Fact Sheet No.1

NAD83(CSRS)v7 Epoch 2010

Land Surveys Unit, Geodetic Control

Introduction

The Canadian Spatial Reference System (CSRS) derivation of the North American Datum 1983 (NAD83) was first implemented for Alberta Survey Control Markers (ASCMs) in 1999. Since then, Alberta has undertaken three provincial readjustments of the Alberta Survey Control network culminating in the latest derivation of NAD83(CSRS), NAD83(CSRS)v7 Epoch 2010.

Derivation of NAD83(CSRS)v7 in Canada

At the national level, NAD83(CSRS)v7 Epoch 2010 is based on a conformal 7-parameter transformation from the International Terrestrial Reference Frame of 2014 (ITRF2014). NAD83(CSRS)v7 was released by the Canadian Geodetic Survey (CGS) of Natural Resources Canada in 2019. In conjunction with NAD83(CSRS)v7, a new velocity grid had been released by CGS to account for crustal motion in 3D. Implementation of NAD83(CSRS)v7 Epoch 2010 in Alberta is based on the CGS derivation of NAD83(CSRS)v7 Epoch 2010. For further information on NAD83(CSRS)v7 Epoch 2010 and its derivation in Canada as well as information on the velocity grid, please see https://webapp.geod.nrcan.gc.ca/geod/tools-outils/nad83-docs.php.

Derivation of NAD83(CSRS)v7 in Alberta

NAD83(CSRS)v7 Epoch 2010 coordinate data in Alberta is based on constraining to the 21 Canadian Base Network (CBN) markers in Alberta as well as the Priddis Canadian Active Control System (CACS) station in 3D. The NAD83(CSRS)v7 reference frame is propagated through the Alberta Survey Control network via Global Navigation Satellite System (GNSS) observations, triangulation and trilateration observations, Inertial Survey System (ISS) observations, and spirit levelling observations in various urban and rural areas of Alberta.

NAD83(CSRS)v7 Coordinate data in Alberta

NAD83(CSRS)v7 Epoch 2010 in Alberta is based on the NAD83V7.0.0.AB.1 provincial readjustment completed in August 2020. NAD83V7.0.0.AB.1 is a 3D adjustment of approximately 43,000 ASCMs including those with 3D coordinates, benchmarks, temporary points, and others ASCMs that reside outside of Alberta. Coming out of this adjustment, NAD83(CSRS)v7 Epoch 2010 coordinates are published for 32,970 ASCMs (including destroyed ASCMs). In addition, Canadian Geodetic Vertical Datum 2013 (CGVD2013) elevations have been derived and published for each of the 32,971 ASCMs. For further information on CGVD2013, see Fact Sheet No.5. **NOTE: NAD83 coordinate data currently available on the Spatial Information (SPIN) System at Alberta Land Titles is with respect to NAD83(Original). Please see Fact Sheet No.2 for further information on this legacy data.**

Published NAD83(CSRS)v7 Coordinate Data

An excel format spreadsheet containing the 32,971 ASCMs with published NAD83(CSRS)v7 Epoch 2010 coordinates is available from the Government of Alberta open data portal at https://open.alberta.ca/publications/nad83-csrs-v7_e2010_cgvd2013_data-xlsx. This listing contains detailed information for each ASCM listed. See the spreadsheet for further information. **NOTE: This spreadsheet may be updated from time-to-time. Users are strongly encouraged to regularly**

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check the listing at the noted web address to see if new data has been added.

Coordinate Differences NAD83(Original) vs NAD83(CSRS)v7

The average coordinate difference for the 73 urban cadastral areas (i.e., the former Municipal Integrated Surveying and Mapping (MISAM) areas of Alberta) between NAD83(CSRS)v7 Epoch 2010 and NAD83(Original) is 0.15 m. Within rural areas of Alberta (i.e., everywhere outside of the MISAM areas) the average coordinate difference is 0.31 m. Note that the average coordinate difference does differ throughout Alberta. This is largely due to the quality of observations used to derive coordinates for a particular ASCM as well as the level of integration to higher order networks (i.e., the CBN and the Canadian Active Control Stations). Specifically, the average coordinate difference in Calgary is 0.075 m while in Edmonton it is 0.09 m. More information on these differences is available from Geodetic Control upon request.

Need more information?

This fact sheet is one of a series published by Lands Division, Land Surveys Unit, Geodetic Control. For more information, please visit our web site or contact us at (780) 422-1291.

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