# Alberta Land Surveyors’ Association

## Manual of Good Practice

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CHAPTER 1
INTRODUCTION
STANDARDS FOR SURVEYS

The Alberta Land Surveyors’ Association is a self-governing profession established pursuant to The Land Surveyors Act, (SA 1981, c. L-4.1).

Implicit in this legislation is the responsibility to establish and maintain standards for various surveys conducted by Alberta land surveyors, in concert with government and other complementary legislation.

The Standards contained herein were adopted in principle by the Council of the Association on March 5, 1987 for the purpose of distribution to the members on a one year trial basis. Following the trial period, and incorporation of modifications which arose as a result of same, a formal adoption process at a General Meeting was proposed.

These Standards are intended to replace all standards existing as at March 5, 1987 relevant to surveys pursuant to the Surveys Act, Land Titles Act, Condominium Property Act, and related regulations. In particular all relevant Instructions Regarding Plans and Good Practice Resolutions (with the exception of GPR 19 - Real Property Reports), have been incorporated. Additionally, it should be noted that the Standards are intended to complement the Surveys Act which was introduced to the Legislature in the Spring of 1987 and proclaimed on June 9, 1988.

Good practice requirements should not be regarded as cast in stone. Alberta land surveyors are requested to provide input to the Association where improvements can be incorporated. Moreover, it is anticipated that changing legislation, improved technology and techniques, and incorporation of standards for other types of surveys will cause this document to be modified on a continuing basis in order to prevent obsolescence.

Standards, specifications and guidelines for Alberta Survey Control, pursuant to Section 8 of the Surveys Act are not included in this document and may be obtained from the Survey Control Branch, Land Information Services Division.

CHAPTER 2
DEFINITIONS

The following definitions are in addition to those given in the Surveys Act, Land Titles Act, Planning Act, etc.

1. "Calculated" data is information derived by computation from sources which may not have been measured in entirety by the Surveyor who displays such information.

2. A "disturbed monument" is one that has somehow been moved other than by an Alberta land surveyor in the course of his duty, and that can be proved beyond reasonable doubt to have been moved from its original position.

3. A "lost monument" is one whose position can be re-established only by its bearing and distance from some other monument or monuments to which it had previously been connected by survey.

4. An "obliterated monument" is one that can be restored with confidence from traces remaining on the ground of the original monument or from other physical evidence of the position of the original monument.

5. To "re-establish" means to determine the position of a lost monument.

6. A "restoration survey" is a survey made to restore the obliterated monuments of a previous survey.
7. A “resurvey” is the survey of a previously surveyed boundary made to effect changes in, or corrections to the previous survey, or to re-establish lost monuments or to place additional monuments on the boundary. A resurvey will always include a retracement of the boundary and often also the restoration of obliterated monuments.

8. A “retracement survey” is a survey of the existing monumentation of a previously surveyed boundary in order to determine the bearings and distances between the monuments.

9. The “right” or “left bank” of a river or stream is that bank which is on the right or left side of the bed as the case may be when the observer is looking downstream.


11. The “azimuth” of a point B from another point A is the angle formed by the vertical plane containing A and B with the plane of the astronomical meridian passing through A, such angle being reckoned from north, around through east, south and west, to 360°, east being 90°, south 180°, west 270° and north 360° or 0°. It follows that, except in the case of a meridian or the equator, the azimuth of a straight line changes as the initial point moves along the line and that a direction is not defined by an azimuth unless the initial point is specified or implied.

12. The “bearing” of a point B from another point A is the angle formed by the vertical plane containing A and B with the plane of a fixed astronomical meridian, which may or may not be the astronomical meridian passing through A, such angle being reckoned like the azimuth from north around through east, south and west, to 360°. It follows that a straight line has the same bearing at all its points, but except in the case of a meridian or the equator, a direction is not defined by a bearing unless the meridian to which the bearing is referred is specified or implied.

CHAPTER 3
MEASUREMENTS AND ACCURACIES

New Surveys

1. The minimum accuracy for surveys under the Surveys Act shall be such that the error shall not exceed the greater of 1:7500 or 0.02 m in the surveyor’s own work.

Prior Surveys

2. When closing on work performed by other surveyors, an error of closure not exceeding 1:5000 is adequate. If such accuracy is not obtained the survey shall be re-measured, or verified in an independent manner.

Checking Work

3. All surveys pursuant to the Surveys Act shall be verified in some manner, i.e. by closure on prior or current work, by a closing traverse, by closing on existing Alberta Survey Control, or by check measuring all observations, etc.

CHAPTER 4
BOUNDARIES & MONUMENTATION

Recommended Monuments

1. In the event that it is not practical to place a statutory iron post at a property corner the following shall be used.

- Lead Plug 'with tack' In Drill Hole - for rock or concrete conditions.
- Concrete Nail 'with washer' - for asphalt conditions.
- 2 cm Diameter, Round Solid Steel Bar - for gravel conditions, length to suit circumstances.
- Reference Monuments - may be used at an offset location if the actual corner is inaccessible or impractical to monument, but must not create confusion or ambiguity.
- Other Monuments - may be used if the above are impractical, at the surveyor’s discretion.
2. Prior to June 9, 1988, good practice required that 1.25 cm square by 45 cm long iron bars be placed at lot corners on subdivision surveys, except for those lot corners on curved block limits and block outline corners. With passage into law of the Surveys Act on June 9, 1988 the practice will be monumentation (statutory iron posts) at all property corners. Therefore, surveyors should refrain from using such iron bars, particularly where confusion could result in areas surveyed prior to June 9, 1988.

