

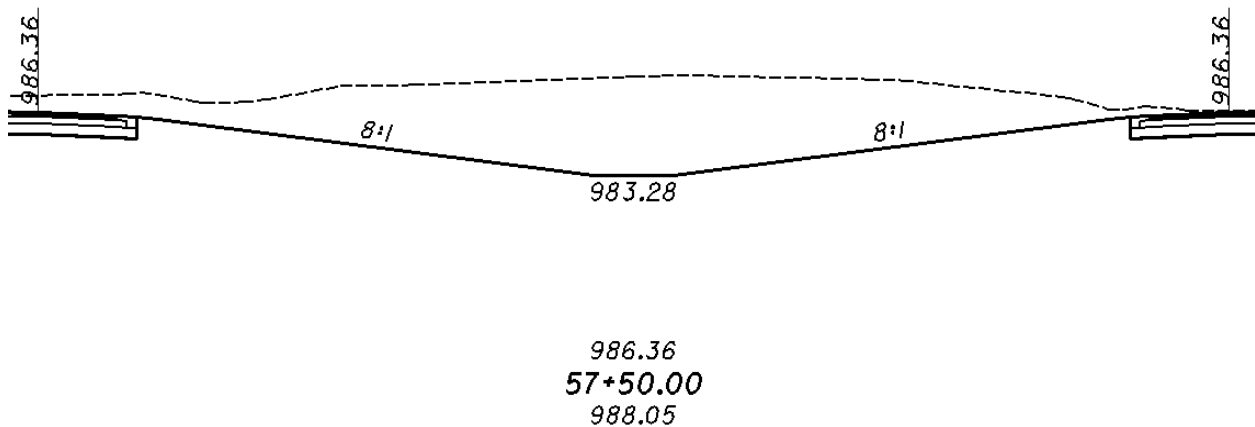
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Description

MED304-1.x is used to draw depressed medians, or barrier medians according to **Figure 304-1** of the **Location and Design Manual, Volume 1, Roadway Design**. Type B, B1, C, or C1 Single Slope barrier can be drawn according to **Standard Roadway Construction Drawing RM-4.3**.

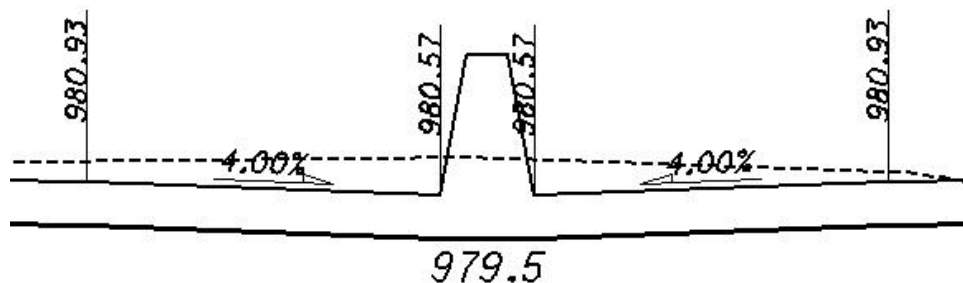
DEPRESSED MEDIAN EXAMPLE:

In this example, the median width is 60'. The median is drawn using an 8:1 slope as specified by figure 304-1 of the Location and Design Manual, Volume 1 - Roadway Design. A 4' flat bottom ditch is drawn as shown below.



BARRIER MEDIAN EXAMPLE:

In this example, the criteria encountered a median barrier line drawn in the plan view design file. A Type B Single Slope median barrier is drawn as shown below.



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Inclusion Sequence

The ODOT Standard criteria file `DEFINE.X` contains default definitions for some of the Define Variables used by ODOT's criteria files. `DEFINE.X` must always be included first in any criteria run. `MED304-1.x` can be included after the following ODOT Standard shoulder criteria files:

```
SH301-8.X
SH301-8B.X
SH301-9.X
```

`MED304-1.x` should be included after the shoulder criteria for the Side Slope Left condition of the Right shape cluster. A sample inclusion sequence is shown below:

```
Criteria for Shape Cluster
shape cluster baseline = P185
shape cluster profile  = P185
shape cluster tie      = -30.000
side slope LT
    include define.x
    include pavt.x
    include sh301-8b.x
    include ss307-4.x

side slope RT
    include pavt.x
    include sh301-8b.x

Criteria for Shape Cluster
shape cluster baseline = P185
shape cluster profile  = P185
shape cluster tie      = 30.000
side slope LT
    include pavt.x
    include sh301-8b.x
    include med304-1.x

side slope RT
    include pavt.x
    include sh301-8b.x
    include ss307-4.x
```

NOTES:

1. ODOT's criteria is written with the assumption that the left side slope condition is always processed first (this is the GEOPAK default). Be sure to always define the left pavement lanes and the left side slope first.
2. `DEFINE.X` does not need to be included for every side slope condition. It only needs to be included as the very first criteria file in the first side slope condition as shown in the example above.

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Define Variables

A summary of the variables defined in MED304-1.x is included below. Each variable has been assigned a default value within the criteria. The user should review the variables below to ensure that the default values are acceptable for the project. The value of each variable can be changed by the user before processing the criteria, as needed. See the **ODOT GEOPAK Road Training Guide, Part 2**, Chapter 5 for more information on modifying the default value of the variables.

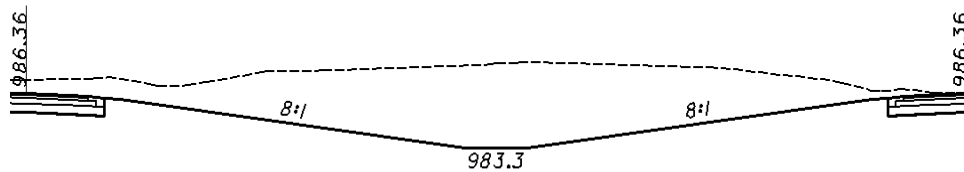
“cl chain name”

This variable is used to specify the name of the COGO chain that will be used for any criteria function that measures offsets from a chain. This variable is used in labeling ditch offsets (see “**ditch annotation style**”). The default value is none.

