.011	131	0.009	0.013
22030HB	0.014	140	0.012	0.015
22030HC	0.015	155	0.012	0.018
22030HD	0.011	177	0.010	0.015
22030HE	0.010	165	0.008	0.012
22030HF	0.009	154	0.009	0.012
22030HG	0.008	35	0.008	0.010
22030HH	0.012	163	0.010	0.016
22030HI	0.008	167	0.008	0.009
22030HJ	0.009	7	0.008	0.010
22030ZA	0.009	153	0.008	0.010
22030ZB	0.008	158	0.008	0.011
22030ZC	0.008	180	0.008	0.010
22030ZD	0.008	178	0.007	0.008
22030ZE	0.008	171	0.008	0.008
22030ZF	0.009	137	0.007	0.008
22030ZG	0.011	152	0.008	0.014
22030ZH	0.008	53	0.007	0.008
22030ZI	0.008	160	0.008	0.007
22030ZJ	0.007	28	0.007	0.007
22030ZK	0.008	154	0.008	0.010
DQ5099	0.011	155	0.009	0.016

SUMMARY

A LiDAR ground control network was established in SW Minnesota. The estimated accuracy of the control network is ± 0.03 m with respect to the NAD83 (2011) epoch 2010.0 reference frame and the NAVD88 vertical datum (using GEOID18).

Horizontal Datum: NAD83 (2011) epoch 2010.0

Vertical Datum: NAVD88= Ellipsoidal Height-GEOID18

UTM Zones: 14 & 15

Units: meters

Table 5– Adjusted Coordinates and Elevations (meters)

Station Name	Latitude	Longitude	NAVD88	Ellip H	UTM14 Northing	UTM14 Easting	UTM15 Northing	UTM15 Easting
GCP01	43°31'19.97649" N	96°24'43.58812" W	457.115	430.567	4822062.335	709143.457	4824466.466	224242.975
GCP02	43°51'49.60736" N	96°24'28.54553" W	492.215	465.988	4860009.406	708294.768	4862390.464	226141.336
GCP03	44°09'13.44682" N	96°22'05.28979" W	504.313	478.425	4892316.471	710464.037	4894466.010	230656.154
GCP04	43°41'22.76474" N	96°18'43.70988" W	469.875	443.478	4840915.722	716620.494	4842737.183	233064.753
GCP05	43°59'36.53238" N	96°18'00.84273" W	529.883	503.781	4874692.636	716477.960	4876445.368	235372.366
GCP06	43°31'45.48838" N	96°12'48.42034" W	443.452	416.849	4823368.349	725172.468	4824613.562	240329.281
GCP07	43°52'13.60336" N	96°09'53.54346" W	489.667	463.405	4861391.262	727801.595	4862353.611	245702.350
GCP08	44°09'11.88830" N	96°10'29.22155" W	586.627	560.590	4892781.704	725927.993	4893802.250	246116.829
GCP09	43°42'11.08478" N	96°02'02.92616" W	464.576	438.184	4843170.713	738972.304	4843369.971	255524.839
GCP10	43°59'40.00602" N	96°01'27.22426" W	561.997	535.832	4875561.803	738605.966	4875703.247	257508.408
GCP11	44°09'11.11910" N	95°59'02.71492" W	524.211	497.866	4893299.930	741178.956	4893207.018	261366.126
