

# CURB\_GUTTER.X – version 07.04.10

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## Description

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This criteria file is used to draw curb and gutter according to Standard Drawing BP-5.1. The following curb types are supported:

Type 2	Type 3	Type 4
Type 2-A	Type 3-A	Type 4-A
Type 2-B	Type 3-B	Type 4-B

See Standard Drawing BP-5.1 for details on the curb dimensions.

## Inclusion Sequence

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ODOT's criteria files are written so that each individual file is responsible for drawing only a specific component of the proposed cross section design. This allows for greater flexibility when utilizing the criteria files to accommodate a wide variety of design scenarios. When a criteria run is processed, the user will specify the individual criteria files that will be used to draw each component. The order in which these components are specified is significant. Criteria files must be included in the order that they will process from the centerline out. For example, the pavement criteria must be included before the shoulder criteria which must be included before the side slope criteria. Each criteria file will start drawing where the previous criteria file ended.

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.

**CURB\_GUTTER.X** can be included directly after the following ODOT Standard Criteria files:

Pavement Criteria:  
**PAVT.X**  
**PAVT\_EXIST.X**  
**PAVT\_OVERLAY1.X**  
**PAVT\_SHAPELESS.X**  
**PAVT\_WIDEN.X**

The following marked points must be previously defined by the pavement criteria in order for **CURB\_GUTTER.X** to process correctly:

Bottom of pavement layer 1	x101 y101
Bottom of pavement layer 2	x201 y201
Bottom of pavement layer 3	x301 y301
Bottom of pavement layer 4	x401 y401
Bottom of pavement layer 5	x501 y501
Bottom of pavement layer 6	x601 y601

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## Processing Notes

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The criteria will draw the curb and gutter adjacent to the proposed edge of pavement or the proposed shoulder. Three factors work together to determine the type of curb and gutter placed:

1. The value of the variable “**curb type**”.
2. The width of the gutter as drawn in the plan view graphics.
3. The value of the variable “**wearing course thickness**”.

Lets take a look at how these three factors work together to draw the curb and gutter on the cross sections.

### 1. The value of the variable “**curb type**”

The shape of curb is determined by the variable “**curb type**”. The variable can be set as shown below.

Value	Curb Placed
“curb type” = 2	Type 2
“curb type” = 3	Type 3
“curb type” = 4	Type 4

### 2. Plan View Graphics.

The criteria will check the plan view graphics to determine the width of the gutter. If the gutter width is 2 feet or less, a Type 2, 3, or 4 curb and gutter will always be drawn depending on the value of the variable “**curb type**”. If the gutter width is greater than 2 feet, the criteria will place a Type A or B gutter depending on the value of the variable “**wearing course thickness**”.

### 3. The value of the variable “**wearing course thickness**”

If the gutter width is greater than 2 feet, the criteria will draw a type A or B gutter depending on the value of the variable “**wearing course thickness**” as shown in the table below:

Value	Gutter Placed
“wearing course thickness” = 0	Type A
“wearing course thickness” > 0	Type B

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## Processing Examples

### EXAMPLE 1 - Curb and Gutter adjacent to the proposed pavement. Gutter width is 2 feet.

The criteria will check the width of the gutter as drawn in the plan view graphics. The symbology of the curb and gutter is defined by the DGN Variable “~curb in dgn”. If the gutter width is equal to 2 feet, the criteria will place a Type 2, 3 or 4 curb and gutter. Consider the plan view graphics shown in Figure1 below:

