



Bureau of Land Management
Alaska State Office
Division of Cadastral Survey

Drafting Guidelines For Rectangular Surveys



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DRAFTING GUIDELINES

for Rectangular Survey

This handbook is subject to revision and will be updated whenever significant discrepancies are noted or policy changes are instituted. To assure that you have a current version contact the Bureau of Land Management, Division of Cadastral Survey, Branch of Examination and Records at (907) 271-5768. Feedback from users is invited in order to keep this handbook as accurate and current as possible.

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DRAFTING GUIDELINES

Part I

PROTRACTED SUBDIVISION TOWNSHIPS

INTRODUCTORY STATEMENT

These guidelines are supplemental to the Manual of Surveying Instructions, 1973 which is the official manual of specifications for the Bureau of Land Management (BLM) surveys. The Protracted Subdivision style of platting as covered in Part I is an exception to the standards specified by the Manual of Surveying Instructions. The Alaska Statehood Act and the Alaska Native Claims Settlement Act have authorized an exception to the Manual procedures for expediency in completing the conveyance of Federal lands to the State and to Native Corporations.

The style of platting covered by this supplement to the Manual has been developed over the years by the Division of Cadastral Survey. This method of surveying and platting the Federal lands expedites the system established by the Manual of Surveying Instructions by eliminating the requirement for half-mile monumentation throughout the township. Refer to the Guidelines for Traditional Rectangular Survey in part II for the platting style of those townships which have half-mile monumentation. Part I of this handbook covers a style of platting that is identified by two-mile monumentation along township boundaries and selection boundaries as well as monumentation at angle points of the selection boundaries. The only subdivisional lines that are surveyed (other than by protraction) are those that form a portion of the selection boundary.

State Selections must generally be along township boundaries. Native Corporations must select land by full section except in SE Alaska where selection is allowed by aliquot part. For consistency, State Selections and Native selections are platted in the same style with protracted subdivisional lines throughout the township. In SE Alaska lotting is protracted within the selected portion of each section.

1. PLAT MATERIAL

The working plat may be produced on either light weight paper or 4 Mil mylar. Prior to approval the photo lab will reproduce the working plat onto archival quality mylar which becomes the official survey plat.

2. ORIENTATION AND LAYOUT

The sheet size for BLM survey plats is 19 X 24 inches. A border is drawn 1 1/2 inches from each edge of the sheet resulting in an enclosed rectangle of 16 X 21 inches. The sheet is oriented so that the long direction extends left and right.

Bearings to be plotted must be in their proper relationship to the north arrow and the borders of the sheet. Plotted bearings shall be accurate to the nearest five minutes. Measured distances must be plotted in their proper relationship to the scale bar.

The township is centered on the working area of the plat with about two inches of extra space around each side excluding the area reserved for the plat memorandum. See "DIMENSIONS FOR SHEET LAYOUT" in appendix I.

If the township boundaries are plotted by hand keep the north and south boundaries parallel and square with the paper. Let the east and west boundaries converge equally toward the center of the paper. The east boundary is plotted about N. 0° 05' W., and the west boundary is plotted about N. 0° 05' E. The distances along the north and south boundaries shall be scaled accurately. These distances will determine the exact amount of convergency to be plotted in each boundary.

If a computer is used to plot and calculate the areas of the township be sure to use a Geodetic Coordinate Geometry Program that allows for the convergency of the meridians. If a plane surveying program is used the township will not close properly.

Leave five inches of space on the right-hand side of the sheet for the plat memorandum. This space is normally excluded from the working area of the plat; the township title is excluded from this general rule. The top 3 or 4 inches can be utilized for an enlarged diagram when space permits. See "DIMENSIONS FOR SHEET LAYOUT" in appendix I.

3. OFFICIALLY FILED STATEMENT

The officially filed statement is placed in the top margin of the plat, just outside the border. This statement starts five inches to the left of the right-hand border. The words "Officially Filed" and "ORIGINAL" (without quotation marks) are on the first line. These are labeled with a

1 pen using 175 lettering. Upper and lower case letters are used for "Officially Filed," while the word "ORIGINAL" is in all capital letters. The word ORIGINAL is placed so that the end of the word is even with the right-hand border of the plat. On the next line the word "DATE" is aligned with the left end of the first line, using vertical, all capital, 120 size letters with a 0 pen. A dashed underline extends from the end of the word "DATE", out to point even with the end of the word "Filed." Refer to the samples in appendix I.

4. GENERAL STANDARDS

The final plat is to be drafted in black ink. The line work will be dense and sharp with smooth edges. Lines must meet flush at angle points without overlapping. When monument symbols are used the lines will stop flush with the edge of the symbol. Spaces within dashed lines must look fairly even, however, the length of each dash and space does not need to be measured.

Protracted section lines and lot lines must be drawn to the intersection with surveyed boundaries or meander lines. It is unacceptable to leave the lines hanging, or ending with a space between the dashes, since the point of these intersections must be clearly shown.

It is preferable that the intersection of protracted lines also cross at a dash rather than in the space between the dashes although this is less critical as long as the intended intersection point is not ambiguous.

Conversely, dashed lines that are straight line extensions of a solid line must begin with a space, so that the termination of the solid line is clearly shown.

The finished plat must have an aesthetic, pleasing appearance. Sound judgment must be exercised in the placement of lettering and details to avoid confusion. All data must be clearly portrayed without ambiguous interpretation. Enlargements must be made to accommodate areas in which figures cannot be shown clearly. Enlarged diagrams must be separated from the main drawing enough to avoid confusion.

If the final plat is plotted by computer the lettering sizes, line weights and quality of work must be comparable to those given in this guideline.

5. SCALE

Township plats are normally drawn at 40 chains per inch. When only a portion of the township is involved larger scales can be used.

6. SCALE BAR

The scale bar is normally centered beneath the township at the bottom of the sheet about 3/4 inch above the border. The scale bar for an enlarged diagram is normally centered about 1/2 inch below the diagram. Scale bars are drawn with a 000 or 0000 pen and are lettered with a 60 or 80

lettering size. See examples labeled "Typical Scale Bars" in appendix I for further details on the layout of scale bars. The length of a scale bar used for an enlarged diagram will vary depending on the space available and the size of the diagram, but the style should follow the pattern shown in the examples.

7. NORTH ARROW

The north arrow is placed on the left-hand side of the plat paper about eight-tenths of an inch inside the border and is centered latitudinally on the paper; it may be adjusted slightly from this position to allow room for other detail. See "DIMENSIONS FOR SHEET LAYOUT" in appendix I. The north arrow is oriented true north and is drawn with a 000 or 0000 pen. It must be drawn to the specific standards shown in appendix I. (Dimensions given in the appendix are at the 50 scale.)

The words "True Meridian" are lettered along the left-hand side of the shaft on the southern half of the north arrow. This is done with capital and lower case slanted letters at the 100 lettering size with a 00 pen.

8. MAGNETIC DECLINATION

The magnetic declination is centered beneath the north arrow. Since the magnetic declination varies throughout an area as large as a township, the word "mean" precedes the statement to indicate that the figure is the average for the township. The declination is given in fraction form to the nearest one-quarter degree, e.g., $30\ 1/4^\circ$, $29\ 1/2^\circ$, $28\ 3/4^\circ$, etc., (not $30^\circ 15'$, etc.). The direction of the declination follows the magnitude and is abbreviated. The direction of declination is East everywhere in Alaska, e.g., Mean Magnetic Declination $29\ 1/2^\circ$ E. This is normally lettered in four lines using vertical, capital and lower case letters at the 100 lettering size with a 00 pen. See "NORTH ARROW" in appendix I.

9. GEOGRAPHIC POSITION OF THE TOWNSHIP

The geographic position (i.e., Latitude and Longitude) is shown for one of the corners (normally the southeast corner) of new survey on every township plat. If the township has regular field notes this information will be given in the front of the notes and the placement on the plat must match the corner for which the position is given in the notes. If the township has field notes that contain only monument descriptions and meanders, the geographic position is not given in the field notes. The geographic position should then be determined and placed at the southeast corner of the township with the following exceptions:

- a. If the SE corner falls in excluded water give the position of the nearest meander corner. It is also acceptable to give the position of the witness corner to the meander corner if the statement At W.C.M.C. is placed above the Latitude and Longitude.







- b. If the SE corner falls on land but was not surveyed give the position of the nearest surveyed corner, whether monumented or not, with preference given to a corner on the township boundary.
- c. If the SE corner was previously established and is NOT recovered or remonumented, give the position at the most southeasterly corner of the new survey work (whether original survey or resurvey) with preference given to a corner on the township boundary.

The Latitude and Longitude may be given in the field notes or on the sketch plat; may be taken from the protraction sheets; or may have to be calculated depending on what information is provided in the survey package. Once determined, this data is placed on the plat in vertical lettering using capital and lower case letters. The words latitude and longitude are spelled out. The words North and West must be abbreviated. The position shall be given in degrees, minutes and seconds, with the seconds carried to two decimal places. This data is placed in two lines, one for latitude and one for longitude. The statement (NAD27) will follow the geographic position to indicate 1927 North American Datum. Lettering is normally done at the 80 lettering size with a 000 pen.

10. LETTERING STANDARDS

Lettering sizes given in these guidelines refer to standard K & E Leroy lettering sizes. These figures are given in thousands of an inch. If another system is used the line weights and lettering sizes should match these sizes as much as possible. Slanted lettering referred to in this handbook has letters slanted 22° to the right of vertical. See "LINE WEIGHTS" in appendix I.

Lettering will be oriented to read from the bottom and the right-hand side of the sheet. Along lines with bearings of North to N. 5° W., and South to S. 5° E. the lettering is normally oriented to read from the right-hand side even though this is slightly upside down when viewed from the bottom. Letters may not touch lines or other letters; neither should they come so close that they cause problems making legible copies; there must be clear space between them. Lettering must be uniform in density. Distorted or faint letters are not acceptable. Words and letters must be equitably spaced.

11. TOWNSHIP TITLE

The township title is centered on the entire paper approximately 1/2 inch below the top border. This is done with vertical, all capital letters at the 240 lettering size with a three pen. No abbreviations are allowed. Commas are placed as shown in the example; no period is used, e.g., TOWNSHIP 2 NORTH, RANGE 5 WEST, OF THE COPPER RIVER MERIDIAN, ALASKA. See "DIMENSIONS FOR SHEET LAYOUT" in appendix I.

12. SUBTITLES

If a subtitle is used, it is centered below the main title leaving approximately one-half inch of space between the title and the subtitle. Original surveys have no subtitle. Subtitles are used for resurveys,

subdivisions, supplemental plats, and amended plats. All capital 175 lettering size with a 2 pen is used. Examples: DEPENDENT RESURVEY; DEPENDENT RESURVEY AND SUBDIVISION; SUPPLEMENTAL PLAT; AMENDED PLAT, DEPENDENT RESURVEY AND SURVEY.

13. SOLID LINES

The following lines are shown solid (these lines are not broken for lettering or other detail except as noted):

- Surveyed lines - This includes concurrently surveyed lines and previously surveyed lines, whether Township, U.S. Survey, or Mineral Survey. To determine which lines are surveyed refer to the "Plan of Survey", the surveyors sketch plat, and the record of previous surveys in the area. An exception to this guideline is a surveyed line across a meandered water body. (See the Section on dashed lines.)
- Meander lines
- The plat border.
- The north arrow and bar scale.
- Those standard symbols utilizing solid lines. (See "TYPICAL TOPOGRAPHIC SYMBOLS" in appendix I.) In most cases these may be broken for other detail.

14. DASHED LINES

The following lines will be shown dashed and may be broken for lettering or any other detail when necessary:

- Surveyed lines across meandered water, U.S. Surveys, Mineral Surveys or any other lands excluded from the area of the township. Use the same line weight as for the surveyed lines and generally use longer dashes along a township boundary than along subdivisional section lines. Except at the township corner these must be straight line ties; it is not acceptable to protract out to a hypothetical section corner and then continue on a different bearing to the next meander corner. Across tidal water dashed lines are omitted except where needed for continuity.
- Protracted township boundaries across unsurveyed land and non-tidal water. Use the same line weight as for the rest of the township boundary with dashes about one-half inch long. Protracted township boundaries are normally omitted over major tidal water bodies or major freshwater lakes, however they may be shown for continuity.
- Protracted subdivisional lines across land. Protracted subdivisional lines are omitted over segregated water and excluded surveys within the township.

- Protracted centerlines and lot lines within a section.
- Tie lines
- Those topographic symbols utilizing dashed lines listed in the Section on "SYMBOLS."
- Bracket lines and leader lines. Some leader lines may be shown solid, however dotted lines are not used.

Do not dash surveyed lines across water bodies which are given as line calls; these are not meanderable water bodies.

15. LINE WEIGHTS

In this handbook line widths are identified by standard K & E Leroy Rapidograph pen sizes. When other brands are used comparable line weights should be approximated as nearly as possible. Refer to the chart in appendix I for widths of standard K & E Leroy Pen sizes.

Line weights may vary somewhat to allow for scale differences and individual preference within the following guidelines:

- a. The plat border should be at either a 0 or 1 line weight.
- b. The township boundary should be at either a 0 or 1 line weight.
- c. Surveyed section lines should be either 00 or 0 using one line weight thinner than the township boundary.
- d. Protracted section lines should be either 00 or 0 and at least one line weight thinner than the township boundary.
- e. Protracted (or surveyed) lot lines within each section should be at either 000 or 0000 line weight.
- f. Meander lines and sketched shorelines should be a 000 line weight.
- g. Topographic symbols, when shown, should be at either 0000 or 000 line weight.
- h. Bracket lines and leader lines should be at the 0000 line weight.

Section lines must be thinner than the township boundaries and the lot lines within a section must be thinner than the section lines.

16. SECTION LABELS

Sections are numbered in sequence beginning at the northeast corner of the township, thence proceeding westerly across the top row of sections to the northwest corner of the township, thence south to the next row of sections and easterly along the second row of sections to the east boundary of the township, thence south to the new row of sections and

westerly underneath the previous row, continuing in this fashion until the township is completed. See the example "DIMENSIONS FOR SHEET LAYOUT" in appendix I.

Label all surveyed sections, previously surveyed sections, and those unsurveyed sections within the township which are adjacent to a surveyed line or touch on one corner. Sections in adjacent townships are not shown when the corners are common however offset sections are labeled when a township closes on previous work.

Section labels are in vertical lettering using capital and lower case letters. The word section is abbreviated (Sec.) and must have a period. Section labeling is normally at the 120 lettering size with a 0 pen, although a 100 lettering size may be used in congested area. Section numbers are placed slightly above the center of the section, however they may be offset from this position to avoid crowded areas. Section numbers may be placed inside large U.S. Surveys. They may also straddle a meander line or a surveyed line when appropriate.