GCP12	43°31'44.98638" N	95°56'00.92507" W	472.119	445.508	4824149.131	747788.723	4823761.716	262944.575
GCP13	43°51'47.45669" N	95°56'37.65041" W	524.685	498.395	4861218.060	745595.925	4860889.982	263438.154
GCP14	43°59'37.00556" N	95°48'12.16027" W	490.240	463.727	4876132.434	756318.680	4874984.582	275214.283
GCP15	43°42'13.22707" N	95°46'24.10330" W	505.503	479.102	4844022.165	759983.275	4842699.626	276540.429
GCP16	43°31'45.79019" N	95°44'01.55985" W	507.811	481.175	4824789.170	763935.875	4823236.030	279093.263
GCP17	44°09'10.07686" N	95°44'46.35335" W	468.612	441.958	4893993.527	760203.669	4892511.661	280388.350
GCP18	43°52'15.15359" N	95°39'44.27791" W	480.577	453.876	4862948.170	768183.020	4860977.025	286086.995
GCP19	43°42'11.68667" N	95°35'36.75200" W	478.571	451.953	4844554.790	774474.805	4842182.891	291028.133
GCP20	43°31'12.10529" N	95°33'14.69880" W	486.518	459.650	4824336.372	778499.630	4821735.008	293581.508
GCP21	43°59'35.80001" N	95°32'33.48552" W	462.095	435.271	4876939.470	777228.593	4874269.392	296121.044
GCP22	44°09'08.55777" N	95°31'22.94846" W	433.969	407.054	4894677.715	778052.907	4891892.740	298233.808
GCP23	43°51'43.61437" N	95°28'56.91892" W	438.894	411.939	4862574.848	782673.809	4859554.076	300506.647
GCP24	43°30'52.94663" N	95°24'52.02521" W	459.142	431.934	4824222.746	789810.939	4820806.787	304849.596
GCP25	43°40'27.44919" N	95°24'55.11652" W	448.188	421.159	4841944.869	788975.836	4838532.983	305295.704
GCP26	43°47'22.65524" N	95°24'56.39547" W	437.126	410.097	4854754.164	788392.466	4851343.739	305640.638
GCP27	43°40'08.25365" N	95°10'27.75289" W	449.436	422.051	4842221.242	808427.151	4837403.275	324702.976
GCP28	43°49'09.00336" N	95°10'29.19125" W	443.377	416.099	4858903.961	807623.602	4854087.213	325108.822
GCP29	43°32'41.03388" N	95°09'14.83171" W	443.881	416.284	4828498.570	810700.085	4823563.427	325978.093
GCP30	43°31'47.15741" N	94°53'40.71833" W	420.755	392.803	4827840.047	831746.533	4821390.848	346902.570
GCP31	43°41'49.11990" N	94°53'40.54541" W	413.181	385.468	4846413.159	830830.860	4839961.852	347330.198
GCP32	43°49'10.13478" N	94°53'40.40188" W	413.051	385.447	4860020.539	830158.581	4853567.799	347644.683
NVA01	44°09'16.75718" N	96°23'53.36017" W	523.199	497.313	4892342.179	708060.159	4894667.009	228259.684