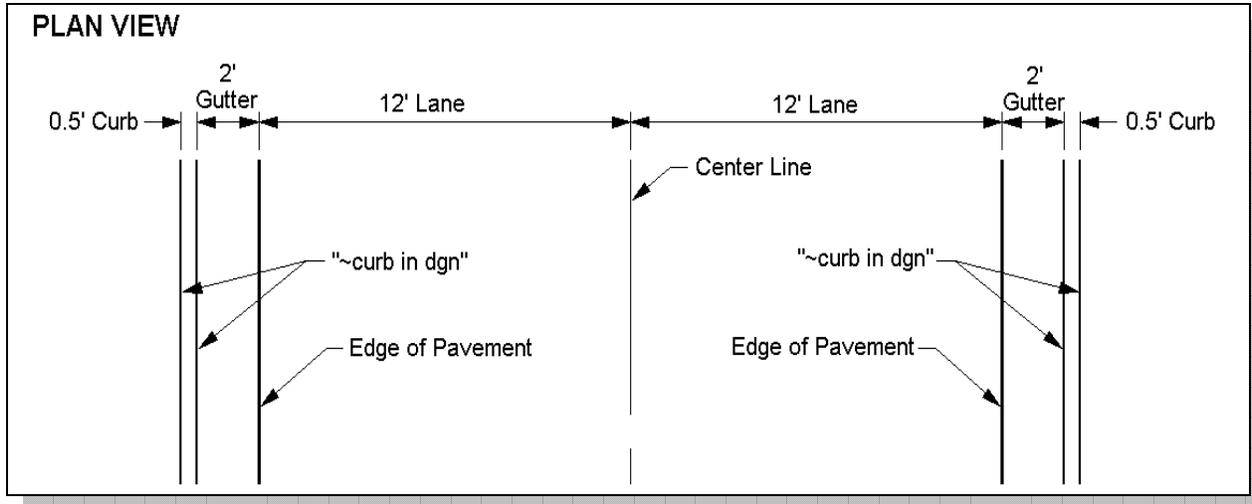


Figure 1

To process the cross sections, the following criteria files are used:

**DEFINE.X** - Criteria defining various ODOT standards.

**PAVT.X** - Criteria to draw the proposed pavement.

**CURB\_GUTTER.X** - Criteria to draw the curb and gutter.

The following variables are defined for the criteria run:

PAVT.X Variables	CURB_GUTTER.X Variables
"number of layers" = 4	"curb type" = 2
"layer 1 thickness" = 0.142	"step behind curb" = 0.83
"layer 2 thickness" = 0.1458	"gutter plate thickness" = 0.75
"layer 3 thickness" = 0.5	"wearing course thickness" = 0
"layer 4 thickness" = 0.75	"underdrain on high side of super" = 0
"layer 5 thickness" = ignored	"maximum shoulder break" = 7
"layer 6 thickness" = ignored	"dgn file name" = Plan View DGN file name

The resulting cross section is shown in Figure 2 on the following page.

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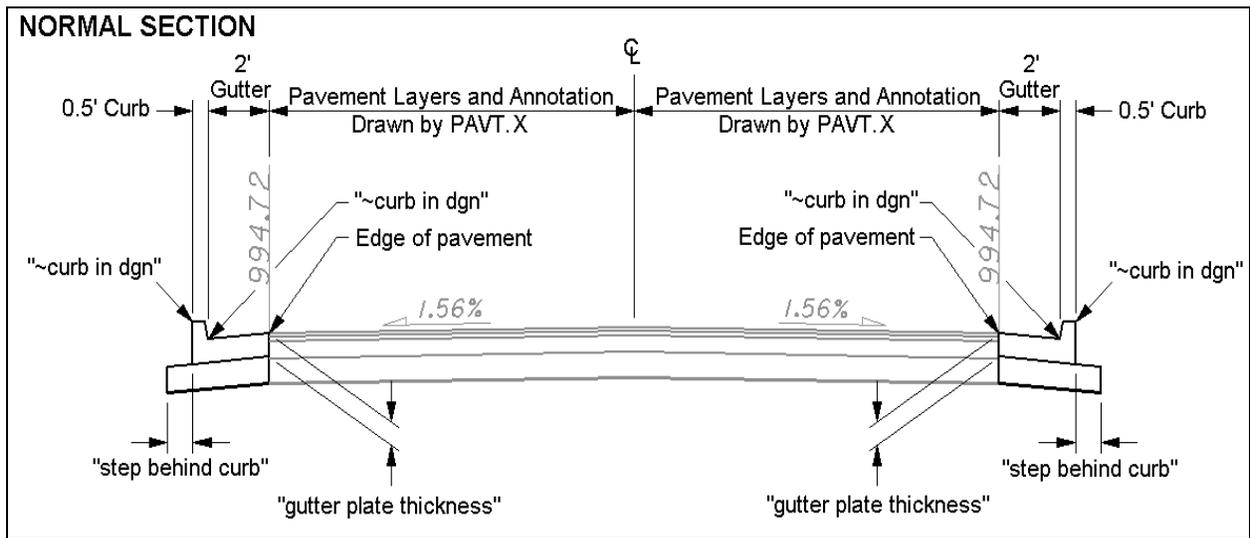


