

CALTRANS UPDATE

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CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

INTRODUCTION

EXPERIENCE

- HQ, Office of Land Surveys (2021-Present)
- College of the Canyons (2022-Present)
- Caltrans District 11 (2012 – 2021)
- County of San Bernardino (2007 – 2012)
- City of Redlands (2005 – 2007)
- Coors Brewing Company (1999-2005)
- Klaussner's Furniture (1995-1999)
- Maxwell Transport (1992-1995)

EDUCATION

- Business Administration Degree
- Construction & Engineering Technology



PRESENTATION OUTLINE



- a) CALTRANS OVERVIEW
 - a) Districts
 - b) HQ, Office of Land Surveys
- b) CALTRANS SPATIAL REFERENCE NETWORK (CTSRN)
 - a) Benefits
 - b) Current Status
 - c) Long Term Goals
- c) CALTRANS CONTRIBUTIONS TO THE NSRS
 - a) Five projects submitted to NGS

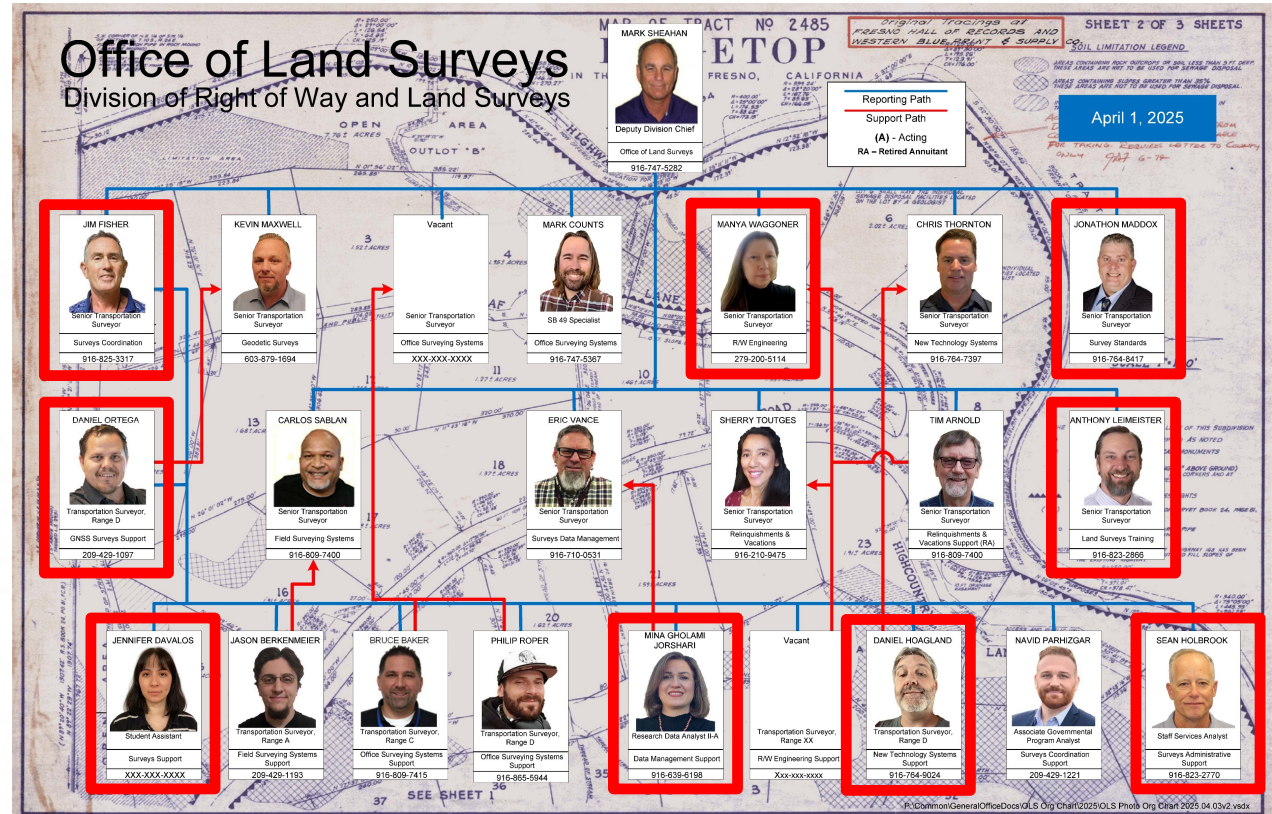
CALTRANS DISTRICTS

The state is divided into twelve (12) districts to maintain the state transportation system



