

**Brent Spence Bridge
Design Exceptions - Alternate E**

I-71/I-75/US 50 INTERCHANGE	Curve PI	Design Exception	D.E. Number	Design Speed Met (Required)	Horizontal Dc (Maximum)	Horizontal SSD (Minimum)	Vertical Curvature - K (Minimum)	Other	Design Speed Existing	Reason(s) For Design Exception	Potential Impact(s) to Eliminate Design Exceptions	Potential Mitigation Solutions
I-75	48+69.80 (Horiz)	Y	1	51 mph (60)		454' (570)			50 mph	<ul style="list-style-type: none"> Concrete Barrier. A 22.5' shoulder would be needed for Design SSD. This would increase overhead bridge lengths and increase impact to parking garage at TV station since I-75 SB to I-71 NB ramp would have to shift farther west. 	<ul style="list-style-type: none"> Flattening the curve at this location will force the I-75 SB to I-71 NB/FWW EB connection into the Harriet Beecher Stowe building (parking garage), as well as creating vertical clearance issues with I-75 mainline as this alignment connects to US 50 to I-71 NB/FWW EB. US 50 EB to I-75 SB will also have to be relocated and will impact the UPS parking lot. I-71 SB to I-75 NB will also have substandard minimum terminal ramp spacing with C-D NB which cannot be adjusted otherwise that connection does not have the required length for a lane drop. 	Add Signage/ Lighting
	76+47.01 (Horiz)	Y	2	54 mph (60)		480' (570)			40 mph	<ul style="list-style-type: none"> Median barrier. A 20' shoulder would be needed. If a flatter curve would be used 5 Residential structures could potentially be impacted since Winchell Ave. would need to be relocated also. 	<ul style="list-style-type: none"> Flattening the curve to obtain the required SSD will impact the following connections; C-D NB to Winchell, Sixth Street to Winchell, Ninth Street to Winchell removal of Freeman Ave to I-75 NB Ramp however it is possible to relocate this ramp north of the Winchell/Ezzard Charles intersection. 	Add Signage/ Lighting
I-71 NB	23+95.64 (Horiz)	Y	3	46 mph (60)		375' (570)			49 mph	<ul style="list-style-type: none"> Bridge parapet. A wider shoulder would significantly increase structure width. 		Add Signage/ Lighting
	31+39.32 (Horiz)	Y	4	40 mph (60)	11° 12' 27" (4° 15' 00")				45 mph	<ul style="list-style-type: none"> Curve needed to clear NB and SB CD Road alignments, 2nd Street ramps and then tie into US 50 EB which just misses the Dunhumby Building. 	<ul style="list-style-type: none"> Using a 60 mph design speed for I-71 NB we flatten the curve but are still required to have at least a 22' outside shoulder. In addition, the top deck of the new main span bridge will need to be elevated higher for both I-71 NB and SB to have the required vertical clearance over C-D NB and SB. There is one location near the railroad bridge and Clay Wade Bailey where I-71 NB passes above the CWB/Second Street intersection. At this location there will need to be a 350 foot bridge span. Potential impacts to other connections are identical to I-71 SB. 	Add Signage/Traffic Control Devices
	31+39.32 (Horiz)	Y	5	36 mph (60)		260' (570)			33 mph	<ul style="list-style-type: none"> Bridge parapet. A wider shoulder would significantly increase structure width. 		Add Signage/ Lighting
	39+54.57 (Horiz)	Y	6	55 mph (60)	5° 21' 17" (4° 15' 00")				55 mph	<ul style="list-style-type: none"> Curve needed to clear NB and SB CD Road alignments, 2nd Street ramps and then tie into US 50 EB which just misses the Dunhumby Building. 		Add Signage/Traffic Control Devices
	39+54.57 (Horiz)	Y	7	51 mph (60)		440' (570)			42 mph	<ul style="list-style-type: none"> Bridge parapet. A wider shoulder would significantly increase structure width. 		Add Signage/ Lighting
	30+98.00 (Vertical)	Y	8	45 mph (60)			61 (151)			<ul style="list-style-type: none"> Vertical curve needed to keep a tangent on the new bridge and then achieve vertical clearance over I-75 and the railroad. 	<ul style="list-style-type: none"> Increasing the K value will increase the grade of I-71 NB which is already at 6% 	Add Signage/ Lighting