Figure 2 – Type 2 Curb and Gutter

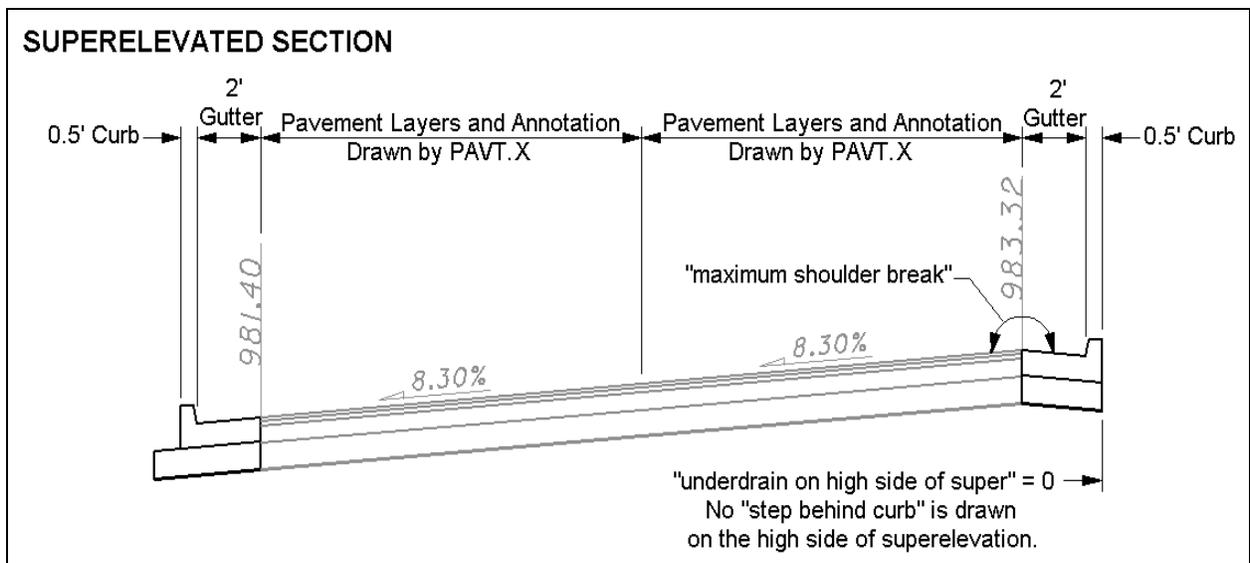


Figure 3 – Type 2 Curb and Gutter

Notes:

- If the gutter width is drawn at 2 feet, the value of the variable "**wearing course removed**" is ignored. The criteria will not allow placement of a Type B gutter if the gutter width is 2 feet or less.
- The variable "**maximum shoulder break**" is ignored if the gutter width is less than 4 feet. See Figure 5.
- If the total pavement buildup is the same thickness as the "**gutter plate thickness**", no material will be drawn underneath the curb and gutter. The value of "**step behind curb**" is ignored in this case.

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## EXAMPLE 2 - Curb and Gutter adjacent to the proposed pavement. Gutter width is greater than 2'.