HQ OFFICE OF LAND SURVEYS

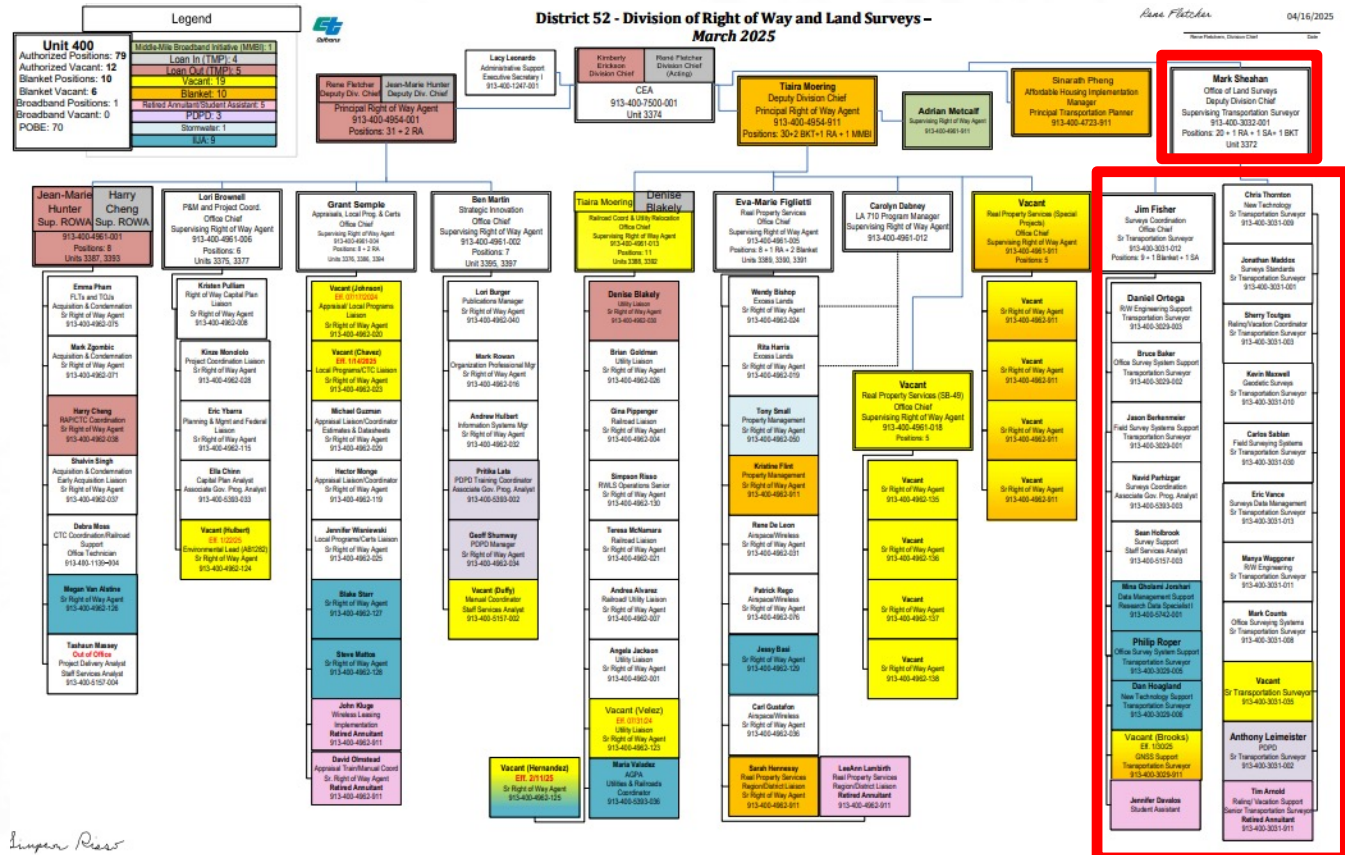
Org Chart



DIVISION OF RIGHT OF WAY & LAND SURVEYS

Org Chart

05/15/2025



CSRC COORDINATING COUNCIL, SPRING 2025

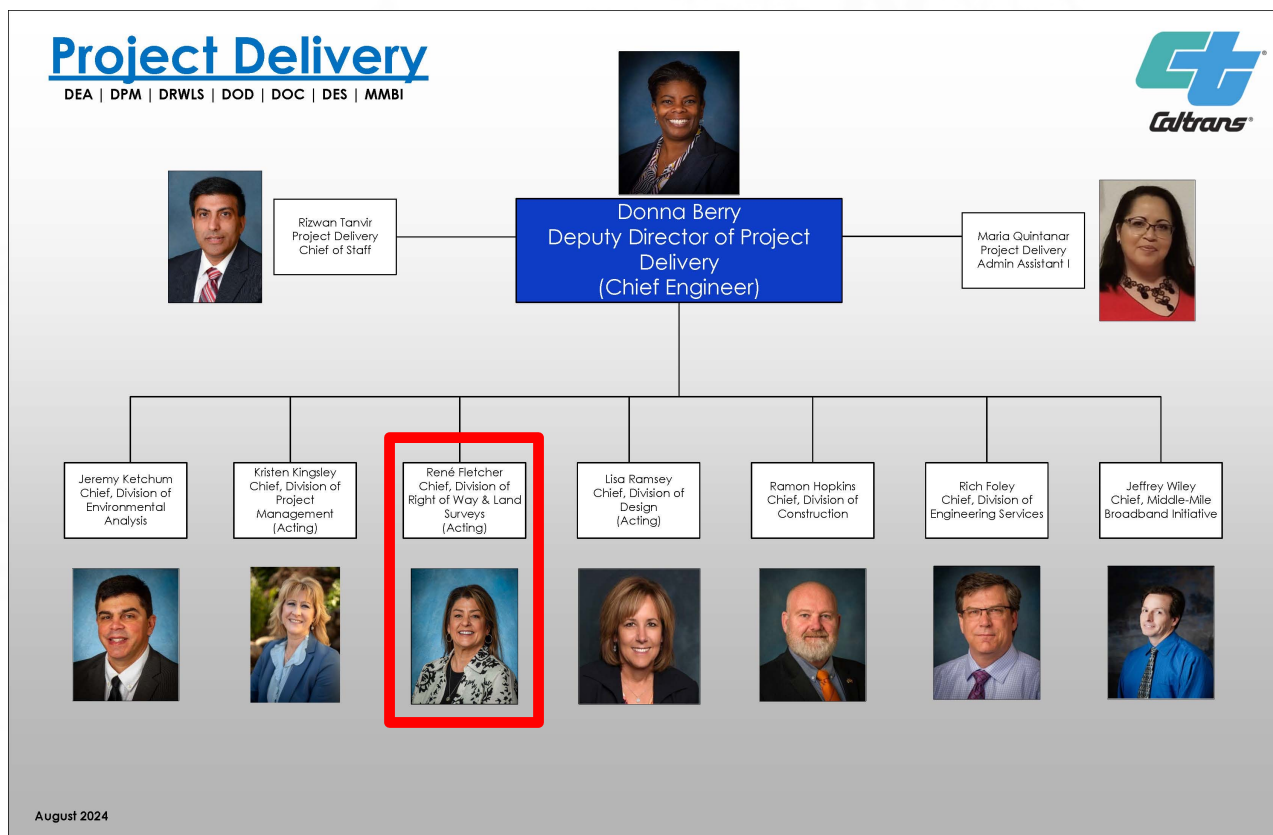


04/16/2025
New Release: Division Chief

PROJECT DELIVERY

Org Chart

05/15/2025



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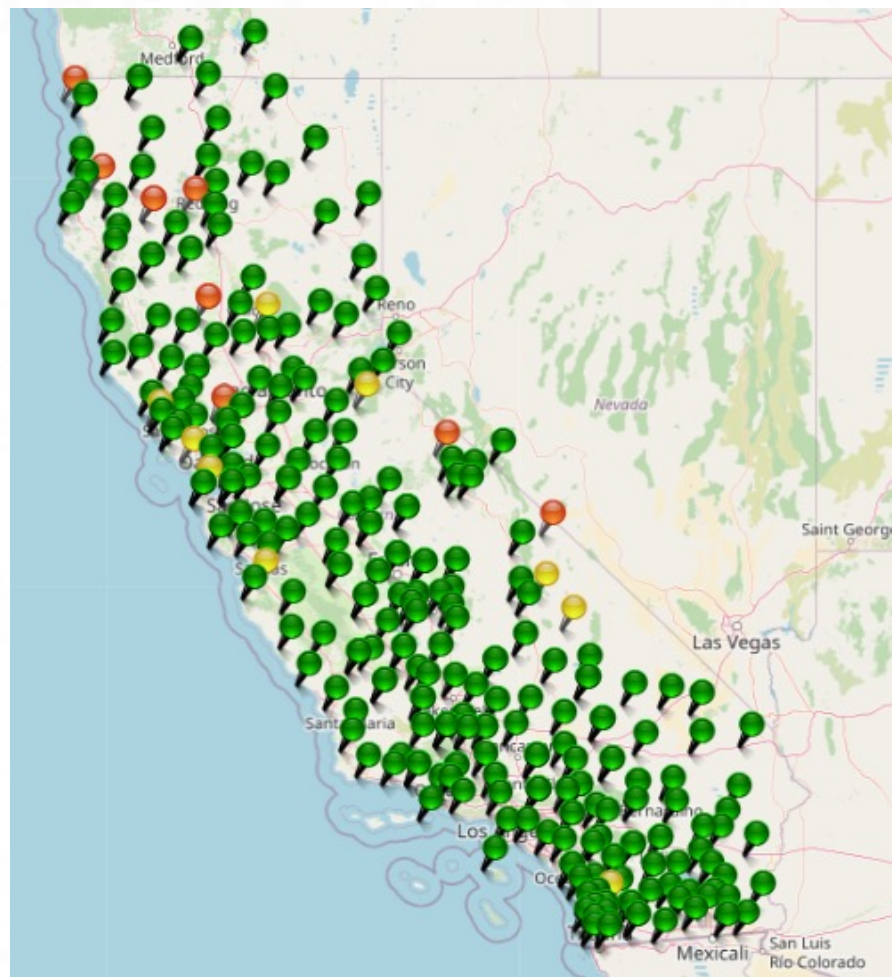
CALTRANS SPATIAL REFERENCE NETWORK (CTSRN)

- a) Statewide Real-Time Positioning Network
 - a) OLS and Division of Construction (DOC) working together to target new station builds
- b) Benefits
