ALBERTA SURVEY CONTROL PRODUCTS MANUAL

Lands Division
Land Dispositions Branch
Geodetic Control Unit

Edmonton
2007

Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

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FAX: (780) 427-1493

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FIGURE

The Lands Dispositions Branch, Surveys & Technical Services Section (referred to as “DOS” in this manual) is within the Lands Division of Alberta Sustainable Resource Development. One of the primary responsibilities of DOS is to establish and maintain – under the authority of the Surveys Act – the survey control component of the provincial spatial referencing system. This component includes a network of several thousand durable markers set permanently in the ground at an appropriate spacing throughout Alberta.

Co-ordinates and other Albert Survey Control Marker (ASCM) attributes are maintained by DOS and are available to the public in the form of specific products. This manual describes three of the products available from DOS: the ASCM identification (ID) card, the ASCM Multiple Listing, and the ASCM Preliminary ID card. These products are generated from the Multipurpose Alberta Survey Control Operations and Tasks (MASCOT) system. The MASCOT system also includes software to support the maintenance, densification and extension of the provincial spatial referencing system.

The ASCM ID card is a one-page product that contains extensive information for a specific marker. Information displayed on the ID card includes the marker’s coordinates, elevation, identifying markings, physical construction, physical condition, location description, condition report comments, and coordinate revision history. ID cards are used by surveyors and other positioning specialists who require an extensive amount of information for an ASCM. An example ID card is shown in Figure 1, with a full description provided in Section 2.

The Multiple Listing is a one page to multiple page product that contains limited information or one or more markers. The Multiple Listing contains two lines of data per marker, for up to 17 markers per page. Markers are listed in ascending order by ASCM number and are grouped by mapsheet. Information displayed on the Multiple Listing includes the marker’s coordinates, elevation, identifying markings, and physical condition. An example Multiple Listing is shown in Figure 2, with a full description provided in Section 3.

The Preliminary ID card is a one page product that contains any preliminary information available for a specific marker. A preliminary ID card will exist for a marker only when:

- the coordinates of a new marker that was recently installed have not been adopted by DOS, or
- the coordinates or elevation (or both) currently published for an existing marker are due to be revised by DOS.

In either case, the information on the Preliminary ID card includes the marker’s physical construction, tablet markings, and location description. In the case of a new marker, this information is important to surveyors performing integrated surveys in the vicinity of the marker. Coordinates or an elevation (or both) are sometimes displayed on the Preliminary ID card: if they are, they are pending approval by DOS. An example Preliminary ID card is shown in Figure 3, with a full description provided in Section 4.

Each of the next three sections begins with an example product. To simplify the product description, each example product has been divided into blocks. Each block is highlighted later in the section and followed by a full description of the block’s contents. NOTE THAT THESE EXAMPLES ARE ONLY MOCK-UPS OF THE ACTUAL PRODUCTS. THEY HAVE BEEN INCLUDED IN THE MANUAL FOR ILLUSTRATION PURPOSES ONLY.

LAND INFORMATION SERVICES DIVISION

Alberta Survey Control Marker (ASCM) Information

ASCM 257030

Horz. Datum **NAD83** Updated: 93-09-03
Latitude 52°17′19.″16301
Longitude 113°48′05.″40456
Horz. Class INTEGRATED , ORDER 2

Vert. Datum CVD28 Updated: 91-05-27
Elevation 884.423 m
Vert. Class INTEGRATED , SPIRIT LEVELS

Marker Installed 64-03

Date Printed 93-09-07
Last Updated 93-09-03

For current information call Geodetic Survey
(403) 427-5824 FAX: (403) 427-1493

Tablet Markings 085220

Mapsheet Name RED DEER
Mapsheet Number 5793 + 016

Marker Condition GOOD 89-02-08

Alberta FORESTRY, LANDS AND WILDLIFE Land Information Services

3TM COORDINATES

Scale Factor	0.999900	at Ref. Mer.	114°
Northing	5794901.393 m		
Easting	13543.364 m		
Convergence	00°09′25.″32		
Station Ellipsoid Factor		0.999864	
Station Combined Factor		0.999767	

GEOID DATA (GSD91) Updated: 93-09-03

Component	Magnitude	Std.Dev.
Meridian Defl'n ξ (+N)	2.″3	2"
Prime Vert. Defl'n η (+E)	3.″9	2"
Geoid-Ellipsoid Separation	-18.06 m	1 m

COORDINATE HISTORY

	HORZ	VERT
Originating Project	70031	70031
Published	70-04-08	70-04-08
Revising Project	82042	88072
Published	84-07-04	91-05-27
Revising Project	NAD83	
Published	93-09-03	
Revising Project		
Published		

NON-COORDINATE REVISIONS

70-04-07 FIRST MARKER LOCATION DESCRIPTION ENTERED

88-10-25 NGDB NUMBER AND NGDB NAME ENTERED

HISTORICAL / OTHER MARKER NAMES

OLD ASC # 57933 16 7 NGDB # 646073
NGDB NAME 85220
HISTORY 57933 16 7

ADJACENT MARKERS (calculated) Updated: 93-09-03

ASCM To	Tablet Markings	Horizontal Distance (m)	Std Dev (cm)	PPM/ Order	Grid/ Grnd Factor	Grid Bearing (° ′ ″)	Std Dev (″)	T-t Corr (″)
41491	793+16.105	179.543	1	86/2	0.999720	298 47 51.83	9.8	0.00
424036	424036	223.171	1	85/2	0.999769	111 14 27.26	9.0	0.00
106096	793+16.110	380.191	1	56/2	0.999811	194 42 40.80	6.8	-0.01
399840	399840	515.104	2	67/2	0.999766	266 37 48.62	6.9	0.00
109942	793+16.7.2	563.104	1	65/2	0.999798	188 52 08.58	6.0	-0.02
279026	793+16.13.3	628.279	1	53/2	0.999777	107 50 13.46	4.4	-0.01

MARKER TYPE Updated: 89-06-07

TSC CAP IN REINFORCED CONCRETE CYLINDER INSIDE MANHOLE WITH REMOVABLE COVER; 10.0 CM BGL; 0.6 M S OF MP.