17. MONUMENTATION

One standard monument symbol is used to show the position of each corner which was recovered or set. This symbol is a filled-in-circle five to seven hundredths of an inch in diameter. Do not show monument symbols for corners set during a previous survey unless the corners were recovered.

18. LEGEND

Legends are not required since one standard monument symbol is used at the position of every monumented corner.

19. PROTRACTED SECTION LINES

Once all of the surveyed lines are drawn section lines are protracted over the remaining land within the surveyed area. To determine which lands are surveyed refer to the section on Surveyed/Unsurveyed Land. Unsurveyed sections within a township do not have protracted section lines. Do not protract section lines over meandered water bodies. Refer to the Manual of Surveying Instructions, 1973 for the proper method of protracting section lines through a township with irregular boundaries.

20. SURVEYED/UNSURVEYED LAND

The field notes or sketch plat do not indicate which lands are to be shown as surveyed on the final plat. This is determined by the following criteria:

- a. If the entire township boundary is surveyed (except across major water bodies) then all of the land within the township not previously surveyed will be returned as surveyed land.

- b. If a portion of the township boundary is left unsurveyed then normally only the selected land within the township will be returned as surveyed. The "Plan of Survey" indicates the selected lands with hatching.

On the plat surveyed lands are indicated by protracting section lines and lot lines over the land and returning an area. (See examples in appendix I.) Unserved lands show neither an area nor protracted lines. Major shorelines are normally sketched through the unserved land for continuity. These shorelines can be taken from the USGS Quad maps. Water bodies and islands are named. The label "UNSERVEDED" is lettered across the land using all capital, slanted letters. The lettering size depends on the space available. It's recommended that the lettering be spaced out to cover the majority of the unserved land, and be generally centered in the appropriate area. In the unserved area sections are not labeled except those abutting a surveyed line or corner. Section lines are protracted approximately 3/4 of an inch into the unserved area from each surveyed line or corner.

U.S. Surveys or Mineral Surveys which fall within the unserved land must be plotted. It's often impossible to accurately locate these surveys since they may not be tied to a township corner. The best available evidence of the position should be used to fix the location of these surveys. Often the configuration of the shoreline is the best way to position the surveys.

21. MEANDER LINES

A meander line is a traverse of the approximate line of ordinary high water (or mean high tide in the case of tidal water) which is run for the purpose of determining upland areas. The traverse of the meander line is tabulated in the field notes and must be plotted on the plat. On this type of township plat most meanders are photointerpreted, digitized and incorporated into field notes. These are normally plotted from a digital file. These are plotted with a 000 pen. The bearings and distances of the meanders are NOT annotated on the plat. Meander line traverses always begin and end at a meander corner and MUST close exactly on these points. The end of each meander course between meander corners are called meander points. Meander points are not marked or annotated on the plat.

Meander lines are normally shown only in the surveyed portion of the township and stop flush at the boundaries. The meanders should match adjacent townships which use the same hydrographic source and are being surveyed concurrently. Meander lines may not match previously surveyed work or concurrent surveys which utilized a different source or date of hydrography.

The meanders of previous surveys within the township are also plotted on the plat in the same manner as the new meanders. If the meanders of a previous survey are being resurveyed, the original meander line is also

depicted as a dashed line with a 0000 pen and labeled ORIGINAL MEANDER LINE in all capital, slant lettering. This is normally labeled in 60 lettering with a 0000 pen.

New meander lines should not be shown through previously surveyed sections, U.S. Surveys or Mineral Surveys. Only the record meanders are shown unless the meanders are being resurveyed.

22. MATCHING MEANDER RECORDS (PARTITION LINES)

The meander lines of the township may not match the meander corners of a previously approved survey since the shoreline may have changed. Many unique situations can occur as shorelines change. In this handbook, only the most typical situations of erosion and accretion are covered. EROSION is the gradual loss of land along a meander line due to water action, while ACCRETION is the gradual and imperceptible gain of land due to water action. Since the meander line is NOT a fixed boundary the ownership of lands extends to the actual shoreline and changes as the shoreline changes.

In the case of accretion, the lands gained in front of the record meander line belong to the upland owner and MUST be excluded from the lotting of the rest of the section. The boundaries of the public land are surveyed as a "Partition Line" connecting the present meanderline to the meander corners of the previous surveys. The partition line is a surveyed line of the township and therefore has the bearing and distance, and witness corner information depicted just like other surveyed lines of the township. The 60 lettering size with a 0000 pen is normally used for labeling data along partition lines.

In the case of erosion, the present shoreline will intersect a line of the U.S. Survey inland from the record meander corner. The meander corner of the township applies only to the lands outside the U.S. Survey. A resurvey of at least that one line of the U.S. Survey is required to establish the position of the new meander corner, however the meanders of the U.S. Survey are NOT rerun since the Federal government has no interest in patented land.

On the plat, the record configuration of the U.S. Survey will be plotted even though it extends out into the water body. See the illustration of U.S. Surveys within a section in appendix I.

23. NAMED HYDROGRAPHIC FEATURES

Hydrographic names are taken from the Dictionary of Alaska Place Names and from inch-to-the-mile quadrangle maps. Lettering size varies greatly depending on the importance of the feature and the space available, however no lettering on the plat may be larger than the title. Major water bodies are normally shown with all capital letters, while less important features may use capital and lower case letters. All hydrography is labeled with slanted lettering. Flow arrows must be used on all double line rivers or streams.

24. LOTTING WITHIN A SECTION

On this type of township plat, the sections are NOT further subdivided by protracted lotting except in SE Alaska where surveyed selection boundaries often run along the centerlines of sections and the centerlines of quarter sections.

A. SECTION LOTTING IN SE ALASKA

The selected portion of each section will be subdivided by protraction along the centerlines of the section and along the centerlines of the quarter sections. The centerlines of a section are determined by connecting opposite one-quarter section corners with a straight line. Full selected sections will show only the protracted centerlines, while fractional sections may show aliquot parts and irregular lotting around meanders and excluded surveys. Protract lot lines which leave as many aliquot parts of 40, 80 or 160 acres as possible without creating lots smaller than 10 acres when practical. Parcels smaller than this should be combined with other lots or even with a 40 acre aliquot part if necessary. Do not combine parcels which will create a lot larger than 50 acres. If no combination can be found which meet both standards, it is better to create a lot smaller than 10 acres rather than one over 50 acres. It is acceptable to combine two lots each over 10 acres, but it is advisable not to combine lots of over 15 acres each. In the process of determining which lot lines to omit, preference is given to maintaining lot lines which are along the section centerlines. Consideration should also be given to making practical shaped lots that tend to divide shore space evenly between owners.

B. SECTION LOTTING IN OTHER PARTS OF ALASKA

For expediency, protracted lotting is omitted within these sections. If the surveyed land within a section is one contiguous parcel no lot number is assigned, unless there is unsurveyed land within the section. If the land mass within a section is noncontiguous (that is separated by meander lines or surveyed boundaries) a lot number is assigned to each noncontiguous parcel.

Cultural features such as roads, railroads, pipelines, powerlines, etc., do not normally constitute lot boundaries.

A feature which appears to be a lot line, but is not, should be shown with a land hook (-----/-----) connecting the two portions of the lot. This indicates that both parcels are part of the same lot.

Previously surveyed sections should not be relotted except in certain cases in which dependent resurvey or subdivision has been done. If a portion of a section was previously lotted, number these lots with their original numbers and do not return any area for them. Begin new lotting in the section with the next higher lot number.

Lotting information is in vertical lettering and is normally labeled at the 60 lettering size with a 0000 pen. The word "lot" is omitted - only the number itself is shown on the plat. The lot number and acreage are placed inside the lot when practical. If this information must be placed outside the lot, a leader line is used to identify the area involved. The placement of this data must not be outside the section.

The area of the lot is given in acres. The word "acres" is omitted and only the figures are shown on the plat. Lot areas are to the nearest one-hundredth acre; two decimal places.

When necessary to assign lot numbers within a section the numerical sequence starts over with each new section and on new work begins with number 1. The procedure for assigning lot numbers is similar to the sequence for numbering sections, that is they are numbered in a back and forth pattern across the section starting in the northeast corner. Lots encountered simultaneously should be numbered north to south. If a parcel extends over two horizontal rows, don't assign a lot number until encountering the bulk of the parcel. When the northern portion of the section is missing, the direction of each pass is determined by beginning at the theoretical northeast corner of the section and making each pass in the normal manner.

25. PROCEDURE FOR CALCULATING THE AREA OF LOTS AROUND MEANDERS OR EXCLUDED SURVEYS.

When the meanders are photointerpreted the lot areas will normally be computed on BLM programs and provided to the draftsman.

When the meanders are determined in the field the areas of irregular lots around meanders or excluded surveys are calculated using the following general procedure:

1. Determine whether the traverse around each newly surveyed parcel closes within limits. (Previously surveyed parcels need not close within these limits.) This closure is calculated using the bearings and distances given in the field notes (or sketch plat) of the most recent survey available for each portion of the line. The closure is a ratio of the error of closure to the perimeter of the traverse and must be 1:905 or better, as long as the closure does not exceed 1:1280 in either latitude or departure. A parcel which fails to meet this criteria should be returned to the surveyor.
2. Adjust the traverse to close flat using the compass rule adjustment. When meanders are involved the adjustment is normally placed in the meander courses, otherwise the adjustment is distributed proportionately around the entire traverse.

3. Establish the protracted section corners for the irregular sections around the meanders. Be sure to follow the proper procedure for subdividing a township as outlined in the Manual of Surveying Instructions, 1973.
4. Calculate the intersection points of the protracted section lines with the meanders or U.S. Surveys.
5. Calculate areas from the points established around each parcel.
6. Proportionally adjust the calculated areas if necessary so that the record area of the excluded surveys will total properly with the lot areas.

26. METHOD OF CALCULATING THE AREA OF SHORT OR ELONGATED SECTIONS

For original townships the method normally used to calculate the area of west tier sections is described in the diagram entitled "DIAGRAM SHOWING METHOD OF CALCULATING WEST TIER SECTION AREAS" in appendix I.

Along a defective boundary (the alignment of the entire boundary is more than 14' from cardinal bearings) it is normally best to follow the steps for calculating the area of irregular sections as outlined in SECTION 25, of this handbook.

For SE Alaska townships which have protracted lotting within each section the proper method is described in the "DIAGRAM SHOWING METHOD OF CALCULATING WEST TIER LOTS" in appendix I.

27. SECTION AREAS AND TOTAL AREA SURVEYED

If a section can be completely described by aliquot parts, i.e., full sections, half sections, etc., the surveyed area is returned to the full acre without showing a decimal point. All irregular sections, whether lotted or in one parcel without lotting, return the surveyed area to two decimal places. If lotted the acreage for a section is the total acreage of all of the lots in that section. The word "acres" is omitted only the figures are shown on the plat. The section area is shown in vertical lettering. It is centered underneath the section number and is normally one size smaller than the section number.

The total area surveyed is determined by adding together all of the section areas and rectangular tract areas when applicable. This information is centered beneath the bar scale in vertical lettering using the 100 lettering size with a 00 pen. Only the first letter of each word is capitalized. The statement reads "Area Surveyed: 00,000.00 Acres". A colon is placed after the word "Surveyed", and the word "Acres" follows the area.

28. BEARINGS AND DISTANCES

The bearings depicted on the plat must conform to the field notes (or sketch plat) of the current survey, and to the official record of previously surveyed lines which are not being resurveyed or retraced. The bearing given in the field notes should in turn conform to the "Plan of Survey" for the Group.

Cardinal bearings NORTH, SOUTH, EAST and WEST are spelled out and shown in all capital letters. When north, south, east or west appear in other bearing they are abbreviated and must have a period after each letter. Bearings are usually given to the nearest minute. Bearings from zero to nine degrees have the initial zero omitted in front of the degrees, however the initial zero is never omitted from the minutes or seconds portion of the bearing.

Distances depicted on the plat must conform to the field notes (or sketch plat) of the current survey and to the official record of previously surveyed lines when applicable. Distances are shown in chains and are normally given to two decimal places. The word "chains" is omitted from the plat. Distances less than one chain must be shown with a zero to the left of the decimal point. Bearings and distances are depicted on the plat using slanted lettering.

- a. Along a township boundary, bearings and distances are generally placed outside the township. Distances are shown once for each section while bearings are given once for each segment of straight line and are therefore placed farther from the line than the distances. If the position for a section corner is not shown on the plat the overall distance is terminated at the last meander corner (or closing corner) before the missing section corner, and another overall distance is given between the meander corners (or closing corners) which straddle the missing section corner unless the field notes indicate otherwise. Overall distances are normally shown in the 80 lettering size with a 000 pen, while the bearings are shown either with the 100 lettering size and a 00 pen, or a 120 lettering size and a 0 pen.

On townships in SE Alaska it is common for a portion of the surveyed land within a township to have an unsurveyed township boundary. Distances given between protracted section corners along an unsurveyed township boundary are shown in parentheses.

- b. Along surveyed subdivisional lines bearings and distances are shown once for each section. These are normally shown at the 80 lettering size with a 000 pen. Bearings and distances may straddle the section line or they may both be placed along one side. If they straddle the line the bearing would normally be placed on top of the line and the distance below as viewed from the bottom or the right hand side of the sheet. If the bearing and distance are placed on one side of the line they are normally placed above the line as viewed from the bottom or the right side of the sheet.

- c. When sections are subdivided the surveyed lines within each section are normally shown at the 60 lettering size with a 0000 pen. The centerlines of each section are given one bearing and distance across the entire section, however the centerlines of each 1/4 section must terminate at the section centerline.
- d. Breakdown distances are shown to give the distances along surveyed lines to intermediate points on the line such as meander corners, closing corner and witness points. Breakdown distances are not used to give the distance to topographic calls or witness corners. These distances should be one size smaller than the size used for the overall length of the line. They are normally placed on the opposite side of the line or placed closer to the line than the overall bearings and distances. A distance must be shown for each segment on the line so that the total of all of the breakdown distances will equal the overall distance.
- e. Distances shown to intermediate points along the surveyed line which are not called for in the field notes are shown in parenthesis. These are used to show the spacing of lot lines which are not proportioned evenly along the surveyed boundary. They are used only when the spacing is irregular such as along boundaries of short or elongated sections or the distances to meander corners or closing corners (not for a W.P.) Lot corners are presumed to be evenly spaced along the survey line if these distances are not shown. One distance is shown between a section corner and the adjacent 1/4 section corner if the lotting along that portion of the line is evenly spaced. A parenthetical distance does not extend beyond a section corner or 1/4 section corner which is shown. Neither does it extend beyond a meander corner or a closing corner. Parenthetical distances supplement the breakdown distances to points called for in the field notes or depicted on the sketch plat as outlined in paragraph (d). Both distances must be shown when appropriate. If a parenthetical distance is used for any portion of a line between two field-measured points, they must be given for every portion of that line.
- f. Bearings and distances along a Retraced or Resurveyed line are depicted the same as along a newly surveyed line.
- g. On a previously surveyed line (that is not being resurveyed or retraced) repeat the record survey information for those lines that form the boundary of new surveyed land. It is not necessary to show line calls along previously surveyed lines.