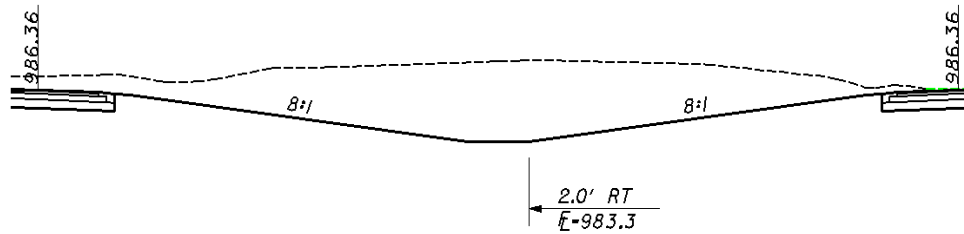
“ditch annotation style”

This variable selects the ditch annotation labeling style for the median ditch. Two different annotation styles are available as shown below. The default value is 0.

“ditch annotation style” = 0



“ditch annotation style” = 1



“median graded shoulder width LT”

This variable is used to define the width of the graded shoulder in the median (to the drivers left) in cases where the median slope is 6:1 or flatter. See figure 303-1 of the Location and Design Manual, Volume 1 - Roadway Design for the acceptable values for this variable. The default value is 6.0

“median graded shoulder width GT”

This variable is used to define the width of the graded shoulder in the median (to the drivers left) in cases where the median slope is steeper than 6:1. See figure 303-1 of the Location and Design Manual, Volume 1 - Roadway Design for the acceptable values for this variable. The default value is 9.0

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“median special ditch profile”

This variable identifies the name of the COGO profile to be used for the median ditch. If the specified profile is found at the station being processed, the median slopes will be drawn to intersect the profile elevation. The default value is “none”. NOTE: The criteria will only meet the COGO profile if a graphic ditch line has also been drawn in the design file specified by the variable “**proposed dgn file name**”.

“fixed median slope”

This variable will allow the user to override the default median slopes. When the variable is set to 0, the median slope will be set according to the median width as defined in Figure 304-1 of the Location and Design Manual, Volume 1 - Roadway Design. If the value is set to anything other than 0, the new value will be used for the median slope, regardless of the median width. **Note:** This variable must always specified as an integer. For example, setting the variable to a value of 3 will result in a 3:-1 side slope being placed for the median. The default value is 0.

“PROPOSED DGN FILE NAME”

This variable is used by the DEFINE_DGN variables to identify the base map MicroStation design file that contains the proposed plan view graphics. The default value for the variable has been defined using a relative path as follows:

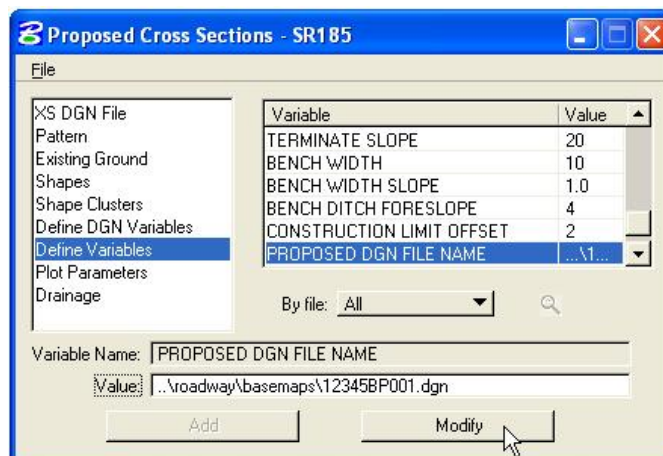
```
define "PROPOSED DGN FILE NAME" ..\roadway\basemaps\nnnnnBP###.dgn
```

By default GEOPAK will look for design files in the Working Directory assigned for the project. Using the directory structure defined in the **ODOT CADD Engineering Standards Manual**, Section 302, Project Directory Structure, the GEOPAK Working Directory should be defined as the `geopak` folder.

The “. . .” syntax will instruct GEOPAK to look for the proposed design file by starting in the Working Directory, and then go up the project folder path one directory. From there, go into the `\roadway\basemaps` folder to find the file.

The name of the design file, `nnnnnBP###.dgn` must be edited to reflect the name of the plan view design file for your project. See the **ODOT CADD Engineering Standards Manual**, Section 304 File Naming Conventions for design file names.

The name and path of the "PROPOSED DGN FILE NAME" variable can be edited in the GEOPAK *Proposed Cross Sections* dialog as shown below.



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Define DGN Variables

The following DEFINE_DGN variables are used by the criteria to locate the MicroStation elements that MED304-1.x will search for in order to draw the proposed median.

These variables have been defined with the values listed below in accordance with ODOT standards and should never be redefined by the user.

Additionally, these variables have been defined as “hidden” variables and will not show up in the DEFINE_DGN Variables portion of the *Proposed Cross Sections* dialog box when preparing a criteria run.

```
define_dgn “~median barrier in dgn pr” \  
  dgn = “proposed dgn file name” \  
  ddb = $(GPK_ACBOOK_DDBFILE) \  
  feature = Drafting Standards/Proposed Plan View/RD - Roadway/P_SSBC
```

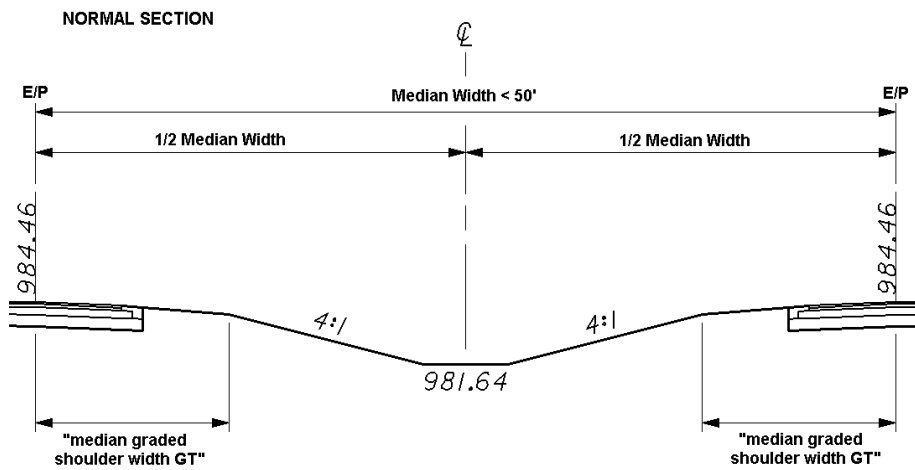
```
define_dgn “~type 1 median barrier in dgn pr” \  
  dgn = “proposed dgn file name” \  
  ddb = $(GPK_ACBOOK_DDBFILE) \  
  feature = Drafting Standards/Proposed Plan View/RD - Roadway/P_SSM1
```

```
define_dgn “~proposed ditch in DGN” \  
  dgn = “proposed dgn file name” \  
  lvname = DR_P_Ditch \  
  wt = 1, ByLevel \  
  co = 11, ByLevel
```