MARKER LOCATION Updated: 88-07-18

LOCATED ON THE NORTH SIDE OF 67 STREET RIGHT OF WAY SOUTH OF PARSONS CLOSE; IN 67 STREET ROAD ALLOWANCE; 39.9 M SOUTH EAST OF SOUTH EAST CORNER OF LOT 8, BLOCK 1, PLAN 782 2383 (#32 PARSONS CLOSE); 20.1 M SOUTH WEST OF SOUTH EAST CORNER LOT 8; BEHIND #32 PARSONS CLOSE AT CREST OF HILL OVERLOOKING 67 STREET; IN RESERVE.

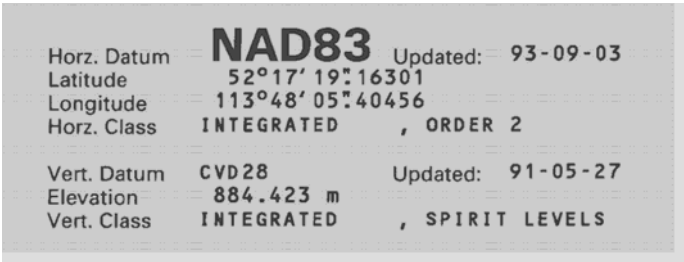
MARKER CONDITION COMMENTS

	Inspected	Updated
MARKER REPORTED IN GOOD CONDITION	88-02-15	88-07-18
MARKER REPORTED IN GOOD CONDITION.	88-11-24	88-12-01
MARKER REPORTED IN GOOD CONDITION.	89-02-08	89-06-07

COORDINATE HISTORY COMMENTS

HORZ 84-07-04 93-09-03	201°12′29"	0.034 m	REV HORZ COORDINATES-MOVEMENT SUSPECTED NAD83 READJUSTMENT
VERT 91-05-27		-0.021 m	REVISED ELEVATION-MOVEMENT SUSPECTED

LISD 36 (Rev. 06/92)



Horz. Datum:
- Identifies the reference system for the horizontal coordinates, gravity field information and the horizontal coordinate history data.
- Based on a specific ellipsoid with a specific origin and orientation with respect to the earth.
- A geocentric GRS80 ellipsoid is the basis of the NAD83 datum. A non-geocentric Clark 1866 ellipsoid is the basis of the NAD27 datum.

Latitude/Longitude:
- The geographic coordinates of the marker.
- Referenced to the surface of the ellipsoid associated with Horz. Datum.
- Displayed in units of degrees, minutes and seconds of arc.

Horz. Class:
- Qualifies both the horizontal integration status and horizontal order of the marker's coordinates.
- The integration status can be either INTEGRATED, UNCLASSIFIED, PROVISIONAL, TRANSFORMED, APPROXIMATE or CONSULT AGENCY (see APPENDIX 1 for an explanation).
- The horizontal ORDER corresponds to the worst-case order determined relative to the nearest 100 (at most) ADJACENT MARKERS that are at least 200m away. The ORDER can be either 1, 2, 3, 4 or U (see APPENDIX 1 for an explanation).

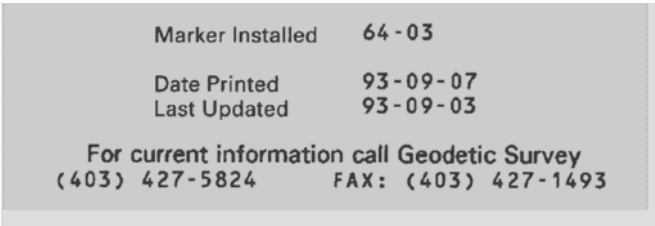
Updated:
- Date the geographic coordinates were adopted by DOS.

Vert. Datum:
- Identifies the reference system for the elevation and vertical coordinate history data.
- Vertical datum is defined by a set of fundamental elevations to which other elevations are referred.
- The 1928 Canadian Vertical Datum (CVD28) is defined by five tidal stations and a benchmark included in the 1928 national vertical adjustment.

Elevation:
- Height of the marker above mean sea level, as defined by the Vert. Datum.
- Also known as "Orthometric Height" or H, where H=h-N (orthometric height is the ellipsoidal height minus geoid-ellipsoid separation).
- Displayed in metres.

Vert. Class:
- Qualifies both the vertical integration status of the marker's elevation and the survey method used to determine the elevation.
- The integration status can be either INTEGRATED, UNCLASSIFIED, APPROXIMATE, PROVISIONAL, or CONSULT AGENCY (see APPENDIX 1 for an explanation).

Updated:
- Date the elevation was adopted by DOS.


Marker Installed 64-03

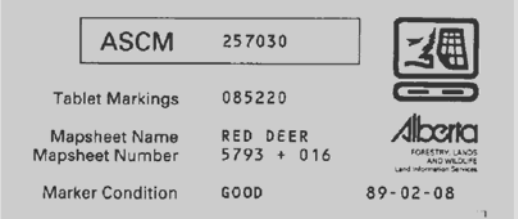
Date Printed 93-09-07
Last Updated 93-09-03

For current information call Geodetic Survey
(403) 427-5824 FAX: (403) 427-1493

Marker Installed: - Year and month the marker was physically installed in the field.

Date Printed: - Date the ID card was printed by the user.

Last Updated:
- Date on which the last update was made to any information on the ID card.
- Last update date for new markers will be the same as the originating project date (see COORDINATE HISTORY).
- For existing markers, the Last Updated date will match the Updated date of the most recent revision to the ID card.



ASCM:

- A random number consisting of two to six digits assigned to the marker by DOS to identify the marker.
- Permanently associated with the marker (even if the marker is destroyed).
- If a new marker is installed in the same location as the destroyed marker it replaces, a new ASCM number will be assigned to the replacement marker.
- May or may not be stamped into the marker's tablet or cap.

Tablet Markings:

- Actual number or marking stamped into the marker's tablet or cap.
- For markers installed after circa 1987, the tablet markings usually reflect the ASCM number. For markers installed before circa 1988, the tablet markings usually reflect the old ASC number (see HISTORICAL/OTHER MARKER NAMES).
- For markers that were not installed under the direction of DOS, the tablet markings usually reflect the identifier adopted by the installing agency (the National Geodetic Data Base – NGDB number assigned by Natural Resource Canada – NRCAN.