Any time both the bearing and distance are stacked and shown on one side of the line, the distance is placed closest to the line.

See "Illustrations of Distances Shown Along Surveyed Lines" in appendix I.


29. TIE INFORMATION

If a group has regular field notes every tie given in the field notes must be shown on the plat. This does not include ties to improvements, bearing objects or meander points for beginning the meandering of an island or lake within the township. These are often too numerous to show and would clutter the plat. A tie from a corner on a common boundary between two townships must be shown on the plat of the township that contains the description of the monument from which the tie originates, but otherwise may be shown only on the township plat on the side on which the tie falls. From a closing corner on the boundary of a previous survey both ties must be shown on both plats.

Along tie lines, bearings and distances are normally shown at the 60 lettering size with a 0000 pen. The bearing given is the forward bearing. The statement "Forward Bearing" is not needed. Ties less than 80 chains in lengths are normally given to the nearest minute, while ties greater than 80 chains are carried to the nearest second. If additional information about the tie is included along the tie line it will be depicted in the same lettering size and style as the tie bearing and distance.

Ties from a witness corner or a witness corner to a meander corner shall state "From W.C." or "From W.C.M.C." respectively, to identify the point at which the tie originates; ties are presumed to come from the true point unless this statement is made. The identity of the tie destination is also shown on the plat. The identification may be in narrative or pictorial form. This information may be shown along the tie line or it may be labeled at the termination of the line.

Ties which would extend off the working area of the plat, if shown to proper scale, may be portrayed in either of two ways:

- An arrowhead may be placed at the end of the tie line and the corner identified along the line with the bearing and distance. In this case, the word "To" precedes the corner identification.
- A compressed distance symbol (— — —  — —) may be placed in the tie line to indicate that the distance is not plotted to scale. This allows the corner to be shown within the working area of the plat and identified at the termination point.

30. U.S. SURVEYS AND MINERAL SURVEYS WITHIN A TOWNSHIP

All approved U.S. Surveys and Mineral Surveys within the surveyed portion of a township must be plotted and identified on the township plat. A tie must be given in the field data or in the official record which enables the surveys to be plotted. Record ties between special surveys are used for plotting but are not repeated on the township plat. Only ties made as part of the township survey will be shown. If a group of surveys are connected by record ties, a tie to each survey is not necessary; one tie

to the group is sufficient. Approved U.S. Surveys and Mineral Surveys within an unsurveyed portion of the township are also plotted based on the best available evidence of their location. Ties are not normally given to those surveys.

It is not necessary to repeat record bearings and distances around the boundaries of inholding surveys abutting the new surveyed area on this type of township plat. Each survey must be labeled and hatched. Normally the entire area is hatched, although larger surveys may show hatching only around the edges. The labeling of these surveys may be spelled out, e.g., U.S. SURVEY NO. 5283, MINERAL SURVEY NO. 2018, or abbreviated U.S.S. 5283, M.S. 2018 respectively. Note that the abbreviation "No." is not used when the title is abbreviated. It is not necessary to show the lotting of a U.S. Survey or the claim names of a Mineral Survey on the township plat unless these are needed to accurately identify a recovered corner of the survey.

The technician should check the official records to assure that all approved surveys are shown on the township plat. The areas of these surveys are excluded from the area of the township. Do not protract section lines or lot lines through these surveys. Show lotting around the excluded surveys the same way lots would be shown around a meander line. These lot areas must be calculated.

31. CONTROL STATIONS

Control stations include triangulation stations, doppler stations, electronic control stations, etc. Show only those control stations which were tied during the current survey. Control stations are shown with an open triangle symbol and are labeled as follows:

- a. The agency identification is given on the first line and is abbreviated. One of the following abbreviations will be used:
 1. BLM/B.L.M. - Bureau of Land Management
 2. N.G.S - National Geodetic Survey (formally known as U.S.C.& G.S. - U.S. Coast and Geodetic Survey. Occasionally a sketch plat may list a control station as U.S.C. & G.S. These are all labeled N.G.S. on the plat.)
 3. U.S.C.E. - U.S. Army Corp of Engineers and Army Map Service
 4. U.S.G.S. - United States Geological Survey
 5. A.M.S. - Army Map Service
- b. The next line is the name of the station. This is enclosed by quotation marks and should not contain periods or commas. The year is part of the name and must be included. Use all capital letters. This name must be exactly as it appears in the published record of the establishing agency.

33. LABELING MERIDIAN BOUNDARIES

A township boundary which coincides with the boundary between two meridians must be labeled appropriately. These statements should be worded to refer to the boundary of the adjoining meridian and do not mention the boundary of the meridian already shown in the township heading. For example the statement SOUTH BOUNDARY KATEEL RIVER MERIDIAN may be placed along the north boundary of a township in the Seward Meridian which abuts the Kateel River Meridian. Lettering standards for these statements are the same as those for Standard Parallels and Guide Meridians.

34. LABELING ABUTTING TOWNSHIP BOUNDARIES AND PREVIOUSLY SURVEYED AREAS

When new survey work adjoins a boundary that has been surveyed under another township, and the boundary is not being resurveyed, a statement must be made along the boundary indicating where the information for that line is to be found. This statement is placed outside, farther from the line, than any other data or labels which are shown along the boundary. They must be shown with leader lines to indicate what portion of the line the statement includes. To determine which boundaries are to be considered surveyed under each township, refer to the heading for each line in the body of the field notes. To determine which lines are previously surveyed check the protraction sheets and the history of previous surveys. The sketch plats should also indicate which boundaries are previously surveyed or concurrently surveyed.

For each of the following situations the statements should read as indicated:

- a. If a common boundary is surveyed at the same time with another township of the same group: Surveyed concurrently with T. 10 N., R. 7 W., in 1979-1980.
- b. If a common boundary is surveyed at the same time with a township of a different group by a BLM surveyor: Surveyed concurrently with T. 10 N., R. 7 W., by John E. Doe, in 1979-1980.
- c. If a common boundary is surveyed at the same time with a township of a different group by a contract surveyor: Surveyed concurrently under contract with T. 10 N., R. 7 W., in 1979-1980.
- d. If an area or common boundary was previously surveyed by a BLM surveyor: Surveyed by Joe E. Doe in 1946-1947.
- e. If an area or boundary was previously surveyed under contract for the BLM: Surveyed under contract in 1974-1975.
- f. If a common boundary was previously surveyed under contract with an adjacent township: Surveyed under contract with T. 10 N., R. 7 W., in 1974-1975.

- g. If a common boundary was previously surveyed by protraction and this boundary is now being surveyed and monumented on the ground:
Surveyed by protraction under Group 310, Area A, in 1974.
Monumented this survey.
- h. If a common boundary was previously surveyed by protraction and the boundary is now being surveyed and monumented with an adjacent township of the same group: Surveyed by protraction under Group 310, Area A in 1974. Monumented concurrently with
T. 10 N., R. 7 W., in 1979-1980.

Statements (a) through (f) can also be applied to resurveyed lines by using the word "Resurveyed" in place of "surveyed". The statements for resurveyed lines only mention the most recent work; no reference is made to the original surveyor, original survey dates, or group number. The statements for concurrent surveys make no reference to group numbers.

Lettering size can be either 80 or 100 depending on the length of the statement and the space available. These statements should be in slanted lettering using capital and lower case letters.

If the surveyor's name appears in the statement it must be given exactly as it appears on the plat memorandum or on the front cover of the field notes of the previously approved survey.

Previously surveyed areas within a township are hatched within the previous survey around the edges. These are labeled across the area involved rather than along the surveyed lines. A township boundary which forms a portion of the enclosure of a previously surveyed area should be labeled independently of the surveyed area. See "Illustration of PREVIOUSLY SURVEYED AREAS WITHIN A TOWNSHIP" in appendix I.

35. RESURVEYED OR RETRACED LINES

Retraced or resurveyed lines are identified in the field notes or on the sketch plat. Do not repeat the record information along these lines; show only the bearings and distances returned by the new survey. This information is shown on the plat in the same manner as it is shown on original work.

The statement "Dependent Resurvey" or "Retracement" will be placed along the resurveyed or retraced portion of the line. Do not use the statements for previously surveyed boundaries along those portions of the lines that are being resurveyed or retraced. Those statements apply to previously resurveyed or retraced lines which are not changed by the present survey.

Slanted lettering is used for these statements; the size of the lettering varies greatly depending upon the space available. Anything from a 60 to a 120 lettering size may be acceptable. The use of capital and lower case letters is optional.

40. WITNESS POINTS

Witness points are shown on these townships plats. They are indicated by a monument symbol and are labeled "W.P." in vertical lettering. It is normally labeled at the 60 lettering size with a 0000 pen. Lettering is normally oriented at a perpendicular or irregular angle that radiates out from the monumented point like witness corner information. Breakdown distances must be shown on each side of the witness point.

41. WITNESS CORNERS

Whenever it is impractical to set a monument at the true corner position a witness corner is established at a safe position within ten chains (five chains if off line). When meander corners are witnessed, these points are called witness corners to the meander corners (W.C.M.C.); witness corners to the auxiliary meander corners (W.C.A.M.C.); or witness corners to the special meander corners (W.C.S.M.C.). Witness corners to all other types of corners are simply referred to as witness corners (W.C.).

The monumented point for a witness corner is indicated by a monument symbol. The information which describes the position of the witness corner is placed at the true point. Breakdown distances are not used to show the location of a witness corner. See "ILLUSTRATIONS OF DISTANCES SHOWN ALONG SURVEYED LINES" in appendix I.)

The witness corner data is kept in a single line when practical. The information is normally placed at an irregular angle radiating out from the true corner position. It is normally shown at the 60 lettering size with the 0000 pen, using slanted lettering.

The data is given in the following order:

- a. The single letter abbreviations for witness corner or witness corner meander corner, etc.
- b. The bearing from the true point to the monumented point. Cardinal bearings must be spelled out in all capital letters.
- c. The distance from the true point to the monumented point. The distance is given in chains, although the word "chains" is omitted.

42. STANDARD PARALLELS

Standard parallels are surveyed every fourth tier of townships within a meridian going north or south from the base line. A base line is an E-W line which passes through the initial point. The procedure for depicting data along a base line is the same as along a standard parallel. Standard Parallels are surveyed to adjust for the convergency of the longitudinal township boundaries. Many unique situations occur at the standard parallels where this adjustment is made.

A. Townships Along The North Side of a Standard Parallel

If closing corners for the township to the south are set on the standard parallel, townships along the north side of a standard parallel will show no indication of the offset townships to the south unless the southerly townships were previously surveyed. On concurrent work, think of the township to the north of the standard parallel as having been surveyed first, before the offset section corners to the south were established.

If corners of minimum control are established for the township to the south, these corners must be depicted on this plat.

The section corners controlling lines north of a standard parallel are called standard corners. Standard corners are not labeled on the plat. Townships along the north side of a standard parallel show the bearings and distances along this boundary in the normal manner except where corners of minimum control have been established. In that case breakdown distances must be shown to indicate the position of these corners.

B. Townships Along The South Side of a Standard Parallel

The townships along the south side of a standard parallel will show the offset sections along the north boundary. Section lines will be projected northerly about 1/2 inch from the standard parallel, while township lines should be slightly longer. Use one line weight thinner for these lines than for regular section and township lines. They will be solid lines if surveyed and dashed if protracted. Offset township lines will be labeled by township and ranges. These are labeled horizontal to the page with the range numbers staggering the vertical township line with the township number placed above. This is labeled in vertical lettering at the 80 lettering size with a 000 pen. Sections north of the standard parallel are labeled on the normal manner. (See the section on "SECTION LABELS".

Distances along the north boundary of these townships are given in reference to the standard corners so that the bearings and distances will match the townships to the north. All measurements which are in reference to the standard corners are shown above the standard parallel. This includes breakdown distances as well as overall distances. Bearings are also placed above the line and should be given at least once for each township even if the entire boundary has no break in bearing.

The section corners abutting the south side of a standard parallel are called closing corners or corners of minimum control. Only closing corners on the surveyed lines are labeled. Corners of minimum control are depicted but are not labeled.

Only the following distances are placed beneath the standard parallel.

- The offset distance from the closing corner or corners of minimum control on the east boundary of the township extending easterly to the next standard corner, whether monumented or not, or to the nearest meander corner, whichever is shortest. (The tie given in the field notes sometimes extends past an unmonumented standard corner to the next monumented point; however, the distance will still be shown only to the nearest corner.)
- The offset distances from the closing corner or corners of minimum control on the west boundary of the township, westerly to the next point, in the same manner described in paragraph(a).
- The offset distance from the closing corner or corners of minimum control of each surveyed subdivisional line, in an easterly or westerly direction to the nearest monumented standard corner, witness point or true meander corner, whichever is shortest, without extending past an unmonumented standard corner. If neither standard corner bracketing the closing corner is monumented, then show the distance to the nearest standard corner.
- The parenthetical distance showing the distance along the north boundary of section 6, or other westernmost section in irregular townships.

See "ILLUSTRATION OF DATA FOR TOWNSHIPS WHICH ABUT A STANDARD PARALLEL" in appendix I.

43. MONUMENT DESCRIPTIONS

The entire description of each new or recovered monument must be included in the survey record. If the township has regular field notes the monument descriptions are contained there, and no indication of the description is made on the plat. In many cases the monument descriptions will be given in abbreviated field note form. These field notes identify each description with a letter of the alphabet. A letter must be shown on the plat which corresponds to the letter for that monument description in the field notes. These letters are normally taken directly off of the surveyors sketch plat. They are labeled to read from the bottom of the page in vertical lettering using 120 lettering size with a 0 pen. Each letter is circled so it will stand out. The circles are drawn just large enough to avoid touching the letters using an 0 pen. Each letter is placed about 1/2 inch from the monument symbol it represents and is connected by a straight, solid leader line. The leader line should be the same thickness as the circle around the letter. It is preferable if the leader line doesn't quite touch the monument symbol.