Consider the plan view graphics show in Figure 1 on page 3 of this documentation. For cases where the gutter width is greater than 2 feet wide, a Type A or B gutter will be drawn depending on the value of the variable “wearing course thickness” as shown in Figure 4 below:

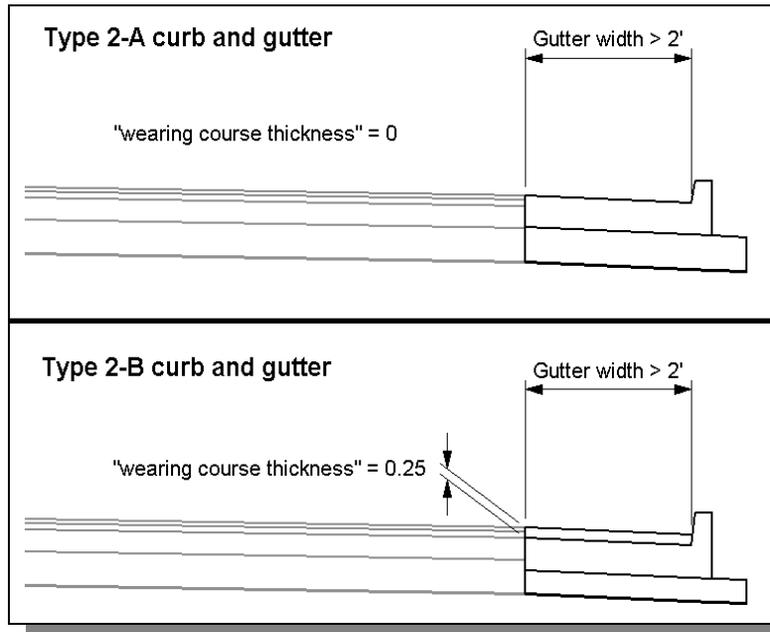


Figure 4 – Type 2-A or 2-B Curb and Gutter

The slope of the gutter is drawn using the shoulder slope (4.17%) as shown in Figure 301-8 of the Location and Design Manual, Volume 1 - Roadway Design. Superelevated sections are drawn as shown below.

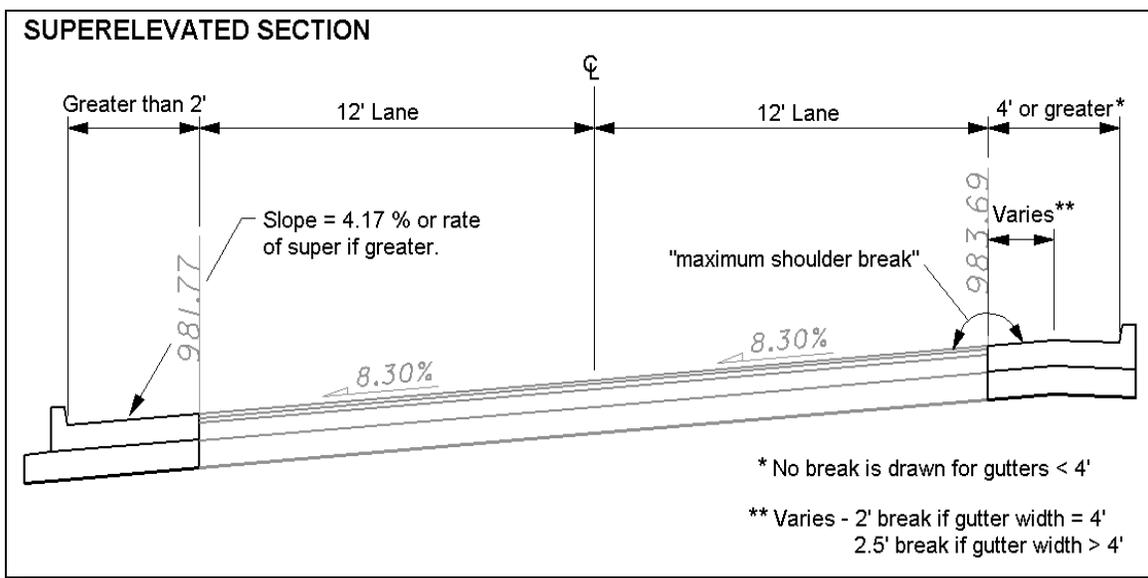


Figure 5

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## EXAMPLE 3 - Processing With Driveways