I-71 SB	3+96.80 (Horiz)	Y	9	45 mph (60)	7° 48' 53" (4° 15' 00")				45 mph	<ul style="list-style-type: none"> Curve needed to remain in existing corridor to avoid impact to an office building to the East and the Dunhumby Building to the West. 	<ul style="list-style-type: none"> Using a 60 mph design speed for I-71 SB, we keep the alignment south of Third Street. This will eliminate design exceptions 9 through 13, existing design deficiencies, and avoid impacts to the DunnHumby building. However, vertical clearance issues as well as maintenance of traffic and construction will be difficult as the ramps in and out of the Fort Washington Way Trench will be close together, in a small area, and at a higher elevation than before. Potential impacts include; vertical clearance issues with the existing Brent Spence Bridge, ramp connections to Second Street from C-D northbound, C-D southbound, and I-71 SB to US 50 and I-75 NB, as well as the horizontal curve extending past the location set for the main span bridge approaches. 	Add Signage/Traffic Control Devices
	3+96.80 (Horiz)	Y	10	45 mph (60)		365' (570)			41 mph	<ul style="list-style-type: none"> Bridge parapet. A wider shoulder would shift 3rd Street to I-71 SB alignment into an office building. 		Add Signage/ Lighting
	6+62.17 (Horiz)	Y	11	35 mph (60)	13° 00' 54" (4° 15' 00")				35 mph	<ul style="list-style-type: none"> Curve needed to remain in existing corridor to avoid impact to an office building to the East and the Dunhumby Building to the West. 		Add Signage/Traffic Control Devices
	6+62.17 (Horiz)	Y	12	42 mph (60)		335' (570)			33 mph	<ul style="list-style-type: none"> Bridge parapet. A wider shoulder would shift 3rd Street to I-71 SB alignment into an office building. 		Add Signage/ Lighting
	17+34.68 (Horiz)	Y	13	40 mph (60)	11° 14' 04" (4° 15' 00")				40 mph	<ul style="list-style-type: none"> Curve needed to tie into proposed I-75 alignment, avoid impacting 2 commercial structures, and avoid additional impacts to Longworth Hall. 	<ul style="list-style-type: none"> A 22' inside shoulder will be required. Connections to the FWW Trench will need to be reviewed on whether those connections can be maintained. 	Add Signage/Traffic Control Devices
	17+34.68 (Horiz)	Y	14	31 mph (60)		215' (570)			29 mph	<ul style="list-style-type: none"> Bridge parapet. A wider shoulder would significantly increase structure width. 		Add Signage/ Lighting
	29+35.43 (Horiz)	Y	15	55 mph (60)		495' (570)			70 mph	<ul style="list-style-type: none"> Bridge parapet. A wider shoulder would significantly increase structure width. 		A wider shoulder will need to be used to transition into the required 14' shoulders for the main span bridge

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I-71/I-75/US 50 INTERCHANGE	Curve PI	Design Exception	D.E. Number	Design Speed Met (Required)	Horizontal Dc (Maximum)	Horizontal SSD (Minimum)	Vertical Curvature - K (Minimum)	Other	Design Speed Existing	Reason(s) For Design Exception	Potential Impact(s) to Eliminate Design Exceptions	Potential Mitigation Solutions
ERSBNB (NB CD to I-75 NB)	48+86.24 (Horiz)	Y	16	45 mph (50)	7° 42' 14.3" (6° 45' 00")				N/A	• Curve needed to parallel 7th to SB CD Road to avoid shifting other ramp alignments to the East into a commercial building along 7th.	Commercial buildings along 7th will be impacted.	Add Signage/Traffic Control Devices. Might be able to improve horizontal geometry if
	48+86.24 (Horiz)	Y	17	41 mph (50)		315' (425)			N/A	• Barrier and retaining wall.	By flattening the curve commercial buildings along 7th will be impacted	Add Signage/ Lighting
EBSBSB (8th St to SB CD RD)	21+58.2 (Horiz)	Y	18	40 mph (50)	10° 24' 15.7" (6° 45' 00")				N/A		Flattening the curve at this location will increase the vertical grade of the off ramp from I-75 SB to 7th Street.	Use a flatter curve or reduce design speed (classification). Eliminate access from 8th Street to CD SB and only allow freeflow left turn onto 7th Street eastbound.