Station Name	Latitude	Longitude	NAVD88	Ellip H	UTM14 Northing	UTM14 Easting	UTM15 Northing	UTM15 Easting
NVA02	44°09'14.30874" N	96°18'34.32258" W	535.126	509.231	4892494.796	715149.537	4894302.152	235343.682
NVA03	43°31'44.27845" N	95°45'12.54446" W	503.516	476.882	4824680.089	762344.251	4823241.981	277498.311
NVA04	44°09'13.53349" N	96°09'52.18652" W	590.196	564.144	4892860.797	726748.938	4893821.276	246941.488
NVA05	44°04'17.92325" N	95°44'34.64037" W	483.848	457.225	4884989.621	760820.934	4883488.890	280347.935
NVA06	44°09'12.22608" N	96°03'51.17668" W	518.346	492.134	4893102.042	734769.800	4893476.991	254959.454
NVA07	43°29'59.04979" N	95°37'23.73222" W	476.369	449.612	4821852.934	773000.036	4819655.220	287919.476
NVA08	44°10'04.54541" N	95°57'22.72094" W	506.671	480.270	4895030.262	743339.178	4894775.165	263646.716
NVA09	44°04'49.79912" N	95°56'34.50760" W	513.960	487.601	4885358.766	744771.022	4885025.501	264369.882
NVA10	44°10'02.60255" N	95°50'36.44896" W	500.472	473.905	4895310.808	752364.235	4894396.761	272667.346
NVA11	44°06'34.24357" N	95°50'36.97115" W	506.114	479.594	4888881.577	752599.523	4887968.433	272433.374
NVA12	44°02'20.32410" N	95°28'57.36538" W	432.519	405.658	4882219.516	781825.764	4879198.779	301087.806
NVA13	44°09'09.43672" N	95°44'34.55219" W	471.380	444.723	4893984.162	760466.608	4892483.156	280649.843
NVA14	43°44'15.87693" N	95°18'53.66114" W	433.350	406.140	4849347.762	796756.691	4845349.520	313586.609
NVA15	44°08'15.01407" N	95°34'57.18117" W	451.093	424.266	4892825.950	773362.496	4890388.502	293422.905
NVA16	44°08'15.67868" N	95°28'57.28145" W	432.926	405.995	4893183.899	781358.716	4890162.693	301420.413
NVA17	44°05'46.84389" N	96°24'29.32845" W	514.220	488.247	4885840.303	707465.305	4888223.324	227192.140
NVA18	44°06'36.82520" N	96°18'12.25960" W	529.155	503.192	4887651.867	715798.992	4889423.354	235638.499
NVA19	43°45'41.35445" N	95°09'36.06390" W	448.265	420.940	4852552.213	809108.071	4847649.733	326128.409
NVA20	44°05'27.61763" N	96°11'04.74379" W	542.506	516.448	4885834.975	725375.807	4886913.064	245059.687
NVA21	44°04'50.54012" N	96°03'51.40745" W	560.792	534.621	4885027.775	735052.914	4885403.069	254653.440
NVA22	44°03'03.59780" N	95°34'56.62184" W	470.237	443.464	4883217.886	773774.213	4880779.765	293133.786
NVA23	44°01'13.97692" N	96°19'05.36941" W	525.202	499.130	4877652.215	714942.858	4879509.649	234056.180
NVA24	43°30'51.59954" N	95°51'22.35414" W	473.154	446.498	4822735.671	754104.291	4821896.860	269141.195
NVA25	43°59'37.57807" N	96°10'28.09531" W	517.703	491.575	4875062.898	726561.335	4876081.433	245458.246
NVA26	43°59'35.61159" N	96°00'50.39014" W	550.520	524.348	4875455.893	739431.312	4875537.607	258323.885
NVA27	43°59'21.79276" N	95°48'13.08330" W	499.873	473.365	4875662.262	756316.326	4874515.914	275177.758
NVA28	43°58'40.77161" N	95°42'12.18551" W	475.332	448.660	4874713.311	764406.260	4872981.740	283175.434
NVA29	43°58'42.91347" N	95°32'35.02317" W	438.144	411.309	4875306.265	777262.800	4872638.729	296036.464
NVA30	43°55'13.93489" N	96°21'38.64423" W	504.027	477.844	4866433.562	711885.905	4868539.301	230190.719
NVA31	43°55'18.38393" N	96°15'53.15508" W	536.270	510.086	4866821.680	719586.194	4868367.204	237901.156
NVA32	43°55'16.40301" N	96°06'13.62335" W	506.149	479.932	4867201.497	732512.402	4867807.317	250823.086
NVA33	43°55'42.76980" N	95°56'36.82593" W	501.793	475.555	4868478.937	745345.543	4868149.493	263715.400
NVA34	43°55'15.20130" N	95°51'49.65676" W	527.498	501.160	4867868.661	751781.330	4867073.584	270089.296
NVA35	43°54'51.80767" N	95°47'13.39031" W	500.282	473.792	4867383.924	757970.585	4866140.895	276226.001
NVA36	43°53'29.09416" N	95°35'53.45730" W	460.950	434.135	4865439.748	773241.025	4863094.277	291310.618
NVA37	43°51'44.69345" N	95°28'50.45425" W	443.257	416.300	4862614.291	782816.706	4859583.035	300651.957
NVA38	43°51'01.21212" N	96°23'23.21900" W	497.721	471.479	4858562.188	709800.177	4860837.281	227538.345
NVA39	43°50'58.66959" N	96°08'40.11090" W	471.219	444.933	4859135.788	729520.522	4859979.051	247253.385
NVA40	43°50'55.65268" N	95°56'39.07624" W	519.010	492.727	4859618.564	745623.214	4859292.804	263349.371