Processing Notes for Depressed Medians

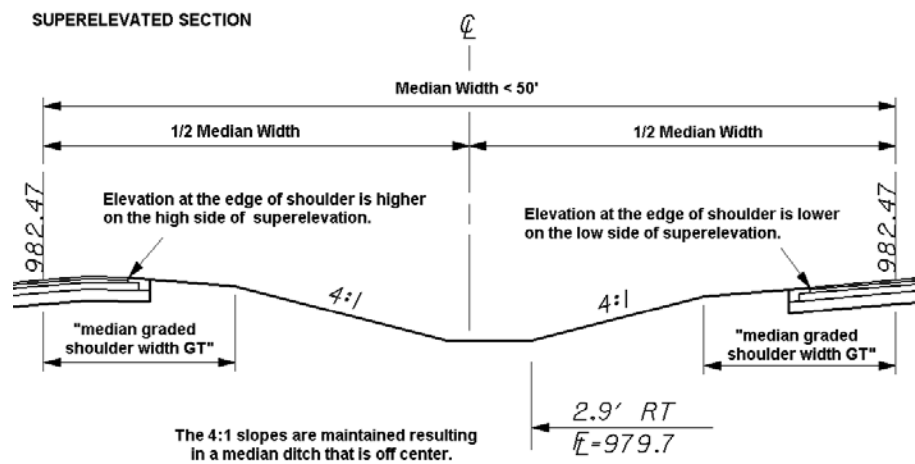
The criteria file will search the MicroStation design file specified by the define variable “**proposed dgn file name**” for elements matching the symbology specified by the DGN Variable “~**median barrier in dgn**”. If no median barrier is encountered, a depressed median will be drawn according to figure 304-1 of the Location and Design Manual, Volume 1 - Roadway design. The median slopes will be placed as detailed in the following examples:

CASE 1 - Medians less than 50' wide



In this case, a 4:1 slope is used for the median as shown in the two figures below. Since the median slopes are greater than 6:1, the value of “**median graded shoulder width GT**” is used to establish the width of the graded shoulder.

In superelevated and bifurcated sections, the elevation at the edge of the shoulder will be higher on one of the two roadways. The 4:1 slope will be maintained from the edge of the graded shoulder in superelevated sections, causing the intersection of the two slopes to be off center as shown below:

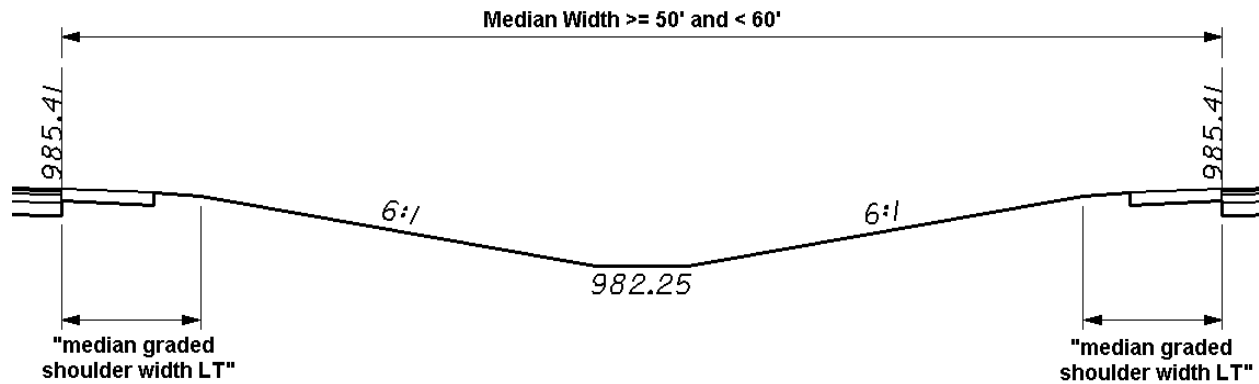


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CASE 2 - Medians greater than or equal to 50' wide and less than 60' wide

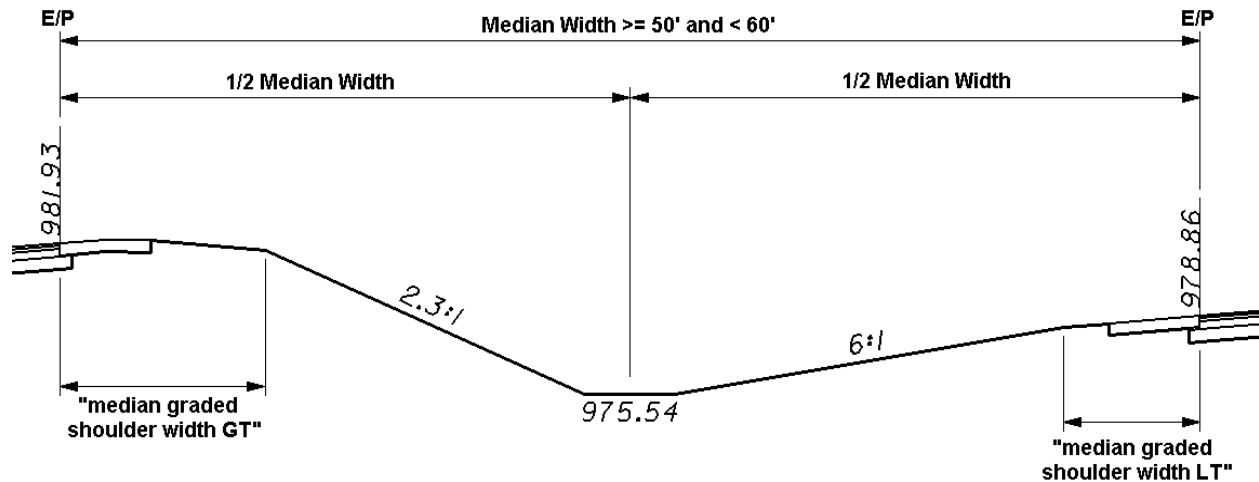
In this case, a 6:1 slope is used for the median as shown in the figure below:

NORMAL SECTION



In superelevated and bifurcated sections, the location of the median ditch is always held in the center of the median. The criteria will first examine the elevation at the edge of the paved shoulders in order to determine which one is lower. Once the lower shoulder is identified, the criteria will draw the graded shoulder and then a 6:1 slope to the center of the median. The criteria will next skip over to the higher shoulder and draw a line at whatever slope is necessary in order to connect the graded shoulder with the 6:1 slope from the lower side.

