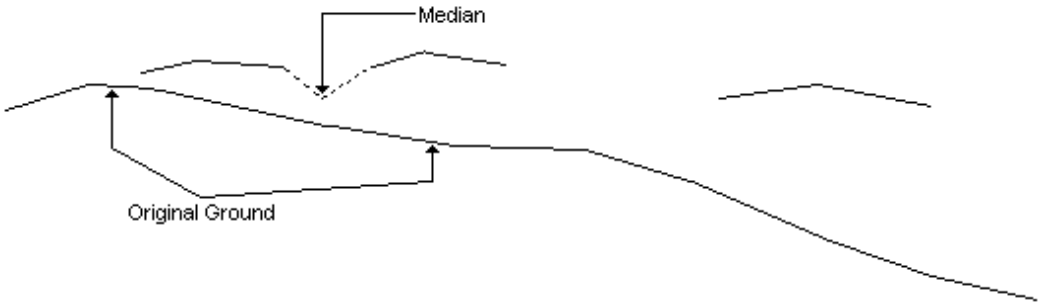
APPENDIX H

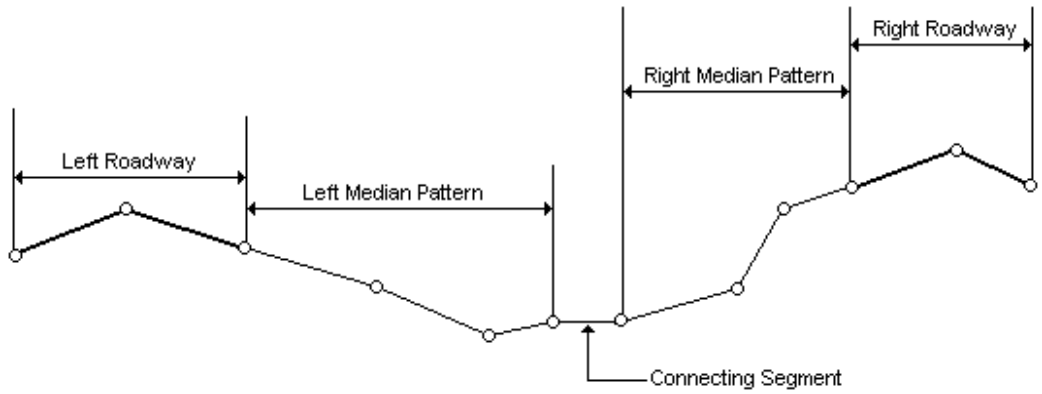
MEDIAN PROCESSES

Median data are used to link adjacent roadways and are similar to template data in that they give a shape to be constructed. Again, a table of typical medians is created. The relative positions of the two roadways may also influence the median shape. Median data may differ from template data in that a median shape definition can apply to a station range so that one median definition may cover a complete section of roadway. The resulting partial section looks like this after applying median data.



MEDIAN SHAPES

A median pattern defines the shape of the earthwork between the two roadways and may consist of up to three fixed segments extending from each roadway with one additional connecting segment possible, as illustrated below.



Median data defines shape criteria (patterns) of the connecting links between roadways and indicates the roadways and station limits where the criteria apply. After a specific median pattern has been defined and given a number, it can be specified to apply at various locations by referring to its number.

If both median and sideslope patterns are specified between the two roadways at the same station, a median will be designed.

A complete median may consist of from zero to seven segments. The case of zero segments provides for merging roadways (connecting shoulder points with a straight line). Provision is also available for introducing special ditch grades into a median (see Appendix I).