Mapsheet Name:

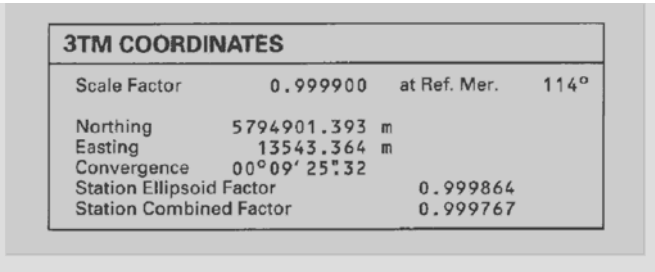
- Identifies the name of the survey control index map(s) that includes the marker.
- For rural index maps, the mapsheet name is consistent with the Canadian National Topographic System (NTS) 1:250 000 map name (GLEICHEN).
- For urban index maps, the mapsheet name includes the name of the surrounding municipality (GRANDE PRAIRIE) or municipalities (BLACK D. – T. VALLEY).
- A series of index maps exists for the cities of Edmonton and Calgary. Each index map in both series is differentiated by an alphabetical identifier (CALGARY A). In cases where a Calgary or Edmonton index map overlaps with an adjacent municipality's index map, markers within the overlap area will appear on both the city and municipality index maps. In these cases, the map name on the ID card is a compound name that refers to the two overlapping urban index maps (CALGARY A/AIRDRIE).

Mapsheet Number:

- Identifies the number of the survey control index map that includes the marker.
- For rural index maps. The mapsheet number is a five-digit number based on both the latitude and longitude of the southeast corner and the mapsheet's three-character NTS 1:250 000 map number (50112 82I).
- For urban index maps, the mapsheet number is the 1:5 000 3TM map number. This number is based on the 3TM northing and easting of the mapsheet's southeast corner (5934 + 028).

Marker Condition

- Last reported physical condition of the marker (GOOD or DESTROYED).
- If a field inspection report or network adjustment indicates an anomaly (damaged tablet or apparent marker instability), the note "SEE BELOW" refers to the latest MARKER CONDITION COMMENTS.
- Unless the marker's current condition is DESTROYED, the date adjacent to the Marker Condition indicates when the marker was last inspected. If the marker's current condition is DESTROYED, the date indicates when the marker was initially reported DESTROYED.



TM COORDINATES:

- Either the Universal Transverse Mercator (UTM) or the 3-degree Transverse Mercator (3TM) map projection is used to publish mapping plane coordinates.
- The UTM projection has a zone width of 6 degrees longitude: the 3TM projection has a zone width of 2 or 4 degrees longitude in rurals area only (in Alberta only). Urban areas are 3 degrees wide.
- Both UTM and 3TM coordinates are available for rural markers (markers included in a rural index map) and urban markers (markers included in an urban index map).

Scale Factor:

- Scale factor along the reference meridian for the specified Transverse Mercator projection.
- The scale factor for the UTM projection is 0.9996; the scale factor for the 3TM projection is 0.9999.

at Ref. Mer.:

- West longitude of the central meridian for the specified Transverse Mercator projection.
- Valid central meridians for the UTM projection are 111 and 117 degrees longitude. Valid central meridians for the 3TM projection are 111, 114, 117 and 120 degrees longitude.
- Displayed in degrees.

Northing:

- North-south mapping plane coordinate.
- Referenced to the equator.
- Derived from the marker's geographic coordinates using the specified Transverse Mercator projection.
- Displayed in metres.

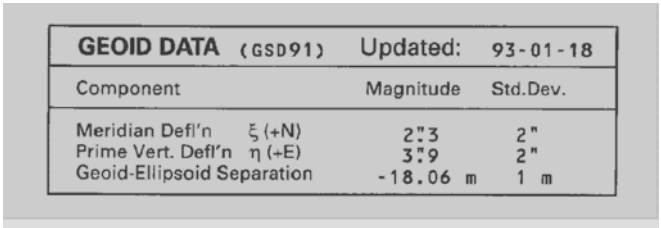
Easting:

- East-west mapping plane coordinate.
- Derived from the marker's geographic coordinates using the specified Transverse Mercator projection.
- For the 3TM projection, the easting of the central meridian is zero; coordinates are positive to the east and negative to the west.
- For the UTM projection, a false easting of 500 000 m is assigned to the central meridian so that all eastings within the specified zone are positive; coordinates increase to the east and decrease to the west.
- Displayed in metres.

Convergence:
- Angle between grid north and geodetic north at the marker.
- This value is added to a grid bearing from the marker to derive an equivalent ellipsoidal azimuth.
- The convergence is positive east of the central meridian and negative west of the central meridian.
- Displayed in units of degrees, minutes and seconds.

Station Ellipsoid Factor:
- Scale factor for reducing measured ground distances to the ellipsoid's surface.
- The scale factor is valid for a limited area around the marker.
- If a distance is measured between two markers that have different scale factors, the mean of the two scale factors can be used as an approximation.
- Note that the Station Ellipsoid Factor should not be used to "scale" the marker's mapping plane coordinates.

Station Combined Factor:
- Scale factor for reducing measured ground distances to the mapping plan.
- The scale factor is valid for a limited area around the marker.
- If a distance is measured between two markers that have different scale factors, the mean of the two scale factors can be used as an approximation.
- Note that the Station Combined Factor should not be used to "Scale" the marker's mapping plane coordinates.



GEOID DATA (GSD91)	Updated: 93-01-18	
Component	Magnitude	Std.Dev.
Meridian Defl'n ξ (+N)	2".3	2"
Prime Vert. Defl'n η (+E)	3".9	2"
Geoid-Ellipsoid Separation	-18.06 m	1 m

GEOID DATA:

- Identifies the mathematical model used to represent the earth's geoid (GSD95)
- The geoid is the equipotential surface of the earth's gravity field that best fits mean sea level.
- The current geoid model (GSD95) is derived from GSD91, new surface gravity measurements and new digital terrain elevation data. The GSD95 model was developed and is distributed by NRCAN, and was made available in January 1996.

Updated:

- Date the GEOID DATA were computed or last updated.
- The date of the update will change only if the geoid model changes, or if there is any change to the marker's geographic coordinates.

