Western Federal Lands Criteria Re-Implementation

➲ Why "*NEW*" criteria?

  ▪ To take advantage of Typical Section Generator.

    – Eliminate the Proposed Cross Section Input File

    – Eliminate the Exception Data File

    – Eliminate the "Criteria Selection" Flow Chart

  ▪ Old criteria's code (.x10) structure was not compatible with Typical Section Generator.

  ▪ Old syntax within the existing criteria limited it's usefulness and ability to be enhanced.

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⮑ Why not develop "In-House"?

- Near impossible to maintain state-of-the-art knowledge of criteria scripting.

- Retirement is looming for original members of the Geopak Implementation team. Who will take over the FLH criteria library? Who has the time? Who has the skills?

- No one to pass the torch to, (at least at WFL).

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⮕ Why contract with Geopak?

- ▪ It's their software, it makes perfect sense to use their programming staff and the latest scripting.

- ▪ All code is written by one individual with specialized skills.

- ▪ The future of the criteria library is secured and maintained by Geopak Corp., after FLH legacy staff retires.

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⊃ Criteria Enhancements/Improvements:

- Allows for an easy transition to Geopak v8, (level numbers to names).

- Traditional Proposed Cross Section Input file & Exception data file no longer used.

- Multiple versions of criteria no longer required to be selected, (the "flow chart" is no longer used).

- Commenting "out" or commenting "in" criteria no longer necessary.

```
/* include F:\resource\geopak\x\fh_fs1.x10 */
/* include F:\resource\geopak\x\fh_fs2.x10 */
include F:\resource\geopak\x\fh_fs3.x10
/* include F:\resource\geopak\x\fh_fs5.x10 */
/* include F:\resource\geopak\x\fh_specdit1.x10 */
include F:\resource\geopak\x\fh_ss3.x10
/* include F:\resource\geopak\x\fhex_fea.x10 */
```

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⇨Criteria Enhancements/Improvements, (cont…):

- Element symbology now taken care of through the use of Design and Computation Manager. This includes all plan elements (Widening A, Guardrail, etc…). Even Existing Ground cross section element symbology is now selected from D&C Manager.

- Draw <u>one line</u> defining the face of guardrail and obtain:
  - Widened pavement (in accordance with standard drawing)
  - Widened gravel shoulder (in accordance with standard drawing)
  - Guardrail drawn on cross sections

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➔ Criteria Enhancements/Improvements, (cont…):

- No need to have multiple proposed cross section input files in regards to "first full length layer" differences in guardrail or gravel shoulder areas.

```
/* fh_pavuc.x10 */
        define "number of layers" 4
        define "pave layer 1 thickness"  0.075
        define "pave layer 2 thickness"  0.050
        define "pave layer 3 thickness"  0.125
        define "pave layer 4 thickness"  0.225
        define "pave layer 5 thickness"  0
        define "first full length layer" 1
```

- Criteria is intelligent enough to use the "first full length layer" in all areas except where guardrail or widened gravel shoulder is found. In those areas, the variable "define pavement layers" is used and that "user defined" value will be used to draw the pavement layers vertical.

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⇨ Criteria Enhancements/Improvements, (cont…):

- Jersey barriers and flares are now available. In the normal barrier areas, no need to draw the widened edge of pavement line. It is drawn automatically using a "user defined" width behind barrier value. The default value is 1 foot or 0.3 meters. The Jersey barrier and flares are placed at the active angle of the pavement slope.

- Exceptions to the cut fill tables will be handled by simply drawing a line (custom line style) somewhere outside the pavement designating the slope ratio. These custom line styles have the slope ratio value built into the line style (------ 6:1--------).
    - This will work for:
        - ◆ Cut slopes
        - ◆ Fill slopes
        - ◆ Bench cuts

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⇒Criteria Enhancements/Improvements, (cont…):

- Ditch foreslope intercept now marches down the existing ground line to see if OG falls away from the new roadway rather than use a distance comparison ("ditch foreslope distance. vs. horizontal cut slope distance).

- No more "search text" (for XYZ notes) doubled up on the same point.

- Ability to daylight to <u>S</u>ub grade, <u>Di</u>tch grade or <u>N</u>ever check for daylight.

