



Height Modernization Benchmark Survey

December 2007

Revised 7/14/08



Prepared By



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Introduction and Procedures

In an effort to establish consistent elevations on the Texas State University at San Marcos Campus, a height modernization benchmark survey was performed. This height modernization benchmark survey established elevations on 12 new benchmarks and 2 existing benchmarks in reference to the North American Vertical Datum of 1988 (NAVD88).

This height modernization survey utilized existing National Geodetic Survey (NGS) and the City of San Marcos (COSM) monumentation that had published NAVD88 elevations, as the basis of elevation for the height modernization survey. An independent verification of the existing NAVD88 elevations on the known control monuments was performed using static GPS observations and conventional three wire leveling in accordance with height modernization procedures outlined in NOAA Technical Memorandum NOS NGS-58. This independent verification was performed to identify any unknown errors in elevation due to subsidence or disturbance in the local area.

A minor discrepancies on the order of 0.01foot in elevation was found between the NGS and COSM benchmark elevations, which is within the acceptable tolerance for Second Order Class II Leveling.

Following the independent verification of elevations on existing NGS and COSM monumentation, conventional three wire and electronic leveling was performed in accordance with NGS leveling standards for Second Order Class II level loops. A series of nine level loops through the new and existing benchmarks monuments were performed. This level network served as the basis for establishing consistent and reliable elevations on the new TSU benchmarks.

All new benchmarks were monumented using 3 inch aluminum disks that were drilled and epoxied on top of substantial concrete features. The benchmarks are documented on individual monument description sheets, along with a photograph showing the location of each monument, in the following pages.

This report also contains the GPS documents and field notes for independent verification of monumentation using GPS observations and the conventional three wire level loops that document the field work, procedures, and any adjustments made to establish the benchmark elevations.

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Project Number 0181-03-061

BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM-1 GPS

NAVD 88 ELEVATION IN FEET: 629.17

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: 13873333.807
X COORDINATE: 2304928.810

DESCRIPTION: 3" Aluminum disk set in concrete retaining wall inside the maintenance facility yard on Sessom Drive.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM-2

NAVD 88 ELEVATION IN FEET: **735.47**
(Revised 7/14/08)

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete lamp post in center of circle drive in front of student health building.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM-3

NAVD 88 ELEVATION IN FEET: 687.45

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete on top of utility vault at corner of parking lot along Matthews Street .

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM -4

NAVD 88 ELEVATION IN FEET: 730.31

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete lamp post south side of Student Center Drive at Matthews Street.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM -5

NAVD 88 ELEVATION IN FEET: 648.04

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete utility vault northeast of the intersection of Pleasant Street and State Street.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM -6

NAVD 88 ELEVATION IN FEET: 614.10

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete retaining wall near stairs in Parking Lot 15, along State Street.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM -7

NAVD 88 ELEVATION IN FEET: 582.17

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete base of LCRA power pole near Strahan Coliseum, at southeast corner of Aquarena Springs Drive and Charles Austin Drive.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM -8

NAVD 88 ELEVATION IN FEET: 598.15

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete landing of stairs at Butler Hall at northeast corner of Concho Street and N Edward Gray Street.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM -9

NAVD 88 ELEVATION IN FEET: 690.73

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete lamp post in mall area north of northeast corner of the Alkek Library, and west of Campus Police Center.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM -10

NAVD 88 ELEVATION IN FEET: 697.98

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete at northwest corner of utility vault at southeast corner of the intersection of N. Comanche Street and W. Woods Street.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM -11

NAVD 88 ELEVATION IN FEET: 762.93

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in concrete utility vault on the south side of Moore Street at Read Street.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM -12