3. Brass caps are used primarily in this province on surveys pursuant to C.L.S. standards, (under instructions from the Surveyor General, i.e. Indian Reserves, National Parks) or pursuant to instructions from the Director of Surveys in relation to initial subdivisions of Provincial Lands.

4. Where practical, iron posts should be referenced by a marker post placed 0.3 m distant therefrom and the direction noted thereon.

(a) Marker posts should not be placed where they may constitute a hazard to the public or interfere in the normal use of land. In general, marker posts should not be placed in developed urban areas.

(b) Marker posts placed along road or right-of-way surveys should be situated on adjacent fence lines whenever possible.

(c) For surveys in unsurveyed territory pursuant to the Survey Regulations, bearing trees and/or marker posts are required.

(d) Where a marker post is placed other than 0.3 m distant from a monument, both the distance and direction of the marker post from the monument shall be noted on the plan.

5. Part III of the Surveys Act requires that all new boundaries be monumented at every deflection and point of curvature, with some exceptions, in addition to intersections with existing surveyed lines. For further detail refer to subsequent sections dealing with specific types of surveys.

6. Monuments shall be countersunk in areas where they interfere with farming or grading operations and a note placed on the plan to that effect.

7. All surveyed boundaries, other than natural boundaries shall be comprised of either straight lines or circular curve segments.

8. When establishing a boundary of an unposted railway right-of-way, the central line of which is shown on the official plan to be a spiralled curve, each spiral shall be replaced with a circular curve in accordance with Schedule A.

9. Statutory iron posts placed shall be marked with the Survey Corporation or Partnership permit number or the registration number of individual surveyors not affiliated with a surveyor's partnership or limited company.

CHAPTER 5
RETRACEMENTS AND RESTORATIONS

1. When undertaking any survey involving property boundaries, thorough research of all available pertinent sources of documentation is mandatory. Sources of documentation are, but are not limited to, the following:
   - Land Titles Office registered or filed plans
   - Land Titles Office certificates of title
   - Land Titles Office registered documents
   - Surveyor's own files and field notes
   - Fellow surveyor's files and field notes when known to exist and the survey has not been publicly recorded
   - Director of Surveys plans and original survey notes
   - Director of Surveys control marker data
   - E.R.C.B. respecting well site plans and licensed pipelines
   - Public Lands Branch for crown dispositions
   - Surface Rights Board

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2. When an Alberta land surveyor is employed to retrace original or existing surveyed property boundaries, it is essential that a thorough field investigation be made to unearth evidence as to the position of the boundaries as originally surveyed. The hierarchy of evidence regarding boundaries is:
- natural boundaries, or evidence of same,
- original monuments or traces of same,
- fences or evidence of possession reasonably dating back to the original survey,
- measurements as shown on plans of previous surveys.

3. Prior to February 16, 1912 it was mandatory that all lot and block corners on subdivision surveys be monumented. Therefore when retracing lot boundaries originally created prior to February 16, 1912 and subsequent of June 9, 1988 it is essential to search for original monuments at all corners.

In the period February 16, 1912 to June 9, 1988 posting was required only for block outlines, deflections, and those lot corners which fell on a curvilinear block boundary. Therefore, when a surveyor is employed to re-establish a lost monument at a lot corner within a plan originally surveyed between February 16, 1912 and June 9, 1988 except for corners on curvilinear boundaries, the positions of the property lines are governed by the plan dimensions in relation to the block corners. This concept will generally entail proportioning from the original block corner monuments, or from the re-established positions thereof.

In the case of a lost monument at a lot corner situated on a curved block boundary the nearest undisputed points on the curve on either side of the lost corner shall be used, in conjunction with proportioning. Generally the curve radius indicated on the registered plan will be maintained.

Although many subdivision plans surveyed in the period 1912 to 1988 will indicate that some form of monument was placed by the surveyor at all lot corners, only those placed on the block limits or at lot corners on curvilinear boundaries should be considered as governing monuments. The former monuments, however, may be useful to the surveyor as evidence as to lost block corner position.

The definition of “block” in the 1912-1988 period is problematic, since no generally accepted definition exists. However, it is common practice to accept the definition which may be illustrated on the subdivision plan in question through the use of lot and/or block numbers, whether surrounded by streets or not. Failing clear definition on the plan, the parcel titles may distinguish between lots and blocks.

The Surveys Act (1912-1988) required posting of “corners”, “angles”, and “beginning and end of curves” on block boundaries.

The Surveys Act passed on June 9, 1988 requires the posting of all lot and block corners on subdivision surveys, therefore, when retracing lot boundaries created prior to February 16, 1912 and after June 9, 1988, it is essential to search for monuments at all lot corners.

Section 14 of the Surveys Act empowers Alberta land surveyors to examine witnesses under oath in relation to determining the true and original position of survey monuments which have been destroyed. Such evidence should not be overlooked in the course of retracement surveys since appropriate testimony from a reliable witness having first hand knowledge may constitute the best evidence available. The evidence should be transcribed in writing and signed under oath by the witness.

At the present time co-ordinates of property corners in relation to the Alberta Survey Control System do not constitute governing evidence. Ties to Alberta Survey Control Markers however, may be useful evidence of original monument locations and are deemed to be measurements in the hierarchy of evidence.
6. Positional conflicts arising from plan dimensions, monuments on the ground, or other sources are not uncommon in conducting retracement surveys. It is the responsibility of the Alberta land surveyor to discharge his duty in an unbiased manner in resolving such conflicts. The surveyor should consider the following in resolving such conflicts.