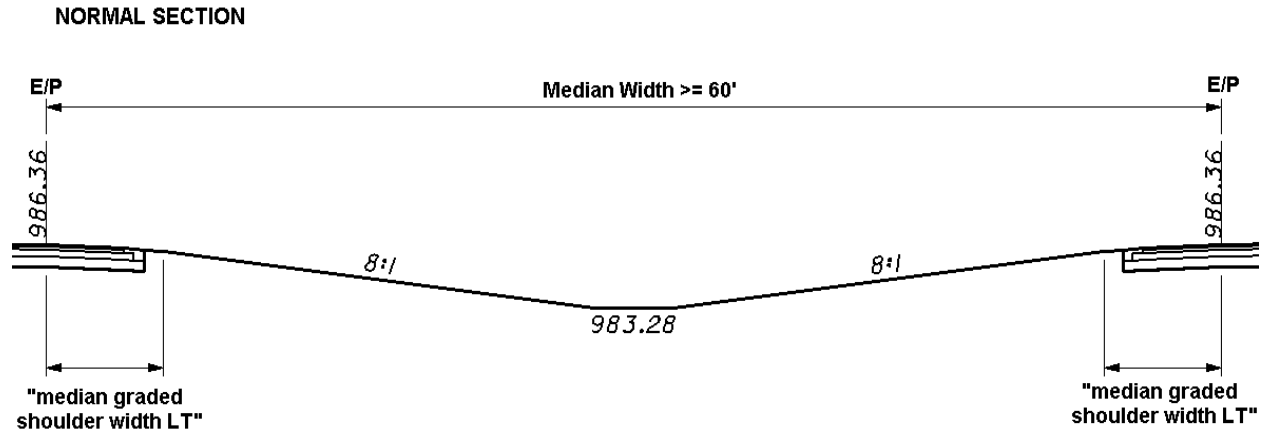
BIFURCATED SECTION



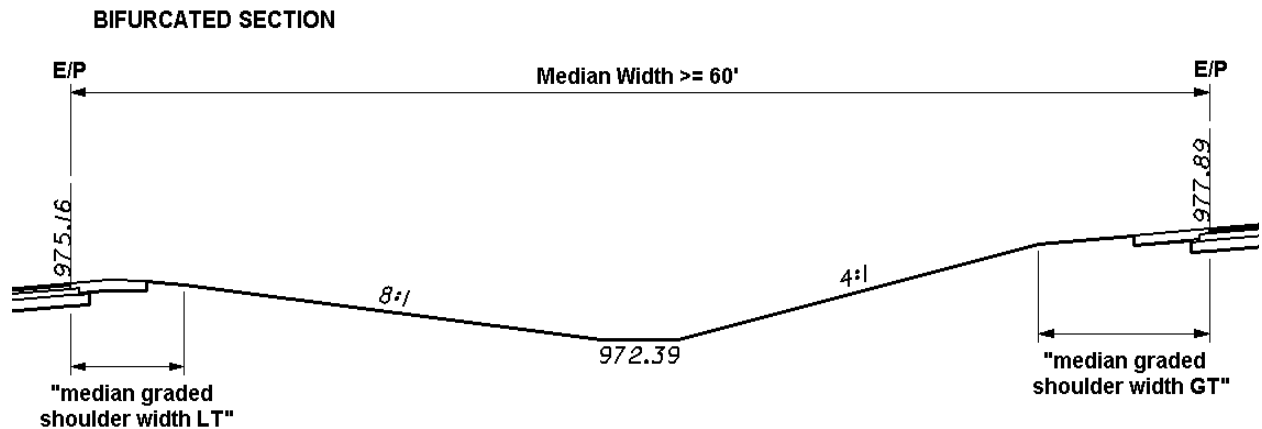
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CASE 3 - Medians greater than or equal to 60'

In this case, an 8:1 slope is used as shown below:



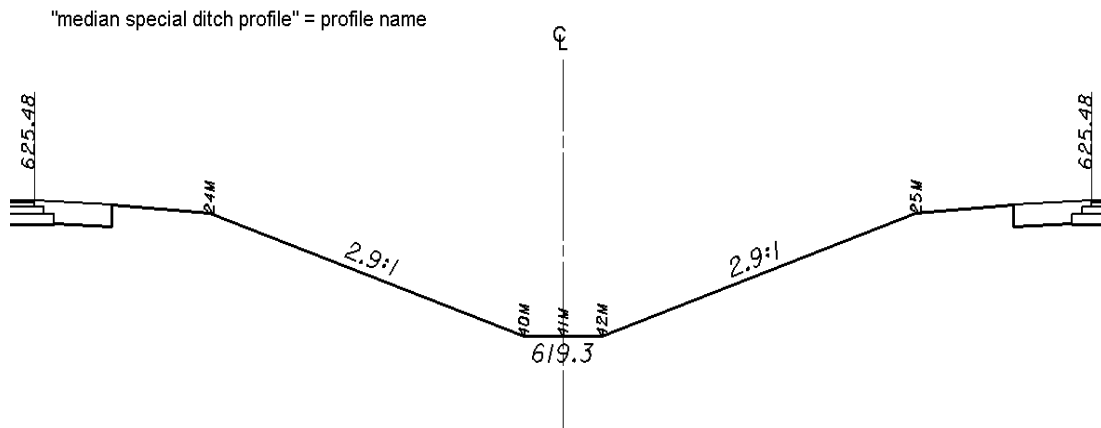
For superelevated and bifurcated sections, the location of the median ditch is always held in the center of the median. The 8:1 slope is drawn from the lower side to the center of the median. The slope for the higher side is drawn from the edge of the graded shoulder to meet the 8:1 slope drawn from the lower side, as shown below:



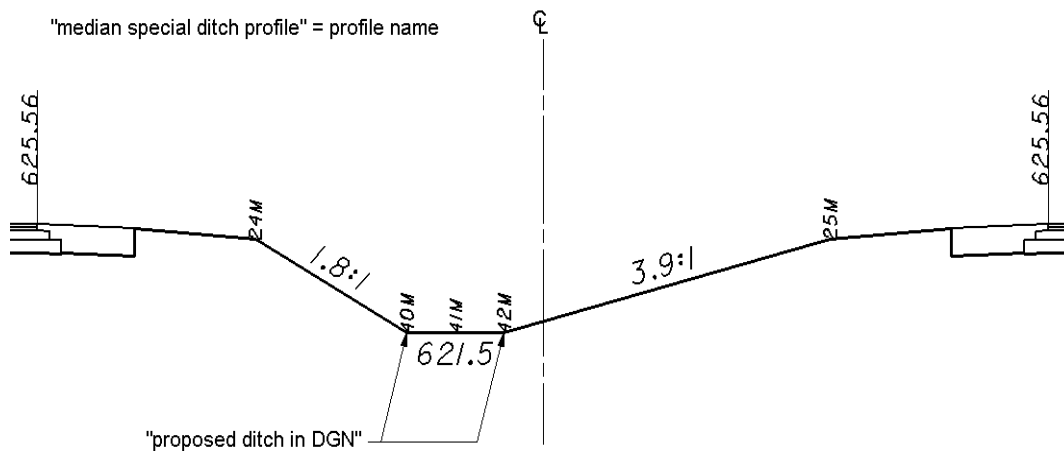
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CASE 4 - Defining the median slopes with a COGO profile and a graphic ditch line

The criteria will allow the designer to specify a COGO profile to use for the median ditch elevations. As each cross section is processed, the criteria will check to see if a COGO profile matching the name specified by the variable **"median special ditch profile"** exists and if the station of the current cross section is within the limits of the profile. If it is, the median slopes will be drawn to meet the elevation of the profile. The ditch will be centered in the median as shown below.



In some cases, the median ditch may need to be placed off center. The criteria will allow the designer to graphically draw a proposed ditch line in the median for the criteria to follow. The criteria will search the MicroStation design file specified by the variable **"proposed dgn file name"** for MicroStation elements meeting the symbology defined by the DGN variable **"~proposed ditch in DGN"**. The criteria will draw the median slopes to intersect the proposed ditch lines. The elevation of the ditch is determined by intersecting the profile specified by the variable **"median special ditch profile"**.



Note: The criteria will not use the graphic ditch line without a COGO profile. Users must store a COGO profile for the median ditch in order to have the criteria intersect the graphic ditch lines.

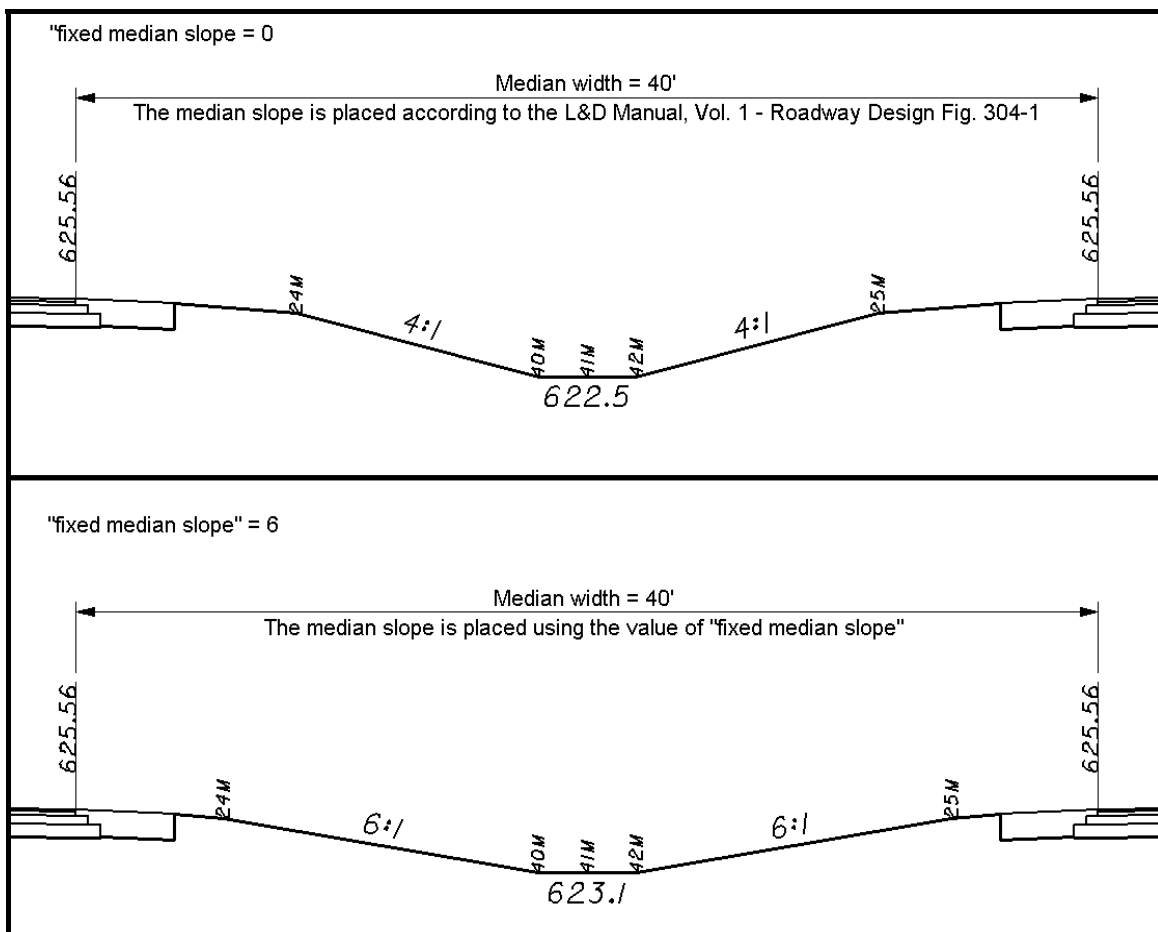
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CASE 5 - Drawing the median using a fixed slope.

