

# Roadway Characteristics Criteria Update – 7/24/18

## *Proposed Approach for 2020 Six-Year Highway Plan*

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### ➤ Score Based on 4 or 5 Components:

- Geometric Constrained Speed: Based on DOC, Assumes e=6%, Considers both Min. and Avg. Values
  - **NEW (PENDING DATA AVAILABILITY):** Consider vertical curve data in geometric constrained speed
  - Average Lane Width: For 2-way 1-lane roads, ½ the reported lane width is used.
- **REVISED:** Average Lateral Clearance (Rural & Freeways Only)
  - Bike Lane Width + Parking Lane Width + Shoulder Width
  - Replaces Shoulder Width
- **NEW:** Median Type & Width (Urban Arterials Only)
- **NEW (PENDING DATA AVAILABILITY):** Roadside Hazard Rating

➤ Target values established for each component based on functional class

➤ Larger Deviation from Targets -> Higher Score

➤ Scores for each component combined into composite score; Can range from 0 to 100

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## *Disclaimer*

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- Initially developed as a standalone criteria
- Merged with the safety criteria late in the process
- Scoring often tends to support safety, but also considers mobility and practicality in accordance with common geometric practices

# Roadway Characteristics Criteria Update – 7/24/18

## *Geometric Constrained Speed (S)*

- Modified equations to award increasing points up to S=0 for most facilities
- New equations are exponential rather than linear
- Minor changes to functional class groups & target speeds

$S=111.89*d^{-0.437}$  if  $d \geq 2.9$ ; otherwise  $S=S_T$  based on functional class

R Fwy/U Fwy:  $P_S=200*\sqrt{1-(S-30)^2*3/6,400}-100$ ;  $S_T=70$

R PrinArt/R MinArt:  $P_S=200*\sqrt{1-(S-15)^2/2,700}-100$ ;  $S_T=60$

U PrinArt/R MajColl/R MinColl:  $P_S=200*\sqrt{1-S^2*3/10,000}-100$ ;  $S_T=50$

U MinArt/U MajColl/R Loc:  $P_S=200*\sqrt{1-S^2*3/6,400}-100$ ;  $S_T=40$

U MinColl/U Loc:  $P_S=200*\sqrt{1-S^2/1,200}-100$ ;  $S_T=30$

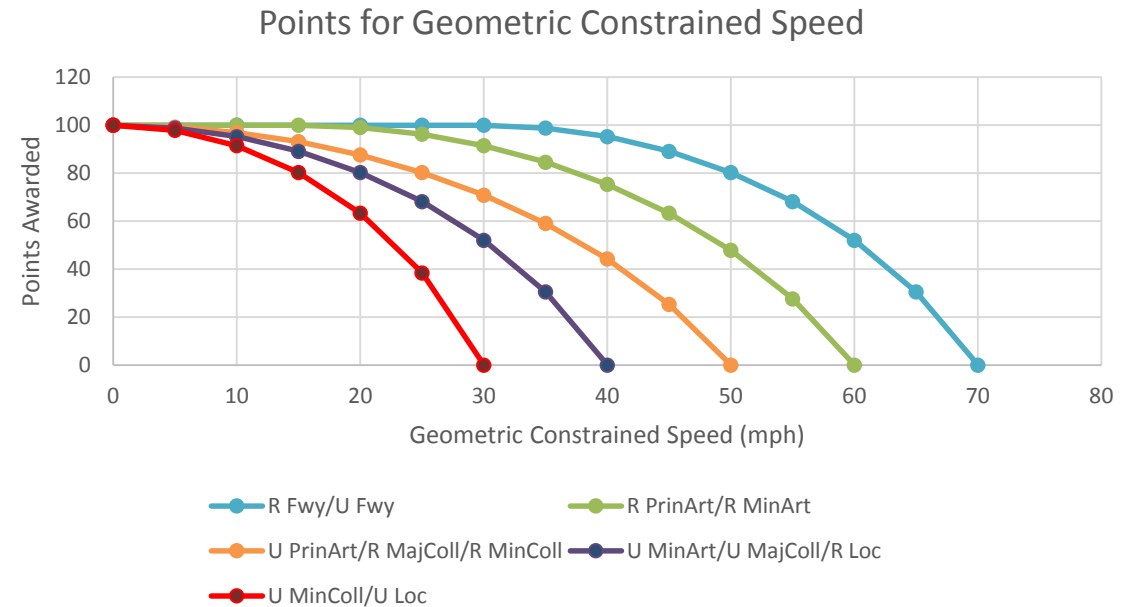
Where:

S=Geometric Constrained Speed

$S_T$ =Target Geometric Constrained Speed

d=Degree of Curve

$P_S$ =Points Awarded for Geometric Constrained Speed



# Roadway Characteristics Criteria Update – 7/24/18

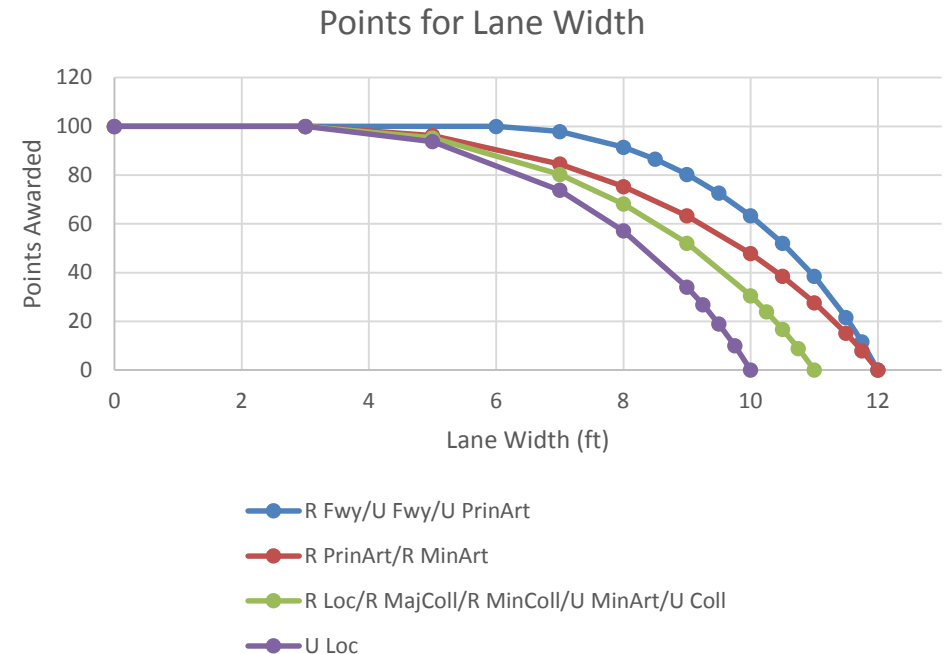
## *Lane Width (L)*

- Modified equations to award increasing points up to L=3' or L=6' depending on functional class
- New equations are exponential rather than linear
- Minor changes to functional class groups & target lane widths

If Two-Way Operation & Number of Lanes < 2, L = HIS Lane Width / 2
Otherwise, L = HIS Lane Width
R Fwy/U Fwy/U PrinArt: $P_L = 200 * \sqrt{1 - (L-6)^2 / 48} - 100$
R PrinArt/R MinArt: $P_L = 200 * \sqrt{1 - (L-3)^2 / 108} - 100$
R MajColl/R MinColl/R Loc/U MinArt/U Coll:
$P_L = 200 * \sqrt{1 - (L-3)^2 * 3 / 256} - 100$
U Loc: $P_L = 200 * \sqrt{1 - (L-3)^2 * 3 / 196} - 100$
$0 \leq P_L \leq 100$

Where:

$P_L$  = Points Awarded for Lane Width



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## *Median Type & Width (M)*

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- Applies to Urban Arterials
- One-Way Couplets/Positive Separation: No Points
- Delineator Posts: 25 Points
- Flush or Mountable Medians: 25 to 100 Points Depending on Median Width

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## *Median Type & Width (M)*

If TYPEROAD=Couplet:  $P_M=0$

If MEDTYPE=Concrete Barrier, Guardrail, Other Positive Barrier,  
Raised Non Mountable, or Depressed:  $P_M=0$