 - a) Supports Safety - Caltrans #1 goal
 - b) Improved efficiency – saves on equipment, personnel and time
 - c) Supports connected tools on projects
 - a) AMG, Lidar scanning, drone data captures
 - d) Supports connected vehicles
 - e) Supports Digital As-Builts and Digital Twin data captures
 - f) Supports scientific community
 - a) Disaster response, climate change, etc.

CTSRN SENSOR MAP

General status

05/15/2025

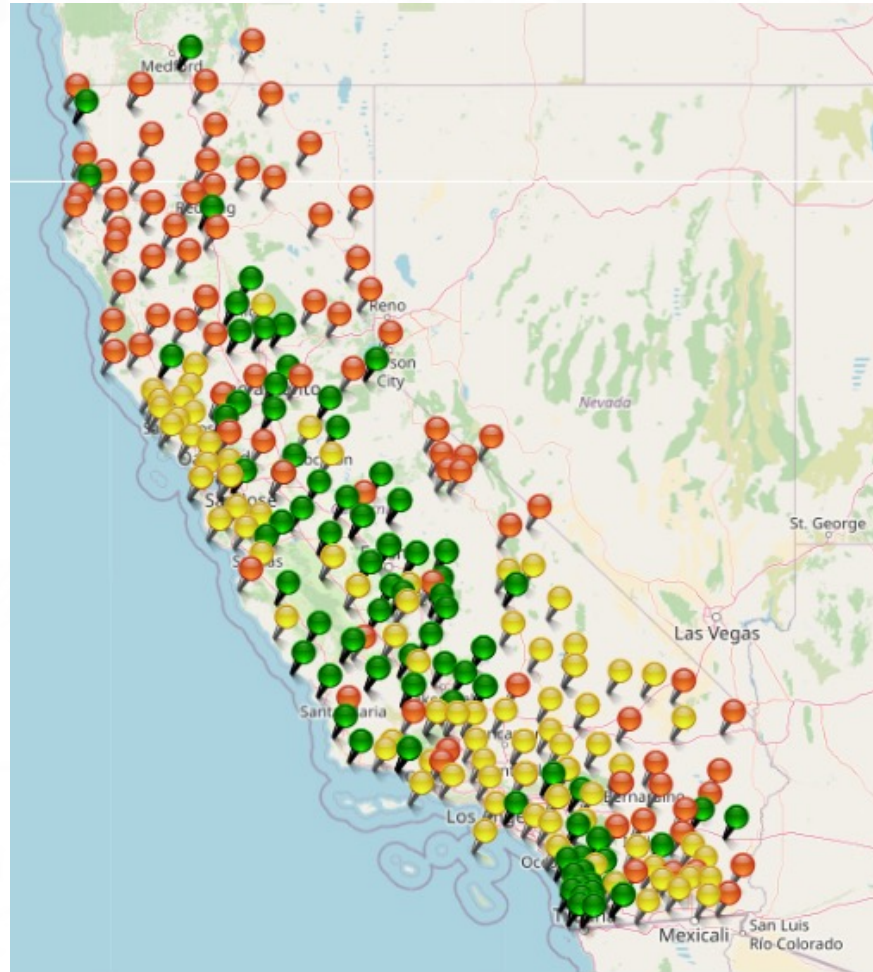


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CTSRN SENSOR MAP

Status when the National Science
Foundations (NSF) Stations (managed
by EarthScope) are offline