44. ABBREVIATIONS

The following abbreviations may be used on this type of survey plat:

A.P.	-----	Angle Point
Am.	-----	amended
A.M.C.	-----	auxiliary meander corner
B.L.M./BLM	-----	Bureau of Land Management
CC	-----	closing corner
E.	-----	East
ft.	-----	foot, feet
Lat.	-----	latitude
Long.	-----	longitude
M.C.	-----	meander corner
mi.	-----	mile
M.S.	-----	mineral survey
N.	-----	North
N.G.S.	-----	National Geodetic Survey
No.	-----	number
R., Rs.	-----	range, ranges
S.	-----	South
Sec.	-----	section
S.M.C.	-----	special meander corner
T., Tps.	-----	township, townships
N.G.S.	-----	National Geodetic Survey
U.S.G.S.	-----	United States Geological Survey
U.S.L.M.	-----	United States Location Monument
U.S.M.M.	-----	United States Mineral Monument

U.S.S. ----- United States Survey (U.S. Survey)

W. ----- West

W.C. ----- witness corner

W.C.A.M.C. ----- witness corner to auxiliary meander corner

W.C.M.C. ----- witness corner to a meander corner

W.C.S.M.C. ----- witness corner to special meander corners

Letters used in cap markings or on accessories are not considered abbreviations and therefore may not conform to this list. A few words which are commonly abbreviated in other places but are not abbreviated on this type of survey plat are: Acres, Marks, Standard Parallel, Guide Meridian, Mountain, Creek, River, Island, Highway, Road, Strait, Inlet, etc.

45. SYMBOLS

The degrees ($^{\circ}$), minutes ($'$), and seconds ($''$) symbols are accepted and must be used. The common punctuations for the period, comma, quotation marks and parenthesis are also used. The symbols for feet and inches are not acceptable on survey plats. The open triangle \triangle is the standard symbol for a control station, and the filled triangle \blacktriangle is used for a U.S. Location Monument. The standard monument symbol, is a filled in circle with a diameter of 5 to 7 hundredths of an inch in diameter. (\bullet) Also see the section on "MONUMENTATION".

Refer to the Illustrations "SYMBOLS" in appendix I for topographic symbols commonly used on survey plats.

46. ENLARGED DIAGRAMS/DETAILS

The term "Enlarged Diagram" can be used interchangeably with the term "Detail". The term "Enlarged Diagram" is used for a blow-up of a large area, while the term "Detail" is used for a blow-up of a very small portion of the drawing. Any time critical detail cannot be clearly portrayed at plat scale, an enlarged diagram or detail must be drawn. An enlarged diagram is not required to depict line call features that are documented in field notes since these are not normally considered critical features on the plat. A detail can be made of a portion of an enlarged diagram.

The scale selected depends on the size needed to show the required information. A second sheet may be used if there is insufficient space on the first sheet. Enlarged diagrams or details may be placed in the top four (4) inches of the space for the plat memorandums (see sheet layout in appendix I), in a large water body, or in an unsurveyed portion of the plat as long as they are clearly separated from the main drawing.

A separate scale bar must be used for an enlarged diagram or detail. One scale bar may be used for several enlarged diagrams or details provided they are all drawn at the same scale and placed in the same vicinity on the plat.

Each enlargement must be clearly labeled either "ENLARGED DIAGRAM" or "DETAIL." If a second sheet is used entirely for enlargements one label is sufficient for the whole sheet. These are labeled in vertical lettering at the 140 size with a 1 pen, or a 175 size with a 2 pen.

The appropriate area on the main drawing must have a corresponding label referring to the enlarged diagram, e.g., "See Detail" or "See Enlarged Diagram". If an enlargement is on a different sheet these statements must also refer to the sheet number, e.g., "See Enlarged Diagram Sheet 2". These statements are labeled in vertical lettering either at the 80 size with a 000 pen, or a 100 size with a 00 pen. The use of capital and lower case letters is optional.

It is not necessary to repeat detail on the enlargement which has already been shown on the main drawing, however section numbers and other labeling which identify the area must be depicted on both drawings. Lot numbers may be shown on both drawings if space is available. Section and lot acreages may be shown on either drawing but must NOT be shown on both. It is preferable for all of the detailed information to be shown on the enlargement rather than having some detail on the main drawing and some on the enlargement. All survey lines and meander lines in the area covered by the enlargement must be shown exactly as they are portrayed on the main drawing.

If a bubble detail is used, information that identifies the placement of the detail (section numbers, lot numbers, U.S. Survey numbers, etc.,) can be omitted and no labels are needed (such as DETAIL and See Detail). For bubble details, the portion of the main drawing requiring a detail is circled (or an oval shape) with a thin 0000 pen dashed line. This bubble is then connected to a magnified circle or oval (also made with a thin dashed line) by dashed lines made with a 0000 pen. The magnified circle is placed in an open area of the plat within a few inches of the small circle. Everything shown inside the magnified circle is an enlargement of the area within the small circle. See the example in appendix I.

47. SECOND SHEETS

A second sheet is used whenever there is too much detail to fit on one sheet. The title of the second sheet must be exactly the same as the title on the first sheet. The sheet size and border dimensions are also the same, however it is not necessary to leave a five inch marginal area along the righthand side. Space for a signature block must be left in the lower righthand corner. This space must be at least four inches high and five inches wide. In the extreme upper righthand corner of each sheet, just inside the border, the sheets are numbered, e.g., Sheet 1 of 2 Sheets. The same criteria applies to third or fourth sheets when they are used. This statement is in vertical lettering at the 100 lettering size with a 00 pen. The use of capital and lower case letters is optional.

48. DRAFTERS INITIALS

The initials of the draftsman must be placed in the lower left-hand corner of each sheet just inside the plat borders. These must be mechanically lettered so they will read from the bottom of the sheet at a 80 or a 60 lettering size. They may be vertical or slant and are normally labeled in all capital letters.

49. LINE CALLS

Line calls are topographic or hydrographic features which are described in the field notes. Many of the calls made along surveyed lines are shown on the plat. These features are plotted, shown with the proper symbol (see the section on "SYMBOLS") and labeled. The features which are normally shown include highways, roads, trails, powerlines, telephone lines, pipelines, bridges, tunnels, rivers, sloughs, creeks, marshes, and sometimes improvements such as fences and garden plots. Other features are not normally shown on the plat; these include gullies, ridges, slopes, tree lines and meadows. Line calls are normally labeled at the 60 lettering size. The distance called in the field notes is presumed to be to the center of the feature unless otherwise stated. The distances to these calls are not shown on the plat. In congested areas line call features may be omitted.

Line call features are occasionally shown on the sketch plat when no field notes are available. In these cases the distance along the line to the feature and the description of the feature must be included on the plat. The distance should be shown at an irregular angle radiating out from the intersection point. It is done at the 60 lettering size and is slanted. The description must include the name of the feature, the width (when available), and the bearing (or course). This information is placed near the feature and is labeled vertically using the 60 lettering size. Examples: GLENN HIGHWAY, 80 Lks. WIDE, BEARS N. 30° W. and S. 25° E.; CREEK, 60 lks. WIDE, COURSE N. 10° W.

DIAGRAM SHOWING METHOD OF CALCULATING WEST TIER LOTS (SE Alaska only)

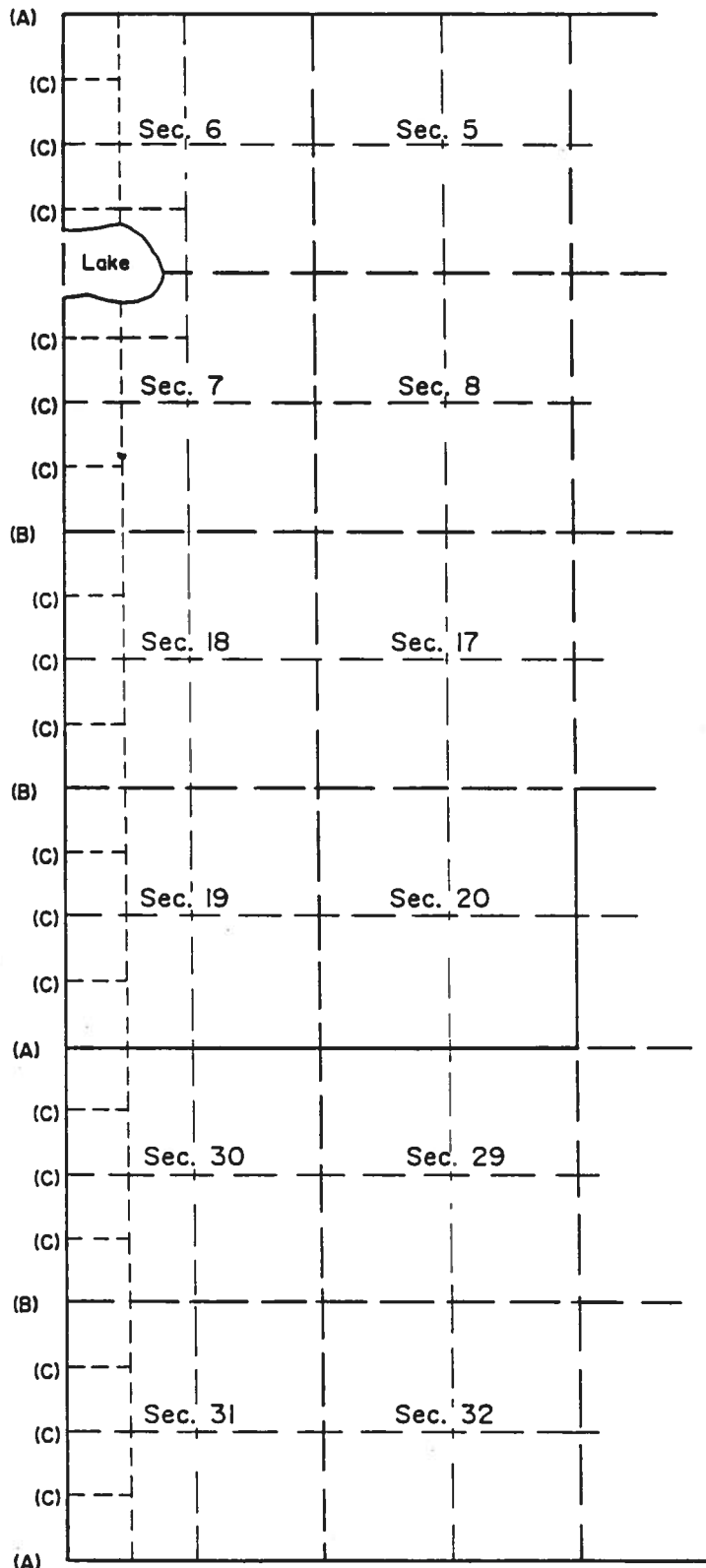
THE LETTERS ON THIS
DIAGRAM REPRESENT
THE E-W LENGTH
(IN CHAINS) ALONG
THE LINE ADJACENT
TO EACH LETTER
FOR THE WESTERLY
1/4 SECTION ONLY.

THE LETTER (A) IS
USED TO REPRESENT
SURVEYED DISTANCES
WHICH ARE GIVEN TO
TWO DECIMAL PLACES.

THE LETTER (B) IS
USED TO REPRESENT
DISTANCES WHICH
ARE TO BE ROUNDED
OFF TO TWO DECIMAL
PLACES.

THE LETTER (C) IS
USED TO REPRESENT
DISTANCES WHICH ARE
NOT ROUNDED OFF.

WHEN ROUNDING OFF
IF THE THIRD DECIMAL
PLACE IS EXACTLY
5 ROUND THE SECOND
DECIMAL PLACE TO
THE NEAREST EVEN
NUMBER.



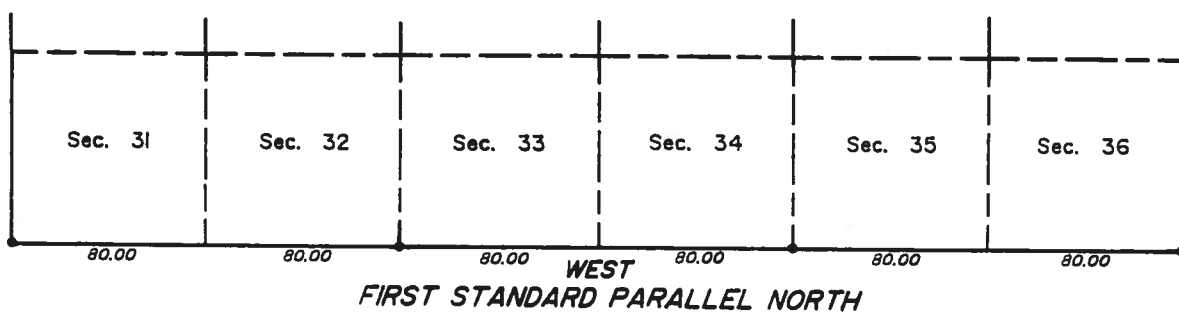
STEPS

- 1.) Hold given distances (A) along surveyed lines.
- 2) Proportion lengths of protracted section lines which are shown on the plat. (B) (Note: Omit this step for any section line if the section cor. falls in water or a U.S. Survey.)
- 3) Proportion lengths along protracted lot lines (C) between section line lengths (B), using rounded figures for length (B).
- 4) Add the length of the north and south boundaries of each lot to obtain the lot area (in acres) for those lots not affected by a water body or a U.S. Survey.
- 5) Round the area of each lot to two decimal places.

ILLUSTRATION OF DATA FOR TOWNSHIPS WHICH ABUT A STANDARD PARALLEL

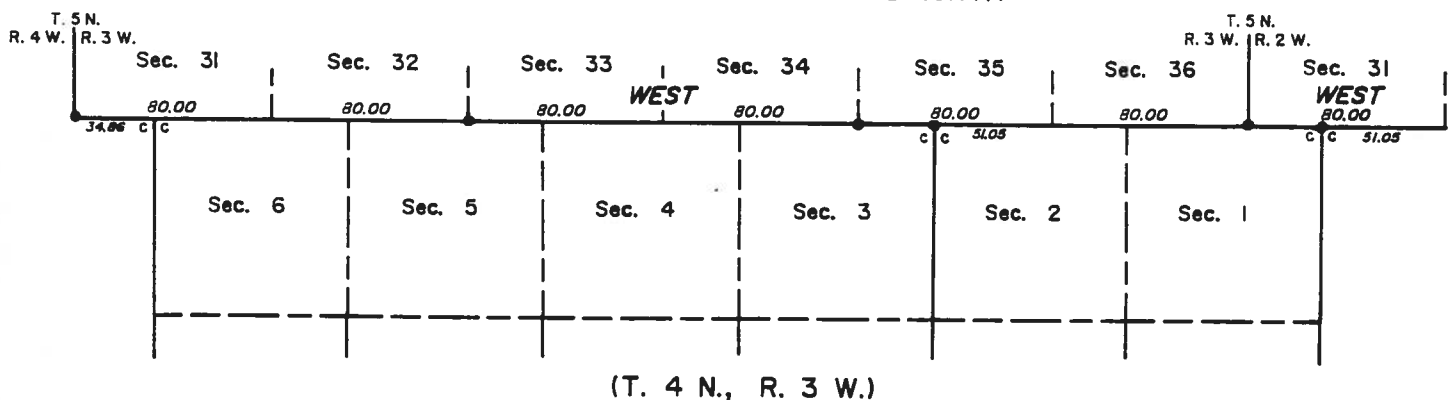
DATA SHOWN FOR TOWNSHIPS NORTH OF A STANDARD PARALLEL

(T. 5 N., R. 3 W.)