The criteria has been developed to place median slopes based on the width of the median as defined in Figure 304-1 of the **Location and Design Manual, Volume 1 - Roadway Design**. The slopes used by the criteria detailed in CASE 1 through CASE 3 of this criteria documentation and are summarized in the table below.

Median Width	Slope
< 40'	Typically median barrier is placed.
>= 40' and < 50'	4:1
>= 50' and < 60'	6:1
>= 60'	8:1

There are cases where the designer may wish to override the default slopes. The variable **"fixed median slope"** can be used to specify the slope for the median. If the variable is set to 0, the slopes shown in the table above will be used to draw the median. If the value of **"fixed median slope"** is set to anything other than 0, the new value will be used for the median slope, regardless of the median width.



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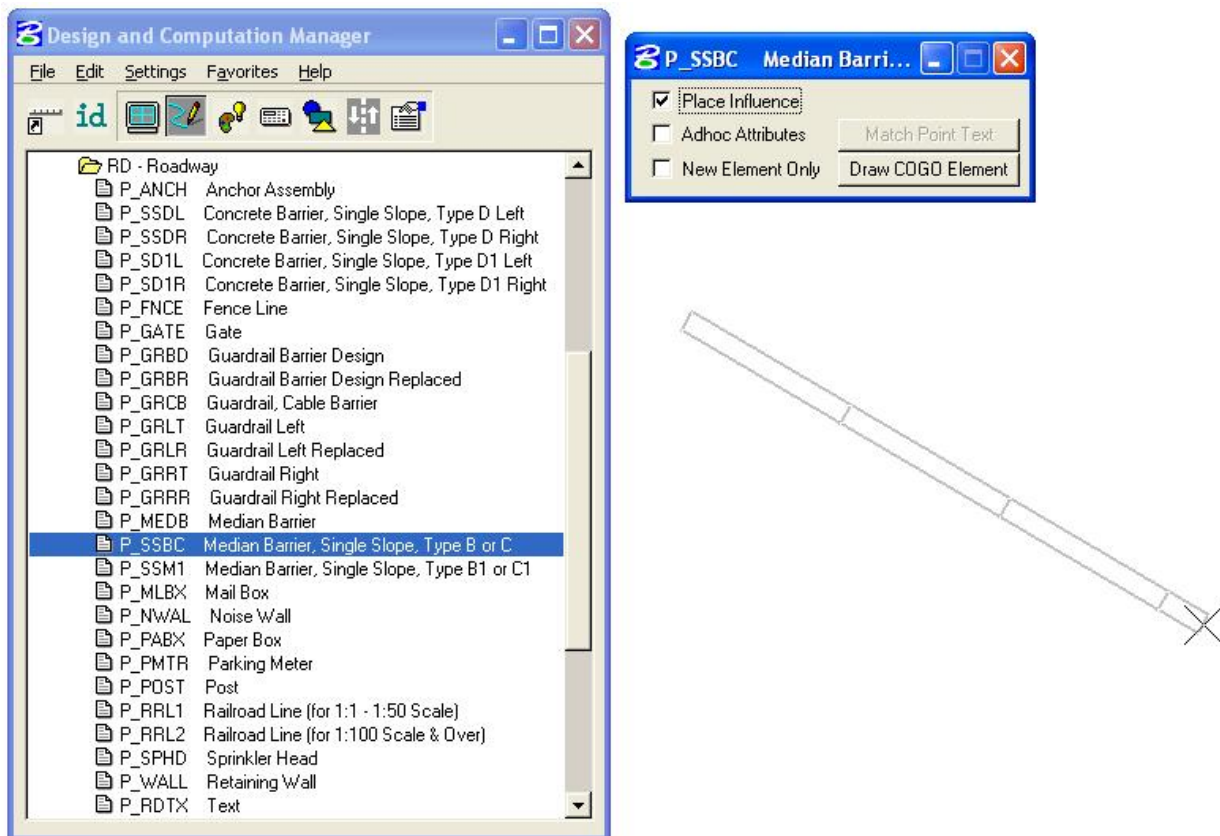
PROCESSING NOTES FOR BARRIER MEDIANS

Median barrier is normally used in cases where the median width is 40' or less. The criteria will search for a single line representing the median barrier as specified by the DEFINE_DGN variables “~median barrier in dgn” or “~type 1 median barrier in dgn”.

A single slope median barrier will be drawn according to **Standard Roadway Construction Drawing RM-4.3**.

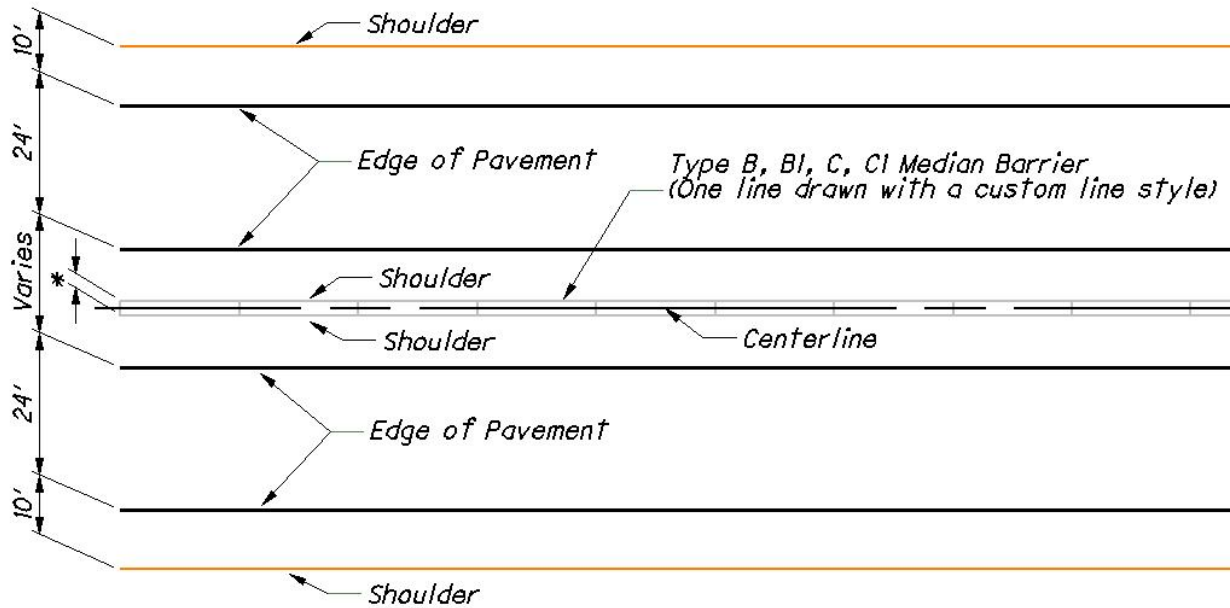
The placement of the plan view MicroStation graphics for the proposed shoulder and median barrier are very important in determining how the barrier is drawn in the cross sections. Separate shoulder lines and a single median barrier line must be drawn in the plan view MicroStation design file in order for the barrier to be drawn correctly on the finished cross sections.