This also impacts CRTN



TUNA

Building Mount



05/15/2025

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EIDE

Concrete Pillar



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PTRI

Concrete Pillar



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PDLR

Building Mount

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CHTH

Concrete Pillar

05/15/2025

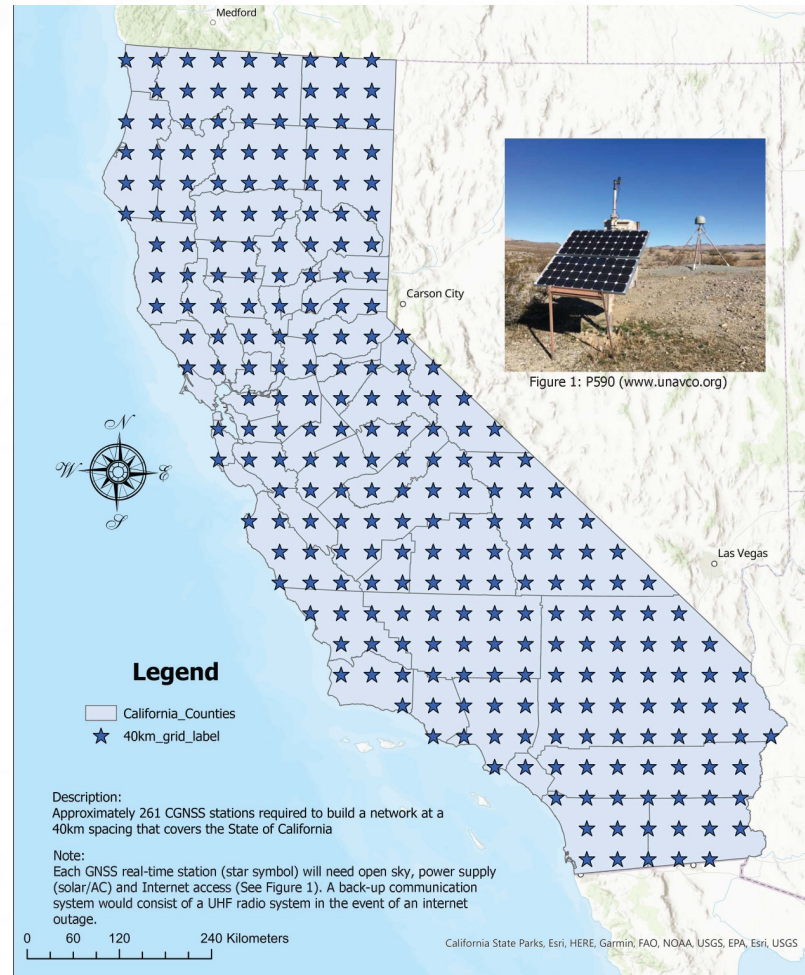


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OUR GOAL

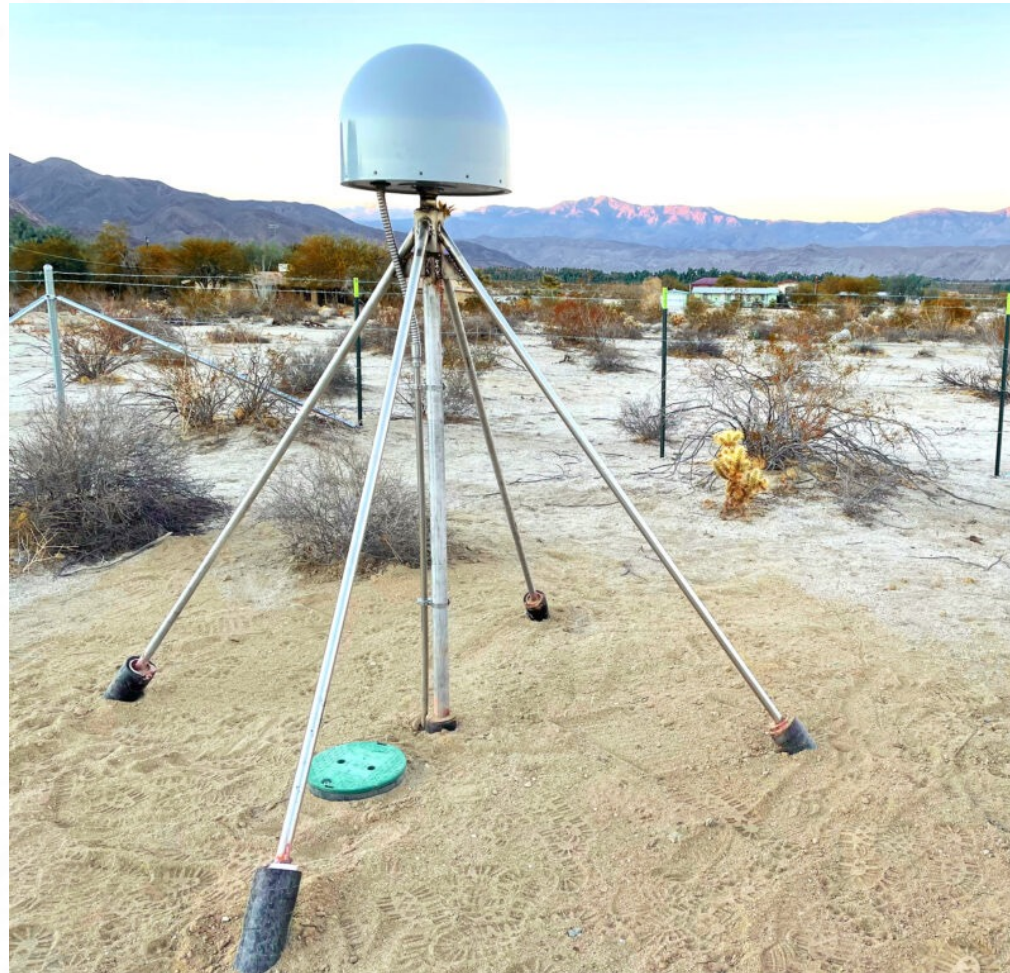
40 Kilometer Spacing of Real-Time cGNSS Stations Statewide

Seeking partnerships with other State, County and Local Agencies to be good stewards of taxpayer dollars



