

Here are the Design Matrices as revised by the Matrix Committee. Row deletions were not tracked here as strikeout. The Risk Program rows have been removed.

↓ Project Type	Main Line																Bridges			Barriers			
	Horizontal Alignment	Vertical Alignment	Lane Width	Shoulder Width [13]	On / Off Connection	Median Width	Cross Slope Lane	Cross Slope Shoulder	Fill / Ditch Slopes	Clear Zone	Signing [10]	Delineation [9]	Illumination & ITS	Basic Safety	Vertical Clear. [11]	Bike and Pedestrian	Lane Width	Shoulder Width	Structural Capacity	Term. & Trans. Section [12]	Standard Run	Bridge Rail [14] [19]	
(1-1) Preventative Maintenance																							
<b>Pavement Restoration</b>																							
(1-2) Diamond Grinding/Dowel Bar Retrofit								[28]	[28]	[28]	[28]	[28]	B							F	[28]	F	
(1-3) BST/Basic Safety						[28]		[28]	[28]	[28]	[28]	[28]	B							F	[28]	F	
(1-4) Milling with HMA Inlays						[28]		[28]	[28]	[28]	[28]	[28]	B							F	[28]	F	
(1-5) HMA Overlays						[28]	[28]	[29]	[28]	[28]	[28]	[28]	B	F						F	F	F	
(1-6) PCCP Single Lane Rehab						[28]	[28]	[29]	[28]	[28]	[28]	[28]	B	EU/F						F	F	F	
<b>Bridge Rehabilitation</b>																							
(1-7) Bridge Deck Rehabilitation											F				F				[11]	F <sup>[6]</sup>	F <sup>[22]</sup>	F	
<b>Safety</b>																							
(1-8) Median Barrier																				F <sup>[20]</sup>	F <sup>[20]</sup>		
(1-9) Bridge Rail Upgrades																				F	F <sup>[22]</sup>	F	
(1-10) CAL/CAC/IAL	Design Elements determined based on identified Counter Measures <sup>[27]</sup>																						
<b>Reconstruction<sup>[16]</sup></b>																							
(1-11) New / Reconstruction	F	F	F	F	F	F	F	F	F	F	F	F	F		F	F	F	F	F	F	F	F	

Comment [1bp1]: Does this still apply if inside lane work is being performed?