The criteria provides the capability to draw a dropped curb in the event that a driveway is encountered in the plan view graphics. The pattern line must cross the back of the driveway in order for the criteria to draw a dropped curb. Consider the plan view graphics shown in Figure 6 below:

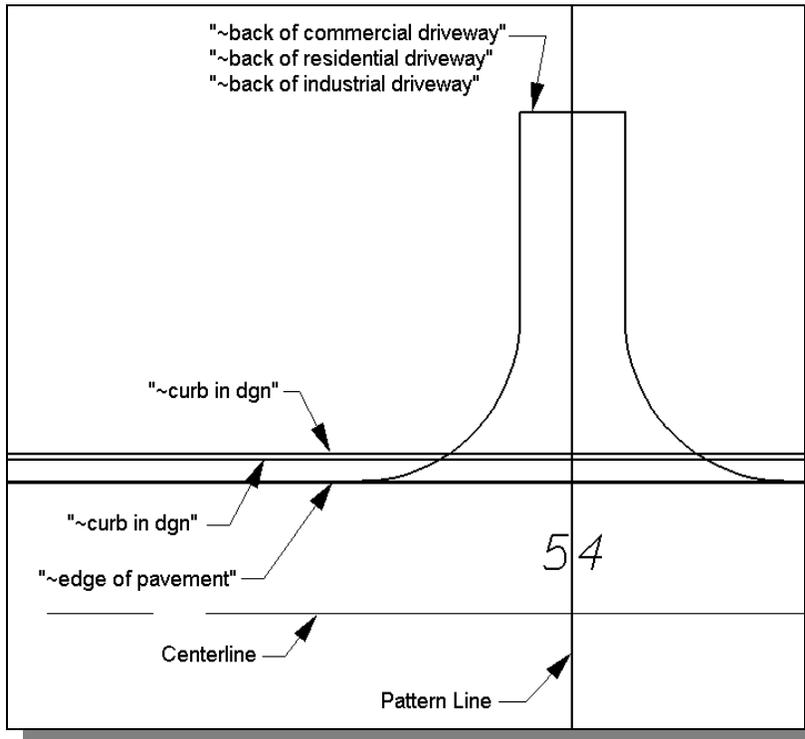


Figure 6

If the pattern line crosses one of the back of driveway elements, a dropped curb is drawn as shown in Figure 7 below:

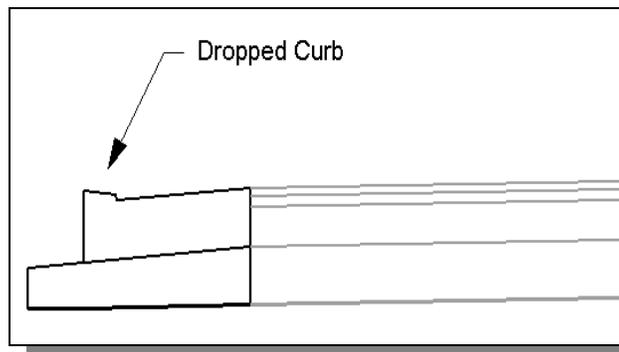


Figure 7

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## Summary of Variables

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A summary of the variables defined in **CURB\_GUTTER.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.

### DEFINE VARIABLES

#### “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.

#### “curb type”

This variable is used to select the type of curb that will be drawn on the cross sections. The variable can be set as follows”

Value	Curb Placed
“curb type” = 2	Type 2
“curb type” = 3	Type 3
“curb type” = 4	Type 4

#### “step behind curb”

Width of material (base or subbase) placed behind curb. The default value is set to 0.83 which is the smallest minimum width of an underdrain. See Figure 2.