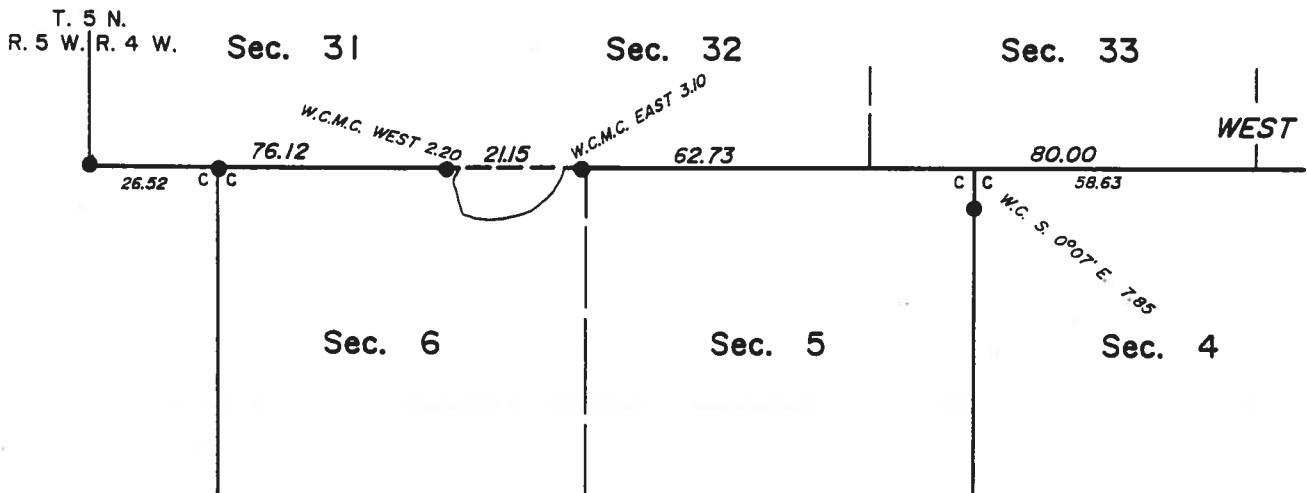
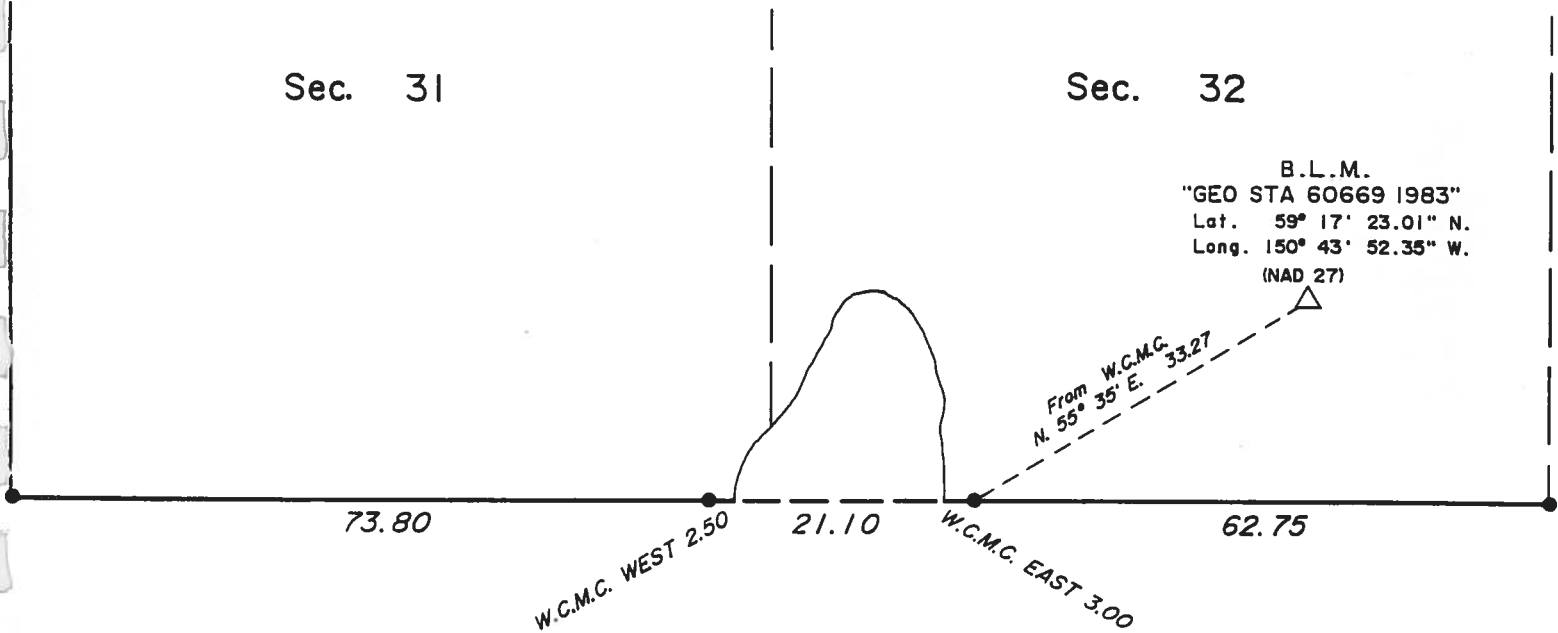
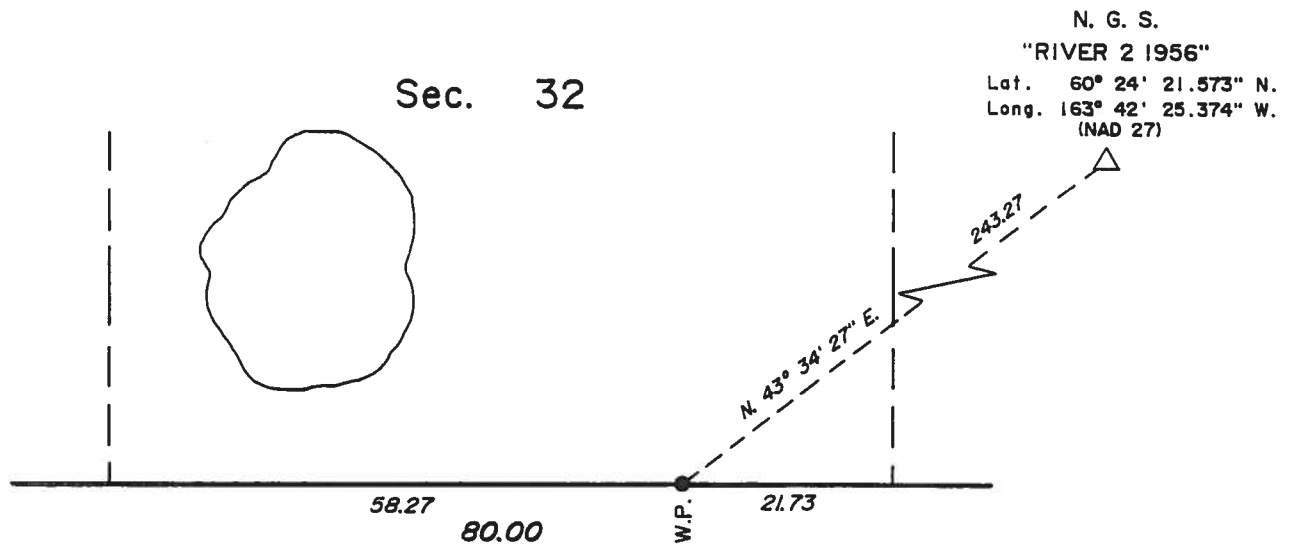


DATA SHOWN FOR TOWNSHIPS SOUTH OF A STANDARD PARALLEL

FIRST STANDARD PARALLEL NORTH



ILLUSTRATIONS OF DISTANCES SHOWN ALONG SURVEYED LINES



ILLUSTRATIONS OF DISTANCES SHOWN ALONG SURVEYED LINES

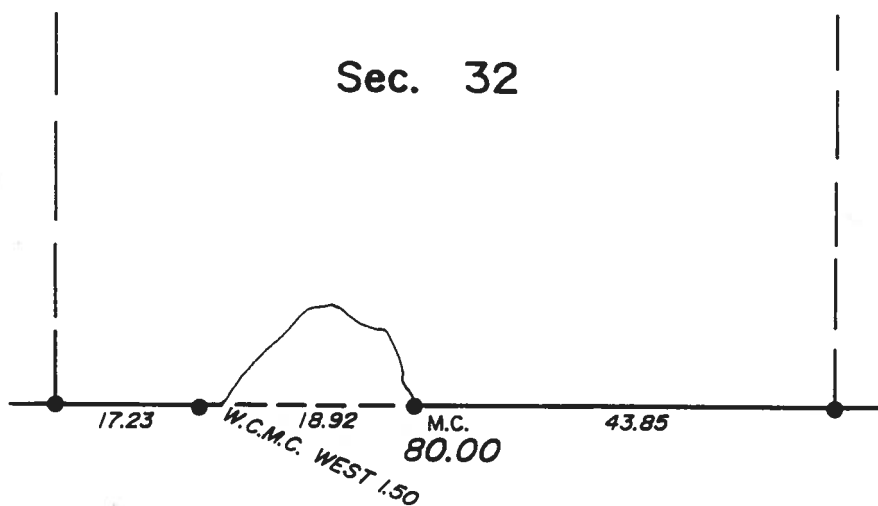
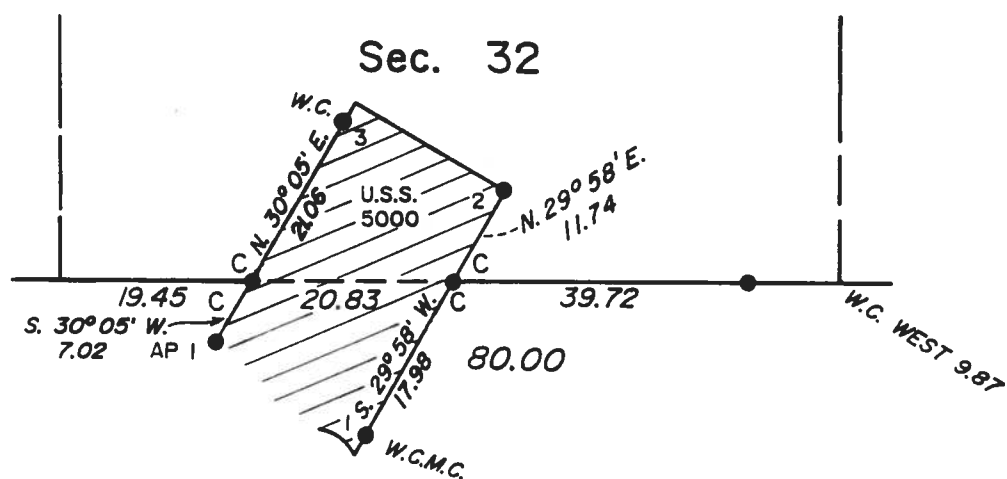
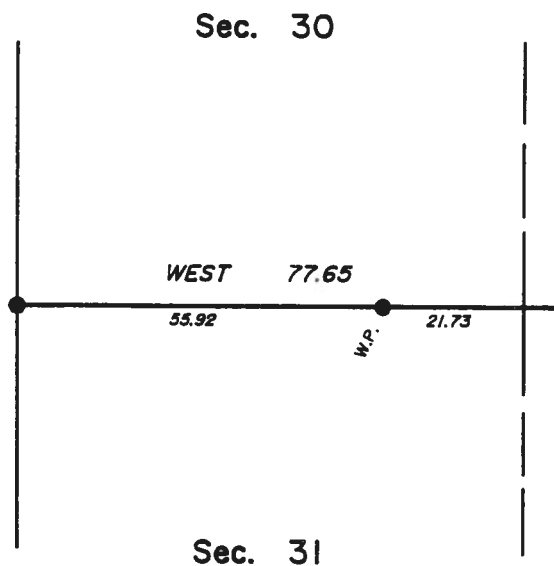


ILLUSTRATION SHOWING ACCRETION AND EROSION (WITH A PARTITION LINE)