If MD\_BARR=Concrete, Guardrail, Cable, Earthed, or Other:  $P_M=0$

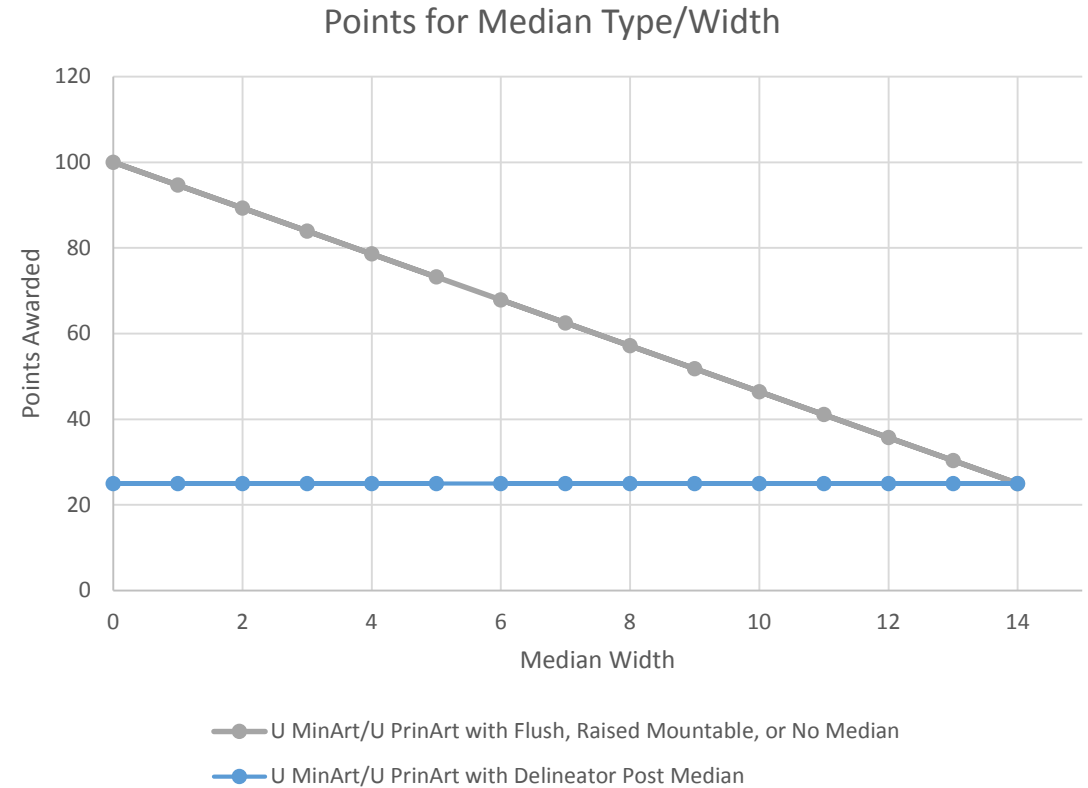
If MD\_BARR=Delineator Post:  $P_M=25$

If MD\_BARR=None:  $P_M=100-75*M/14$ ,  $25 \leq P_M \leq 100$

Where:

M=Median Width

$P_M$ =Points Awarded for Median Type & Width



# Roadway Characteristics Criteria Update – 7/24/18

## *Lateral Clearance (C)*

- Replaces Shoulder Width
- Applies to Freeways & Rural Roads

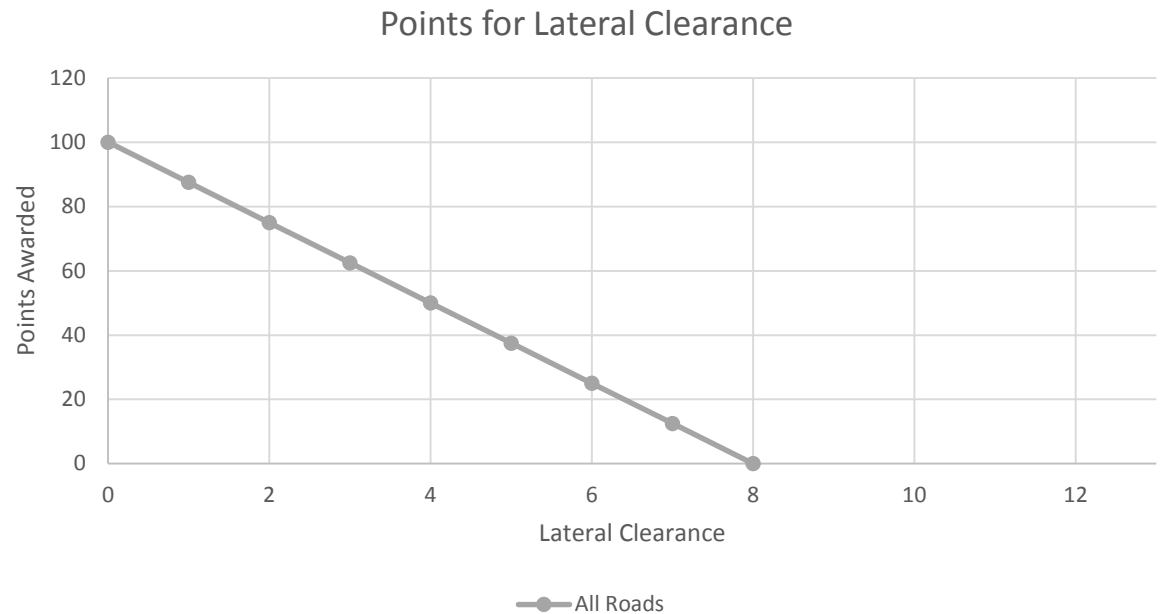
### Lateral Clearance:

$$P_C = 100 - 12.5 * C; 0 \leq P_C \leq 100$$

Where:

C=Bike Lane + Parking Lane+ Outside Shoulder Width

P<sub>C</sub>=Points Awarded for Lateral Clearance



# Roadway Characteristics Criteria Update – 7/24/18

## *Roadside Hazard Rating (H)*

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- Would apply to all rural roads except freeways
- Clear zone width considered, but not feasible to measure
- Propose using Roadside Hazard Rating (H) instead, if resources are available to collect data
- H can range from 1 to 7, with 1 being best and 7 being worst





# Roadway Characteristics Criteria Update – 7/24/18

## *Roadside Hazard Rating (H)*

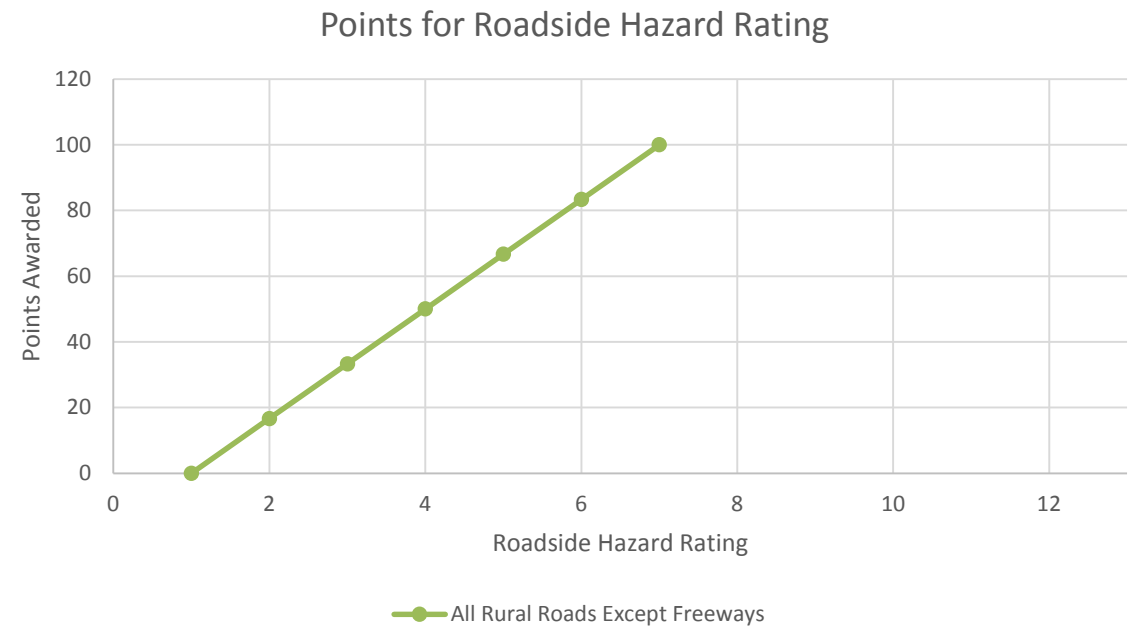
**Roadside Hazard Rating:**

$$P_H = (H - 1) * 50 / 3; 0 \leq P_H \leq 100$$

Where:

H=Roadside Hazard Rating

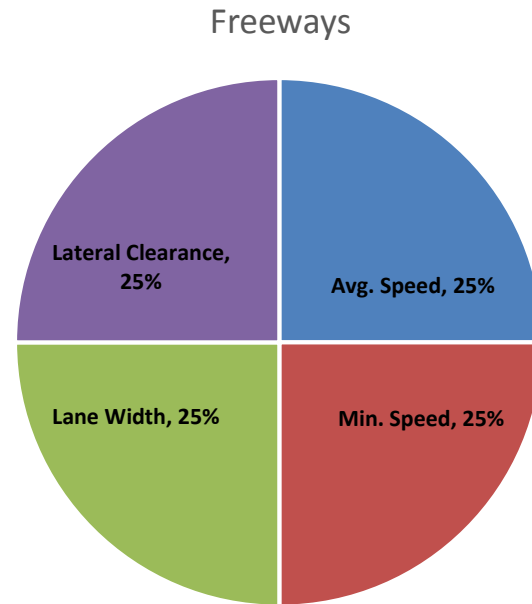
P<sub>H</sub>=Points Awarded for Roadside Hazard Rating