Station Name	Latitude	Longitude	NAVD88	Ellip H	UTM14 Northing	UTM14 Easting	UTM15 Northing	UTM15 Easting
NVA41	43°50'50.83318" N	95°40'21.28101" W	478.964	452.313	4860313.258	767461.901	4858402.173	285176.950
NVA42	43°47'51.16997" N	95°19'25.88173" W	432.047	404.884	4855958.290	795740.679	4852011.931	313052.315
NVA43	43°50'42.06762" N	95°08'07.97797" W	435.894	408.590	4861922.180	810644.008	4856876.252	328337.505
NVA44	43°47'20.88365" N	94°59'40.28806" W	422.796	395.320	4856254.985	822281.988	4850386.180	339524.097
NVA45	43°47'25.43356" N	94°52'33.89826" W	402.141	374.491	4856864.040	831805.529	4850303.717	349057.035
NVA46	43°48'19.88616" N	96°24'06.16264" W	476.243	449.977	4853554.655	708997.769	4855899.225	226374.608
NVA47	43°48'17.50842" N	96°12'53.83590" W	505.169	478.858	4853970.180	724022.884	4855224.733	241394.757
NVA48	43°48'17.01388" N	96°04'24.84463" W	485.609	459.303	4854347.635	735396.650	4854777.003	252767.543
NVA49	43°47'25.12451" N	95°55'57.90091" W	513.247	487.005	4853157.191	746783.585	4852764.706	264038.341
NVA50	43°45'39.94614" N	95°49'28.39916" W	523.481	497.193	4850240.641	755613.623	4849216.750	272632.977
NVA51	43°42'13.21150" N	95°42'47.66733" W	520.316	493.865	4844212.145	764827.738	4842538.765	281384.752
NVA52	43°42'12.67615" N	95°35'33.13607" W	478.637	452.018	4844588.648	774554.485	4842210.886	291110.022
NVA53	43°41'45.75306" N	95°28'22.72951" W	453.011	426.132	4844161.281	784223.681	4841085.836	300718.685
NVA54	43°40'27.91029" N	95°10'05.92889" W	448.490	421.108	4842850.307	808887.881	4837996.915	325207.576
NVA55	43°40'12.27612" N	95°02'04.69816" W	439.987	412.473	4842875.095	819687.865	4837241.519	335971.812
NVA56	43°41'20.96839" N	94°52'14.09639" W	410.002	382.238	4845640.812	832809.452	4839049.401	349245.695
NVA57	43°47'26.28737" N	95°35'35.65066" W	463.557	436.878	4854262.252	774099.907	4851888.249	291356.761
NVA58	43°44'52.89969" N	96°25'54.43625" W	480.116	453.850	4847093.086	706776.657	4849612.983	223690.288
NVA59	43°43'57.52241" N	96°12'45.27866" W	491.343	464.959	4845955.396	724484.248	4847195.940	241274.520
NVA60	43°42'11.06033" N	96°01'56.99742" W	465.267	438.876	4843174.710	739105.032	4843364.358	255657.514
NVA61	43°42'09.72594" N	95°49'58.88953" W	530.662	504.304	4843728.622	755179.900	4842754.248	271729.310
NVA62	43°37'47.26190" N	95°36'42.03314" W	482.361	455.694	4836336.580	773347.120	4834070.775	289310.053
NVA63	43°37'49.24117" N	95°27'17.87141" W	464.094	437.125	4836926.126	785987.710	4833745.883	301954.539
NVA64	43°38'03.94684" N	95°18'53.19352" W	443.649	416.351	4837872.904	797277.660	4833874.569	313276.695
NVA65	43°38'08.30149" N	95°10'28.83702" W	443.581	416.150	4838519.169	808573.688	4833703.224	324581.693
NVA66	43°38'19.08295" N	95°01'19.43641" W	423.883	396.306	4839431.250	820869.206	4833724.584	336900.306
NVA67	43°38'14.51205" N	94°52'15.13939" W	422.868	395.055	4839886.700	833072.845	4833297.538	349092.616
NVA68	43°40'29.32659" N	96°25'53.89374" W	477.857	451.531	4838961.695	707040.851	4841480.421	223365.448
NVA69	43°41'19.28329" N	96°18'43.74663" W	468.276	441.878	4840808.285	716623.155	4842629.803	233059.636
NVA70	43°39'08.23751" N	96°12'27.94544" W	443.274	416.790	4837043.378	725172.718	4838255.668	241316.756
NVA71	43°38'25.31092" N	95°56'06.38689" W	463.609	437.137	4836495.479	747210.192	4836116.842	263258.554
NVA72	43°36'59.91289" N	95°47'38.14930" W	508.745	482.186	4834291.248	758699.745	4833088.908	274557.424
NVA73	43°35'41.53589" N	95°37'49.70220" W	487.361	460.692	4832395.812	771988.158	4830239.816	287670.685
NVA74	43°34'21.09356" N	95°26'04.74861" W	470.938	443.864	4830574.404	787902.379	4827275.962	303404.879
NVA75	43°33'32.84699" N	95°09'17.54116" W	436.510	408.941	4830094.360	810565.247	4825163.482	325958.732
NVA76	43°36'11.76974" N	94°59'40.04058" W	434.213	406.528	4835610.414	823286.223	4829742.947	339033.005
NVA77	43°35'16.78397" N	94°52'27.16037" W	423.285	395.419	4834389.666	833076.318	4827820.545	348699.508
NVA78	43°36'38.85889" N	96°25'55.99022" W	439.045	412.613	4831849.912	707213.978	4834371.767	223024.172
NVA79	43°35'14.10590" N	96°12'40.38368" W	432.663	406.114	4829810.596	725136.825	4831042.910	240758.526

