Did You Know?
Basis of Bearings

Did you know that state law includes specific requirements for basis of bearings statements beyond just noting which survey or derivation of north was used?

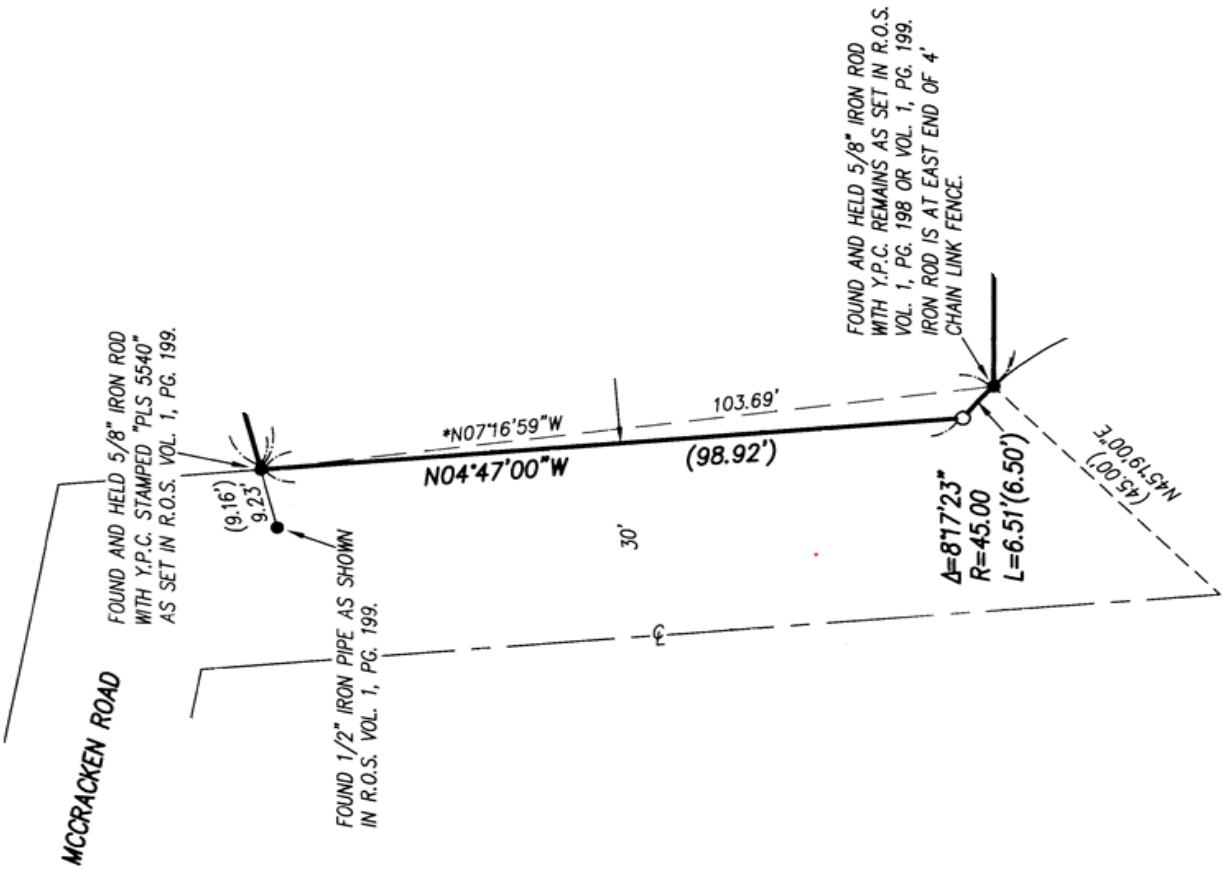
For instance, WAC 332-130-050(1)(b)(iii) states (in part):

"… The description of the directional reference system, along with the method and location of obtaining it, shall be clearly given …"

This means that every survey map needs to include a statement or notes describing how a basis of bearings was obtained (the method), and where that basis of bearings line is at (the location).