- property lines established on a registered subdivision or original township, survey plan cannot be altered by subsequent plans, although resubdivision can be used to effect new boundaries between consenting owners.
- property lines shown on registered plans which are obviously in conflict with prior established boundaries will not effect change to the prior boundary position.
- given ambiguity or conflict within a single plan, the "intent" of the original survey should be considered as a guide to the surveyor in effecting re-establishment.
- the advice of the Director of Surveys, experienced surveyors, or the original surveyor should be sought in severe cases.

If a boundary conflict cannot be resolved by the surveyor, it may be necessary to involve the Boundary Adjudication Board pursuant to Section 9 of the Surveys Act or the Courts. In this event, the surveyor would assume the role of expert witness.

7. For the purpose of restoring original township survey boundaries it is essential that surveyors be familiar with BULLETIN 38 of the Federal Topographical Surveys Branch, Dept. of the Interior, which describes original monument formats used in the period 1871 to 1917.

8. When establishing a section or quarter section corner from a witness monument placed subsequent to 1890 the said corner shall be defined by producing the line through the witness monument on the same side of the witnessed corner. The corner in question shall be placed at the distance indicated for the witness monument. Prior to 1890 witness monuments were not required to be placed on a surveyed line and corner establishment should be based on the nature of the evidence.

9. When searching for original section or quarter corner monuments, the original township survey notes may be indispensable. Such information as direction of survey and ties to topographic features, etc., may assist in a thorough search for evidence. Copies of these field notes are available from the Director of Surveys.

10. When monuments on original township survey boundaries cannot be restored from traces remaining on the ground of the original monument, from other physical evidence, or testimony by witnesses, then as a last resort the surveyor may proceed to re-establish the monument by measurement from other monuments which are connected to it by survey.

If the re-establishment employs other monuments in the original township survey, the surveyor shall take into consideration the intent and sequence of the original survey.

That is to say, if the lost monument is in the interior of the township, generally other monuments north and south of the lost corner should be used. If the lost monument is on the exterior boundary of the township other monuments on either side of the lost corner on the same township boundary should be used. The exception is quarter corners on east-west section boundaries in the interior of the township, which shall be re-established in relation to the section corners on either side.

It is the responsibility of the surveyor to assess all available evidence including other monuments placed on subsequent plans when re-establishing a lost monument. The re-establishment should be performed using the best evidence available, while additional ties should be made to other monuments to confirm the validity of the re-establishment.
When re-establishing lost corners in original township surveys, due weight shall be given to the bearings as shown on the official or registered plan.

Monuments To Restore

11. All damaged or obliterated monuments used in a survey whether urban or rural, should be restored. Pits, mounds and/or trenches on original township surveys, however, shall not be reconstructed or restored unless so instructed by the Director of Surveys.

CHAPTER 6
FIELD NOTES

The following requirements pertain to compiling, recording and retaining of field notes that are made in conjunction with surveys.

Systematic Records

1. Systematic records shall be made of all field measurements at the time of observation. These records shall be preserved for future reference or submission to the Director of Surveys if requested.

Content of Notes

2. The field notes shall give a clear and detailed account of everything found, observed and done in the course of the survey including:
   (a) the date of observations, location, and purpose of the survey;
   (b) the type and identification of equipment if pertinent;
   (c) the name of the person(s) making and recording the observations;
   (d) the entry of each quantitative observation or measurement;
   (e) a complete description of the condition of every monument found, restored, and placed, and of every permanent structure referencing a monument;
   (f) a record of all searches made for evidence (physical, documentary or verbal). All lost monuments shall be identified.

3. Entries in field notes should not be erased or obliterated.

4. Field notes should be kept indefinitely by the practitioner. Notes can be kept in one or more of the following forms and should be filed such that ready retrieval for subsequent reference is possible:
   (a) Field books, bound or loose leaf.
   (b) Micro-film of above.
   (c) Electronic medium.

CHAPTER 7
GENERAL REQUIREMENTS FOR PLANS

The following requirements pertain to the preparation of various types of plans which are required to be submitted to the Land Titles Office for registration.

While the Surveys Act defines the field requirements, the Land Titles Act and certain other acts provide the statutory authority for the registration of plans of survey, and, to some extent, specify the information which must be shown on plans. The requirements which follow are intended to supplement and amplify the statutory provisions and to indicate the manner in which plans should be prepared in order that they may most effectively fulfill the purposes for which they are intended.

General Requirements
(Applicable to all plans)

1. All plans intended for registration must be drawn on tracing linen or mylar film not more than 0.75 m in width nor more than 3.0 m in length. In general, a somewhat lesser width and length is desirable. However, no plan should be smaller than 0.35 m by 0.4 m. A mylar thickness of 0.08 mm (3 mil) is recommended.

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2. A marginal outline not less than 0.02m from the edge of the plan should be drawn around all sides of the plan. No survey data shall be shown outside the marginal line.

3. Universal black drawing ink for mylar film shall be used. All ink shall be black, except as noted in Section 23.

4. Plans must scale accurately and be of a good standard of craftsmanship. Mechanical lettering throughout is preferred, with minimum letter height of 2 mm. (80 CL template).

5. Each plan must bear a heading, preferably on the top righthand side, stating:
   (a) The nature or purpose of the survey shown thereon: e.g. “Plan showing survey of public work (Gravel Pit)”, “Right-of-way for Oil Pipe Line”, “Plan showing subdivision of”.
   (b) The legal description of the affected area by quarter section, township, range, and meridian numbers or river lot and settlement plan numbers or, if in a subdivided area, by lot, block, and registered plan numbers as well as quarter section, township and range numbers. The name of the municipality should also be shown.
   (c) The scale of the plan. The 1:1, 1:2, 1:5 scale ratios should be adhered to and scale ratios of less than 1:5000 shall not be used without the permission of the Land Titles Office.
   A scale bar shall also be shown. It is not essential to show the name of the surveyor or the year in which the survey was made in the heading, but is permitted. Company logos shall not be shown.
   (d) A legend listing symbols used and the explanation of each.