Two items are included in the ODOT Standard Design and Computation Manager database, `ODOT.ddb`, to facilitate drafting the single slope median barrier in the plan view. The barrier is drawn using a custom line style as shown below.



An example of the plan view graphics is shown on the following page.

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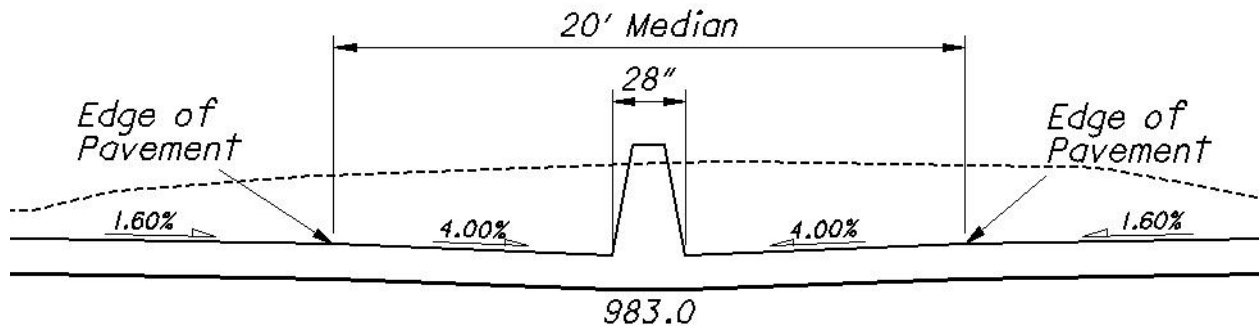


* See Standard Construction Drawing RM-4.3

Note:

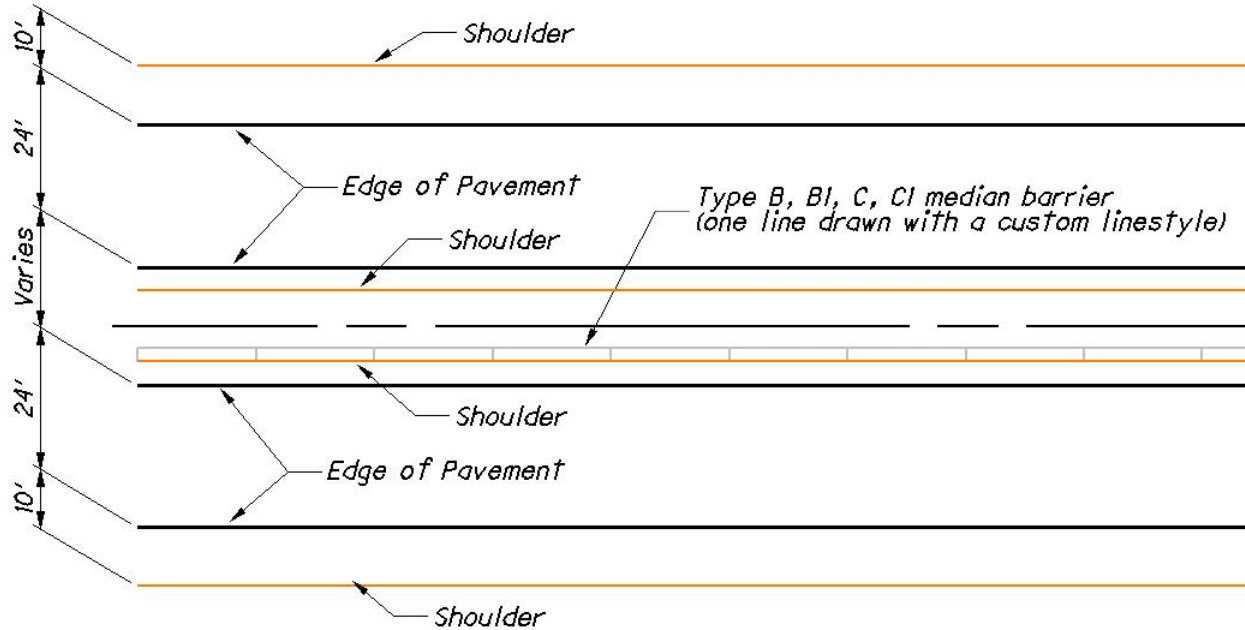
It is important to note that the width of the median barrier drawn on the cross section is determined by the location of the median shoulder lines, not by the width of the custom line style used for the barrier line. The shoulder lines should be drawn to the correct width to match the width of the custom line style as shown in the example above.

The example below shows a Type B single slope median barrier drawn at a width of 28". The shoulder lines were drawn 14" to the left and right of the centerline in the plan view.