The designer is concerned not only with defining the median patterns by entering data for the various segments, but also must be concerned with achieving the desired median shape under various conditions. A given median pattern may be generally applicable over extended roadway distances. Due to variations in the horizontal or vertical alignments, or both, of the roadways involved, the space (width) within which the median must fit may change. Within limits, IGrds will modify the specified median shapes to create one which will fit. The designer chooses, from certain options, the general approach IGrds is to use to resolve situations where the specified median patterns do not fit exactly. The cases that can occur are:

- Median pattern halves do not overlap or intersect - Handled automatically by connecting ends.
- Roadway surfaces overlap - Resolved automatically. See discussion below.
- Overlapping medians that do not intersect - Controlled by intercept codes. See discussion below.
- Medians that intersect - Controlled by intercept codes. See discussion below.
- Special ditches are introduced - Controlled by special options. See Appendix I.

Intercept codes and options are entered to achieve desired results. The selection of the correct intercept and option codes is greatly simplified when the median pattern is designed to either intersect or connect.

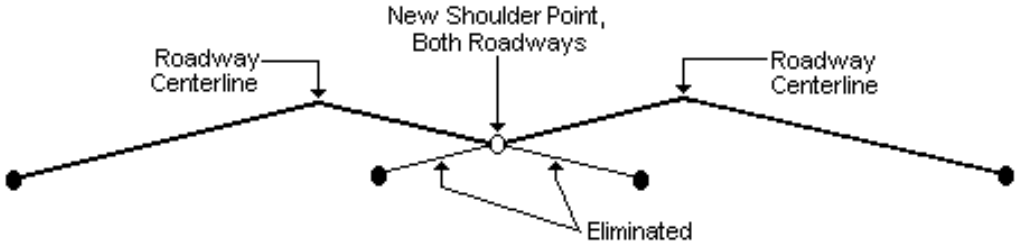
Median shapes can be transitioned from one shape to another, if desired, in a fashion similar to roadway templates. The shape specified at the from station will transition, segment by segment, to the shape specified at the ending station.

Roadways That Overlap

The possibility of overlapping or intersecting roadway templates and the resulting design must be considered.

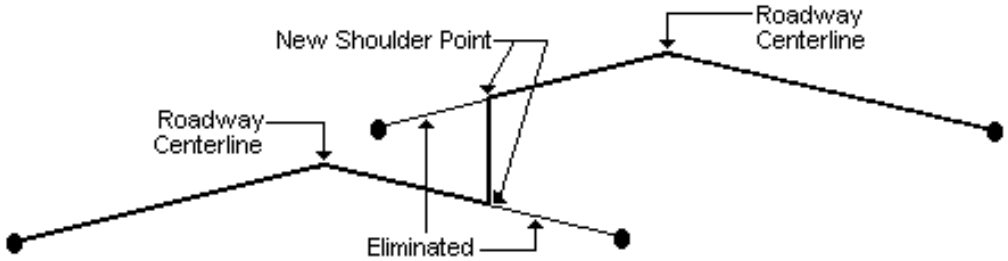
Case 1 - Roadway templates overlap and intersect.

Solution: The point of intersection becomes the median. All roadway template ridge points beyond the point of intersection are eliminated and the point of intersection becomes a shoulder point of both roadway templates.



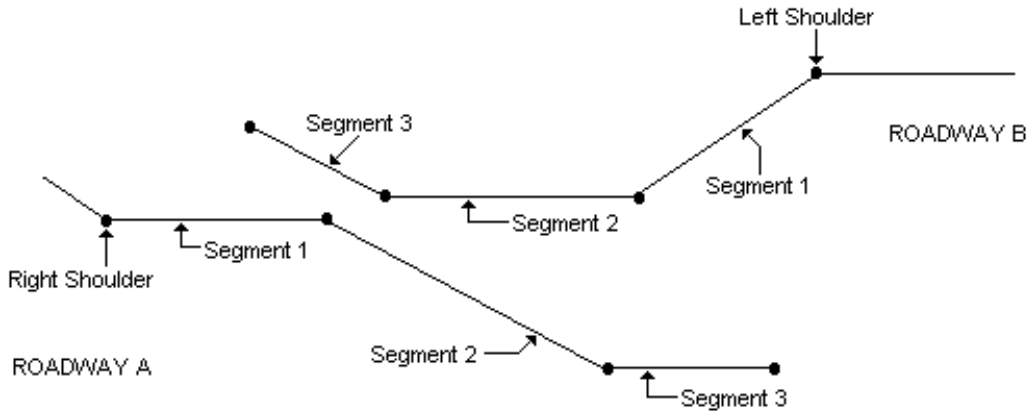
Case 2 - Roadway templates overlap and there is no intersection.