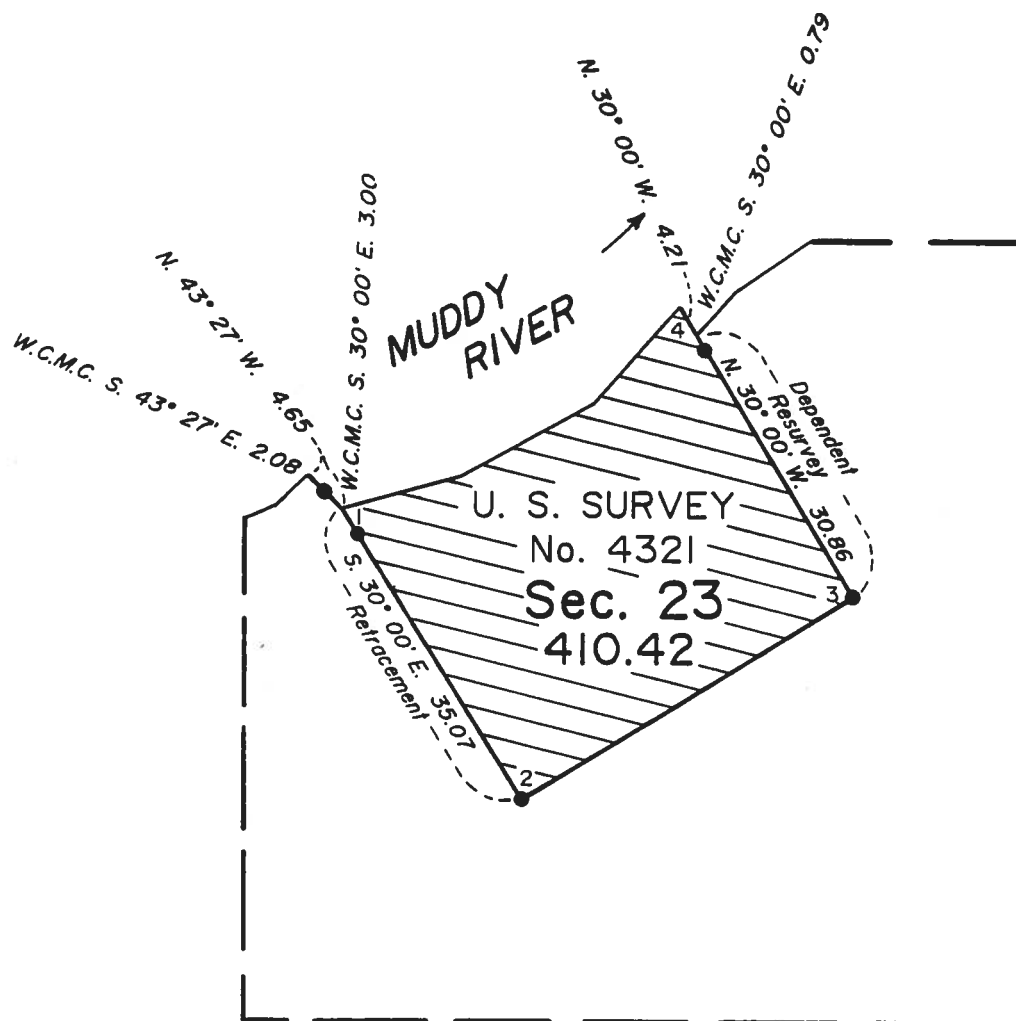
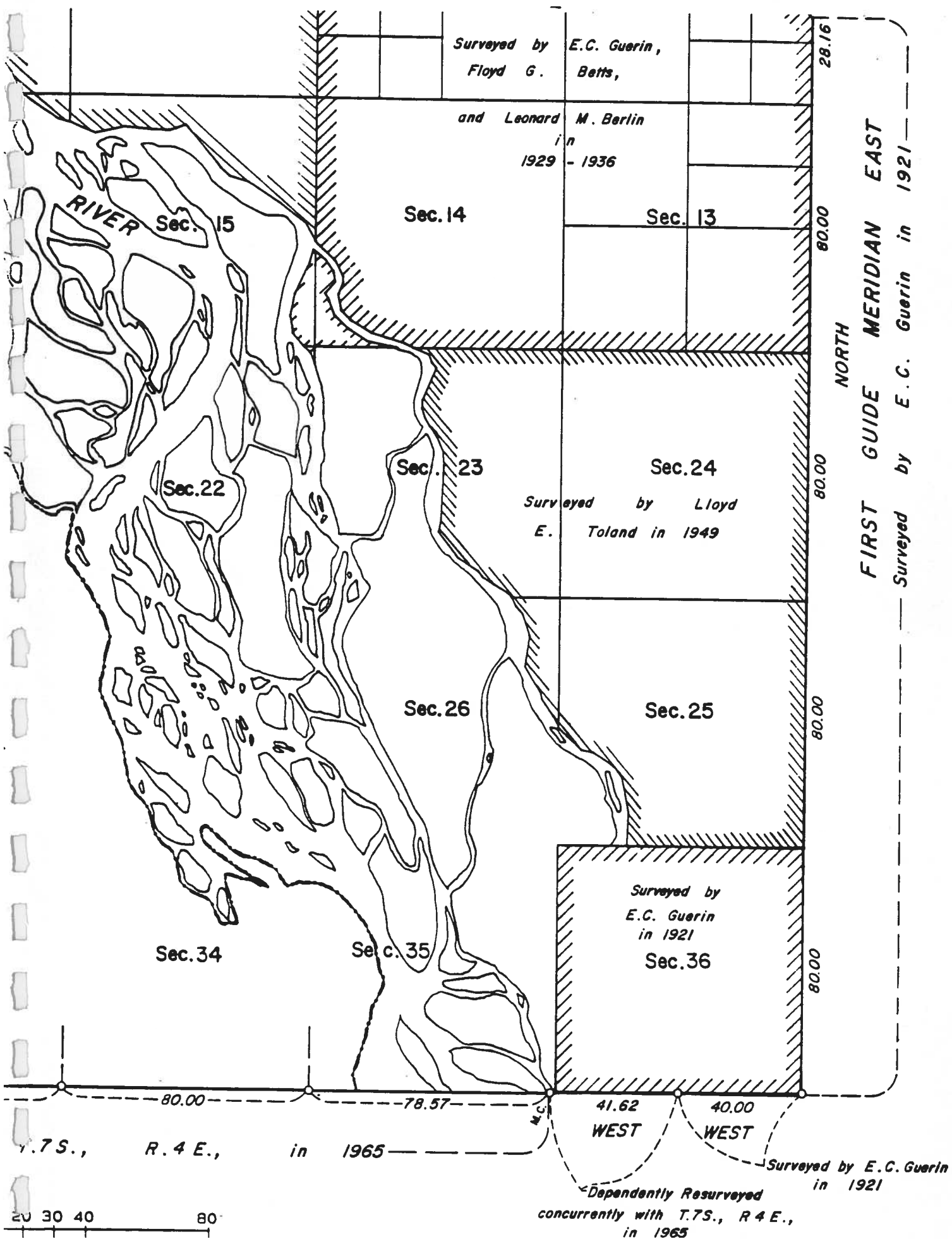
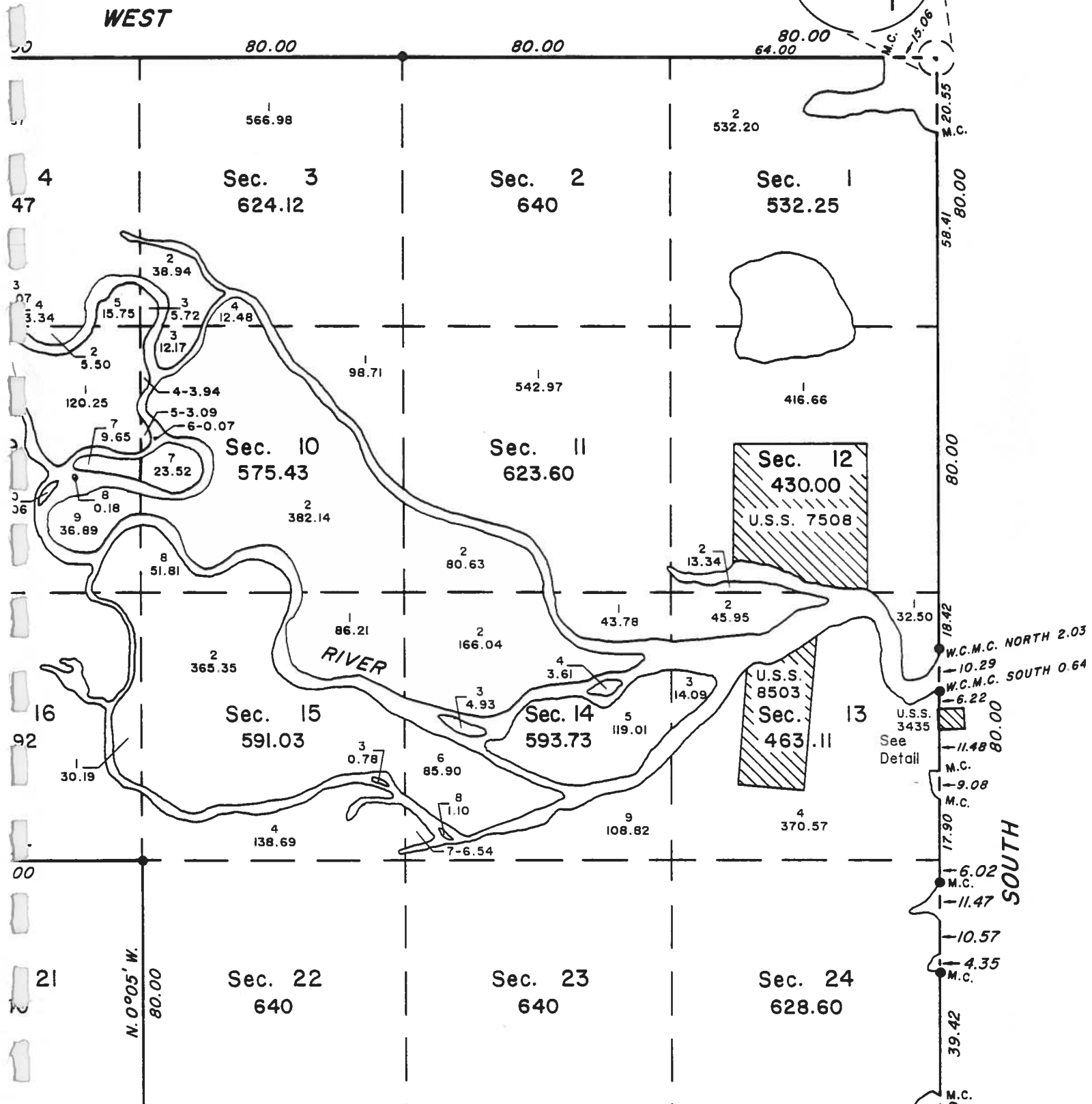


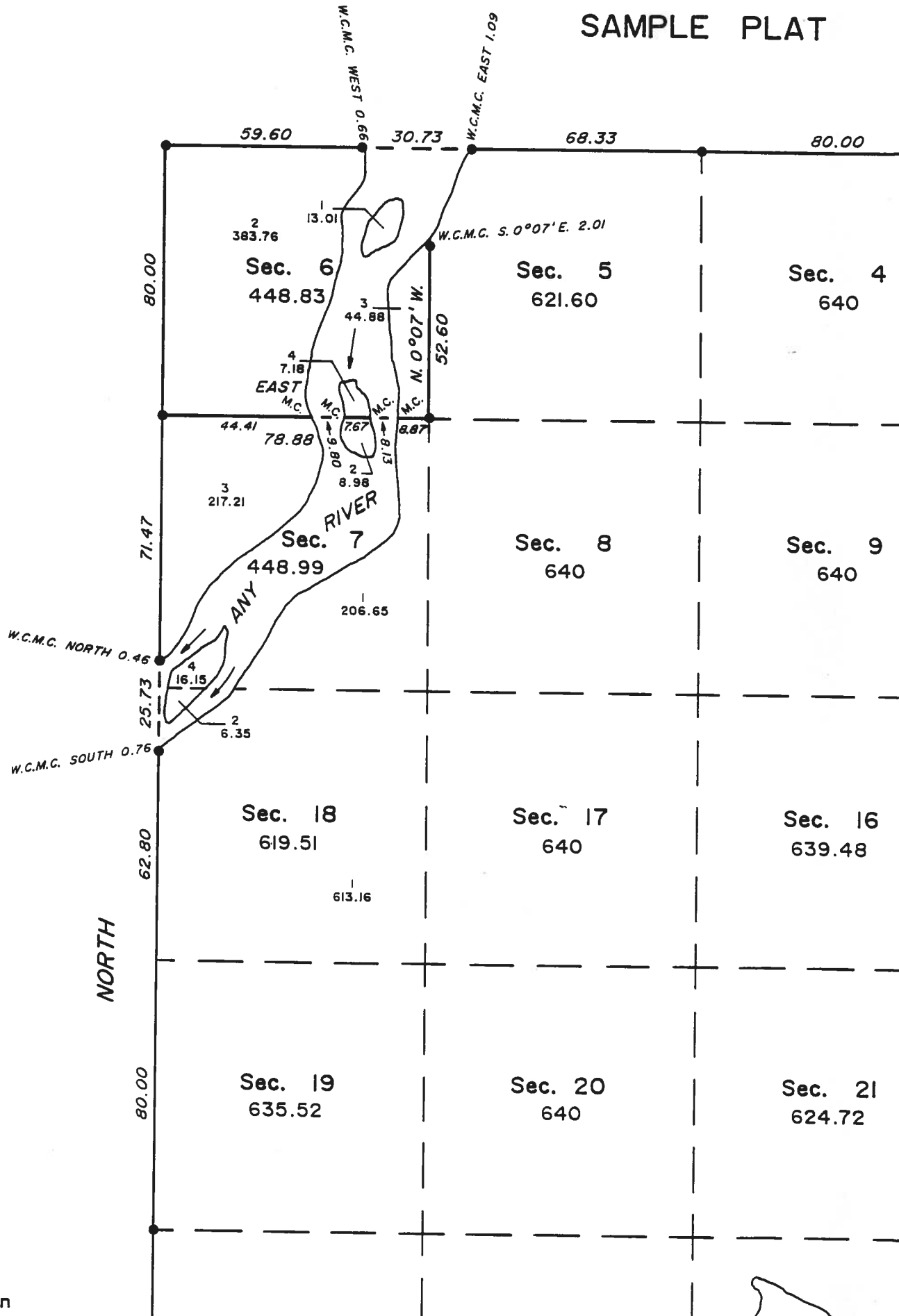
ILLUSTRATION OF PREVIOUSLY SURVEYED AREAS WITHIN A TOWNSHIP





TOWNSHIP 0 NORTH, RAI

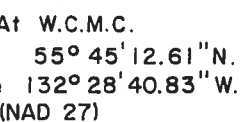
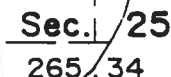
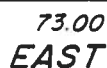
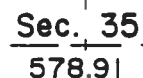
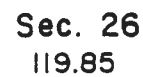
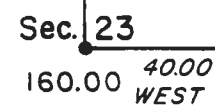
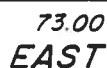
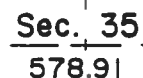
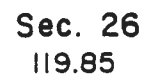
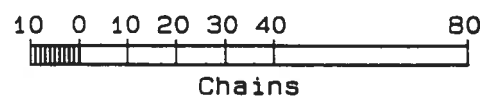
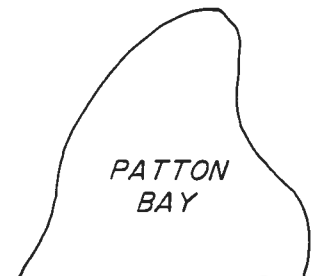
SAMPLE PLAT



Mean
Magnetic
Declination
00°00'