6. The north direction of the reference meridian must be indicated by an arrow drawn on the plan. The area shown on the plan should be oriented in such a way that the direction of north is towards the top of the plan where practical.

7. All data shall be clearly legible and should be so placed on the plan as to be read from left to right or from bottom to top of the plan. Data should not be placed in such a way that the plan has to be turned around in order to be read. Such information as connections to Alberta Survey Control must not interfere with the survey boundaries illustrated. An inset showing same will be preferable in many cases.

8. Sufficient blank space, preferably above or below the heading of the plan, should be left to accommodate any approval or registration certificates, etc., that may be required.

9. The plan must show the original boundaries of quarter sections, settlement lots or other surveyed parcels to such an extent as is necessary to indicate clearly the location of the area surveyed. Original section, settlement lot or parcel boundaries should be shown in full black lines unless rendered redundant through resubdivision, in which case they shall be shown in dotted or broken lines, as well as interior quarter section boundaries which shall also be broken. Where not otherwise clear, the designation of original quarter section or parcel boundaries should be shown by a notation made beside them on the plan, e.g. “North Bdy. of N.E. ¼ Sec. 9-28-7-5”.

10. If abbreviations are used the following shall apply, but need not be explained on the plan. The following abbreviations may be used on the plan without explanation in the legend.

**Abbreviations**

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<th>Abbreviation</th>
<th>Description</th>
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<td>ASCM</td>
<td>Alberta Survey Control Marker</td>
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<td>Bk.</td>
<td>block</td>
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<td>bdy.</td>
<td>boundary</td>
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<tr>
<td>B.C.</td>
<td>beginning of curve</td>
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<tr>
<td>B.M.</td>
<td>Bench Mark</td>
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<tr>
<td>B.T.</td>
<td>bearing tree</td>
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</table>
calc. ................................................... calculated
ck.m. .................................................. check measured
chd .................................................... chord
cop .................................................... copied
c.s. ..................................................... countersunk
C. of T. ................................................ Certificate of Title
conc. ................................................... concrete
cor. ..................................................... corner
E.C. ..................................................... end of curve
EDM ................................................... electromagnetic distance measurement
Fd. ...................................................... found
ha. ...................................................... hectare
I. ......................................................... iron post
I.Bar ................................................... iron bar
I.R. ...................................................... Indian Reserve
L.S. ...................................................... Legal subdivision
M. ....................................................... mound or meridian
Mp. ...................................................... marker post
Mkd ...................................................... marked
Mon. .................................................... monument
P. ....................................................... standard C.L.S. Post (Brass Cap)
P.C.C. ................................................... point of change of curvature
P.I. ....................................................... point of intersection
Pl. ....................................................... placed
P.C. .................................................... point of curvature (tangency)
Pit ....................................................... 4 pits
R. ....................................................... Radius
Ref. ..................................................... Reference
Rge. ................................................... range
Re-est. ................................................ re-established
Res. .................................................... restored
R/W .................................................... right-of-way
Ry. ..................................................... railway
Sec. ................................................... section
S.M. ................................................... stone mound
S.T. ................................................... sub-tangent
T. ....................................................... trench
Twp. .................................................. township
Wo. ................................................... wooden post
Wit ...................................................... witness
\[\triangle\] ................................................. central angle of curve

Legends

11. Monuments found or placed shall be indicated on the plan by the use of the following symbols. Descriptive notes should also be shown in accordance with Section 10 where necessary to clearly show what was found and what was left at every corner used or established by the survey. A legend is required explaining all symbols used.

- ...................................................... statutory iron post found
- ...................................................... statutory iron post placed
- ...................................................... wooden post found
- ...................................................... wooden post placed
- ...................................................... I.bar found
- ...................................................... I.bar placed
- ...................................................... witness monument found
- ...................................................... witness monument placed
- ...................................................... survey control marker found
12. Linear measurements shall be shown in metres and decimals thereof. Rounding to the nearest 0.01 metre is recommended. However, distances to the nearest 0.001 metre may be shown to eliminate ambiguity in certain cases, i.e. where converting from Imperial Measure, or specifying a third item of curve data.

13. Directions shall be shown on all surveyed lines in the form of full circle bearings, except for ties to Survey Control Markers where actual observed angles shall be displayed. Generally directions should be rounded to the nearest 5 seconds of arc unless circumstances warrant greater accuracy.

14. When required, areas (except for condominium unit areas) should be shown to the following accuracies:

Area of lot or right-of-way
0.1 ha to 1.0 ha .................................................. . quote to 0.001 ha
Over 1.0 ha .................................................... . quote to 0.01 ha

15. When a monument cannot be placed at a required position, the reason for the omission shall be clearly stated on the plan.

16. Plans of survey shall indicate the condition of monuments found or placed. In the absence of a note to the contrary it is assumed that the monument is undamaged.

17. All calculated data on plans shall be shown followed by the abbreviation "calc".

18. Plans of survey shall show ties to section or quarter section corners re-established from secondary evidence such as fence corners so that the position of the re-established corner can be ascertained in relation to some supporting physical evidence on the ground.

19. (a) Whenever it is necessary to re-establish original boundaries, all original monuments or other evidence by which such original boundaries are re-established must be shown on the plan.

(b) If any original monument is restored by the surveyor, the extent of such restoration should be noted on the plan.

(c) A note shall be placed on the plan of survey describing the method used in re-establishing lost corners if the method is not otherwise clearly evident.