Design Matrix 1: Interstate Routes (Main Line)  
Exhibit 1100-4



↓ Project Type	Main Line														Bridges <sup>[11]</sup>				Intersections			Barriers			
	Horizontal Alignment	Vertical Alignment	Lane Width	Shoulder Width	Lane Transition	On / Off Connection	Median Width	Cross Slope Lane	Cross Slope Shoulder	Fill / Ditch Slopes	Access <sup>[3]</sup>	Clear Zone <sup>[18]</sup>	Sign., Del., Illum., & ITS	Basic Safety	Bike & Ped.	Lane Width	Shoulder Width	Vertical Clearance	Structural Capacity	Turn Radii	Angle	I/S Sight Distance	Term. & Trans. Section <sup>[12]</sup>	Standard Run	Bridge Rail <sup>[14] [19]</sup>
(3-1) Preventative Maintenance																									
<b>Preservation</b>																									
<b>Roadway</b>																									
(3-2) BST/Basic Safety								[28]		[28]		[28]	[28]	B								[28]	F	[28]	F
(3-3) Milling With HMA Inlays								[28]		[28]		[28]	[28]	B	M							[28]	F	[28]	F
(3-4) HMA Overlays								[28]		[28]		[28]	[28]	B	M			EU/F				[28]	F	[28]	F
(3-5) Replace HMA w/PCCP at I/S			EU/M	EU/M	EU/F			EU/M	EU/M	[28]		[28]	[28]	B	M			F		EU/F	EU/F	[28]	F	[28]	F
<b>Structures</b>																									
(3-6) Bridge Replacement	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>		F	F		F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F	F
(3-7) Bridge Deck Rehab.												[28]	[28]	B	M			F	[11]			[28]	F <sup>[6]</sup>	F <sup>[22]</sup>	F
<b>Improvements<sup>[16]</sup></b>																									
<b>Mobility</b>																									
(3-8) Non-Interstate Freeway	F	F	F	F	F	F	F	F	F	F	F	F	F		F	F	F	F	F	F	F	F	F	F	F
(3-9) Urban	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F		F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F	F
(3-10) Rural	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F		F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F	F
(3-11) HOV	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F		F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F	F
(3-12) Bike/Ped. Connectivity [5]			F <sup>[2]</sup>	F <sup>[2]</sup>											F	F <sup>[2]</sup>	F <sup>[2]</sup>								
<b>Safety</b>																									
(3-13) Non-Interstate Freeway	F	F	F	F	F	F	F	F	F	F	F	F	F		F	F	F	F		F	F	F	F	F	F
(3-14) Intersection <sup>[1]</sup>			F <sup>[2]</sup>	F <sup>[2]</sup>	F					F <sup>[2]</sup>	F	F	F		M					F	F	F	F	F	F
(3-15) Corridor <sup>[1][24]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	F	F <sup>[17]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	F	F	F		F	M <sup>[4]</sup>	M <sup>[4]</sup>	F		M <sup>[4]</sup>	M <sup>[4]</sup>	F	F	F	F
(3-16) Median Barrier				DE/F																			F <sup>[20]</sup>	F <sup>[20]</sup>	
(3-17) Guardrail Upgrades				DE/F																			F	F <sup>[23]</sup>	
(3-18) Bridge Rail Upgrades																							F	F <sup>[22]</sup>	F
(3-19) CAL/CAC/IAL	Design Elements determined based on identified Counter Measures <sup>[27]</sup>																								
<b>Economic Development</b>																									
(3-20) Freight & Goods (Frost Free) <sup>[8]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	EU/F	F	F		EU/F <sup>[26]</sup>	DE/F	DE/F	F	F	EU/F	EU/F	EU/F	F	F	F
(3-21) Four-Lane Trunk System	F	F	F	F	F	F	F	F	F	F	F	F	F		F	F	F	F	F	F	F	F	F	F	F
(3-22) Rest Areas (New)	F	F	F	F	F	F	F	F	F	F	F	F	F		F	F	F	F		F	F	F	F	F	F
(3-23) Bridge Restrictions	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>		F	F		EU/F <sup>[26]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F	F
(3-24) Bike Routes (Shldr)			EU/M	[7]	EU/F				EU/M	EU/M		[28]	[28]	B	F	EU/M	EU/M	F				[28]	F	[28]	EU/F