Solution: A vertical line is constructed at the midpoint of the overlap distance. This vertical line becomes the median and all template ridge lines beyond the vertical median are eliminated. The shoulder points of the road bed template coincide with the respective ends of the median.



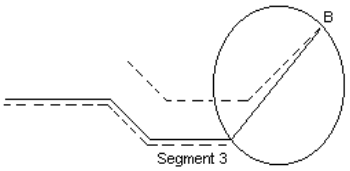
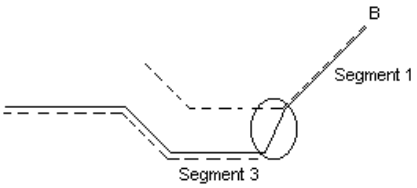
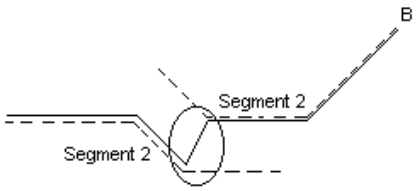
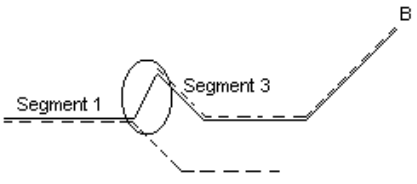
Overlapping Medians That Do Not Intersect

This drawing shows median patterns that overlap, but DO NOT intersect.



IGrds determines which pattern reaches the lower elevation. Then it uses the intercept code of the OTHER pattern. A code must be entered for both patterns since it is not known which one has the lower elevation.

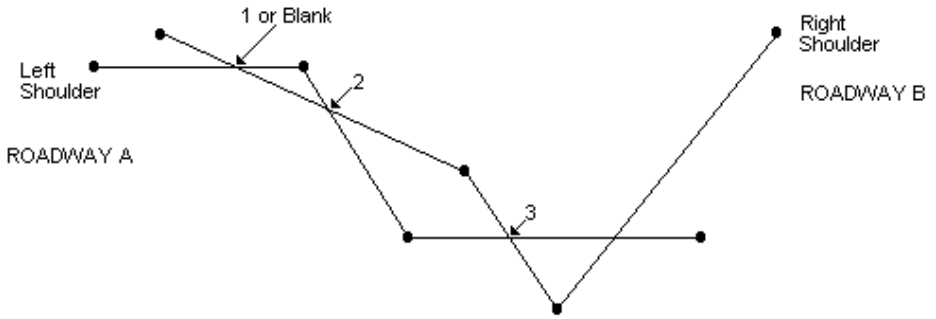
The following demonstrates how to control what happens when the median segments overlap, but do not intersect.

INTC Code of Roadway B	IGrds Action	Median Design
Blank	The last segment of the median pattern at the lowest elevation is connected to the shoulder point of the other roadway.	
1	The last segment of the median pattern of the lowest elevation is connected to segment 1 of the other pattern.	
2	The last segment of the median pattern of the lowest elevation is connected to segment 2 of the other pattern.	
		Segment 3 of A is deleted to eliminate overlap
3	The last segment of the median pattern at the lowest elevation is connected to segment 3 of the other pattern.	
		Segments 2 and 3 of A are deleted to eliminate overlap