Below are examples from recorded maps around the state that meet the requirements:

1) R.O.S. VOL. 1, PG. 199 AS DETERMINED FROM THE CALCULATED BEARING OF N07°16'59"W BETWEEN IRON RODS ON THE EAST RIGHT OF WAY LINE OF MCCRACKEN ROAD NOTED HEREON AS HELD. (SEE NARRATIVE).
(Note that the surveyor dashed this calculated line on his map and labeled the bearing and distance between the two monuments, see below)



2) BEARINGS ARE BASED ON THE MERIDIAN ESTABLISHED IN THE SHORT PLAT OF SEA RANCH, VOL. 2, PGS. 44-44B, RECORDS OF SAN JUAN COUNTY, WASHINGTON. CONTROLLING MONUMENTS ARE THE FOUND IRON PIPE MONUMENT ON THE WEST LINE OF LOT 1 AND THE IRON PIPE MONUMENT MARKING THE SOUTHEAST CORNER OF SAID LOT 1
(The surveyor also showed this line, labeled it "BASIS OF BEARINGS", and showed the record and measured information on his map. Drawing not shown hereon.)

3) BEARINGS SHOWN HEREON ARE RELATED TO THE 1991 ADJUSTMENT OF THE WASHINGTON COORDINATE SYSTEM, NORTH ZONE, NORTH AMERICAN DATUM OF 1983 (WCS GRID) VIA TIES TO CLALLAM COUNTY GEODETIC FRAMEWORK POINTS 05301111 (= NE CORNER S11, 05301141 (= EAST ¼ CORNER, S11), 05301172 AND 05301173. REFER TO SHEET 4 OF SURVEY FILED UNDER AFN 1998-1004253, RECORDS OF CLALLAM COUNTY FOR THE SUBDIVISION OF SECTION 11, ESTABLISHMENT OF SUPPLEMENTAL GEODETIC CONTROL, CORNER POSITIONS AND HISTORIES. THE MAPPING ANGLE IS -1°49'35" AT THE CENTER OF SECTION 11 = NORTH LATITUDE 48°06'31.310", WEST LONGITUTDE 123°17'10.555"
(Note that there are additional requirements to be shown when showing State Plane Coordinates on your survey (assuming you are showing State Plane Coordinates on a map with a State Plane basis of bearings), such as convergence angle and control scheme (see RCW 58.09.070, and WAC, if such is your intention.)

4) WASHINGTON COORDINATE SYSTEM, NAD83(2011)(EPOCH:2010), NORTH ZONE, DERIVED FROM OPUS POST PROCESSING USING THE FOLLOWING CORS STATIONS:

STATION DESIGNATION	LATITUDE	LONGITUDE
DL2071 SMAI	N47°31'24.843"	W122°20'42.147"
AF9670 SEDR	N48°31'17.592"	W122°13'25.789"
DI8467 CHCM	N48°00'38.208"	W122°46'33.058"

(Note that this is a preferred method for showing a State Plane Basis of Bearings derived from OPUS or the WSRN. Again, WAC 332-130-050(1)(b)(iii) requires the location of your basis of bearings. If it is from CORS stations (in the case of OPUS or WSRN), then station name and geodetic latitude and longitude would be required at a minimum (unless you are showing them graphically).

If you are using OPUS or WSRN generated coordinates, then picking a prominent line, explaining and labeling it as "Basis of Bearings" on your survey would work as well.

It is preferable that the words "related to" or "based on" at the beginning of the statement be struck, in favor of something more definitive, such as "BEARINGS SHOWN HEREON ARE ON THE 1991 ADJUSTMENT…"

It is also extremely helpful to highlight the location on the map itself by labeling it similar to "--BASIS OF BEARINGS—". If it is for a calculated line (as shown in item 1 above), then it is

necessary to show the location of that line on the map for “intelligent interpretation” (see WAC 332-130-050(1)(f)(iii)).

Another part of WAC 332-130-050(1)(b)(iii) states:

“If the basis of direction differs from record title, that difference should be noted;”
This means that the surveyor should note differences from the record title documents. This could mean deeds, plats, records of survey, etc. Anything utilized to transfer title (or aid in that transfer). Admittedly, it says “should”, not “shall”. However, WAC 332-130-050(1)(f)(ii) states: “Show deed calls that are at variance with the measured distances and directions of the surveyed parcel”, which would include basis of bearings, and is probably why many (if not most) surveyors think the “should” is actually a “shall”, as evidenced by their recorded surveys that include this information for each line. The “intelligent interpretation” clause referred to previously (see WAC 332-130-050(1)(f)(iii)) requires that the surveyor show enough information so that one can easily see that measured bearings and distances are either similar or different than previous surveys, which will tie into the surveyor’s notes or narrative on how they resolved the boundary.

The conclusion of all of this (and we believe the intent of the WAC) being that the easier you make it for other surveyors to understand and follow your survey, the more likely it is that they will choose to hold your monuments and methodology, which will maintain the established property corners, and promote harmony in the neighborhood.