# Roadway Characteristics Criteria Update – 7/24/18

## *Composite Scores*

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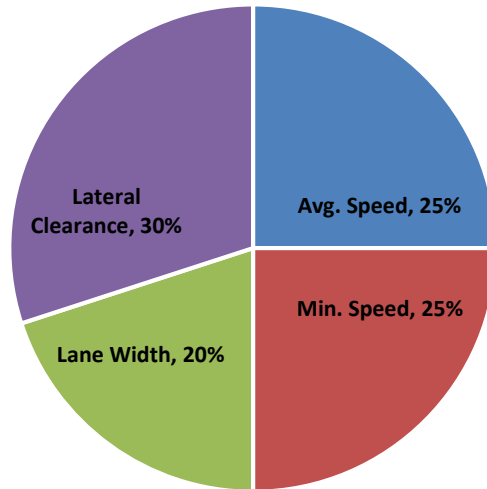
$$P=0.25P_{S,avg}+0.25P_{S,min}+0.25P_L+0.25P_C$$

# Roadway Characteristics Criteria Update – 7/24/18

## *Composite Scores*

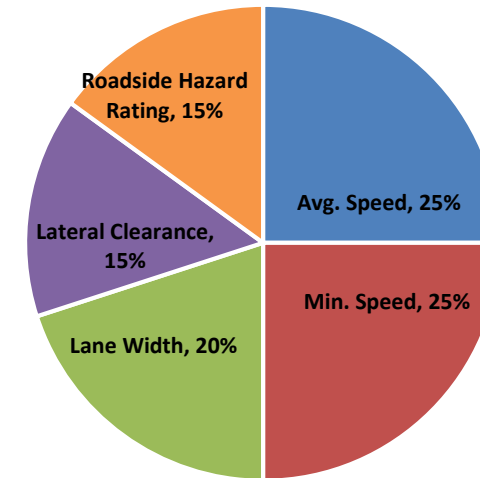
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Rural Non-Freeway  
(Without Roadside Hazard Rating)



$$P=0.25P_{S,avg}+0.25P_{S,min}+0.2P_L+0.3P_C$$

Rural Non-Freeway  
(With Roadside Hazard Rating)



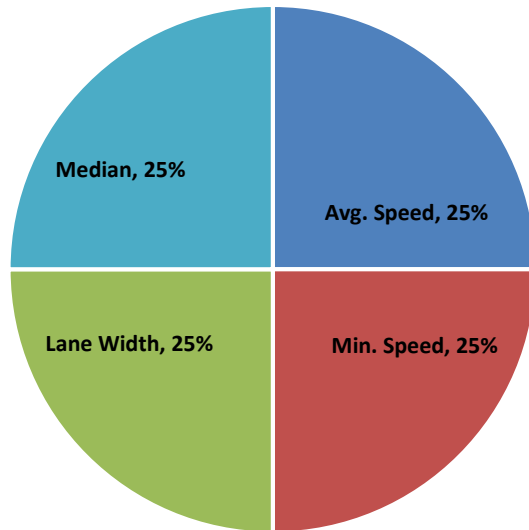
$$P=0.25P_{S,avg}+0.25P_{S,min}+0.2P_L+0.15P_C+0.15P_H$$

# Roadway Characteristics Criteria Update – 7/24/18

## *Composite Scores*

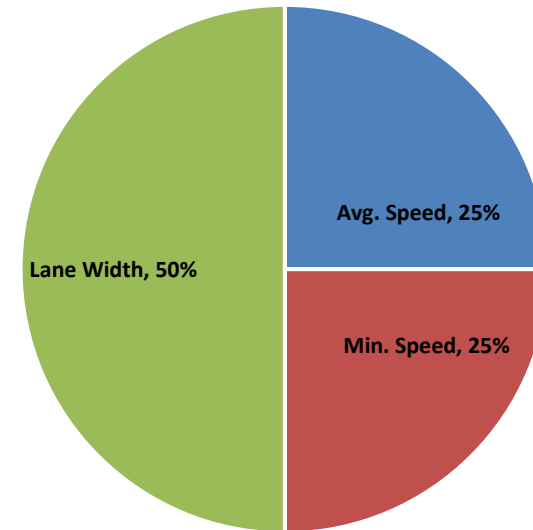
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Urban Arterials



$$P=0.25P_{S,avg}+0.25P_{S,min}+0.25P_L+0.25P_M$$

Urban Collectors/Locals



$$P=0.25P_{S,avg}+0.25P_{S,min}+0.5P_L$$

Roadway Characteristics Criteria Update – 7/24/18  
*Composite Scores*

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**Questions/  
Comments**