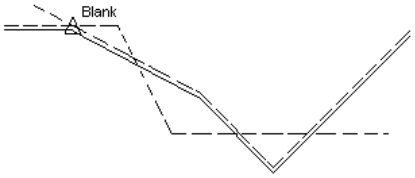
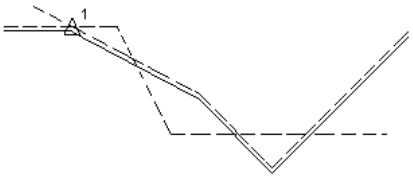
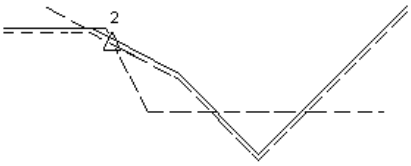
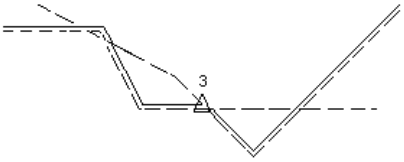
Medians That Intersect

When the medians intersect, intercept codes are used to select the linking segment.

The final median pattern is always formed at the segment selected on the HIGHER median pattern. In this case, the higher pattern is Roadway A.



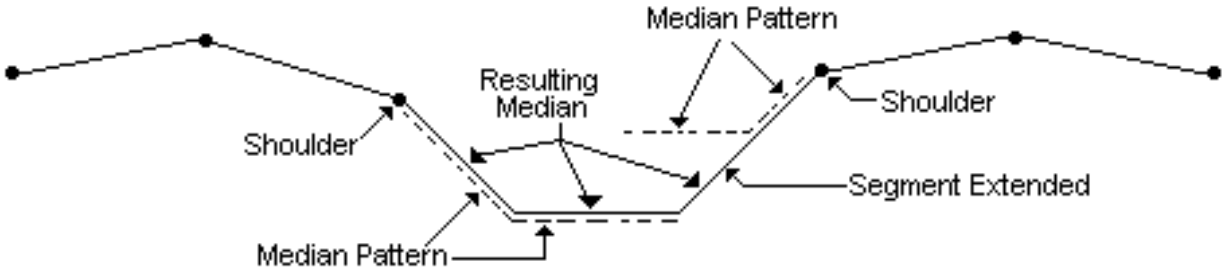
The following demonstrates how to control medians that intersect.

INTC Code of Roadway A	IGrds Action	Median Design
Blank	The first intersection of the median patterns controls.	
1	The intersection on segment 1 of Roadway A controls.	
2	The intersection on segment 2 of Roadway A controls.	
3	The intersection on segment 3 of Roadway A controls.	

When the segment has more than one intersection, as segment 3 shows, the first intersection on the higher median pattern controls.

Special Median Options

Option L may be used to alter normal intercept and overlap resolutions of median patterns. This option selects the pattern which results in the lowest ditch, then extends segment 1 of the highest pattern to intersect the low pattern. The L option supports flat bottom and V bottom median configurations.



Another special option is B. This requires only the input of one segment on either the left or right design roadway. A vee bottom median ditch is built at the specified horizontal distance from the terrain baseline and at the specified vertical distance from the shoulder of the design roadway segment used. For this option, the designer must know which roadway is the lowest in order to get the lowest ditch, if desired.