GPS

NAVD 88 ELEVATION IN FEET: 581.84

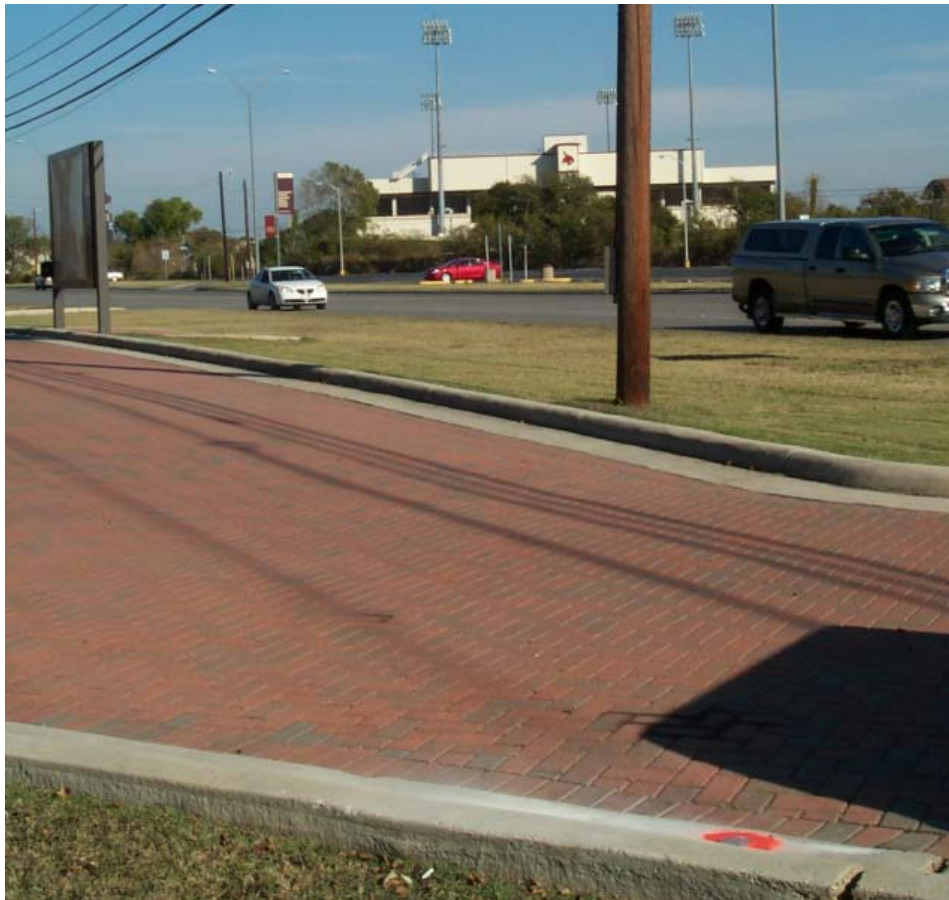
TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.

Y COORDINATE: 13872945.319

X COORDINATE: 2307562.978

DESCRIPTION: 3" Aluminum disk set in concrete curb of turnout for the Campus Directions Sign along Aquarena Springs Drive 650, feet northeast of Charles Austin Drive.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: SWT1

NAVD 88 ELEVATION IN FEET: 767.83

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: 13871968.76
X COORDINATE: 2301498.55

DESCRIPTION: 3" Brass disk set in concrete on north side of Academy Street, 200 feet northwest of Llano Circle. Same as NGS Monument AJ6952

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: BM SWT3

NAVD 88 ELEVATION IN FEET: 581.73

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Brass disk set in concrete 200 feet west of University Drive in grass area, 25 feet south of major sidewalk.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: AX2445

NAVD 88 ELEVATION IN FEET: 572.44

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Brass disk set in northeast concrete bridge abutment on Aquarena Springs Drive at the San Marcos River. This is NGS monument S1307

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: COSM GPS #6

NAVD 88 ELEVATION IN FEET: 581.58

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: 13869170.230
X COORDINATE: 2304809.118

DESCRIPTION: 3" Aluminum disk set in concrete on south side of railroad tracks and north side of Comal street, near covered train depot. This is a City of San Marcos GPS #6 monument and benchmark.

MONUMENT LOCATION PHOTO



BENCHMARK MONUMENT DESCRIPTION

DATE: December 2007
BENCHMARK ID: COSM 37

NAVD 88 ELEVATION IN FEET: 603.29

TEXAS STATE PLANE COORDINATES, SOUTH CENTRAL ZONE, IN FEET.
Y COORDINATE: NONE
X COORDINATE: NONE

DESCRIPTION: 3" Aluminum disk set in traffic island at fork in Alta Vista Road and Ed JL Green Drive. This is a City of San Marcos benchmark.

MONUMENT LOCATION PHOTO