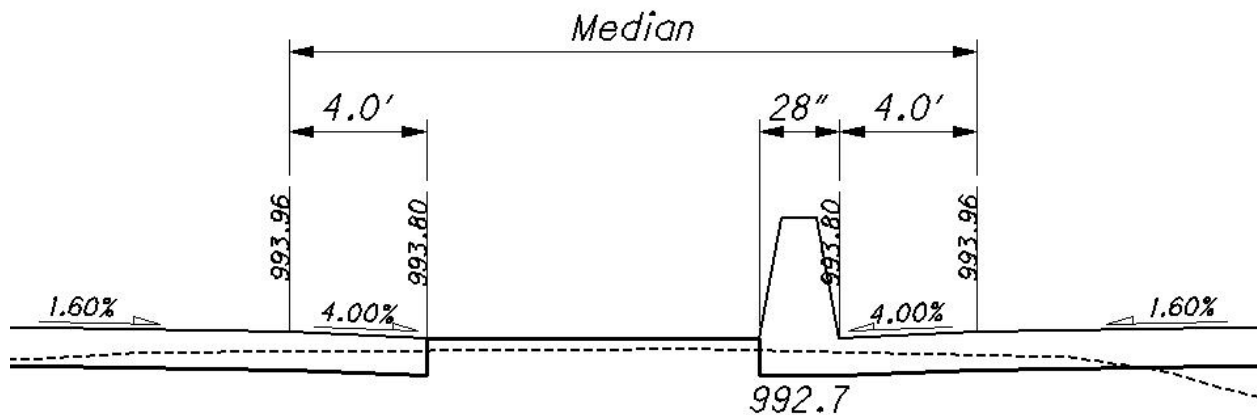


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In cases where the median barrier is adjacent to only one of the proposed shoulders, a grass median will be placed between the barrier and the opposite shoulder. Consider the plan view graphics shown in the figure below:



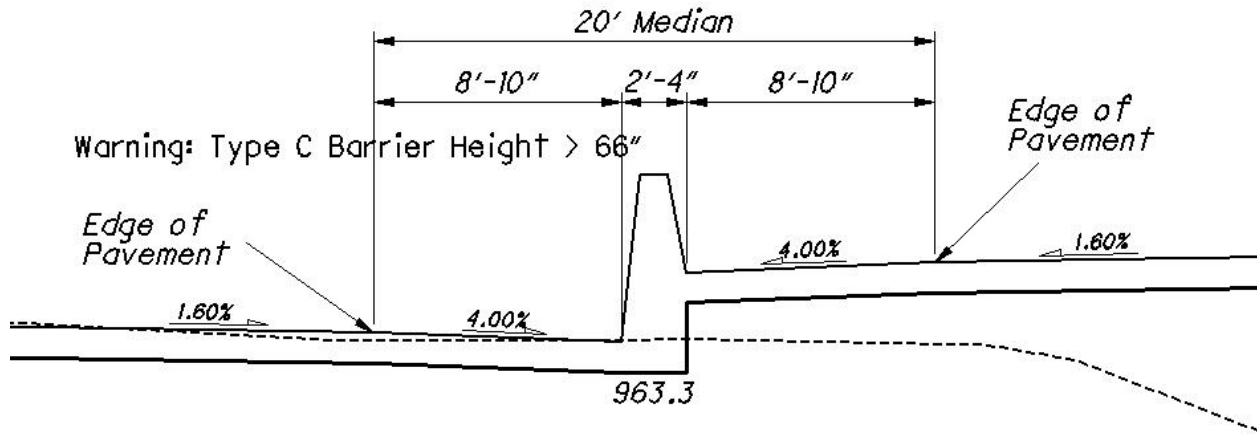
The plan view graphics shown above will result in the median shown below.



NOTE: The grass portion of the median is drawn by connecting a straight line from the shoulder to the barrier as shown above. It will be necessary for the designer to evaluate the desired drainage flow for the cross sections and to modify the cross section graphics accordingly.

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In superelevated or bifurcated sections a Type C or C1 barrier will be drawn as shown in the example below.



In a bifurcated section, it is possible that the height of the Type C or C1 barrier may exceed the specifications of **Standard Roadway Construction Drawing RM-4.3**. In this case, a warning is placed in the design file on the level XS_P_Text_WarningMsg as shown above.

Also, remember that the width of the barrier is determined by the location of the shoulder lines in the plan view design file. If the shoulder line is drawn in the plan view at the standard width for a Type B or B1 barrier, the slope of the barrier on the lower side (the left side in the example above) will be slightly steeper than the 5.25:1 slope specified on **Standard Roadway Construction Drawing RM-4.3**. This minor inaccuracy is negligible and should be ignored.

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Labels and Symbology

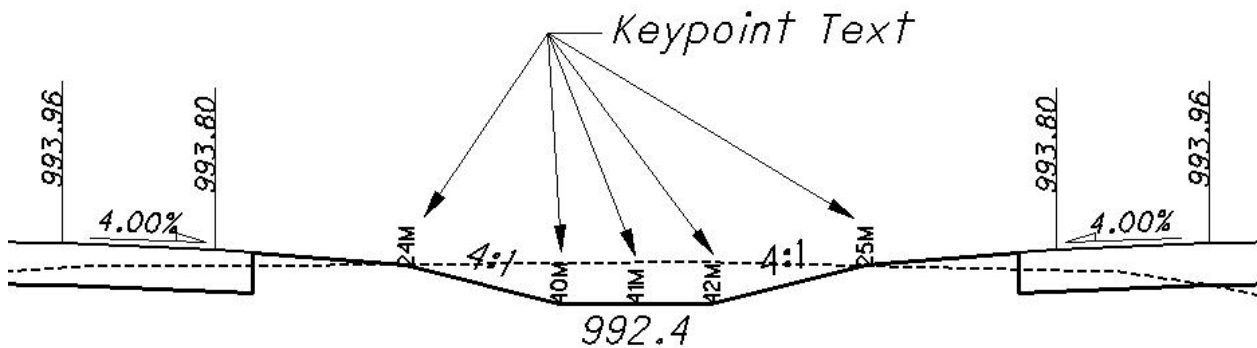
MED304-1.x will draw cross section graphics are drawn on the following levels:

- XS_P_Barrier_Surface
- XS_P_Ditch_Bottom
- XS_P_Finished_Grade
- XS_P_Finished_Grade_Seeded
- XS_P_Subgrade

Station and elevation labels are placed on level XS_P_Annotation. The text size for the station and elevation labels is determined by the value of the Define Variable “**xs annotation scale**” which is defined in DEFINE.X. See the documentation for DEFINE.X for more information.

Marked Points

MED304-1.x will place text in the design file at the “key points” of the median as shown in the example below.



This text is placed on the level XS_P_Text_MarkedPoint. Using GEOPAK's Profile Grade Report, users can instruct the software to search for this key point text to create a COGO chain and/or profile by measuring the offset and elevations at the locations of the key point text on each cross section. For more information on creating COGO chains and profiles from the “key point” text, see the [ODOT GEOPAK Road Training Guide, Part 2, Chapter 9 - Limits of Construction](#).