20. (a) Sufficient linear and angular tie measurements between the newly surveyed and the previously surveyed boundaries to accurately fix the location of the surveyed area in relation to original land boundaries, must be shown on the plan.

The purpose of making ties is twofold: to accurately locate the area surveyed in relation to boundaries already established and to permit a complete checking of the data of the new survey against that of previous surveys. Ties should be made and shown on the plan with these objectives in mind.

(b) Tie distances and other linear measurements, where their extent is not indicated by arrows are assumed to refer to the distance between the two nearest monuments on the line on which the distance is shown. Where there is any possibility of doubt, the extremities of the tie should be indicated by small arrows.
(c) When it is necessary to show linear ties to original monuments located at considerable distances from the boundaries of the area being surveyed, the lines on which such ties are made may be shown foreshortened on the plan. All boundaries within the area to be registered shall be shown to scale however.

21. When, in connection with a new survey, any portion of a previous survey is retraced or re-measured and measurements shown on the plan thereof are found to be in error, the surveyor shall confirm his own measurements by measuring each distance or angle again. These measurements shall be shown on the new plan of survey "Check Measured", or " ck.m. ".

22. (a) The "reference" or "assumed" bearing for the survey shall be clearly indicated on the plan of survey. Township bearings shall be used unless the survey has been integrated into the Alberta Survey Control Network.

(b) All bearings shall be shown as full circle bearings.

23. The extent of the area affected by the plan of survey shall be delineated by a heavy black line coinciding with the exterior boundaries of the survey. Road plans may also be inclined with red ink. This inclining, however, must not create confusion or interfere with other plan data.

24. When the area or areas shown on the plan comprise lands which are bounded by a natural boundary, the natural boundary must be shown on the plan.

(a) When it has been confirmed that an adjoining owner has riparian rights, the bank of the body of water should be shown as it exists at the time of survey.

(b) If it is found that an owner does not have riparian rights, the bank should be shown according to the traverse of the river or lake upon which the title is based. Notes of these traverses are available from the office of the Director of Surveys at a nominal charge to surveyors.

(c) If a bank is traversed at the time of survey, the lengths and bearings of the courses should be shown on the plan together with the offsets from them at intervals not exceeding 30 metres and more frequent where required to show the present position of the bank in relation to the remainder of the survey.

(d) The boundary so established should be shown as a solid black line with a statement printed along it giving the date of traverse and the name of the surveyor.

   e.g. "Bank shown according to traverse by ............... A.L.S., (.....Date.....), 19......"

(e) If it is necessary to show the present bank as well as its position at the time of patent, both traverses should be plotted and one shown in a solid black line, the other in a broken black line, in order of importance, with a statement on each setting out the date of traverse and the name of the surveyor.

(f) The name or number of the lake or river should appear on the plan; and the direction of flow of water should be indicated by an arrow in the case of streams or rivers.


In common law, a natural boundary at any instant is the designated natural feature as it exists at that instant, and the boundary position changes with the natural movements of the feature as long as these movements are gradual and imperceptible from moment to moment.

It is essential to designate clearly and concisely both on the plan and in the field notes the character of any natural feature adopted as a boundary. In the case of water boundaries, except where applicable legislation, judicial decision, or existing rights are to the contrary, the bank shall be used as the feature defining
the boundary.

Locate natural boundaries by either:

1. a survey network utilizing offsets or radial measurements such that bank identification points do not exceed a 30 metre interval.
2. by plotting the feature directly from controlled aerial photographs, provided that:
   (a) the scale of the photographs is as large as or larger than the scale of the final plan of survey. Enlargements may be used to fulfill this requirement only if the resolution is such that the boundary feature is sharply defined on the enlargement.
   (b) the boundary is inspected on the ground by the surveyor.
   (c) the position of the boundary is clearly marked on the photographs and, where it is inspected on the ground, is marked on the photograph in the course of the inspection.
   (d) photo identifiable points are positively identified and are pin-pricked on the photographs and surveyed on the ground in relation to the monumentation of the survey and according to the following specifications:
      i) one photo identifiable point is to be established in the vicinity of each intersection of an artificial boundary with the natural boundary, and a tie is to be made to the natural boundary along each intersecting artificial boundary.
      ii) at least three photo identifiable points are to be established in the vicinity of the natural boundary on each photograph used, or if enlargements are used, on each 25 cm square of the enlargement along the course of the natural boundary, and
      iii) the accuracy of survey of the photo identifiable points shall be at least equal to that prescribed for surveys under the Surveys Act.

3. Notwithstanding Sections 1 and 2, natural boundaries may be plotted by stereoplotters provided that:
   (a) the scale at which the model is viewed is as large as or larger than the final plan of survey,
   (b) clause 2(b) above is complied with, and
   (c) photo identifiable points are pin-pricked on the photographs and surveyed on the ground according to the following specifications:
      i) one photo identifiable point is to be established in the vicinity of each intersection of an artificial boundary with the natural boundary.
      ii) at least two photo identifiable points at each end of the series of overlaps and at least one control point at intervals not exceeding three overlaps are to be established, and
      iii) the accuracy of survey of the photo identifiable points shall be at least the equivalent to that prescribed for surveys under the Surveys Act.

4. All detail transferred from a particular photograph to the plan in accordance with sections 2 or 3 should be outlined in ink on the photograph, and the photograph should be retained by the surveyor as part of the field notes. The relevant photograph numbers must be shown on the plan. All photographs used must show date of photography and scale, and be signed and dated by the Alberta land surveyor responsible for the survey.

5. The plan may require the approval of the Department of Forestry, Lands and Wildlife as to the location of the natural boundary.