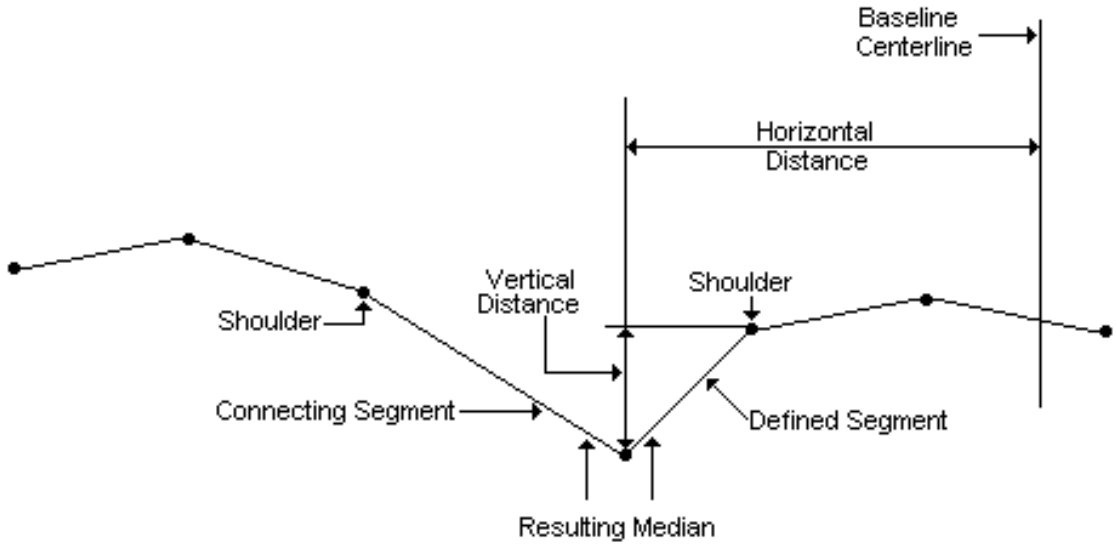


Figure H-1 gives examples of median data and resulting medians.

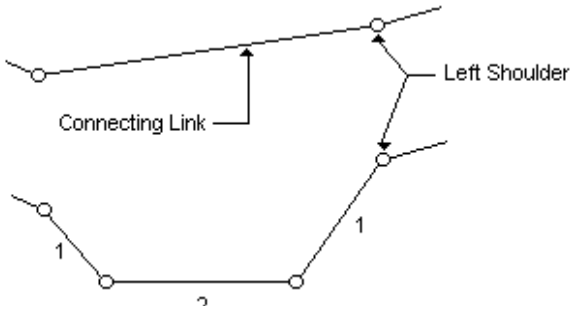
Pattern	Left Roadway						Right Roadway					
	SEGMENT 1		SEGMENT 2		SEGMENT 3		SEGMENT 3		SEGMENT 2		SEGMENT 1	
	HOR. DIST.	VERT. DIST.	HOR. DIST.	VERT. DIST.	HOR. DIST.	VERT. DIST.	HOR. DIST.	VERT. DIST.	HOR. DIST.	VERT. DIST.	HOR. DIST.	VERT. DIST.
1												
2	10.0	-10.0	25.0	0.0							20.0	-15.0
3	12.0	-2.0	10.0	-1.0	10.	5.0					20.0	-10.0
4	0.0	1.0	20.0	1.0					1.0	-50.0	10.0	-1.0
5	12.0	-0.5	0.2	3.5					0.2	3.5	12.0	-0.5