Sec. 12

SURVEYED



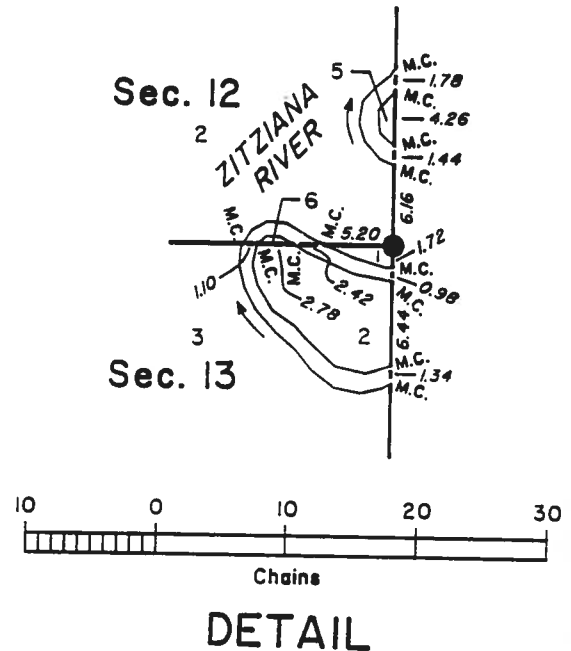
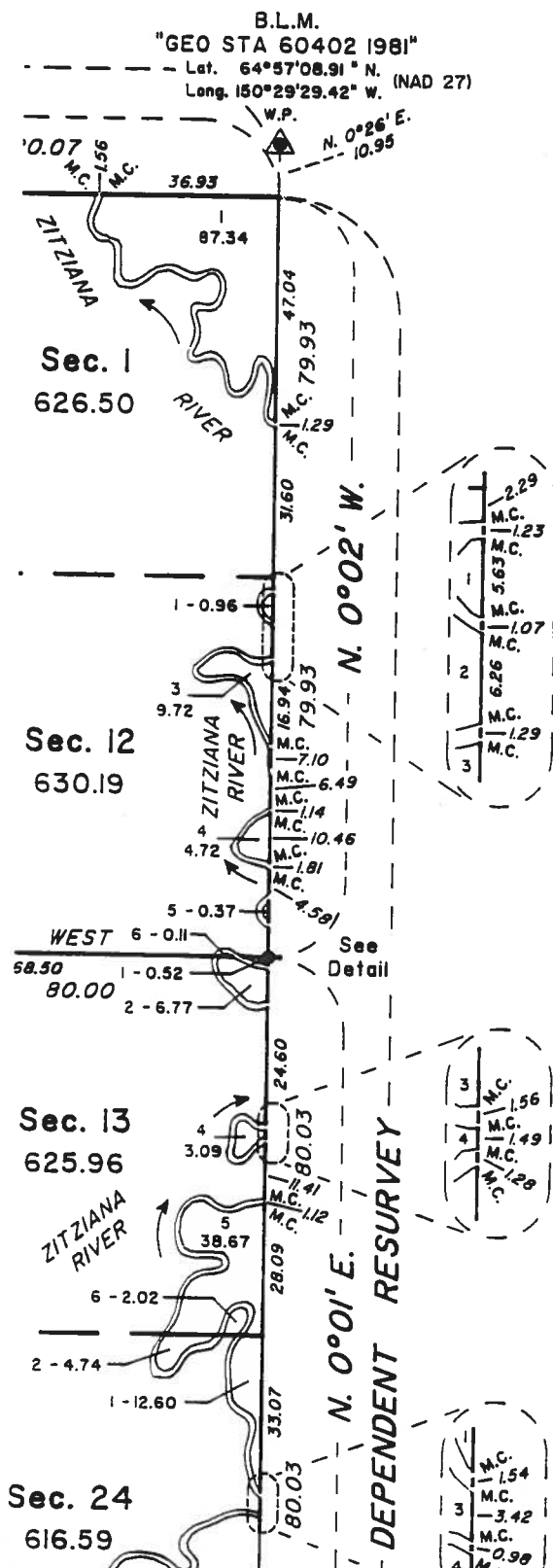
SAMPLE DETAILS

Officially Filed

ORIGIN

DATE _ _ _ _ _

AIRBANKS MERIDIAN, ALASKA



The history of surveys is contained in the field notes.

This plat and the field notes represent the dependent resurvey of the east and north boundaries of Township 1 North, Range 15 West; and the survey of the Fairbanks Base Line along the south boundary of Township 1 North through Range 15 West, a portion of the subdivisional lines, and meanders of Township 1 North, Range 15 West, Fairbanks Meridian, Alaska. A portion of the subdivisional lines of the township were surveyed by protraction as shown on this plat.

This dependent resurvey and survey were executed by Tommy A. Noble and Paul J. Hickey, Cadastral Surveyors, August 13, 1981, through September 15, 1986, in accordance with the specifications set forth in the Manual of Surveying Instructions, 1973; Special Instructions for Group No. 384, Alaska, dated August 8, 1980, approved January 15, 1981; and Assignment Instructions dated August 13, 1981, Amended Assignment Instructions dated April 27, 1982, and Assignment

DRAFTING GUIDELINES

PART II

TRADITIONAL RECTANGULAR SURVEY

INTRODUCTORY STATEMENT

The traditional style of Township survey is covered extensively in the Manual of Surveying Instructions, 1973 which is the official manual of specifications for the Bureau of Land Management (BLM) Surveys. These guidelines are not designed to supercede that Manual, but rather to abstract information specific to platting.

The primary purpose of Part II is to identify specific areas of the traditional style of platting that are different from the protracted subdivision style covered in Part I. All Section of Part I not covered by Part II are to be followed for both types of rectangular survey.

The term "Traditional Rectangular Survey" is used to indicate that this is the standard method of surveying and platting the public lands. Since the vast majority of lands surveyed in Alaska do NOT conform to this standard, it is important to clarify when it is appropriate to use this method. The platting of a Township in the Traditional Rectangular Survey style is indicated for those sections within the township which have every section line surveyed and generally have the section corners and one-quarter sections corner monumented or witnessed. Any portions of the township not meeting this criteria should be completed by the standards for Protracted Subdivision Townships as covered in Part I.

1. MONUMENTATION

Monument symbols are not shown on Traditional Rectangular Surveys. Every survey section corner, one-quarter section corner, meander corner, closing corner, and intersection of survey lines is presumed to be monumented or witnessed. The record of the monumentation is carried in the field notes.

An exception to this rule is when the current survey is platted with a mixture of styles. If a portion of township is being surveyed in the protracted subdivision style and a portion is being surveyed in the traditional style, monument symbols are shown at the position of each corner that was recovered or set. Refer to the section on "MONUMENT SYMBOLS" in Part I.

2. SURVEYED/UNSURVEYED LAND

On Traditional Rectangular Surveys, all sections completely bound by surveyed lines are returned as surveyed land and given an area on the township plat except:

- a. New areas are NOT assigned to as previously surveyed section unless the calculated area of any lot varies over 5% from the record and the land is still in public domain.
- b. Lands within a U.S. Survey or Mineral Survey.
- c. Lands that are quitclaim deeded and are therefore no longer in Federal ownership.

3. LOTTING WITHIN A SECTION

Each surveyed section not subdivided by survey is subdivided by protraction. Regular sections have protracted centerlines only, while other sections have lotting around the irregularities which allow as many aliquot parts as practical. When lot lines are needed they are drawn along the centerlines of sections and along the centerlines of quarter sections. The centerlines of a section are determined by connecting opposite quarter-section corners with a straight line.

In the process of protracting lot lines, do not create lots less than 10 acres. Parcels smaller than this should be combined with other lots, or even with a 40 acre aliquot part if necessary. Do not combine parcels which will create a lot larger than 50 acres. If no combination can be found which meet both standards, it is better to create a lot smaller than 10 acres rather than one over 50 acres. It is acceptable to combine two lots each over 10 acres, but it is advisable not to combine lots of over 15 acres each. In the process of determining which lot lines to omit preference is given to maintaining lot lines which are along the section centerlines. Consideration should also be given to making practical shaped lots that tend to divide shore space evenly between owners.

See the examples of lotting within a section in Appendix II.

Cultural features such as roads, railroads, pipelines, powerlines, etc., normally do not constitute lot boundaries.

A feature which appears to be a lot line, but is not, should be shown with a land hook (-----⁷-----) connecting the two portions of the lot. This indicates that both parcels are part of the same lot.

Previously surveyed sections should not be relotted except in certain cases in which dependent resurvey or subdivision has been done. If a portion of a section was previously lotted, number these lots with their original numbers and do not return any area for them. Begin new lotting in the section with the next higher lot number.

Lotting information is in vertical lettering and is normally labeled at the 60 lettering size with a 0000 pen. The word "lot" is omitted - only the number itself is shown on the plat. The lot number and acreage are placed inside the lot when practical. If this information must be placed outside the lot, a leader line is used to identify the area involved. The placement of this data must not be outside the section.

The area of the lot is given in acres. The word "acres" is omitted and only the figures are shown on the plat. Lot areas are to the nearest one-hundredth acre; two decimal places.

Each lot is identified by a number. The numerical sequence starts over with each new section and on new work begins with number 1. The procedure for assigning lot numbers is similar to the sequence for numbering sections, that is they are numbered in a back and forth pattern across the section starting in the NE corner.

Lots encountered simultaneously should be numbered north to south. If a parcel extends over two horizontal rows, lot numbers are not assigned until encountering the bulk of the parcel. When the northern portion of the section is missing, the direction of each pass is determined by beginning at the theoretical northeast corner of the section and making each pass in the normal manner.

Aliquot parts are not lots and are not assigned lot numbers. They are not identified on the plat except by the approximate area of the parcel. Aliquot parts do not have calculated areas; they are assigned areas of either 40, 80 or 160 acres. Do not make aliquot parts which extend across the centerline of the section or which take an elbow shape. The area of aliquot parts are in whole acres and do not show decimal places. Lettering size usually matches the lot numbers. In a full 640 acre section aliquot part areas are omitted.

4. METHOD OF LOTTING AND CALCULATING LOT AREAS OF SHORT AND ELONGATED SECTIONS

In a regular township, the sections next to the west boundary of the township are short, that is, they are designed to be less than 80.00 chs. wide. These sections are referred to as the west tier. Other townships may have short or elongated sections along any boundary that abuts previous survey or the boundary between two meridians, e.g., the boundary between the Seward Meridian and the Copper River Meridian.

Interior sections in a township are considered regular sections even though they vary in size from a 80.00 chain square, as long as they are within rectangular limits. An excess or deficiency of 0.50 chains per mile is within rectangular limits. Lotting along the boundary is required any time an excess or deficiency in distance is pushed to the edge of the surveyed area rather than being distributed evenly between the lots within a section. This can be determined from the distances given in the field notes or from the official record of a previously surveyed line. Along a previously surveyed line protracted lot lines should be spaced proportionately based on the original record.

Within the western tier of sections, the irregular distances are all placed in the most westerly tier of lots so that the remainder of the lots and aliquot parts in the section are regular size. Within the northern row of sections the irregular distances are normally placed in the northerly row of lots.

The proper method of calculating the areas of the west tier lots is demonstrated in the illustration "Lotting and Calculating Short or Elongated Sections" in appendix II. This method of area calculation is designed to disregard deviations in the N-S length of the west tier sections that are within rectangular limits. If the northerly row of sections is also short or elongated, the N-S length must be considered in calculating the area of the most northerly west tier lot in the most northerly west tier section.

5. U.S. SURVEYS AND MINERAL SURVEYS WITHIN A TOWNSHIP

All approved U.S. Surveys and Mineral Surveys within the township must be plotted and identified on the township plat. The names may be spelled out or abbreviated, e.g., U.S. Survey No. 5283, Mineral Survey No. 2018, or U.S.S. 5283, M.S. 2018 respectively. Note that the abbreviation "No." is not used when the title is abbreviated.

Those surveys within surveyed sections must have a tie in the field data or in the official record which enables the surveys to be plotted. Record ties between noncontiguous surveys are used for plotting, and are repeated on the township plat unless a new tie has been made. Those surveys within unsurveyed portions of the township are positioned by the best available evidence. Ties and record bearings and distances are not depicted for these surveys.

Some of the record information of the lines of U.S. Surveys and Mineral Surveys, that about the new survey is depicted on the township plat. Show corner numbers, bearings and distances along these lines. It is not necessary to depict lotting within the U.S. Surveys or claim names of Mineral Surveys except as needed to identify corners around the edge of the survey. Enlarged diagrams are often necessary to depict this information. If shown on the main drawing, the 60 lettering size with a 0000 pen is used.

Those record surveys within the unsurveyed portion of the township are hatched so they will stand out. Record surveys within surveyed areas are not hatched.

The technician checks the official record to assure that all approved surveys are shown on the township plat. The areas of these surveys are excluded from the area of the township; do not protract lot lines through them. Show lotting around the excluded surveys the same way lots would be shown around a meander line. These lot areas are normally calculated by the technician. See the example in appendix II.

6. WITNESS POINTS

Witness points are monumented points along a line. They are normally used only on very long lines and are used to assist in re-establishing the line in the future. Witness points are placed so that it is not over 45 chains between monumented points.

Witness points are NOT depicted on Traditional Rectangular Survey plats. Information pertaining to a witness point is carried in the field note record. Exceptions to this rule are as follows:

- a. Along a resurveyed or retraced line a witness point is shown if it becomes an angle point on the line. (See the Section on Angle Points in Part I.)
- b. A witness point is shown if a tie originates from the point. When depicted, a small tick mark is used to indicate the position of the witness point. The tick mark is made with a 0000 pen, and is oriented perpendicular to the surveyed line, and extends about two-hundredths of an inch on each side of the line. The letters W.P. are placed near the tick mark using vertical 60 lettering with a 0000 pen. Periods are used after each letter and they are oriented to radiate out from the actual point.

7. WITNESS CORNERS

No indication of the actual witness corner position is made on the plat unless a tie originates or terminates at the witness corner. In that case, a small tick mark is used to indicate the position of a witness corner. The tick mark is drawn perpendicular to the surveyed line with a 0000 pen, and extends only about 2 or 3 hundredths of an inch on each side of the line. All other standards given in the sections on witness corners in Part I apply to Traditional Rectangular Surveys.

8. STANDARD PARALLELS

The standards in Part I apply to Traditional Rectangular Surveys with one addition. On this type of survey plat the offset distance is depicted on the township to the south side of the standard parallel, from each one-quarter section corner. Refer to the "ILLUSTRATION OF DATA FOR TOWNSHIP WHICH ABUT A STANDARD PARALLEL" in appendix II.

9. CENTERLINE TRAVERSE - Field Notes

The field notes will occasionally list the traverse of the centerline of a highway in the same manner it would list meanders. These features must be plotted and shown on the final plat. Centerline traverses may be portrayed in either of two ways:

- a. They may be plotted with a centerline symbol and labeled as the centerline of the highway.
- b. They may be plotted with the appropriate symbol (see the Section on "SYMBOLS" in part I) and labeled with only the name of the highway. This is the preferred method.

The bearings and distances are not shown along the courses of a centerline traverse unless the centerline forms a boundary of the survey.