6. If the plan is required for a transaction (i.e. separation of titles under Section 86 of the Planning Act) which results in the exclusion of the beds and shores of waterbodies from the existing Certificate of Title, the plan must have the approval of the Department of Forestry, Lands and Wildlife as to ownership. This approval may be endorsed on the plan or be in a letter form.
26. Where any boundary or limit of a block, parcel or right-of-way has been surveyed as an arc of a circular curve, the length of the curve, its radius, and the central angle of curve shall be shown on the plan. Chord lengths and bearings with length of subtangents may also be shown but are not essential.

Note: On subdivision plans having curvilinear boundaries, it may be desirable to show the Delta Angle to the nearest second of arc, and the other curve related information to millimetre precision. For multiple curves or curve segments, information may be shown in tabular form.

Topography 27. (a) In general, the only topographic features which should be shown on a plan are those which form an essential part of the survey, such as a river bank or lake which constitutes a property boundary. It is sometimes desirable, however, to show any well-defined features such as a creek bank, a fence corner, or a building, if a monument is situated near it, since a record of the relative positions of the monument and the feature shown may be of assistance in re-locating the monument at some future time. In such cases, the topography should be accurately plotted and if measurements have been made to determine its location, they should also be shown.

(b) Topography which is not essential or which serves no useful purpose should be omitted from plans which are to be registered, as well as such designations of parcels as “Church Site”, “Cultivated Land”, etc., describing the purpose for which the land is used or is intended to be used unless required by statute. In no case should contour lines be shown on any plan which is to be registered.

CHAPTER 8
SUBDIVISION SURVEYS

1. If a subdivision plan encompasses part of a previously registered parcel or quarter section, the heading should so state.

2. The total area of the subdivision should be shown on the plan by means of a notation as follows, printed beneath the heading. “The area affected by the registration of this plan is denoted thus..... and contains ......ha.” If the area subdivided is under more than one registered ownership or if it affects more than one quarter section or other former parcel, the area subdivided in each portion, should be stated. Where several titles or former parcels are affected, the acreage and title or parcel numbers should be shown in tabular form.

3. Each lot or parcel which is 0.25 hectare or more in area shall have its area shown.

4. Block letters or numbers used should not be in duplication of those shown on previous plans of subdivision in the same quarter section or neighborhood. In additions to small townsites, block numbers or letters used should follow consecutively those shown on previously registered plans of the townsite. In resubdivisions of existing blocks, former lot numbers should not be duplicated.

Reserves and public utility lots are to be designated in accordance with the Planning Act and Regulations. In addition, the full meaning of the suffixes ER, MR, SR, MSR, & PUL, if used, shall be shown in the legend. Where applicable the name of the school authority and its address shall be shown.

5. In plans of additions to existing subdivisions, productions into the new subdivision of streets or avenues in any adjoining existing subdivision should be given the same numbers or names as the streets and avenues already in use.

6. Perpendicular widths of each street should be shown twice in each course thereof. When intersected other than perpendicularly by other streets or by the limit of the subdivision, the slant width should also be shown. Widths of lanes should be shown twice in each course in each block.
7. (a) Complete information as to the length and bearing of every boundary created shall be shown, with the exception that ditto marks may be used where dimensions are repetitive.

(b) If corner-cuts are standard, a note to that effect may be shown in the legend of the plan giving the required dimensions etc.

8. If a larger area than that intended to be registered has been surveyed on the ground, only that part which is to be registered may be shown on the plan. Plans showing further extensions of the subdivision outside the portion to be registered will not be accepted. Only previously registered surveyed lines may be shown outside the area to be registered under the new plan, and they shall be shown as continuous black lines, whether rights-of-way or subdivisions.

9. Plan numbers of all previously registered adjacent subdivisions, roads, railways, etc., must be shown on the plan.

10. (a) Where the plan is a subdivision of part of a former plan, the boundaries and numbers of original lots should be shown in black broken lines only when necessary for clarification. Rights-of-way within the plan limits should also be shown in black broken lines.

(b) If the area being re-subdivided formerly contained streets or lanes which are to be superseded by lots or by new streets or lanes differently located on the new plan, the former lot boundaries and numbers should not be shown. Only if it is desired to indicate the locations of evidence found at the old lot corners, should the former lot boundaries be shown, and in that case they should be drawn in black dotted lines.

(c) Streets or lanes may be eliminated by a Closing By-law under the Municipal Government Act. In this case title to the former streets or lanes will vest in the Municipality upon registration of the Closing By-law in a Land Titles Office.

(d) Where the re-subdivision of an area containing streets or lanes that are to be eliminated is in the form of a Replotting Scheme under the Planning Act, prior cancellation or closing of the streets or lanes is not necessary as this is automatically accomplished under the reploting scheme.

11. Except as noted below, the plan of subdivision must bear all necessary approvals, signatures and affidavits before it can be accepted for registration in a Land Titles Office.

In general it will include the following:

(a) Surveyor’s affidavit and signature, in form II pursuant to the Land Titles Act, sworn before a Commissioner for Oaths.

(b) Owner - if the owner is an individual his signature must be witnessed and the witness must take an affidavit in form 31 pursuant to the Land Titles Act. This affidavit must be sworn before a Commissioner for Oaths if taken within the Province of Alberta, or before a notary public if taken outside of the Province of Alberta - if the owner is a corporate body, the plan is signed by an executive officer or officers of the corporation under the corporation’s official seal.

(c) Planning Approval - by the subdivision approving authority in accordance with the Planning Act.