Station Name	Latitude	Longitude	NAVD88	Ellip H	UTM14 Northing	UTM14 Easting	UTM15 Northing	UTM15 Easting
NVA80	43°34'24.03999" N	96°02'00.81811" W	449.691	423.152	4828763.034	739534.789	4828958.832	255045.039
NVA81	43°34'21.52321" N	95°56'00.29073" W	494.503	467.936	4828979.133	747624.697	4828590.660	263129.324
NVA82	43°34'21.57203" N	95°47'40.32350" W	497.458	470.854	4829404.171	758839.667	4828205.446	274344.263
NVA83	43°33'27.61917" N	95°39'32.02239" W	497.287	470.628	4828171.386	769860.050	4826181.353	285244.124
NVA84	43°32'29.39852" N	95°28'01.29793" W	474.241	447.210	4827016.531	785434.551	4823907.157	300688.267
NVA85	43°32'38.23038" N	95°18'14.48279" W	451.561	424.139	4827862.135	798592.718	4823801.685	313865.353
NVA86	43°31'28.88788" N	95°06'30.43659" W	431.450	403.750	4826444.513	814493.871	4821243.084	329610.838
NVA87	43°31'23.10156" N	94°59'40.30776" W	427.540	399.676	4826703.664	823710.031	4820837.456	338813.280
NVA88	43°31'48.91228" N	94°53'19.97938" W	410.236	382.278	4827917.222	832209.416	4821434.397	347369.314
NVA89	43°32'37.99813" N	96°25'56.66166" W	454.971	428.456	4824418.541	707428.630	4826941.190	222701.873
NVA90	43°31'45.39992" N	96°11'42.37334" W	423.005	396.400	4823415.484	726655.137	4824553.667	241811.782
NVA91	43°31'18.78199" N	96°01'13.01244" W	441.958	415.369	4823085.865	740812.096	4823204.179	255909.606
VVAF01	44°07'34.03666" N	96°18'26.87716" W	532.109	506.170	4889406.419	715416.252	4891201.645	235384.559
VVAF02	43°40'26.60227" N	95°10'05.40096" W	448.777	421.394	4842810.496	808901.570	4837956.252	325218.342
VVAF03	44°04'02.37525" N	95°40'00.80404" W	465.260	438.563	4884753.837	766931.854	4882809.004	286423.774
VVAF04	44°00'00.55184" N	95°45'47.50882" W	483.711	457.124	4876984.704	759512.143	4875602.269	278460.595
VVAF05	43°41'44.98075" N	95°28'21.25641" W	452.816	425.936	4844138.857	784257.673	4841061.025	300750.949
VVAF06	43°38'21.86755" N	95°56'14.90768" W	462.373	435.900	4836382.191	747023.195	4836017.365	263063.874
VVAF07	43°34'20.12590" N	95°26'05.82157" W	470.773	443.699	4830543.516	787879.593	4827246.813	303379.937
VVAF08	43°31'45.49639" N	96°11'40.93490" W	420.832	394.227	4823419.550	726687.326	4824555.402	241844.186
VVAF09	43°30'00.27842" N	95°37'25.41168" W	474.296	447.541	4821889.308	772960.778	4819694.314	287882.954
VVAF10	43°52'12.40253" N	96°08'25.60378" W	473.685	447.419	4861421.870	729765.701	4862241.635	247663.786
VVAF11	44°01'16.75239" N	96°19'15.16705" W	524.328	498.257	4877730.751	714721.941	4879604.076	233841.496
VVAF12	43°31'32.27606" N	94°55'07.04510" W	391.209	363.274	4827285.384	829831.173	4820976.178	344954.255
VVANF01	44°09'14.63935" N	96°18'34.00456" W	534.243	508.348	4892505.228	715156.267	4894312.068	235351.158
VVANF02	44°04'50.45586" N	96°03'50.33758" W	559.485	533.315	4885026.024	735076.803	4885399.583	254677.138
VVANF03	44°06'33.23822" N	95°50'37.69426" W	504.272	477.752	4888849.940	752584.638	4887937.969	272416.227
VVANF04	44°03'56.06264" N	95°40'03.19539" W	467.041	440.345	4884556.911	766886.543	4882615.961	286364.264
VVANF05	44°00'30.78445" N	96°18'58.66258" W	523.795	497.710	4876324.441	715135.581	4878170.971	234151.845
VVANF06	43°59'35.90159" N	96°00'50.64073" W	550.370	524.198	4875464.639	739425.407	4875546.759	258318.630
VVANF07	43°59'58.82818" N	95°45'47.87656" W	485.510	458.923	4876931.201	759506.041	4875549.362	278450.622
VVANF08	43°58'42.21033" N	95°32'33.55905" W	436.585	409.750	4875285.939	777296.330	4872616.029	296068.415
VVANF09	43°55'18.83591" N	96°15'53.52436" W	535.860	509.675	4866835.352	719577.496	4868381.475	237893.473
VVANF10	43°55'42.41586" N	95°56'38.36067" W	501.967	475.730	4868466.749	745311.725	4868139.794	263680.789
VVANF11	43°54'54.82093" N	95°46'42.33774" W	494.713	468.204	4867503.896	758659.550	4866210.515	276921.715
VVANF12	43°53'30.04248" N	95°35'55.51702" W	459.369	432.555	4865467.114	773193.861	4863124.982	291265.582
VVANF13	43°51'02.68001" N	96°23'27.87261" W	496.408	470.166	4858604.196	709694.844	4860886.835	227436.298
VVANF14	43°50'58.88596" N	96°08'39.79705" W	469.256	442.971	4859142.706	729527.299	4859985.460	247260.647
VVANF15	43°50'55.09578" N	95°56'40.16016" W	517.834	491.552	4859600.486	745599.647	4859276.484	263324.557