	21+58.2 (Horiz)	Y	19	39 mph (50)		300' (425)			N/A	• Barrier for bridge pier.		
	32+03.55 (Horiz)	Y	20	30 mph (50)	20° 22' 36.3" (6° 45' 00")				N/A	• Intersection alignment of NB and SB movements to reduce skew.	• Any re-alignment to the east will impact the storage capacity of Fourth Street WB and Fifth Street EB.	Use a flatter curve, change tangent through intersection, and/or reduce design speed (classification).
	32+03.55 (Horiz)	Y	21	27 mph (50)		175' (425)			N/A	• Bridge parapet. • Wider shoulder would increase structure width.		Add Signage/ Lighting. Reduce design speed (classification).
	32+03.55 (Horiz)	Y	22	30 mph (50)				60' (212)	N/A	• Ahead spiral through intersection.		Add Signage/Traffic Control Devices
	35+29.53 (Horiz)	Y	23	30 mph (50)	17° 17' 08.8" (6° 45' 00")				N/A	• Intersection alignment of NB and SB movements to reduce skew.		Use a flatter curve, change tangent through intersection, increase rear spiral length, and/or reduce design speed (classification).
	35+29.53 (Horiz)	Y	24	27 mph (50)		175' (425)			N/A	• Bridge parapet. • Wider shoulder would increase structure width.		Add Signage/ Lighting
	35+29.53 (Horiz)	Y	25	30 mph (50)				60' (208)	N/A	• Back spiral through intersection.		Use a flatter curve, change tangent through intersection, increase ahead spiral length, and/or reduce design speed (classification).
	40+62.31 (Horiz)	Y	26	28 mph (50)		180' (425)			N/A	• Bridge parapet. • Wider shoulder would increase structure width.		Add Signage/ Lighting
	45+70.78 (Horiz)	Y	27	42 mph (50)		325' (570)			N/A	• Bridge parapet. • Wider shoulder would increase structure width.		Add Signage/ Lighting
43+25.09 (Vertical)	Y	28	45 mph (50)			61 (84)		N/A	• Curve needed for clearance over NB CD Road and under I-71 SB.	Add Signage/Traffic Control Devices. Look at changing grades to allow for more room to increase vertical curve lengths.		
ECDSB7 (SB CD Road to 7th)	37+80.71 (Horiz)	Y	29	45 mph (50)	7° 22' 33.6" (6° 45' 00")				45 mph	• Curve needed to get clearance under 7th to SB CD Road and over ramp from to I-75 SB to I-71 NB.		
	37+80.71 (Horiz)	Y	30	37 mph (50)		270' (425)			36 mph	• Bridge parapet. • Wider shoulder would increase structure width.		Add Signage/ Lighting
	37+80.71 (Horiz)	Y	31	45 mph (50)				200' (393)	N/A	• Spiral in an intersection that intersects another transition.		Change geometry.