Meridian Defl'n:

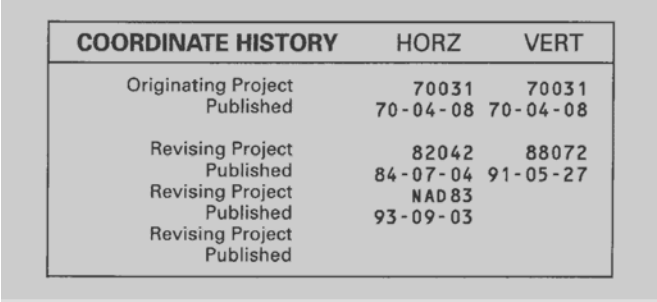
- North-south or meridian component of the deflection of the vertical at the marker.
- The deflection of the vertical is the angle at the earth's surface between the directions of the actual plumb line and an imaginary line perpendicular to the ellipsoid.
- A positive value indicates that the actual plumb line is tilted north from the imaginary line that is perpendicular to the ellipsoid.
- Displayed in seconds of arc.

Prime Vert. Defl'n:

- East-west or prime vertical component of the deflection of the vertical at the marker.
- The deflection of the vertical is the angle at the earth's surface between the directions of the actual plumb line and an imaginary line perpendicular to the ellipsoid.
- A positive value indicates that the actual plumb line is tilted east from the imaginary line that is perpendicular to the ellipsoid.
- Displayed in seconds of arc.

Geoid-Ellipsoid Separation:

- Distance between the ellipsoid and the geoid measured along the actual plumb line.
- Also known as the "geoidal undulation", "geoid separation" or N, where N=h-H (geoidal undulation is ellipsoidal height minus orthometric height).
- The geoid-ellipsoid separation is positive above the ellipsoid and negative below the ellipsoid.
- For GSD95, the accuracy of the relative difference in the geoid-ellipsoid separation for a pair of markers is claimed to be 5 cm over distances of 10 to 30 km. This claimed accuracy deteriorates in mountainous regions.
- Displayed in metres.



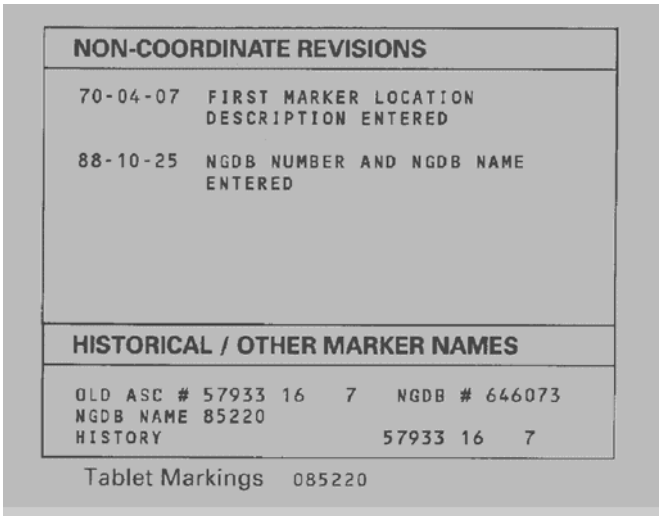
COORDINATE HISTORY	HORZ	VERT
Originating Project	70031	70031
Published	70-04-08	70-04-08
Revising Project	82042	88072
Published	84-07-04	91-05-27
Revising Project	NAD83	
Published	93-09-03	
Revising Project		
Published		

COORDINATE HISTORY:
- Information relating to current and historical attributes of the marker.

Originating Project:
- Identifies the source of the original coordinates or elevation (an adjustment, records conversion, or acceptance of PROVISIONAL coordinates or elevation).
- In most cases, both horizontal and vertical identifiers from the originating project are shown; in these cases, the project identifiers must be the same.
- In some cases, only one of the two originating project identifiers is shown. A blank horizontal (or vertical) originating project identifier indicates that the original coordinates (or elevation) were approximate only.

Published:
- Date the originating (or revised) elevation or coordinates was adopted by DOS.
- All revision project information is sorted in ascending order by the published date.

Revising Project:
- Identifies the source of up to the last three coordinate or elevation revisions.
- If NAD83 is listed as the revising project, the marker's coordinates were revised in the province-wide NAD83 "refresh" readjustment that followed the Western Canada 1993 "Network Maintenance Integration Project" (NMIP93) NAD83 readjustment.



NON-COORDINATES REVISIONS:

- Records the date the marker's location description was adopted, as well as the date and details of the last three non-coordinate revisions.
- Typically, a marker's location description is available to the public the day after it is entered into the database.
- The remaining comments record up to the last three revisions made to any information on the ID card except for geographic coordinates and elevation (tablet markings, installation date, horizontal classification, and NGDB number).

HISTORICAL/OTHER MARKER NAMES:

- Summary of identifiers either previously used or currently associated with the marker.

OLD ASC #:

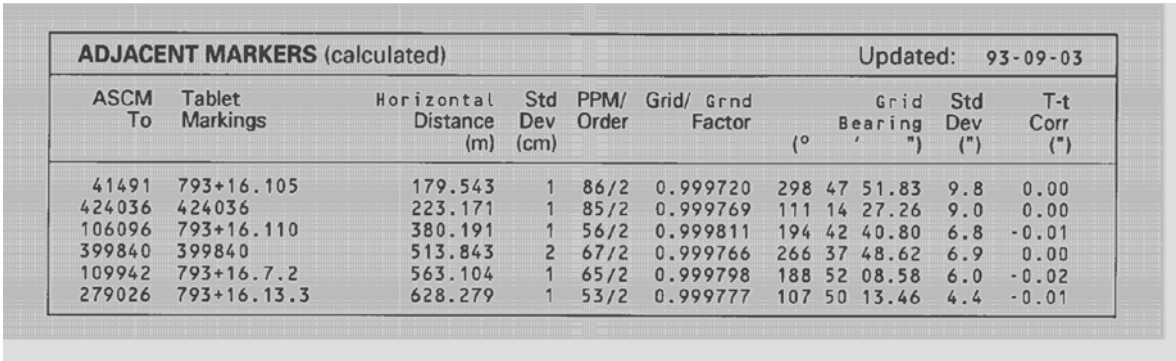
- Alberta Survey Control (ASC) number that was used to identify markers within a specific mapsheet.
- ASC numbers have not been assigned to markers since circa 1988.

