

Date: March 9, 2005

Approved By: 

DEPARTMENT OF PLANNING & DEVELOPMENT SERVICES

<b>Rule: 3006</b>	<b>Requirement for Vertical Datum on Land Development Projects within Snohomish County</b>
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**LEGISLATIVE HISTORY:** Adopted March 24, 1997, as POL 3006, Repromulgated pursuant to SCC 30.82 Rulemaking on March 9, 2005

**SEE ALSO:**

**SCC APPLICABILITY:** Subtitles 30.4, 30.5 and 30.6 SCC

**PURPOSE:** This rule outlines the requirements and responsibilities for the professional surveyor during field and office preparation of Plats, Short Plats, Engineering Development plans in both the Urban & Rural areas for running levels and establishment of vertical datum for these projects.

**RULE SUMMARY:**

1. **Vertical Elevations Are Referenced to Mean Sea Level**  
All vertical elevations required by, the Plat and Short Plat submittal checklists, and the Engineering Design and Development Standards (EDDS) note that the elevation shall be referenced to Mean Sea Level (MSL) datum also known since 1973 as the North American Geodetic Vertical Datum 1929 (NGVD 29). The purpose is to maintain a permanent datum or reference plane for engineering purposes.
2. **Ordinary Direct Leveling Shall Be Used For Highways, Roads and Utilities**  
Ordinary direct or differential leveling shall be used in the construction and location of highways, County Roads and Utilities. Sights are permitted up to 500 ft (150 m) in length, and rod readings are to be made to the nearest 0.01 ft. (0.003m). The precision for leveling in feet (meters) is  $0.1 \sqrt{\text{distance in miles}}$ .
3. **Accurate or Excellent Direct Leveling Shall Be Used to Set Benchmarks**  
Accurate or excellent direct leveling shall be employed to set important project benchmarks. Sights are permitted up to 300 ft (90 m) and rod readings are made to 0.005 ft (0.0015m). The precision in feet (meters) is  $0.05 \sqrt{\text{distance in miles}}$ .
4. **All Projects are Expected to Use or Reference Mean Sea Level Datum**  
Within the Urban & Rural areas, it is expected that all projects will be required to reference the elevations to mean sea level datum or NGVD 29 and that a project benchmark be left on-site in a suitable permanent location for future use.

<sup>1</sup> Surveying: Theory and Practice Davis, Foote and Kelly 5<sup>th</sup> edition, McGraw-Hill, p.203, 1966.

5. **NAVD 88 is Alternate Reference Datum**  
When North American Vertical Datum 1988 (NAVD 88) benchmark(s) is available, projects may elect to use NAVD 88 datum elevations for project mapping, submittals and construction plans. When NAVD 88 elevations are used, the maps and plans shall contain an equation to convert to the NGVD 29 datum.
6. **GPS Derived Ellipsoid Height May Control**  
When a NGVD 29 or NAVD 88 datum benchmark is not within the limits in item 8, and a control point with a Global Positioning System (GPS) derived ellipsoid height is available, it should be converted to NGVD 29 for the project datum. A statement is needed as to how the MSL or NGVD 29 datum has been determined.
7. **Datum Conversion Program May Be Used**  
Any suitable nationally recognized datum conversion computer program may be used to convert or obtain conversion equation to NGVD 29 datum.
8. **Alternate Or Assumed Vertical Datum May Be Used**  
Except that where a suitable benchmark on NGVD 29, NAVD 88, or GPS derived ellipsoid height is not within 1/2 mile of the subject property, or greater than 250 feet of total vertical difference exists between the starting benchmark and the project, an alternate or assumed vertical datum may be used. Alternate datums include sewer or water district datums.
9. **All Project Elevations Shall Use Common Datum**  
All 100 year flood plain elevations, utility invert elevations and road plan profile elevations for each project shall use the same project datum established for that project using one of the datums as described above.