EBSFWWEB (I-75 SB to I-71 NB)	33+07.04 (Horiz)	Y	32	28 mph (45)		185' (360)			33 mph	• Bridge parapet. • Wider shoulder would increase structure width.	• With the flattening of the curve to I-75 mainline, I-75 SB to I-71 NB will be relocated to the west, impacting the tv station/parking garage. In addition the distance needed to make the vertical clearance requirements under I-75 mainline is much less than before. In addition, changes to US 50 to I-71 NB will require that I-75 mainline have a steeper grade south of US 50 to allow I-75 SB to I-71 NB enough room to tie into the gore of US 50 to I-71 NB.	Add Signage/ Lighting
EBSBSB2 (SB CD RD to 2nd)	5+57.82 (Horiz)	Y	33	28 mph (30)		180' (200)			32 mph	• Bridge parapet. • Wider shoulder would increase structure width.		Add Signage/ Lighting, wider shoulder at this location will not impact any other structures
EUS50FWWEB (US 50 to I-71 NB/US 50 EB)	15+55.27 (Horiz)	Y	34	38 mph (45)		280' (360)			30 mph	• Bridge parapet. • Wider shoulder would increase structure width, shift US 50 WB alignment (since it is parallel) which then would impact the Dunhumby building.	• With I-75 Mainline using a flatter curve at Sta. 46+00, there is more room for the connections to/from I-75 and I-71 from/to US 50. However, with the design speed changes made to I-71 NB and I-71 SB will create vertical clearance issues which may lead to higher structures and steeper grades. Also the horizontal sight distance leading into the Fort Washington Way Trench will need to be studied to determine at which point the shoulders can be tapered down to meet the tie-in points for all connections into and out of the Trench.	Add Signage/ Lighting
EFWWWB75 (I-71 SB to I-75 NB)	13+69.55 (Horiz)	Y	35	39 mph (45)		300' (360)			35 mph	• Bridge parapet. • Wider shoulder would increase structure width. Also, shifting the US	• See US50FWWEB potential impacts	Add Signage/Traffic Control Devices
	27+36.92 (Horiz)	Y	36	39 mph (45)		290' (360)			N/A			Use a flatter curve or reduce design speed (classification).
E75SBFREE (I-75 SB to Freeman Ave)	6+39.26 (Horiz)	Y	37	44 mph (45)		350' (360)			57 mph	• Barrier and retaining wall. • A flatter curve can not be used since the alignment is parallel to the SB CD Rd and I-75.		Add Signage/Traffic Control Devices, wider shoulder

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SB I-75 to Kyles Lane	Sta. 445+00	Y	1					Grade		<ul style="list-style-type: none"> Proposed ramp grade is 8.1 percent due to right of way considerations. 	<ul style="list-style-type: none"> Extending the beginning of ramp further south and thus widening the right of way limits required for the connection to the existing elevation at the ramp terminal. 	<ul style="list-style-type: none"> This steep slope is less than 500 feet long and provides an exit ramp to Kyles Lane on which traffic has to decelerate.
NB CD Road	Existing Bridge (Lower Deck)	Y	2					Lane Width		<ul style="list-style-type: none"> 11' lanes needed to utilize the existing bridge width. 	<ul style="list-style-type: none"> Replace the existing bridge and rebuild structure to accommodate a wider section. 	<ul style="list-style-type: none"> Will be maintaining one 12' lane on the lower bridge deck.
	Existing Bridge (Lower Deck)	Y	3					Shoulder Width		<ul style="list-style-type: none"> A minimum 4' left shoulder and an 8' right shoulder are needed to maintain 3 through lanes and utilize the existing bridge width. 	<ul style="list-style-type: none"> Replace the existing bridge and rebuild structure to accommodate a wider section. 	
NB I-75 Mainline	Sta. 571+00	Y	4					Shoulder Width		<ul style="list-style-type: none"> At this location, the southbound structure of the C-D road over I-75 would have a long span and require a pier located at the center of I-75. The proposed pier diameter would be nine feet. This pier would reduce the inside shoulder widths from 14 feet to 9 feet around the pier and tapers. 	<ul style="list-style-type: none"> Widen the overall footprint of roadway to accommodate pier diameter. 	<ul style="list-style-type: none"> Add Signage to warn of reduced shoulder width.
SB I-75 Mainline	Sta. 571+00	Y	5					Shoulder Width		<ul style="list-style-type: none"> At this location, the southbound structure of the C-D road over I-75 would have a long span and require a pier located at the center of I-75. The proposed pier diameter would be nine feet. This pier would reduce the inside shoulder widths from 14 feet to 9 feet around the pier and tapers. 	<ul style="list-style-type: none"> Widen the overall footprint of roadway to accommodate pier diameter. 	<ul style="list-style-type: none"> Add Signage to warn of reduced shoulder width.