GEODETTIC REFERENCE STATION

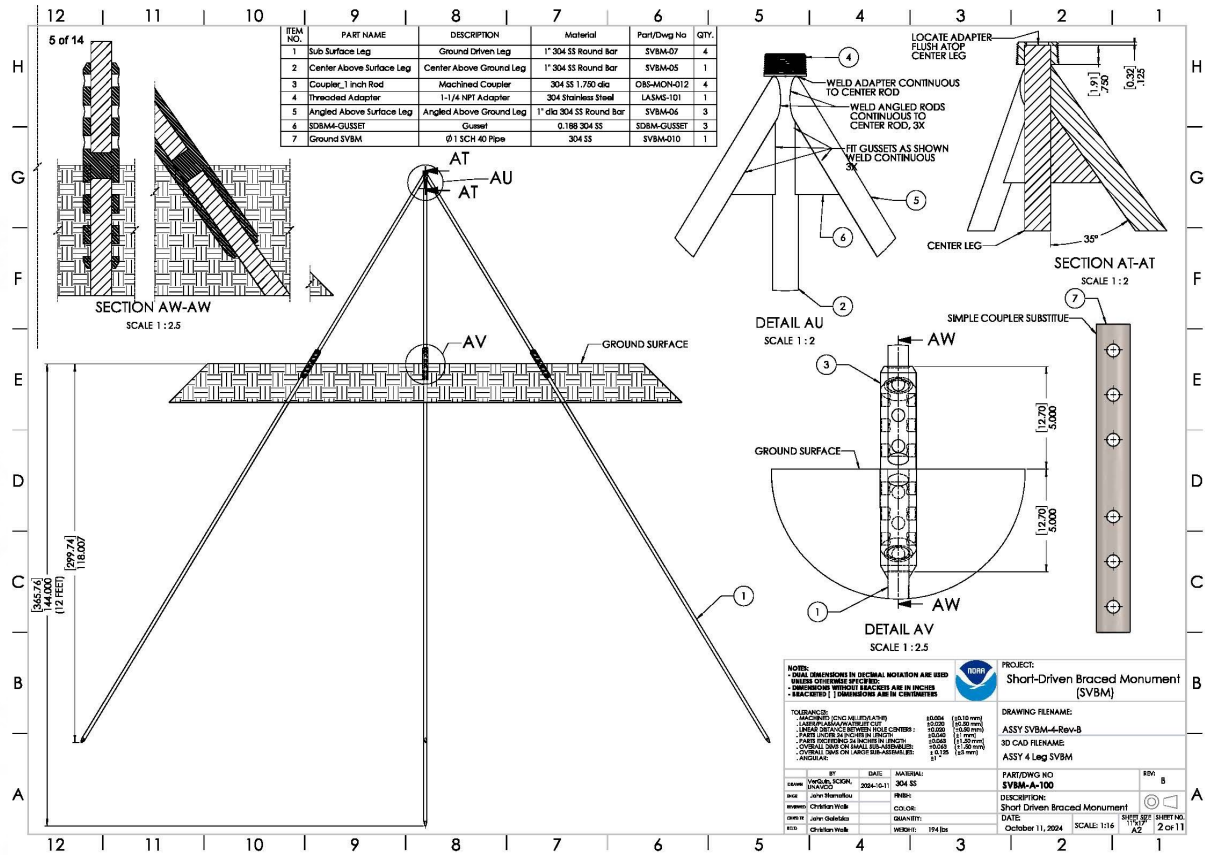
TYPE A2 – SHORT DRIVEN BRACED
MONUMENT



NGS STD & SPECS

Short Driven Braced Monument
(SVBM) Design Drawings

05/15/2025



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GEODETTIC REFERENCE STATION

TYPE A3 – CONCRETE PILLAR

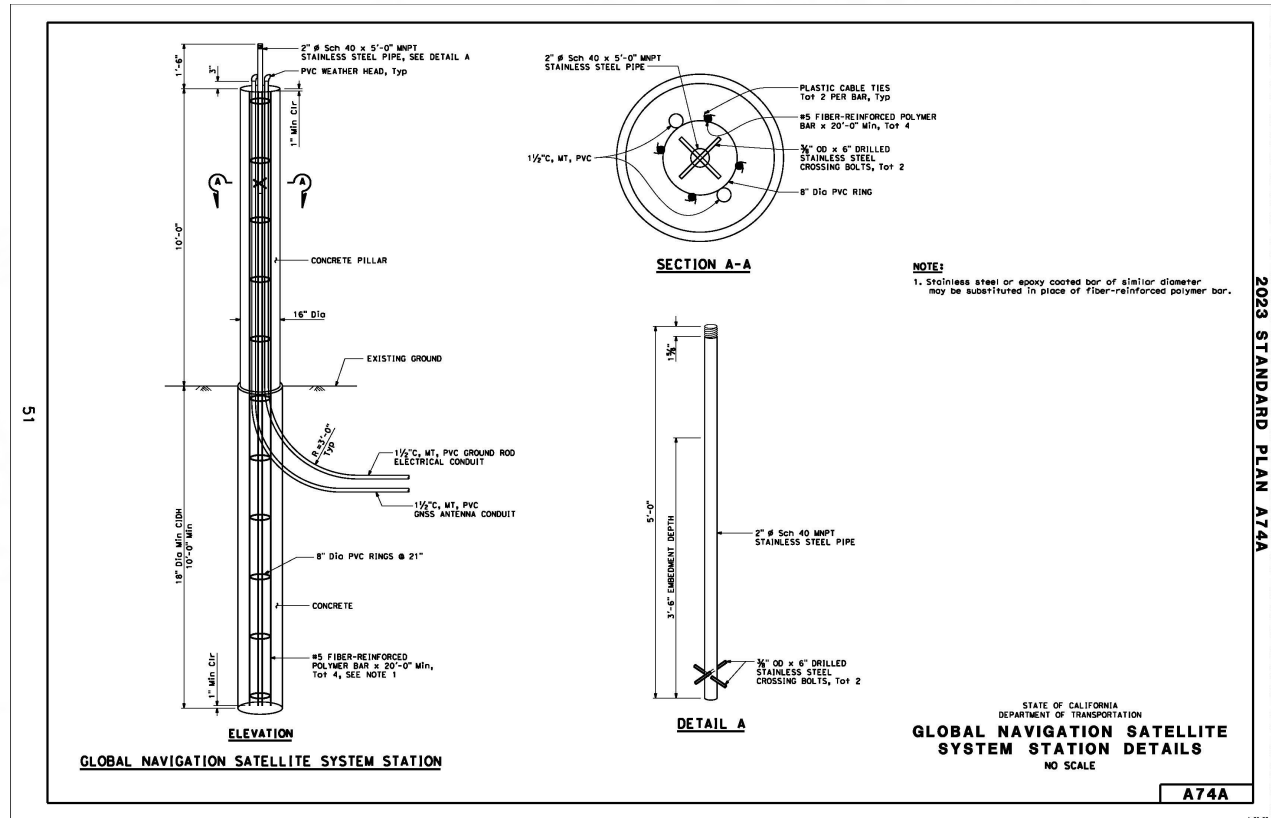
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CALTRANS STD & SPECS