(d) Encumbrancees - are not required to approve the plan if no land is dedicated for public purposes (refer to the Land Titles Act for details). If land is dedicated for public purposes, encumbrancees must approve the subdivision, either directly on the plan or by a separate consent form (Form 12A L.T.A. Forms). A mortgagee’s signature is not required for a mortgage on an easement.
(e) The Director of Program Support, Public Lands Division, Alberta Forestry, Lands & Wildlife - if the plan of subdivision contains land adjoining a lake, river, stream or other body of water.

(f) The Director of Surveys - pursuant to routine examination of unposted subdivision plans, re-establishment plans, and condominium plans.

(g) Replotting schemes - a subdivision plan by a replotting scheme pursuant to the Planning Act will not be executed by the owners, but rather by the appropriate municipal authority.

12. When a subdivision plan is presented to a Land Titles Office for registration therein, it should be accompanied by the appropriate forms and documentation. These may include special instructions, duplicate certificates of title, discharges of encumbrances, etc.

13. Sufficient field measurements shall be made to ensure that no errors of layout or measurement have occurred.

14. Each and every figure on a subdivision plan shall be checked for mathematical closure.

15. The use of delayed posting provisions under the Surveys Act is optional. This option is intended to allow major construction to be completed prior to lot corner monumentation, and its use is recommended where the subdivision plan must be processed prior to completion of construction operations.

16. In the event that conventional posting is employed, and subsequent re-establishment of lot corners occurs, a plan of same shall be prepared by the surveyor and registered in accordance with Section 42 of the Surveys Act.

17. The positions of all monuments placed on a subdivision survey should be marked with guard stakes, such as redtop wooden stakes, to facilitate subsequent location by others.

CHAPTER 9
RIGHT-OF-WAY SURVEYS

This chapter deals with surveys for new roads, utility or pipeline rights-of-way, and railways. Items 1 and 2 are applicable in all cases.

1. Posting Requirements

(a) When only one limit of a right-of-way is monumented, the south and/or west limits are preferred for posting.

(b) When surveying a new right-of-way which is adjacent and parallel to an existing right-of-way, monuments shall be placed on a limit not coincident with any existing limit.

(c) Subject to the above, monuments shall be placed at:
   - each deflection, or terminal point of the limit(s) except as noted in 1.(d) below,
   - each beginning and end of curve, which shall have a constant radius,
   - intervals not exceeding 1000 metres, except for roads which should not exceed 600 metres, or in either case, intervals to yield intervisibility, whichever is the lesser,
   - the intersection of the posted limit(s) with each surveyed boundary crossed, including blind lines.

(d) When a boundary of a right-of-way is coincident with, terminates on or purports to define a ¼ line, the said ¼ line shall be surveyed in accordance with the Surveys Act.

(e) Except as noted in 1.(f) below, when surveying rights-of-way that intersect surveyed section or quarter section lines, the intersection shall be made by using the nearest section or quarter corners on each side of the point of
intersection. If the monuments at these corners are lost they shall be re-established, giving due consideration to all available evidence.

(f) The following alternate methods of making intersections are acceptable:
- if the right-of-way being surveyed is parallel to, or approximately parallel to an existing surveyed section boundary, and the point of intersection with another section boundary is within 30m of the said section boundary, the intersection may be made by adopting the bearing shown on a township plan or other registered plan. Such bearing shall be shown on the new plan of survey.
- if the right-of-way being surveyed is parallel to an existing surveyed right-of-way, and the posted limit is within 30m of the posted limit of the existing right-of-way, the surveyor may place a monument at a section boundary intersection by adopting the intersection angle of the section boundary from the previous survey, provided that the previous survey established the said section boundary by joining with a straight line the nearest section or quarter corners on either side of the point of intersection, and a tie is made in one direction, on the new survey, to the nearest section or ¼ section corner to confirm the previous survey.

(g) For the purpose of these standards, except as noted in 1.(h) below, “surveyed” lines are defined as:
- any line shown to be surveyed on a plan of public record,
- blind lines whether actually surveyed on the original township survey or not,
- quarter lines which are shown to have been surveyed on any plan of public record.

(h) Boundaries shown on cancelled subdivision plans or on abandoned right-of-way plans need not be intersected. A “cancelled” subdivision plan is a plan for which no titles exist. Rights-of-way may be considered as abandoned when no interest exists in relation to the right-of-way.

(i) Except within urban residential parcels, the area of right-of-way surveyed shall be shown on the plan in each parcel or separate title affected. The areas should be placed in close proximity to the parcel designation.

(j) If the right-of-way surveyed has parallel sides, the perpendicular width shall be clearly shown, as well as any rights-of-way widths adopted from previous surveys.

(k) If a new right-of-way is to be surveyed in place of an existing right-of-way to be abandoned, then the new right-of-way must commence and/or end at the relevant parcel or title boundary, even though part of the new alignment may coincide with the old.

(l) On surveys of rights-of-way which may terminate within the interior of a section, the terminal monument shall be tied to some other known point in such a manner that a closure may be obtained from information shown on the plan.

2. Re-Establishments
If an iron post is placed to re-establish a lost monument on a right-of-way survey, it shall be marked with the letters and/or numbers which are indicated on the plan as being marked on the original post. (Other than Permit/Registration No. of the original surveyor.) Pits need not be dug in the case of a monument on a road survey, although a marker post shall be placed in accordance with accepted practice.

3. Special Requirements for New Roads in Rural Areas
Each iron post placed should be marked with the letter “R” and a unique number within the survey being conducted.
4. Special Requirements for New Railway Surveys
(a) When a new railway right-of-way is surveyed, and the track has been constructed prior to the survey, the centre line of actual track shall be related to the right-of-way survey, and such relationship shown on the plans of survey.
(b) Any spiral curves existing on the centre line of track of a new railway shall be replaced with a circular curve in accordance with Schedule “A” for the purpose of posting the railway limits.