Station Name	Latitude	Longitude	NAVD88	Ellip H	UTM14 Northing	UTM14 Easting	UTM15 Northing	UTM15 Easting
VVANF16	43°50'54.70060" N	95°39'50.49427" W	476.221	449.553	4860460.304	768144.524	4858499.300	285868.220
VVANF17	43°51'45.36319" N	95°28'45.91578" W	443.628	416.668	4862639.273	782917.141	4859600.657	300753.889
VVANF18	43°48'20.33269" N	96°24'06.76907" W	475.495	449.230	4853568.006	708983.786	4855913.559	226361.625
VVANF19	43°48'16.28826" N	96°11'31.59019" W	486.463	460.144	4853994.672	725861.909	4855115.886	243231.079
VVANF20	43°47'24.91557" N	95°55'57.31102" W	513.032	486.790	4853151.233	746797.008	4852757.793	264051.297
VVANF21	43°45'40.21178" N	95°49'28.04014" W	522.563	496.275	4850249.145	755621.336	4849224.672	272641.285
VVANF22	43°47'41.72914" N	95°19'21.32536" W	431.864	404.697	4855671.533	795855.462	4851717.802	313145.960
VVANF23	43°46'31.97020" N	94°59'41.98834" W	423.547	396.069	4854743.956	822317.097	4848878.027	339449.724
VVANF24	43°44'52.80984" N	96°25'54.91043" W	479.592	453.326	4847089.985	706766.137	4849610.650	223679.567
VVANF25	43°43'57.78674" N	96°12'45.28878" W	491.034	464.651	4845963.543	724483.747	4847204.104	241274.610
VVANF26	43°42'10.74476" N	96°01'57.86715" W	465.064	438.673	4843164.277	739085.914	4843355.334	255637.690
VVANF27	43°42'16.81516" N	95°42'47.85605" W	520.634	494.184	4844323.160	764819.102	4842650.084	281384.169
VVANF28	43°41'46.03581" N	95°28'23.35501" W	453.039	426.161	4844169.409	784209.307	4841094.977	300704.943
VVANF29	43°40'27.49173" N	95°09'59.50773" W	447.474	420.091	4842844.045	809032.276	4837980.244	325351.026
VVANF30	43°38'15.45255" N	94°52'11.76231" W	422.016	394.201	4839919.489	833147.075	4833324.848	349168.938
VVANF31	43°41'22.43468" N	96°18'44.39076" W	468.393	441.996	4840905.045	716605.581	4842727.609	233049.102
VVANF32	43°39'04.93683" N	96°11'56.86441" W	437.614	411.128	4836965.023	725872.419	4838126.934	242009.102
VVANF33	43°38'29.75620" N	95°56'04.58886" W	463.798	437.327	4836634.116	747245.410	4836252.563	263303.693
VVANF34	43°35'42.17980" N	95°37'49.20400" W	486.811	460.142	4832416.132	771998.523	4830259.328	287682.485
VVANF35	43°34'20.62758" N	95°26'04.56430" W	470.568	443.494	4830560.205	787907.131	4827261.464	303408.592
VVANF36	43°33'33.20959" N	95°09'16.77572" W	435.122	407.554	4830106.343	810581.903	4825174.223	325976.195