- Subexcavation criteria now actually works and separates common excavation from subexcavation. Backfill for the subexcavated areas can also be separated from common backfill. Subexcavation can be accomplished 2 ways:
  - A user defined depth <u>below subgrade</u>
  - A user defined depth <u>below existing ground</u> with the left and right boundaries determined by plan view elements.

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➲ Criteria Enhancements/Improvements, (cont…):

- Added ability to "taper" Cut/Fill slopes from one slope ratio (at a station) to another slope ratio (at a station). Also works for, Flat Bottom Ditch Width and Ditch Fore Slope.   This is an (optional) ASCII file.

- The missing "Step 2" for Retaining walls has finally been solved. Now after running the initial criteria for retaining walls, proposed profiles can be established/stored (top of wall, top of footing) and the footing width is set by 2 lines in plan view. Input from Structures section is suggested for final wall profiles and footing widths.

- Approach Road Match now does not ignore the cross slope of a widening area. The old criteria would use the same cross slope of the shape when widening and tieing vertical to existing ground.
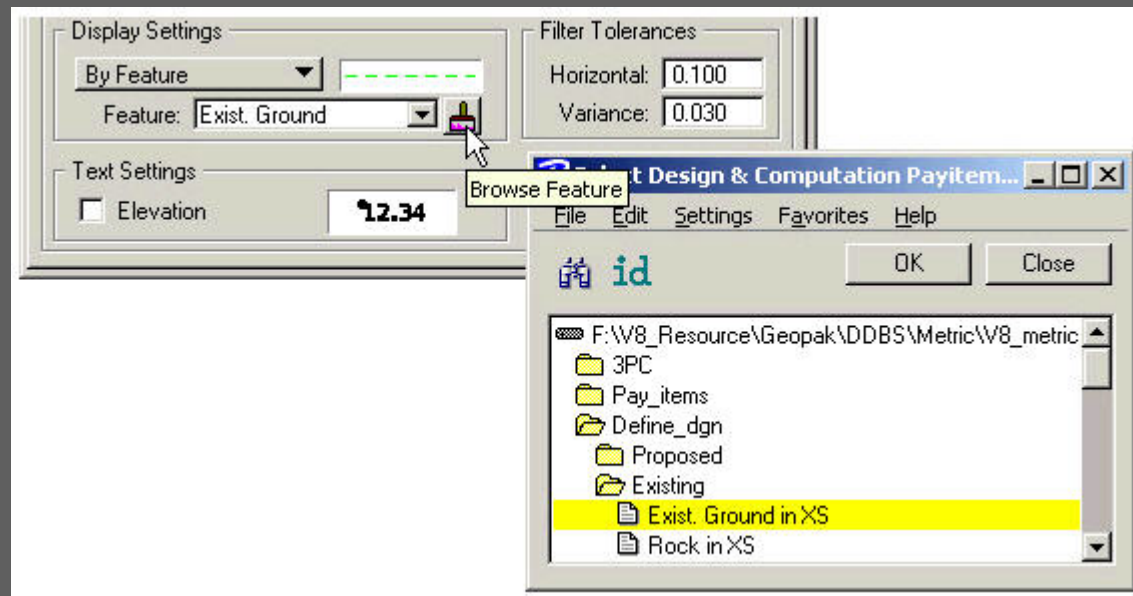
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⮕Criteria Enhancements/Improvements, (cont…):

- The precision of the **elevation text** (drawn on each cross section) is now set by the Geopak User Preferences, "**Distance**" setting, rather than built into the criteria.

- 3R criteria now allows for crown correction by using AASHTO 2001 generated pavement shapes **and** also allows for longitudinal corrections by storing and using any number of short profiles.

- Automatic cross section labeling routine has been re-written so that the labels no longer overlap. This has it's own "Typical Section".

- On-line "help" documentation for running proposed cross sections is available and is written specifically for WFLHD. Simply click on the **Description** button from within Project Manager Typical Section Generator.

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➲ Proposed Cross Section Requirements:

- Ground Cross Sections must be created using the D&C Manager item, Exist. Ground in XS.

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➲ Proposed Cross Section Requirements, (cont…):

- All Plan view elements must be drawn using D&C Manager and Place Influence.