Resulting Median

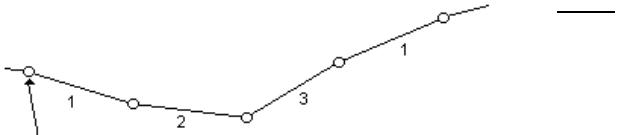
Pattern

1

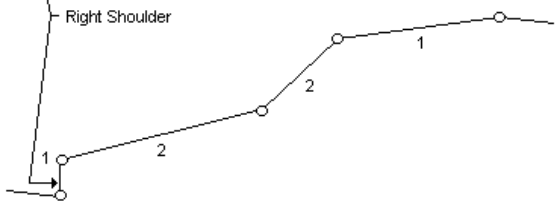
2



3



4



5

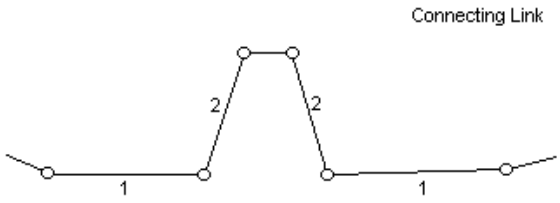


Figure H-1 - Example Median Input and Results

MEDIAN STATIONS

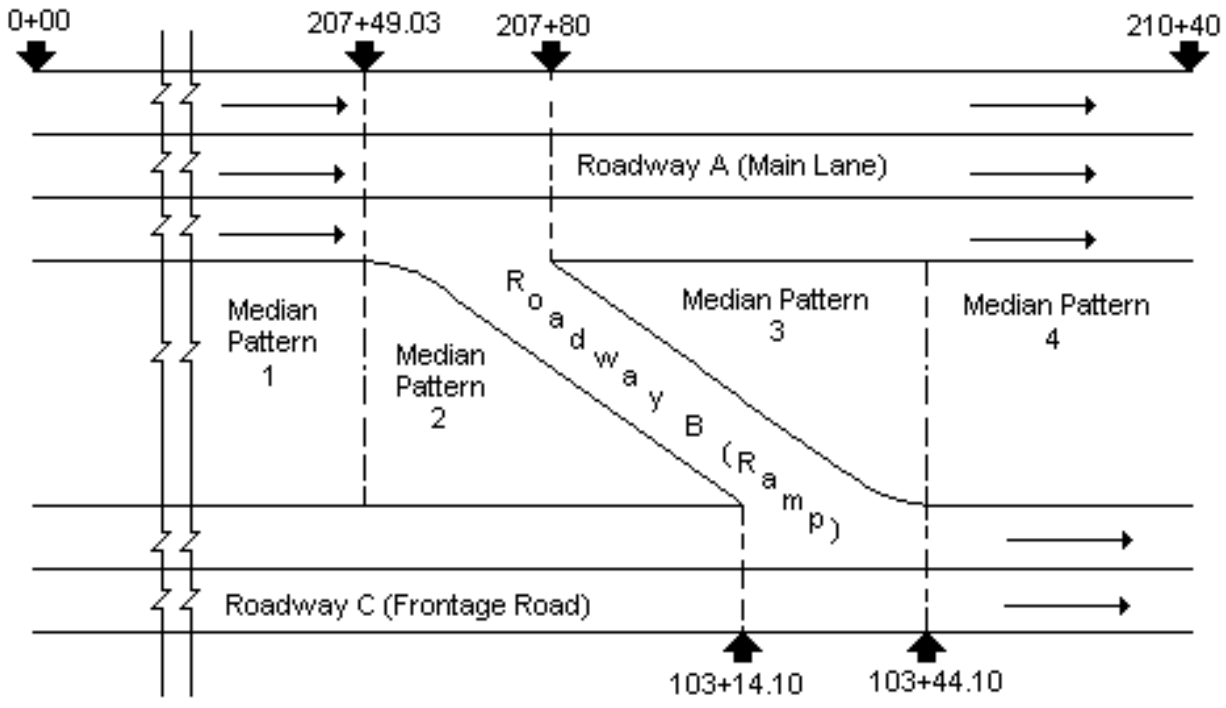
The second use of median design data is to specify where median patterns apply. Beginning and ending stations must be entered. The pattern is then applied at all sections between these limits. If different median patterns are given for the beginning and ending stations, then the segments will be linearly transitioned over the station range.

Considerable flexibility is allowed in defining the beginning and ending stations of a median with respect to any of the roadway alignments. The drawing that follows shows a normal existing design for a main lane to a frontage road. The designer knows:

1. The station on the main lane at which the exit ramp begins.

2. The station on the frontage road at which the exit ramp ends.

The medians lie between the ramp and the main lane, and between the main lane and frontage road. The designer defines the beginning of the median with respect to the main lane stationing, and the end of the median with respect to the frontage road station. Do not forget overlapping equation numbers, if any. For storage purposes, the system computes and stores beginning and ending stations for the median pattern on the left roadway.



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