VVANF37	43°36'13.35745" N	94°59'40.52701" W	433.169	405.485	4835658.874	823272.951	4829792.191	339023.276
VVANF38	43°31'49.19577" N	94°53'21.87591" W	409.211	381.254	4827923.862	832166.408	4821444.110	347326.942
VVANF39	43°36'06.78022" N	96°25'58.01871" W	424.590	398.144	4830858.828	707199.111	4833383.932	222937.751
VVANF40	43°31'46.01293" N	96°11'40.63441" W	420.908	394.304	4823435.713	726693.533	4824571.079	241851.544
VVANF41	43°31'18.38679" N	96°01'16.53556" W	441.288	414.700	4823070.838	740733.438	4823194.860	255830.068
VVANF42	43°32'36.25684" N	95°27'55.88904" W	473.764	446.732	4827233.293	785546.942	4824115.143	300815.932
VVANF43	43°32'39.18821" N	95°18'16.68741" W	449.923	422.502	4827889.486	798541.926	4823832.606	313816.698
VVANF44	43°31'21.26213" N	94°59'42.07828" W	426.091	398.227	4826644.994	823673.017	4820781.662	338772.173
VVANF45	44°09'12.56021" N	96°03'50.76716" W	517.644	491.432	4893112.676	734778.529	4893486.961	254968.936
VVANF46	44°08'15.89861" N	95°28'56.66147" W	432.263	405.332	4893191.275	781372.201	4890169.062	301434.393
VVANF47	43°45'41.67620" N	95°09'20.54018" W	442.284	414.956	4852578.265	809454.748	4847650.613	326475.783
VVANF48	43°38'08.18449" N	95°18'54.41141" W	439.415	412.119	4838002.436	797244.557	4834006.068	313253.052
VVANF49	44°09'09.14471" N	95°44'36.13027" W	470.710	444.054	4893973.763	760431.909	4892475.316	280614.487
VVANF50	43°30'52.03290" N	95°51'22.35937" W	473.056	446.400	4822749.037	754103.668	4821910.234	269141.537
VVANF51	43°29'58.66041" N	95°37'24.25225" W	474.598	447.842	4821840.446	772988.845	4819643.575	287907.418
VVANF52	43°47'26.71659" N	95°35'35.95634" W	462.327	435.647	4854275.214	774092.529	4851901.705	291350.344
VVANF53	44°05'46.24616" N	96°24'29.27976" W	513.647	487.673	4885821.895	707466.968	4888204.837	227192.459
VVANF54	43°32'37.57009" N	96°25'55.94737" W	454.762	428.247	4824405.831	707445.068	4826927.322	222717.358

Station Name	Latitude	Longitude	NAVD88	Ellip H	UTM14 Northing	UTM14 Easting	UTM15 Northing	UTM15 Easting
VVANF55	43°37'01.19971" N	95°47'36.84118" W	508.483	481.924	4834332.082	758727.532	4833127.622	274588.082
VVANF56	43°40'12.29677" N	95°02'04.17295" W	438.278	410.764	4842876.295	819699.597	4837241.868	335983.589
VVANF57	43°59'37.46130" N	96°10'29.09959" W	517.735	491.607	4875058.528	726539.089	4876078.692	245435.737