#### “gutter plate thickness”

This variable is used to define the thickness of the gutter plate. The default value is 0.75. See Figure 2.

#### “wearing course thickness”

This variable is used to set the thickness of the wearing course for a Type 2-B, 3-B, or 4-B curb and gutter. The default value is 0. See Figure 4.

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### “underdrain on high side of super”

This variable is used to control whether an underdrain is placed on the high side of superelevated sections. Set the variable equal to 0 or 1 as follows:

0 - No underdrain, ends base or subbase at back of curb. See Figure 3.

1 - Underdrain, extends base or subbase behind curb for the distance “**step behind curb**”.

The default value is 0.

### “maximum shoulder break”

In cases where the gutter width is greater than 4', the criteria will break the slope of the gutter on the high side of superelevation as shown in Figure 5 below. This variable is used to set the maximum slope break between the pavement and the gutter. The default value is 7%.

### “number of layers”

The total number of pavement layers, including base courses. This variable is initially defined by the pavement criteria. The default value is 4.

## DGN VARIABLES

The following DEFINE\_DGN variables are used by the criteria to locate the MicroStation elements that CURB\_GUTTER.X will search for in order to draw the

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.

### “~curb in dgn”

This variable is used to define the symbology for the proposed face of curb and the back of curb. The following values have been assigned by “~curb in dgn” according to ODOT standards:

```
define_dgn "~curb in dgn" \  
dgn = "proposed dgn file name" \  
lvname = PV_P_Curb \  
co = 10
```

### “~guardrail in dgn”

This variable is used to define the symbology for proposed guardrail. If a guardrail is encountered, the “**step behind curb**” value will be ignored and the material will be drawn to the back of curb. The following values have been assigned by “~guardrail in dgn” according to ODOT standards:

```
define_dgn "~guardrail in dgn" \  
dgn = "proposed dgn file name" \  
lvname = RD_P_GR \  
co = 9
```

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“~back of commercial driveway”

“~back of residential driveway”

“~back of industrial driveway”

These variables are used to define the symbology for driveways. If the criteria encounters one of these driveway lines, a dropped curb will be drawn as show in Figure 3. See Additional Processing Notes on page 6 of this documentation for more information. The value of these three variables has been assigned as shown below:

```
define_dgn "~back of commercial driveway" \  
dgn = "proposed dgn file name" \  
lvname = PV_P_Driveway \  
co = 3
```

```
define_dgn "~back of residential driveway" \  
dgn = "proposed dgn file name" \  
lvname = PV_P_Driveway \  
co = 4
```

```
define_dgn "~back of industrial driveway" \  
dgn = "proposed dgn file name" \  
lvname = PV_P_Driveway \  
co = 5
```

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### Marked Points

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GEOPAK has a simple, yet very important way of "remembering" where the location of various points are during the drawing process. This is accomplished with marked points.

Some marked points are stored during the criteria processing that are only used temporarily and do not need to be "remembered" as processing continues. These points can be subsequently redefined by another criteria file. There are, however, certain key locations that must be referred to by multiple criteria files. **CURB\_GUTTER.X** will store the following marked points during processing that should never be redefined by another criteria file:

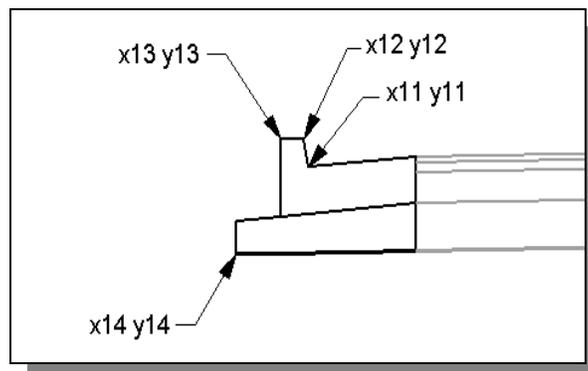


Figure 8