Concrete Pillar Monument



GEODETTIC REFERENCE STATION

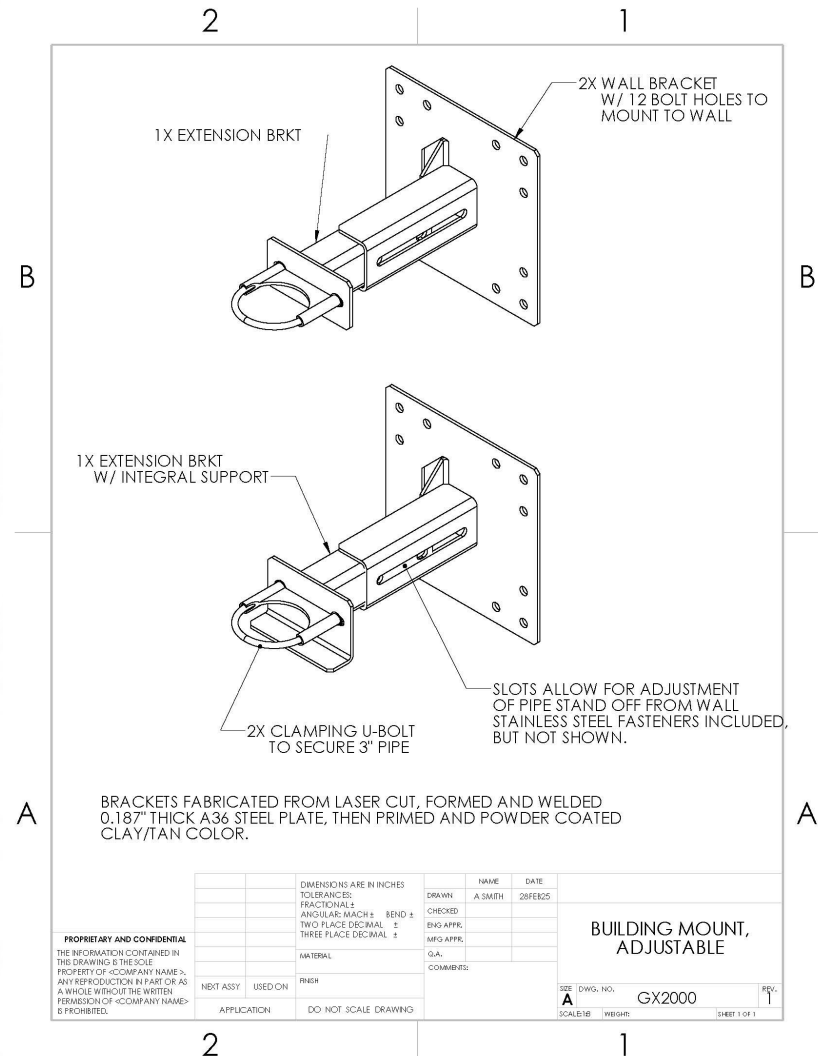
TYPE A4 – BUILDING MOUNT

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JACO MACHINE WORKS DRAWING

Masonry Building Mount



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GEODETC REFERENCE STATION

TYPE B1 – Passive Mark

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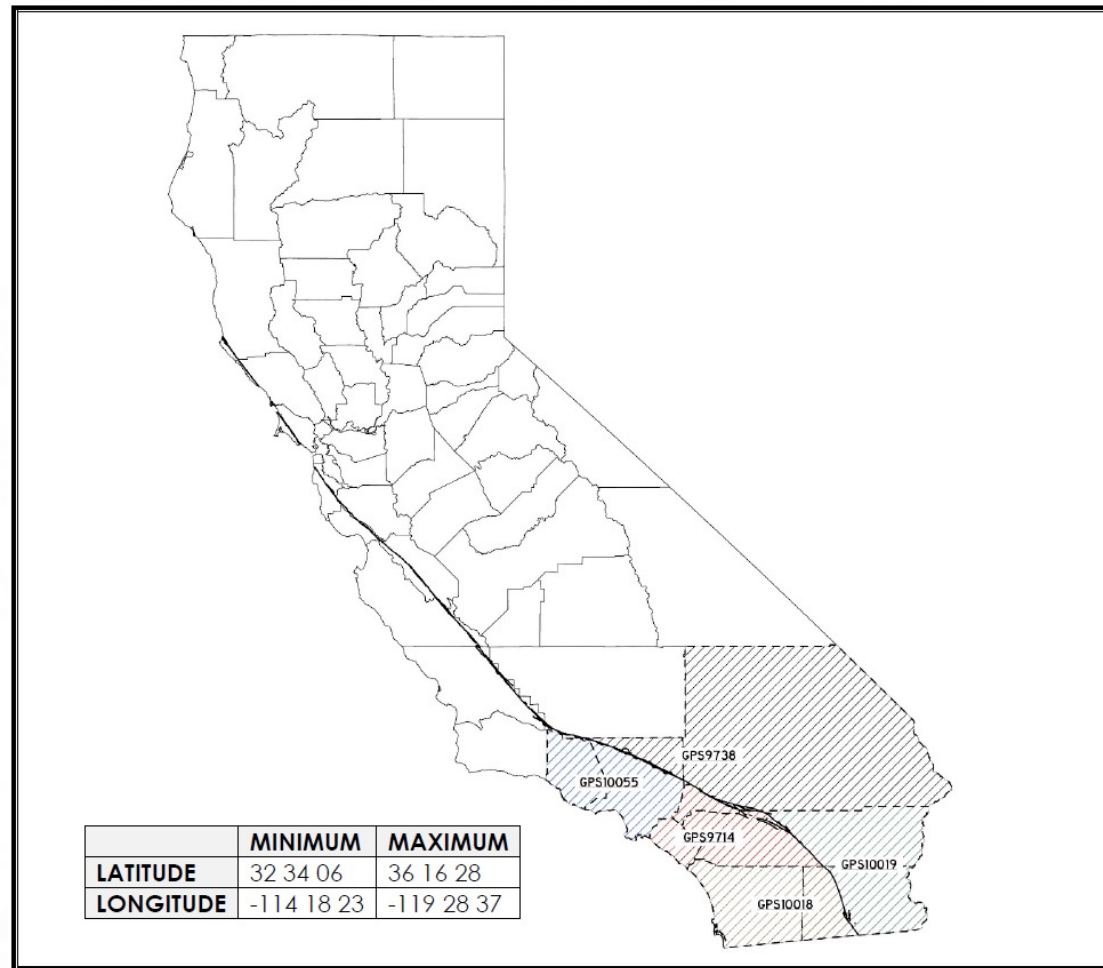
IDYLLWILD NATURE CENTER, 2, 20240328

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CALTRANS PROJECTS SUBMITTED TO NGS