5. Special Requirements for Existing Railway Rights-of-Way
(a) When establishing the boundary of a previously surveyed but unposted railway right-of-way, the centre line of which is shown on the filed plan to be a spiralled curve, the spiral shall be replaced with a circular curve in accordance with Schedule “A”.
(b) When establishing the location of a right-of-way based on existing centre line of track, an iron post shall be placed to define the tangent for subsequent use at least 500m distant from the survey being conducted, or near the next point of curvature whichever is nearer. Such post shall be tied to the survey being conducted.
(c) Existing rights-of-way based on “as constructed” or “as-built” surveys will generally refer to centre line of rail existing at the time of survey, and ownership is based upon this centre line location. Therefore, the centre line of rail is usually the best evidence of the original survey line provided that no movement has occurred since the original survey.
(d) Existing rights-of-way based on “location” plans may or may not correspond to actual rail location since “as located” surveys were conducted prior to rail construction. If it is found that the existing centre line of rail agrees reasonably with the centre line as shown on the plan, then it is likely that the rail is the best evidence of the original survey line. If not, alternate procedures appropriate to the circumstances are indicated.

CHAPTER 10
STRATA AND CONDOMINIUM SURVEYS

1. Strata subdivision surveys are subdivision surveys in a three dimensional sense, conducted in accordance with Section 41 of the Surveys Act, and the plan prepared and registered pursuant to Section 83.2 of the Land Titles Act.
(a) The geometric shapes forming the boundaries of strata spaces shall be limited to:
   - horizontal, vertical, or inclined plane surfaces, and/or
   - cylindrical, or portions of cylindrical surfaces which shall have axis which are either vertical or horizontal.
(b) While the Surveys Act requires that strata surveys be related to a minimum of two bench marks being either adjacent survey control markers, or newly established bench marks within the site related to geodetic datum, it is preferable that the latter be employed whenever practical.

2. Condominium plans, whether bare land or building type, are surveyed pursuant to the Surveys Act and the Condominium Property Act.
(a) A building shall be defined for the purposes of condominium surveys as being a fully enclosed space. That is to say, partially enclosed balconies and other such building appurtenances cannot be included in a building condominium unit.
(b) When conducting a survey of a building condominium, each unit perimeter shall be measured. In addition the site perimeter shall be fully surveyed, monumented, and tied to Alberta Survey Control in accordance with the Surveys Act.
(c) Generally, condominium unit boundaries are defined by existing walls. However, if it is desired to create units or parts of units where interior partitioning does not exist (i.e., parking, storage areas) unit boundaries may be defined by measurements from adjacent existing walls.

(d) The site plan within a building condominium plan shall illustrate in addition to the requirements of the statutes:
- monuments thereon, and ties to Alberta Survey Control,
- the location and dimensions of the building(s), including the perpendicular distances to property lines, the dimensions of the main walls, any protrusions beyond such main walls, and a note identifying the nature of the wall depicted.

(e) Bare Land condominium units shall be monumented in accordance with the Surveys Act.

(f) Refer to Schedule “B” attached for the required affidavit by surveyors for building condominium plans.

CHAPTER 11
WELLSITE SURVEYS

This chapter deals with the survey of oil and gas wellsites and related facilities for the licensing of wells under the “Oil and Gas Conservation Regulations”. The position of the well head and reported coordinates of the well location are adequately covered under the regulations. Any further reporting of the wellhead location should be dealt with on an individual client basis.

In addition to the Survey Regulation, Part 2 - Surveys in Unsurveyed Territory pursuant to the Surveys Act, the following shall apply:

1. An Alberta land surveyor performing a survey for the location of wellsites and related facilities in surveyed territory, shall locate and confirm sufficient monuments to define at least one boundary of the ¼ section affected and shall measure the relationship of the wellsites and related facilities to the said boundary. Where the possibility of conflict occurs, the surveyor shall exercise discretion to ensure that the wellhead or facilities are properly located.

2. Where the boundaries of a wellsites or related facility terminate on, are coincident with or purport to define a property boundary, the said boundary should be surveyed in accordance with the Surveys Act.

3. The type of monumentation found or placed for wellsites and related facilities shall be shown on the plan. It is recommended that iron bars be placed.

4. Energy, Mines & Resources, Canada third order levelling specifications (24mm/√dist. in km) shall be achieved within the surveyor’s own work. Elevations shall be determined from a minimum of two (2) bench marks, one of which is recommended to be a bench mark with a published geodetic elevation. Bench marks used shall be identified on the plan. The datum shall be geodetic and also noted on the plan.

5. Horizontal accuracy shall be no less than 1:5000 in the surveyor’s own work and 1:2500 in ties to previous surveys.

6. The name of the land surveyor shall be printed legibly on the plan.
**SCHEDULE "A"**

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**SCHEDULE "B"**

**AFFIDAVIT**

I,___________________________ of Alberta Land Surveyor, make oath and say:

That the survey represented by this plan was made under my personal supervision;

That the survey was made in accordance with good surveying practices and in accordance with the provisions of the Surveys Act;

That the survey was performed between the dates of ________ and ________ and that this plan is true and correct, and is prepared in accordance with the provisions of the Condominium Property Act and the Land Titles Act;

That the building(s) situated on the parcel that is (are) the subject of this plan is (are) wholly within the external boundaries thereof; (in case of encroachment, this statement will be varied accordingly);

SWORN before me at the ______________ in the Province of Alberta this __________ day of ____________________, 19__.

___________________________
Alberta Land Surveyor

A Commissioner for Oaths in and for the Province of Alberta

19 Manual of Good Practice

88.07.07