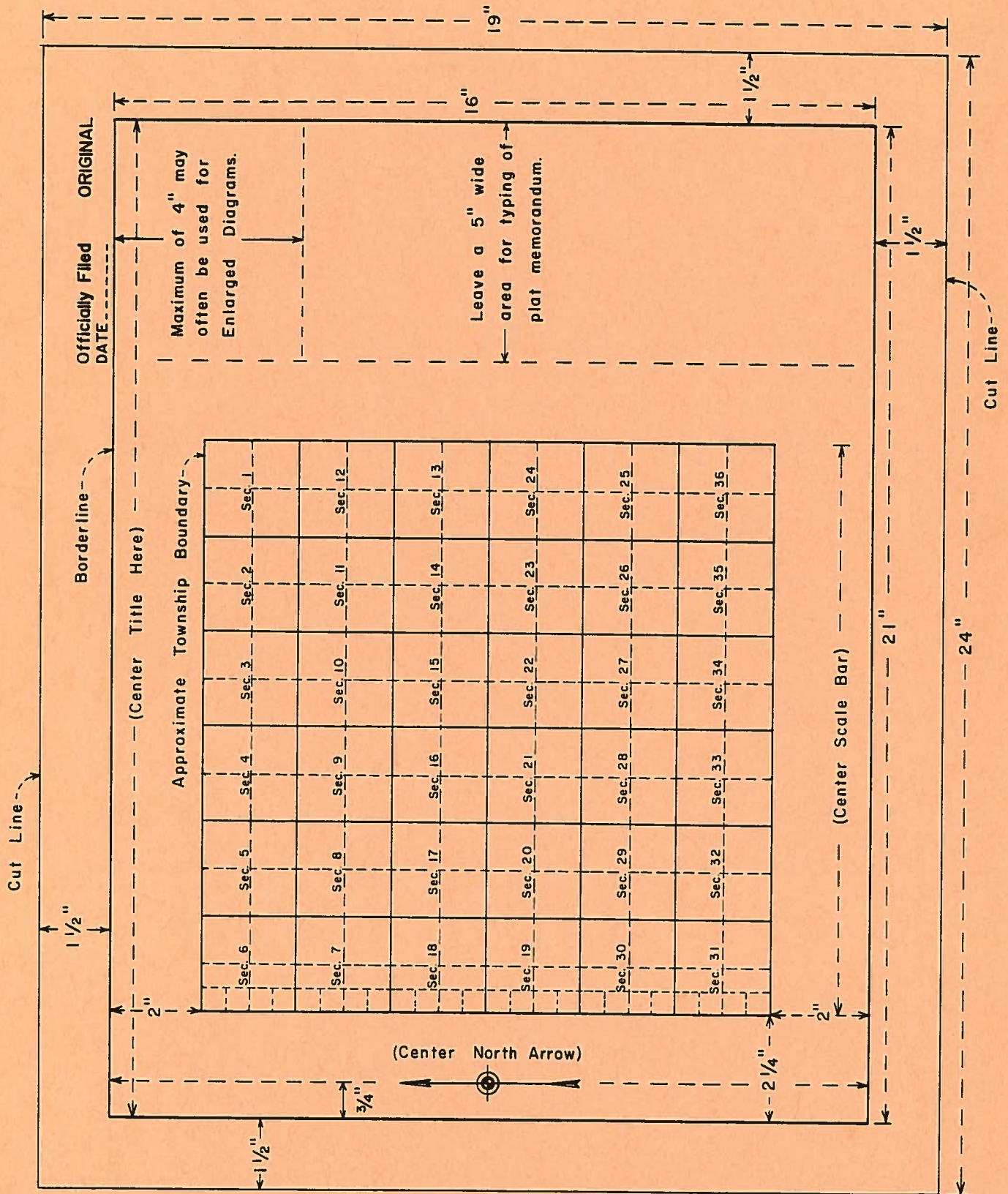
10. IMPROVEMENTS

The word improvement refers to buildings and other cultural features which have been constructed on the land. Roads and power lines are not usually considered improvements. Improvements are plotted to scale on the final plat and labeled as shown in the field notes. Only the outline of the buildings are shown. These outlines are normally drawn with a 0000 pen. On small scale plats it is permissible to show the improvements filled in solid since many of them will appear very small. Improvements are labeled in vertical lettering. This is normally done at the 60 lettering size with 0000 pen.

Do not plot outhouses or temporary improvements such as trailers and do not show the ties to the improvements.

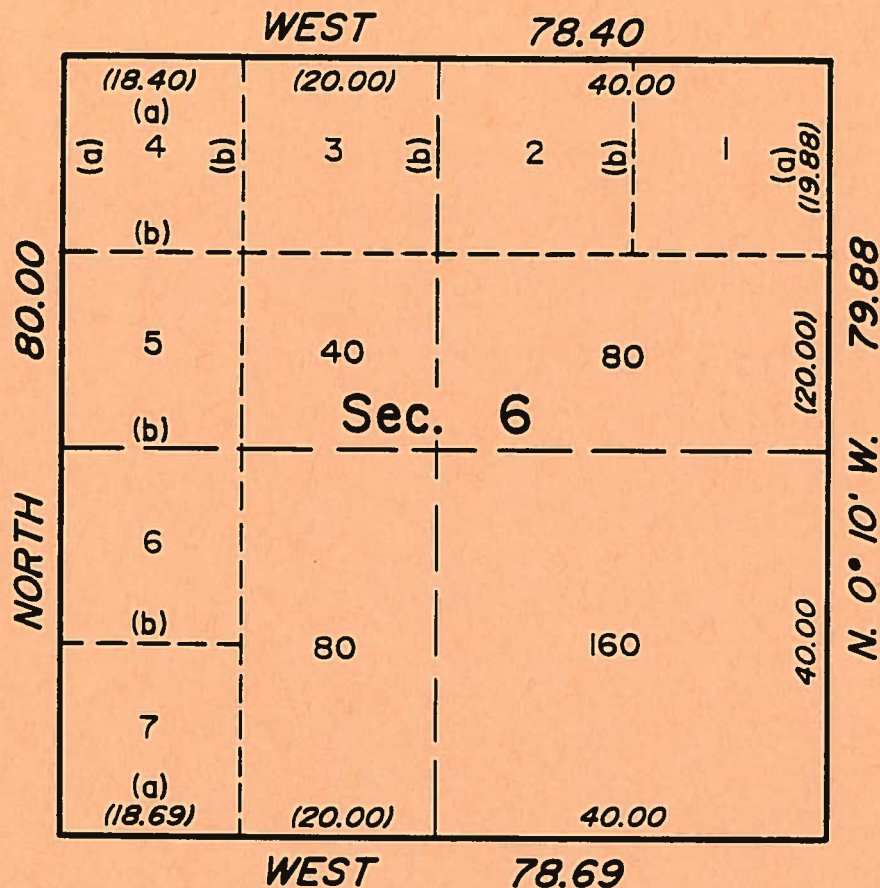
APPENDIX II

DIMENSIONS FOR SHEET LAYOUT



Note: For layout of fractional townships hold the relative position of the sections.

METHOD OF CALCULATING LOT AREAS FOR SHORT OR ENLONGATED SECTIONS

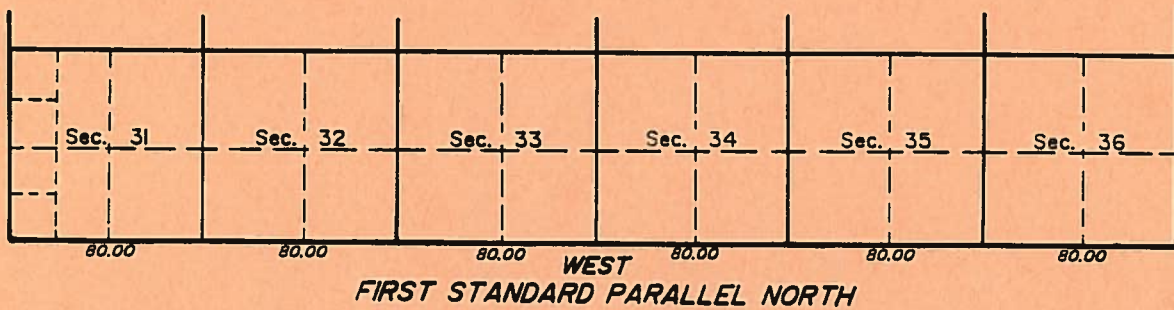


- 1.)Proportion lengths (b) between given distances (a). Carry lengths (b) to three decimal places.
- 2.)To determine the areas for the lots that are 20.00 chains wide (lots 1, 2, 3, 5, 6 and 7 in this example) add the opposite sides (the lengths along (a) or (b)) of each lot together.
- 3.)To determine the area of the corner lot in sections that are short on two sides (lot 4 in this example) average opposite sides (to get the average height and the average width), multiply the average height by the average width, and divide by 10 to get acres (since the distances are in chains).
- 4.)Round each lot area to two decimal places. If the third decimal place is exactly five (5), then round the second decimal place to the nearest even number.

ILLUSTRATION OF DATA FOR TOWNSHIPS WHICH ABUT A STANDARD PARALLEL

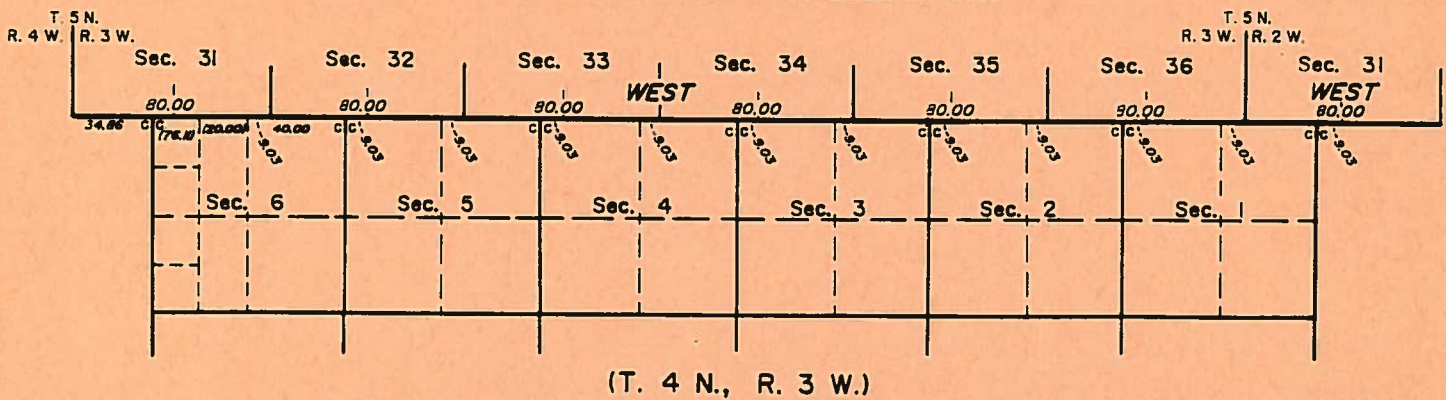
DATA SHOWN FOR TOWNSHIPS NORTH OF A STANDARD PARALLEL

(T. 5 N., R. 3 W.)

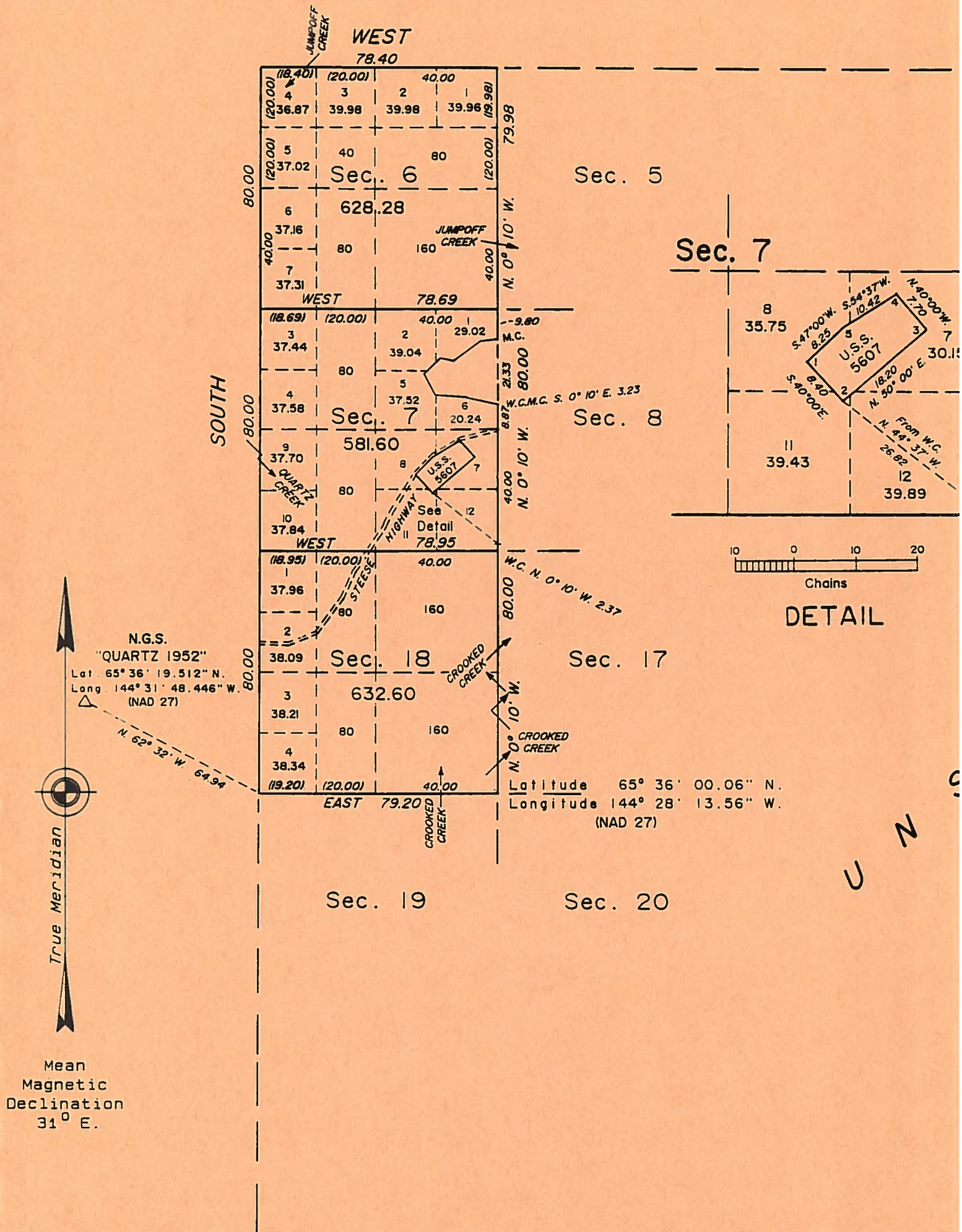


DATA SHOWN FOR TOWNSHIPS SOUTH OF A STANDARD PARALLEL

FIRST STANDARD PARALLEL NORTH



SAMPLE PLAT



TOWNSHIP 1 SOUTH, RANGE 1 WEST, OF T1

RETRACEMENT AND SUB