Overview of Project footprint

05/15/2025



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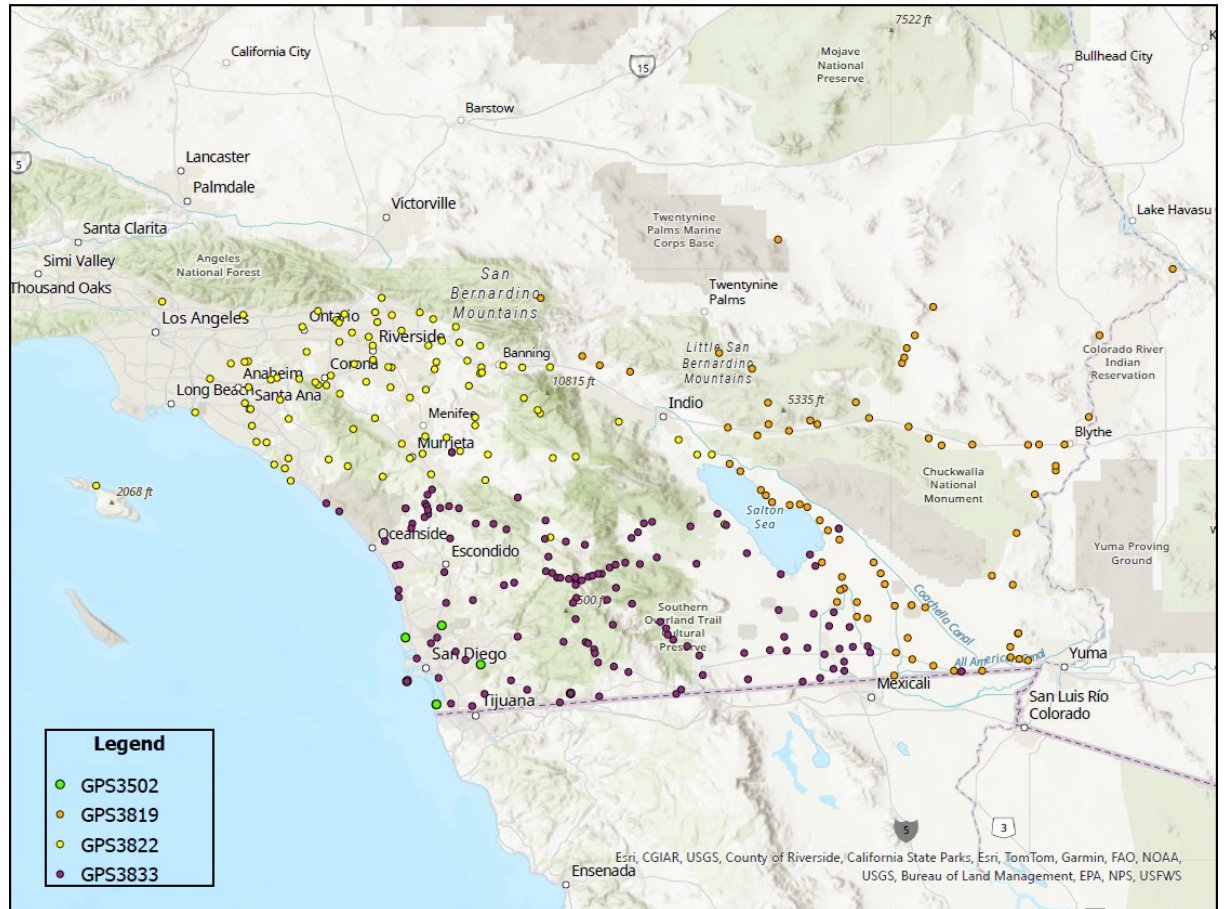
SUMMARY

- 62 National CORS Network Stations were utilized
- 36 New marks will be added to the NGS database
- 192 marks with HD_HELD or SCALED positions will be updated to ADJUSTED
- 24 marks with legacy positions will be updated to current NSRS
- 187 adjusted positions will be updated to match current position

NGS PUBLISHED PROJECTS

GPS3475, GPS3502, GPS3819,
GPS3822, GPS3833

05/15/2025



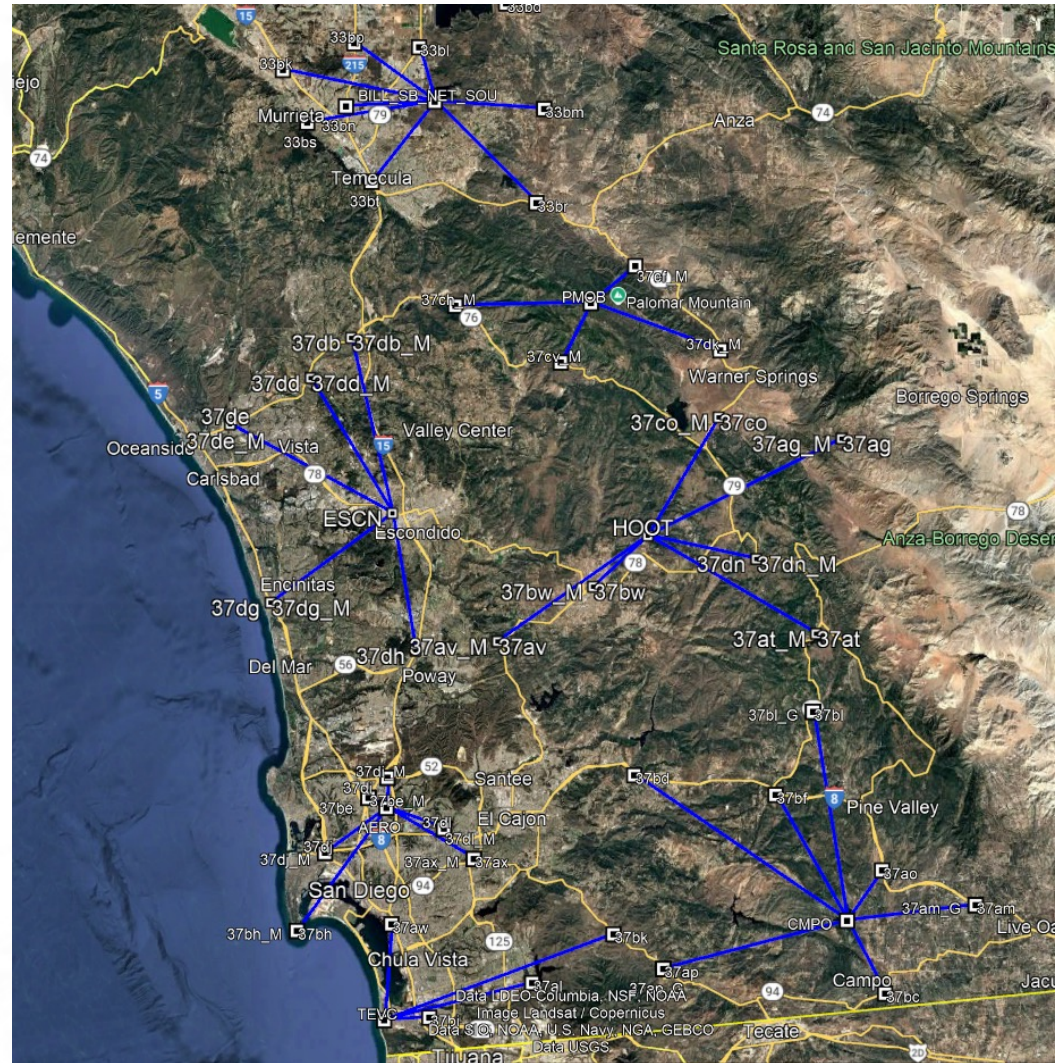
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VALIDATION POINTS