Design Matrix 3: Main Line NHS Routes (Except Interstate)  
Exhibit 1100-6



↓ Project Type	Main Line														Bridges <sup>[11]</sup>				Intersections			Barriers			
Design Elements →	Horizontal Alignment	Vertical Alignment	Lane Width	Shoulder Width	Lane Transition	Median Width	Cross Slope Lane	Cross Slope Shoulder	Fill / Ditch Slopes	Access <sup>[3]</sup>	Clear Zone <sup>[18]</sup>	Sign., Del., Illum., & ITS	Basic Safety	Bike & Ped.	Lane Width	Shoulder Width	Vertical Clearance	Structural Capacity	Turn Radii	Angle	I/S Sight Distance	Term. & Trans. Section <sup>[12]</sup>	Standard Run	Bridge Rail <sup>[19]</sup>	
(5-1) Preventative Maintenance																									
<b>Preservation</b>																									
<b>Roadway</b>																									
(5-2) BST/Basic Safety							[28]		[28]		[28]	[28]	B								[28]	F	[28]	F	
(5-3) Milling with HMA Inlays							[28]		[28]		[28]	[28]	B	M							[28]	F	[28]	F	
(5-4) HMA Overlays							[28]		[28]		[28]	[28]	B	M			EU/F				[28]	F	[28]	F	
(5-5) Replace HMA w/PCCP at I/S			EU/M	EU/M	EU/F		EU/M	EU/M	[28]		F	[28]	B	M			F		EU/F	EU/F	[28]	F	F	F	
<b>Structures</b>																									
(5-6) Bridge Replacement	M	F	M	M	F		M	M	M		F	F		F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	M	M	F	F	F	F	
(5-7) Bridge Repl. (Multilane)	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>		F	F		F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F	F	
(5-8) Bridge Deck Rehab.											[28]	[28]	B	M				[11]			[28]	F <sup>[6]</sup>	F <sup>[22]</sup>	F	
<b>Improvements<sup>[16]</sup></b>																									
<b>Mobility</b>																									
(5-9) Urban (Multilane)	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F		F	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	EU/F	EU/F	F	F	F	F	
(5-10) Urban	M	M	M	M	F		M	M	M	F	F	F		F	M	M	F	F	EU/M	EU/M	F	F	F	F	
(5-11) Rural	M	M	M	M	F	M	M	M	M	F	F	F		F	M	M	F	F	EU/M	EU/M	F	F	F	F	
(5-12) HOV	M	M	M	M	F	M	M	M	M	F	F	F		F	M	M	F	F	EU/M	EU/M	F	F	F	F	
(5-13) Bike/Ped. Connectivity [5]			F <sup>[2]</sup>	F <sup>[2]</sup>										F	F <sup>[2]</sup>	F <sup>[2]</sup>									
<b>Safety</b>																									
(5-14) Non-Interstate Freeway	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F		F	F <sup>[2]</sup>	F <sup>[2]</sup>	F		F <sup>[2]</sup>	F <sup>[2]</sup>	F	F	F	F	
(5-15) Intersection <sup>[1]</sup>			M <sup>[4]</sup>	M <sup>[4]</sup>	F				M <sup>[4]</sup>	F	F	F		M					M <sup>[4]</sup>	M <sup>[4]</sup>	F	F	F	F	
(5-16) Corridor <sup>[1][24]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	F	M <sup>[4]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	M <sup>[4]</sup>	F	F	F		M	M <sup>[4]</sup>	M <sup>[4]</sup>	F		M <sup>[4]</sup>	M <sup>[4]</sup>	F	F	F	F	
(5-17) Median Barrier				DE/F																		F <sup>[20]</sup>	F <sup>[20]</sup>		
(5-18) Guardrail Upgrades				DE/F																		F	F <sup>[23]</sup>		
(5-19) Bridge Rail Upgrades																						F	F <sup>[22]</sup>	F	
(5-20) CAL/CAC/IAL	Design Elements determined based on identified Counter Measures <sup>[27]</sup>																								
<b>Economic Development</b>																									
(5-21) Freight & Goods (Frost Free) <sup>[8]</sup>	EU/M	EU/M	EU/M	EU/M	EU/M	EU/M	M	M	EU/M		F	[28]	B	EU/F <sup>[26]</sup>	DE/M	DE/M	F		EU/M	EU/M	EU/F	F	[28]	F	
(5-22) Rest Areas (New)	F	F	F	F	F	F	F	F	F	F	F	F		F	F	F			F	F	F	F	F	F	
(5-23) Bridge Restrictions	M	F	M	M	F	M	M	M	M		F	F		EU/F <sup>[26]</sup>	M	M	F	F	M	M	F	F	F	F	
(5-24) Bike Routes (Shldrs)			EU/M	[7]	EU/F			EU/M	EU/M		[28]	[28]	B	F	EU/M	EU/M					[28]	F	[28]	EU/F	

Design Matrix 5: Main Line Non-NHS Routes

**Design Matrix Notes:**

- A blank cell indicates that the element is not applicable.
- B** Basic Design Level (see [Chapter 1120](#)).
- F** Full design level (see [Chapter 1140](#)).
- M** Modified design level (see [Chapter 1130](#)).
- DE** Design Exception to design level indicated.
- EU** Evaluate Upgrade to design level indicated.