NGDB # & NGDB NAME:

- The NGDB number and name associated with the marker.
- The NGDB is maintained by NRCAN.
- Not all ASCMs have an NGDB number or name associated with them.

HISTORY:

- Any other name, number or tablet markings associated with the marker.
- In some cases, these identifiers refer to a destroyed marker that was replaced by the existing ASCM.



ADJACENT MARKERS (calculated) Updated: 93-09-03

ASCM To	Tablet Markings	Horizontal Distance (m)	Std Dev (cm)	PPM/ Order	Grid/ Grnd Factor	Grid Bearing (° ' ")	Std Dev (")	T-t Corr (")
41491	793+16.105	179.543	1	86/2	0.999720	298 47 51.83	9.8	0.00
424036	424036	223.171	1	85/2	0.999769	111 14 27.26	9.0	0.00
106096	793+16.110	380.191	1	56/2	0.999811	194 42 40.80	6.8	-0.01
399840	399840	513.843	2	67/2	0.999766	266 37 48.62	6.9	0.00
109942	793+16.7.2	563.104	1	65/2	0.999798	188 52 08.58	6.0	-0.02
279026	793+16.13.3	628.279	1	53/2	0.999777	107 50 13.46	4.4	-0.01

ADJACENT MARKERS (calculated):

- Lists "connection" to nearby markers. These "connections" are not restricted to historic or current sight lines, and are computed from the published coordinates of the two adjacent markers.
- When possible, up to six sample "connections" from the full-circle horizon are selected. The "connections" are sorted in ascending order of horizontal or slope distance.
- "Connections" to destroyed markers are not listed.

Updated:

- Date the ADJACENT MARKERS (calculated) information was calculated or last updated.
- The update date will change only if: 1) There is any change to the coordinates or elevation of either the originating marker or any adjacent markers; 2) there is a change to the tablet markings of any adjacent marker; 3) any previously adjacent marker is reported as destroyed; or 4) a new "connection" is added to the list.

ASCM To & Tablet Markings:

- Identifies an adjacent marker's ASCM number and tablet marking.

Horizontal or Slope Distance

- Horizontal distance is the distance between the markers that is derived assuming a constant elevation based on the "from" marker.
- Slope distance is the spatial distance between the two markers.
- A Horizontal distance is listed only if the originating marker is included in an urban index map; a Slope distance is listed only if the originating marker is included in a rural index map.
- Displayed in metres.

Std Dev (cm):

- Standard deviation of the calculated Horizontal or Slope distance.
- Displayed in centimetres.

PPM/Order:

- Indicates the precision of the marker's coordinates relative to the listed adjacent marker, based on the dimension of the 95 percent relative confidence ellipse's semi-major axis.
- PPM is the ratio of the dimension to the distance

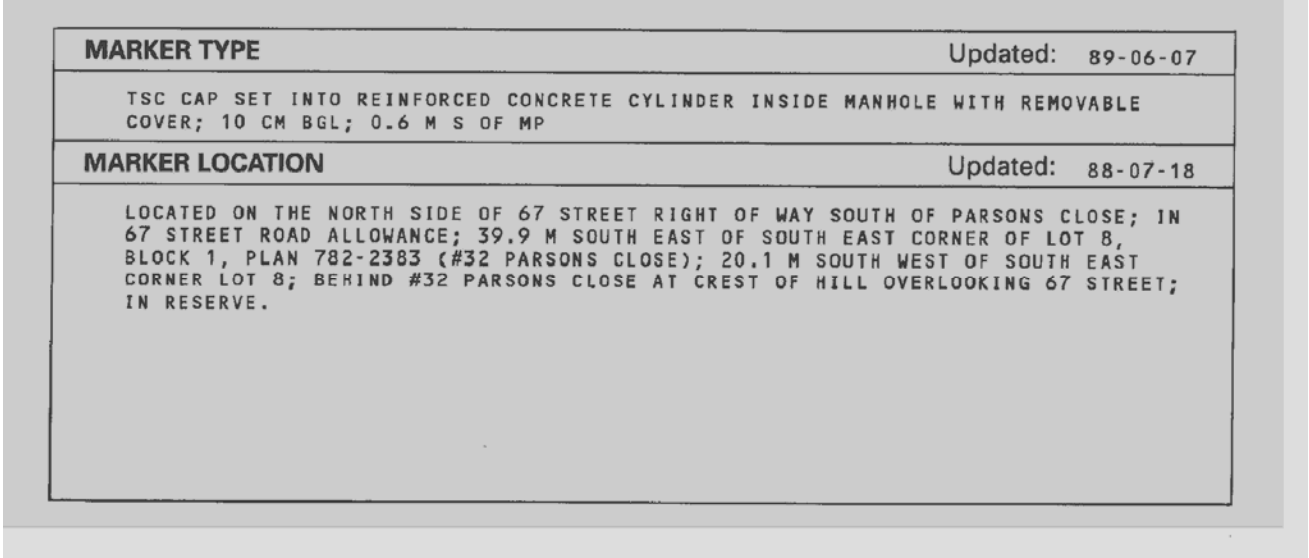
between the two markers, expressed in parts-per-million.
- Order can either be 1, 2, 3 or 4 (see APPENDIX 1 for an explanation).

Grid/Grnd or Grid/Slope Factor:
- Scale factor for reducing the listed Horizontal or Slope distance to the mapping plan.
- A Grid/Grnd factor is listed only if the originating marker is included in an urban index map; a Grid/Slope factor is listed only if the originating marker is included in a rural index map.

Grid Bearing or Astronomic Azimuth:
- Grid bearing is computed directly from the published Transverse Mercator coordinates of the two markers.
- Astronomic Azimuth is computed by adding a set of corrective terms to the calculated ellipsoidal azimuth. The ellipsoidal azimuth is computed directly from the published geographic coordinates of the two markers. The corrective terms account for the deflections of the vertical and the geometry of a geodesic line on the ellipsoid.
- A Grid Bearing is listed only if the originating marker is included in an urban index map; an Astronomic Azimuth is listed only if the originating marker is included in a rural index map.
- Displayed in units of degrees, minutes and seconds of arc.