Various Locations

05/15/2025



INDEPENDENT CHECKS

Site Calibration Report for AERO

05/15/2025

	Maximum residual	Root Mean Square residual	Point
Horizontal	0.01 m	0.01 m	37di_G
Vertical	0.00 m	0.00 m	37ax_G
Three-dimensional	0.01 m	0.01 m	37di_G

Point Residuals

Residuals sign: Calculated-Control

GNSS Point		Calculated Point		Grid Point	
Point	37di_G	Point	37di_G	Point	37di
Latitude	N32°50'26.09726"	Northing	575081.12 m	Northing	575081.11 m
Longitude	W117°07'23.29937"	Easting	1918257.91 m	Easting	1918257.91 m
Height	82.79 m	Elevation	117.16 m	Elevation	117.16 m
		Horiz. residual	0.01 m	Type	Horz and Vert
		Vert. residual	0.00 m		
		3D residual	0.01 m		
Point	37ax_G	Point	37ax_G	Point	37ax
Latitude	N32°45'07.89239"	Northing	565196.18 m	Northing	565196.19 m
Longitude	W117°00'37.50576"	Easting	1928739.00 m	Easting	1928738.99 m
Height	97.97 m	Elevation	132.04 m	Elevation	132.04 m
		Horiz. residual	0.01 m	Type	Horz and Vert
		Vert. residual	0.00 m		
		3D residual	0.01 m		
Point	37bh_G	Point	37bh_G	Point	37bh
Latitude	N32°40'20.00562"	Northing	556509.07 m	Northing	556509.07 m
Longitude	W117°14'25.94761"	Easting	1907089.77 m	Easting	1907089.77 m
Height	90.32 m	Elevation	125.80 m	Elevation	125.80 m
		Horiz. residual	0.00 m	Type	Horz and Vert
		Vert. residual	0.00 m		
		3D residual	0.00 m		

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INDEPENDENT CHECKS

Site Calibration Report for CMPO

05/15/2025

	Maximum residual	Root Mean Square residual	Point
Horizontal	0.01 m	0.01 m	37bl_G
Vertical	0.00 m	0.00 m	37ap_G
Three-dimensional	0.01 m	0.01 m	37bl_G

Point Residuals

Residuals sign: Calculated-Control

GNSS Point	Calculated Point	Grid Point
Point 37bl_G Latitude N32°54'52.11797" Longitude W116°34'15.92265" Height 1203.26 m	Point 37bl_G Northing 582980.09 m Easting 1969965.09 m Elevation 1234.73 m Horiz. residual 0.01 m Vert. residual 0.00 m 3D residual 0.01 m	Point 37bl Northing 582980.09 m Easting 1969965.10 m Elevation 1234.73 m Type Horiz and Vert
Point 37am_G Latitude N32°42'13.60922" Longitude W116°21'37.55328" Height 1220.69 m	Point 37am_G Northing 559572.91 m Easting 1989645.60 m Elevation 1252.95 m Horiz. residual 0.01 m Vert. residual 0.00 m 3D residual 0.01 m	Point 37am Northing 559572.91 m Easting 1989645.59 m Elevation 1252.95 m Type Horiz and Vert
Point 37ap_G Latitude N32°37'59.15648" Longitude W116°45'50.50051" Height 348.26 m	Point 37ap_G Northing 551847.67 m Easting 1951763.69 m Elevation 381.44 m Horiz. residual 0.01 m Vert. residual 0.00 m 3D residual 0.01 m	Point 37ap Northing 551847.66 m Easting 1951763.69 m Elevation 381.44 m Type Horiz and Vert

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INDEPENDENT CHECKS

Site Calibration Report for ESCN

	Maximum residual	Root Mean Square residual	Point
Horizontal	0.01 m	0.01 m	37db_M
Vertical	0.03 m	0.02 m	37dg_M
Three-dimensional	0.03 m	0.03 m	37dg_M

Point Residuals

Residuals sign: Calculated-Control

GNSS Point		Calculated Point		Grid Point	
Point	37db_M	Point	37db_M	Point	37db
Latitude	N33°19'12.92491"	Northing	628316.686 m	Northing	628316.678 m
Longitude	W117°10'24.86704"	Easting	1914007.491 m	Easting	1914007.480 m
Height	40.865 m	Elevation	74.150 m	Elevation	74.130 m
		Horiz. residual	0.01 m	Type	Horz and Vert
		Vert. residual	0.02 m		
		3D residual	0.02 m		
Point	37dd_M	Point	37dd_M	Point	37dd
Latitude	N33°16'34.05290"	Northing	623467.310 m	Northing	623467.312 m
Longitude	W117°13'34.82448"	Easting	1909048.837 m	Easting	1909048.834 m
Height	14.437 m	Elevation	48.099 m	Elevation	48.102 m
		Horiz. residual	0.00 m	Type	Horz and Vert
		Vert. residual	0.00 m		
		3D residual	0.00 m		
Point	37de_M	Point	37de_M	Point	37de
Latitude	N33°13'30.51560"	Northing	617910.137 m	Northing	617910.148 m
Longitude	W117°19'53.50688"	Easting	1899191.545 m	Easting	1899191.549 m
Height	-20.433 m	Elevation	13.950 m	Elevation	13.981 m
		Horiz. residual	0.01 m	Type	Horz and Vert
		Vert. residual	-0.03 m		
		3D residual	0.03 m		

INDEPENDENT CHECKS

Point Comparison Report for TEVC

Point Comparison Report

Horizontal search: 1.00 m Horizontal tolerance: 0.02 m
Vertical search: 1.00 m Vertical tolerance: 0.04 m
Selected points: 10 / 10 Point-pairs found: 6

From Point	To Point	Δ Horizontal	Bearing	Δ Northing	Δ Easting	Δ Vertical
37al	37al-M1	0.01 m	N59°25'55.2"E	0.01 m	0.01 m	0.02 m
37al	37al-M2	0.01 m	N38°02'25.6"E	0.01 m	0.01 m	0.02 m
37al-M1	37al-M2	0.01 m	N87°25'44.1"W	0.00 m	-0.01 m	0.00 m
37aw	37aw-M	0.02 m	N70°40'04.3"W	0.01 m	-0.02 m	0.01 m
37bi	37bi-M	0.00 m	N77°29'23.8"W	0.00 m	0.00 m	0.02 m
37bk	37bk-M	0.01 m	N8°03'26.3"E	0.01 m	0.00 m	0.00 m

THANK YOU

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