**F/M Full for freeways/Modified for nonfreeway uses the word freeway to mean a divided highway facility that has a minimum of two lanes in each direction, for the exclusive use of traffic and with full control of access. For matrix cells with an F/M designation, analyze freeway routes at full design level and nonfreeway routes at modified design level.**

- [1] Collision Reduction or Collision Prevention (At-Grade Removal, Signalization & Channelization). Specific deficiencies that created the project must be upgraded to design level as stated in the matrix.
- [2] Modified design level may apply based on a corridor or project analysis (see [1100.03\(6\)](#)).
- [3] If designated as L/A acquired in the Access Control Tracking System, limited access requirements apply. If not, managed access applies (see [1100.03\(6\)](#)).
- [4] Full design level may apply based on a corridor or project analysis (see [1100.03\(6\)](#)).
- [5] For bike/pedestrian design, see Chapters [1510](#), [1515](#), and [1520](#).
- [6] Applies only to bridge end terminals and transition sections.
- [7] 4-ft minimum shoulders.
- [8] If all-weather structure can be achieved with spot digouts and overlay, modified design level applies to NHS highways and basic design level applies to non-NHS highways.
- [9] Continuous shoulder rumble strips required in rural areas (see [Chapter 1600](#)).
- [10] See [Chapter 1020](#).
- [11] See [Chapter 720](#).
- [12] Impact attenuators are considered as terminals.
- [13] See [Chapters 1140](#) and [1230](#).
- [14] Includes crossroad bridge rail (see [Chapter 1610](#)).
- ~~[15] EU for signing and illumination.~~
- [16] For design elements not in the matrix headings, apply full design level as found in the applicable chapters and see [1100.03\(2\)](#). [Document with an evaluate upgrade.](#)
- [17] DE for existing acceleration/deceleration lanes when length meets posted freeway speed and no significant crash history (see [Chapter 1360](#)).
- [18] On managed access highways within the limits of incorporated cities and towns, city and county design standards apply to areas outside the curb or outside the paved shoulder where no curb exists.
- [19] The funding sources for bridge rail are a function of the length of the bridge. Consult programming personnel.
- [20] Applies to median elements only.
- ~~[21] Analyses required (see 1100.03(6) for details).~~
- [22] Upgrade barrier, if necessary, within 200 ft of the end of the bridge.
- [23] See description of Guardrail Upgrades Project Type, [1100.03\(1\)](#), regarding length of need.
- [24] Apply full design level to projects that realign or reconstruct significant portions of the alignment.
- [25] For [impacts to the](#) main line, use the Project Type row for Safety, Non-Interstate Freeway on Matrix 3 for NHS and on Matrix 5 for non-NHS.
- [26] Sidewalk ramps must be addressed for ADA compliance (see [Chapter 1510](#)).
- [27] Collision Analysis Locations (CALs), Collision Analysis Corridors (CACs), and Intersection Analysis Locations (IALs) require a collision data analysis to identify the contributing factors to the crashes from which counter measures will be identified to reduce the frequency and severity of the collisions. [See Safety Project Scoping process flowchart.](#)
- [28] See [1120.02](#), Basic Safety, for further information.

**Comment [Ibp2]:** [15] No longer on any of the matrices.

**Comment [Ibp3]:** [21] No longer in any of the matrices.

**Comment [Ibp4]:** Modified design level already directs you to full design level when realignment or reconstruction is required.

**Comment [Ibp5]:** Not sure why this note is needed.

**Comment [Ibp6]:** Where is this flowchart?

[29] EU for Fill and Ditch in-slopes steeper than 4:1. Addressing of the back slope or slopes protected by barrier is not required.