Std Dev (“)
- Standard deviation of the calculated Grid Bearing or Astronomic Azimuth.
- Displayed in seconds.

T-t Corr:
- Arc-to-chord correction added to the grid bearing (t) to obtain the bearing of the projected geodesic line (T) between the markers.
- This correction is positive if the adjacent marker is north of the “occupied” marker; otherwise the correction is negative.
- The ellipsoidal azimuth to the adjacent marker can be calculated by adding the meridian convergence and the T-t correction to the grid bearing.
- Displayed in seconds of arc.



MARKER TYPE Updated: 89-06-07

TSC CAP SET INTO REINFORCED CONCRETE CYLINDER INSIDE MANHOLE WITH REMOVABLE COVER; 10 CM BGL; 0.6 M S OF MP

MARKER LOCATION Updated: 88-07-18

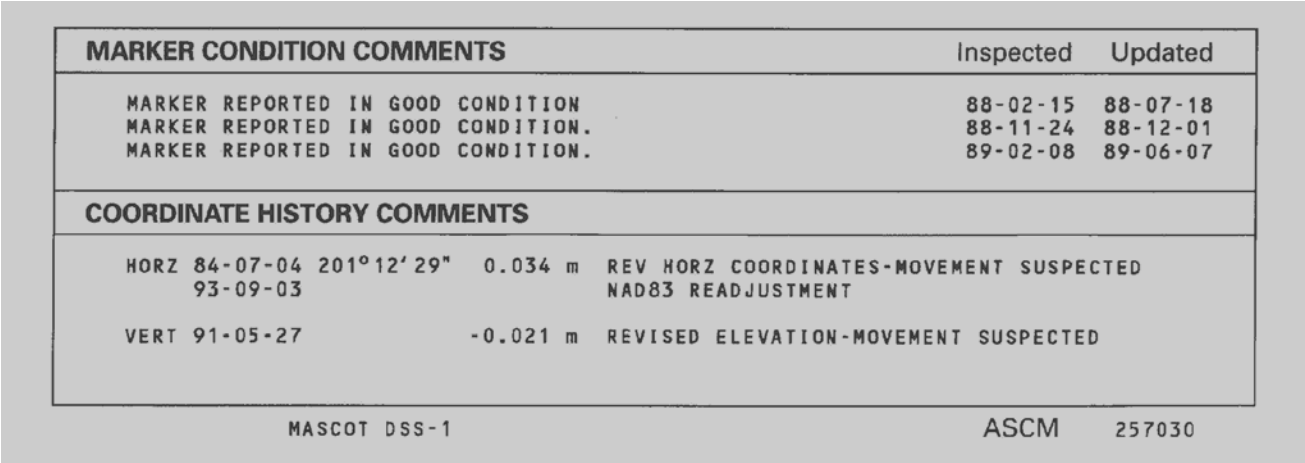
LOCATED ON THE NORTH SIDE OF 67 STREET RIGHT OF WAY SOUTH OF PARSONS CLOSE; IN 67 STREET ROAD ALLOWANCE; 39.9 M SOUTH EAST OF SOUTH EAST CORNER OF LOT 8, BLOCK 1, PLAN 782-2383 (#32 PARSONS CLOSE); 20.1 M SOUTH WEST OF SOUTH EAST CORNER LOT 8; BEHIND #32 PARSONS CLOSE AT CREST OF HILL OVERLOOKING 67 STREET; IN RESERVE.

MARKER TYPE:
- Includes both the physical description of the marker, and an indication of the marker's position with respect to ground level and any nearby marker posts or guard posts.
- The physical description includes the marker's dimensions, material, construction, and the type of tablet installed.
- Abbreviations used in the description are outlined in the *Standards, Specifications and Guidelines for Alberta Survey Control* from DOS.

Updated:
- Date the MARKER TYPE description was last updated.

MARKER LOCATION:
- Description of the marker's location with reference to the township system or a geographic place name, and relative to nearby identifiable features (streets, power poles, sidewalks, fence lines, and hydrants).
- Abbreviations used in the description are outlined in the *Standards, Speculations and Guidelines for Alberta Survey Control* from DOS.

Updated:
- Date the MARKER LOCATION Description was last updated.



MARKER CONDITION COMMENTS	Inspected	Updated
MARKER REPORTED IN GOOD CONDITION	88-02-15	88-07-18
MARKER REPORTED IN GOOD CONDITION.	88-11-24	88-12-01
MARKER REPORTED IN GOOD CONDITION.	89-02-08	89-06-07

COORDINATE HISTORY COMMENTS		
HORZ 84-07-04	201°12'29" 0.034 m	REV HORZ COORDINATES-MOVEMENT SUSPECTED
93-09-03		NAD83 READJUSTMENT
VERT 91-05-27	-0.021 m	REVISED ELEVATION-MOVEMENT SUSPECTED

MASCOT DSS-1 ASCM 257030

MARKER CONDITION COMMENTS:

- Lists the four most recent condition comments.
- In most cases, the condition comments are based on field inspection reports.
- If, during data processing, a marker appears to be unstable, a comment referring to the suspected instability of the marker is added under MARKER CONDITION COMMENTS.
- A marker's condition is downgraded to DESTROYED if it is certified to be "physically lost" after an exhaustive search by an Alberta land surveyor.

Inspected:

- If the comment is based on a field inspection report, the Inspected date is the date the inspection was performed.
- All MARKER CONDITION COMMENTS are sorted in ascending order by the inspection date. The most recent inspection date is repeated next to the current Marker Condition date in the header of the ID card.

Updated:

- Date the associated marker condition comment and inspection date was entered into the database.

COORDINATE HISTORY COMMENTS:

- Lists the last three horizontal coordinate revisions and the last three elevation revisions.
- Each revision is dated; the revision date corresponds to the Published date of the associated revising project.
- Horizontal (or vertical) revisions usually include the direction and magnitude of the shift from the previous coordinates (or evaluation).
- Each revision includes a brief explanation of the nature of the revision (integration or physical movement).

SURVEYING AND MAPPING DIVISION
Alberta Survey Control Marker (ASCM) Information
MASCOT DSS-3

Horz Datum Updated:
Latitude
Longitude
Horz Class , ORDER

Vert Datum CVD28 Updated:
Elevation 853.799 m
Vert Class PENDING ADOPTION , SPIRIT LEVELS

Marker Installed 92-02

Date Printed 93-06-08
Last Updated 93-04-20

For current information call Geodetic Survey
(403) 427-5824 FAX: (403) 427-1493

ASCM 390484
Tablet Markings 123456
Mapsheet Name RED DEER
Mapsheet Number 5793 + 016
Marker Condition GOOD

PROJECT # 92169

FIELD STATUS

Date Proj. Sent To Geod. Sec. 92-12-20
EDM CALIBRATIONS ARE 40 DAYS APART?
SEE MEMOS & NOTES WITH DECISIONS MADE
93-01-04 FIRST MARKER LOCATION
DESCRIPTION ENTERED

DATA PROCESSING STATUS

Date Processing Commenced 93-01-03
Date Edit Finished
Date Elevation Derived 93-04-20
Date Horz Coords Derived

PROJECT COMMENTS

VERT. RE-OBS. REQUESTED 93-01-25

NON-COORDINATE REVISIONS

93-01-04 Tablet Marking & Installation
Date entered via Desc. Editor.

NOTE: See Curr./Hist. Marker Cond. Comm.
FOR PHYSICAL MARKER CONDITION REVISION

MARKER TYPE Updated:

ASC CAP ON 5 CM SQ HEAVY WALL STEEL PIPE 2.4 M LONG WITH HELIX BASE 20 CM BGL; 1.0 M SE OF GP.

MARKER LOCATION Updated:

LOCATED ON W/S OF 100 ST AT 25 AVE SE; 1.0 M WEST OF W EDGE OF BURLINGTON RD; 3.4 M NORTH OF E-W SEC LINE FL PROD E; 12.7 M EAST OF W BDY OF 100 ST FL; 1.5 M SOUTH OF C/L OF 25 AVE PROD W.

MARKER CONDITION COMMENTS Inspected Updated

COORDINATE HISTORY COMMENTS

HORZ

VERT

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* *
* C A U T I O N P R E L I M I N A R Y I N F O R M A T I O N O N L Y *
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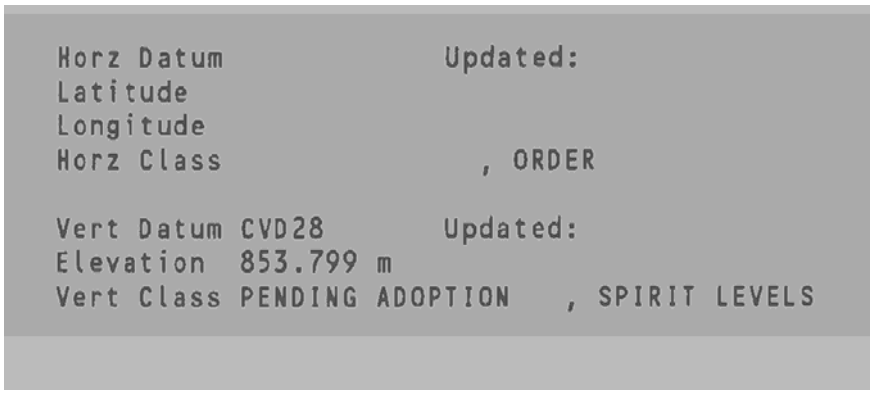


Horz Datum:
- See ID card description (Section 2) for an explanation.
- Will not be printed if the horizontal integration status is “design”.

Latitude/Longitude:
- See ID card description (Section 2) for an explanation.
- Will not be printed if the horizontal integration status is “design”.

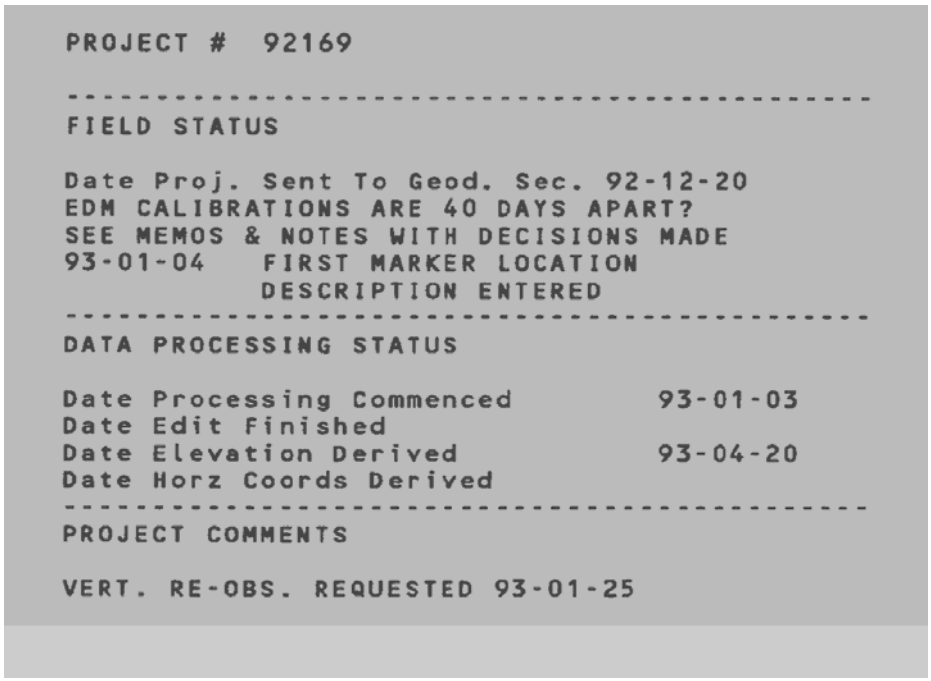
Horz Class:
- If printed, Horz Class identifies the horizontal integration status and the order (see APPENDIX 1 FOR AN EXPLANATION).
- Neither the horizontal integration status nor ORDER will be printed if the integration status is “design”.

Vert Datum:
- See ID card description (Section 2) for an explanation.
- Will not be printed if the vertical integration status is “design”.

Elevation:
- See ID card description (Section 2) for explanation.
- Will not be printed if the vertical integration status is “design”.

Vert Class:
- If printed, Vert Class identifies the vertical integration status for the marker as PENDING ADOPTION and the survey method (see APPENDIX 1 FOR AN EXPLANATION) used to determine the elevation.
- Neither the vertical integration status nor the survey method will be printed if the former is “design”.

Updated:
- See ID card description (Section 2) for an explanation.
- Updated date is always blank for preliminary information.



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PROJECT #  92169

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FIELD STATUS

Date Proj. Sent To Geod. Sec. 92-12-20
EDM CALIBRATIONS ARE 40 DAYS APART?
SEE MEMOS & NOTES WITH DECISIONS MADE
93-01-04   FIRST MARKER LOCATION
           DESCRIPTION ENTERED
-------------------------------------------
DATA PROCESSING STATUS

Date Processing Commenced         93-01-03
Date Edit Finished
Date Elevation Derived            93-04-20
Date Horz Coords Derived
-------------------------------------------
PROJECT COMMENTS

VERT. RE-OBS. REQUESTED 93-01-25
```

PROJECT #: - Identifies the source of the preliminary horizontal and vertical coordinate data.

FIELD STATUS: - Indicates the state of the survey project's network design and the survey field notes or "returns".
- For DOS internal use.

DATA PROCESSING STATUS: - Indicates the state of the adjustment and analysis of the project's survey observations.
- For DOS internal use.

PROJECT COMMENTS: - Summary of any general or "overall" comments recorded for the project.

INTEGRATION STATUS:

- INTEGRATED: coordinates are consistent with the provincial spatial referencing system.
- UNCLASSIFIED: coordinates are final values, but an integration status has not been determined because either it cannot be determined, or it would be of little value (the marker was physically destroyed before the coordinates were published).
- PROVISIONAL: coordinates have been supplied by another agency, or more observations are required; it has not been confirmed whether or not they are consistent with the provincial survey control network.
- TRANSFORMED: coordinates have been transformed from NAD27 to NAD83 using the most current version of the National transformation.
- APPROXIMATE: coordinates are final, but approximate values. If a marker's final horizontal coordinates are APPROXIMATE, then the marker is considered a vertical "benchmark". Vertical benchmark information is not disseminated by DOS.
- CONSULT AGENCY: consult with DOS. Usually is associated with survey control work, performed by an agency other than DOS, that has not been performed to current standards/or specifications. Contact DOS for more information.
- PENDING ADOPTION: coordinates are derived from an adjustment, and will likely be published as final values when they are reviewed and approved by DOS.

HORIZONTAL ORDER:

- Classifies the precision of a marker's horizontal coordinates, relative to the coordinates of either one adjacent marker (in the case of the ADJACENT MARKERS (calculated) information), or a finite number of adjacent markers (in the case of the Horz. Class).
- Based on the dimension of a 95 percent relative confidence ellipse's semi-major axis, as outlined in the *Specifications and Recommendations for Control Surveys and Survey Markers (1978)* by NRCAN. For classification, this dimension (in cm) must not exceed C*(d + 0.20), where d is the distance to the adjacent marker in km, and C is the factor associated with the order class (see the following value-set).
- 1: first order. Dimension is not greater than 2*(d + 0.2).
- 2: second order. Dimension is not greater than 5* (d + 0.2).
- 3: third order. Dimension is not greater than 12*(d + 02).
- 4: fourth order. Dimension is not grater than 30* (d + 0.2).
- U: unclassified. Either the dimension exceeds 30* (d + 0.2), an order cannot be determined (no covariance data exists), or order is irrelevant (the marker was destroyed before the coordinates were adopted).
- An order can be determined for a pair of markers only if covariance information exists for the horizontal coordinates of both markers.

VERTICAL SURVEY METHODS:

- SPIRIT LEVELS: spirit leveling.
- SIMUL TRIG LEV: simultaneous trigonometric leveling.
- NON-SIMUL TRIG: non-simultaneous trigonometric leveling.
- AIR TRIG: airborne trigonometric leveling.
- BAROM LEVELS: barometric leveling
- RADAR ALTI: radar altimetry.
- DOPPLER SAT.: doppler satellite (TRANSIT) observations.
- CONTOURS: elevations are interpolated from a contour map.
- GPS: NAVSTAR Global Positioning System observations.
- ISS: Inertial Survey system.
- SPIRIT/TRIG: relative spirit levels from a TRIG.-derived datum.
- SPIRIT/GPS: relative spirit levels from a GPS-derived datum.
- SPIRIT/ISS: relative spirit levels from an ISS-derived datum.
- CONSULT: consult with DOS. Usually is associated with survey control work, performed by an agency other than DOS that has not been performed to current standards and/or specifications. Contact DOS for more information.

ASC	–	Alberta Survey Control.
ASCM	–	Alberta Survey Control Marker.
C	–	Order class multiplication factor.
Class	–	Classification.
COMB-FAC	–	Combined Factor.
CVD28	–	Canadian Vertical Datum 1928.
D	-	Distance.
Defl'n	–	Deflection.
DSS	–	Data Services Subsystem.
EDM	–	Electronic Distance measurement.
ELL-FAC	–	Ellipsoid Scale Factor.
ELL-SEP	–	Separation between the ellipsoid and the geoid.
GRID/GRND	–	Grid-to-Ground.
GRID/SLOP	–	Grid-to-Slope.
GRS80	–	Geodetic Reference System 1980.
GSD95	–	Geodetic Survey Division 1995 geoid model.
H	–	Orthometric height.
H	–	Ellipsoidal height.
Horz	–	Horizontal.
ID	–	Identification.
MASCOT	–	Multipurpose Alberta Survey Control Operations and Tasks.
N	–	Geoidal undulation.
NAD27	–	North American Datum 1927.
NAD83	–	North American Datum 1983.
NGDB	–	National Geodetic Data Base.
NMIP93	–	Network Maintenance Integration Project 1993.
NTS	–	National Topographic System.
NTVX.X	–	National Transformation Version X.X.
ORD	–	Order.
PPM	–	Parts-per-million.
Ref. Mer	–	Reference Meridian.
Std Dev	–	Standard Deviation.
TM	–	Transverse Mercator.
UTM	–	Universal Transverse Mercator.
3TM	–	3 degree Transverse Mercator.
Vert	–	Vertical.