V. BRIDGES AND OVERPASSES

The KYTC Highway Information Systems (HIS) database lists eighty-three bridge structures along the Ford and Breathitt Parkways in the study area. Data on these structures is included in **Appendix F – Highway Information System Summary of Parkway Data.** Of the 83 structures, 50 are mainline bridges (i.e., bridges carrying "through traffic" lanes) and the remaining are overpasses, culverts, or bridges that accommodate other uses (i.e., bridges carrying ramps or auxiliary lanes). **Table 10** summarizes the number and type of each structure.

Table 10 – Summary of Structure Types

Type	Number of Structures	
	Breathitt Parkway	Ford Parkway
Mainline Bridges	28	22
Overpasses	14	9
Culverts	4	6
Total	46	37

The mainline bridges along the two Parkways and the overpass bridges passing above the Parkways present potential concerns related to lateral (i.e. horizontal) and vertical clearance widths, respectively. Furthermore, the functional and structural condition of these bridges is an added issue that is relevant where consideration is being given to adding additional traffic (particularly truck traffic) to these structures or to determining if they should be widened, rehabilitated, or replaced. The lateral and vertical clearance issues, along with the condition and safety appurtenances associated with bridges along the Ford and Breathitt Parkways, are discussed below.

A. Lateral Clearances of Bridges

Simply stated, lateral clearance problems involve bridge widths that are too narrow to meet current design guidelines. Limited lateral (or horizontal) clearance on bridges is a common problem on many highway facilities, including most interstate highways throughout the United States.

Current AASHTO freeway design guidelines recommend that the approach roadway width (driving lanes plus shoulders) be carried across the bridge plus a 2'-00" offset for approach guardrail. However, it is acceptable to omit the 2'-00" offset on the right and left bridge approaches and use a 20:1 transition rate from the approach rail to the bridge rail. In each direction of travel on a four-lane freeway, this equates to a minimum lateral clearance of 38'-00" (2-12' lanes, 10' right and 4' left shoulder).

The AASHTO guidelines found in "*A Policy on Geometric Design of Highways and Streets, 4th Edition*" (American Association of State Highway Officials, 2001) also state the following on Page 510:

"The clear width on bridges carrying freeway traffic should be as wide as the approach roadway. On bridges longer than 200 feet, some economy in substructure costs may be gained by building a single structure rather than twin parallel structures. In such cases, the approach shoulder widths are provided and a median barrier is extended across the bridge."

In addition, the AASHTO guidelines state on Page 764:

"…For this reason, the clear width on bridges should preferably be as wide as the approach roadway in order to give drivers a sense of openness and continuity. On long bridges, particularly on long-span structures where cost per square meter is greater than the cost on short-span structures, widths that are less than ideal may be acceptable; however, economy alone should not be the governing factor in determining structure widths. The analysis of traffic characteristics, safety features, emergency contingencies, and benefit/cost ratios should be fully considered before the desirable structure width is compromised."

The lateral clearances (widths) of mainline bridges along the Parkways often do not meet AASHTO guidelines, which require bridge widths equal to the paved roadway plus shoulder widths.

The Draft AASHTO *Policy on Design Standards, Interstate System* says the following:

"Long bridges, defined as bridges having an overall length in excess of 200 feet, may have a lesser width. Such bridges shall be analyzed individually. On long bridges, offsets to parapet, rail or barrier shall be at least 4 feet measured from the edge of the nearest traffic lane on both the left and the right."

These citations suggest that for those "long" bridges (over 200' long), the lateral clearance criteria may be relaxed if conditions warrant.

In addition to the lateral clearance, the treatment of the curb on the bridges will need to be reviewed to insure the bridge railing/parapet meet the current guidelines.

Tables 11 and **12** summarize the length, width and horizontal clearance for each of the mainline bridges on the Ford and Breathitt Parkways. There are two measurements that are relevant to the width of the bridge, the width from the outside of the parapet to

the outside of the opposite parapet (width in **Tables 11 and 12**) and the width of roadway between the face of barrier or curbing (horizontal clearance in **Tables 11 and 12**).

On the Ford Parkway, of the 22 mainline bridges, 14 fail to meet the minimum horizontal clearance criteria. Of these, 12 are over 200 feet long.

Table 11 – Summary of Substandard Lateral Clearances Along the Ford Parkway

County	Bridge No.	MP	Features Intersected	Length	Width	Horizontal Clearance
FORD PARKWAY						
Lyon	B00049P	0.001	I-24 @ MP 41.603	275	30.0	26.0
Lyon	B00049	0.001	I-24 @ MP 41.603	272	38.0	34.0
Lyon	B00052	3.408	P&L RR-ELKHORN TAVERN RD	221	41.7	38.0
Lyon	B00052P	3.408	P&L RR-ELKHORN TAVERN RD	221	52.7	38.0
Lyon	B00030	3.702	US 62	226	39.8	38.3
Lyon	B00030P	3.703	US 62	226	39.8	38.0
Caldwell	B00029P	11.357	P&L RAILWAY	189	33.0	30.0
Caldwell	B00029	11.357	P&L RAILWAY	189	33.0	30.0
Caldwell	B00033P	21.752	TRADEWATER RIVER	207	33.0	30.0
Caldwell	B00033	21.752	TRADEWATER RIVER	207	33.0	30.0
Hopkins	B00138	22.003	TRADEWATER RIVER OVERFLOW	215	33.0	30.0
Hopkins	B00138P	22.003	TRADEWATER RIVER OVERFLOW	215	33.0	30.0
Hopkins	B00139P	24.887	P&L RAILWAY	131	38.0	38.0
Hopkins	B00139	24.887	P&L RAILWAY	131	38.0	38.0
Hopkins	B00140	28.346	KY 112 & COPPERAS CREEK	278	33.0	30.0
Hopkins	B00140P	28.346	KY 112 & COPPERAS CREEK	278	33.0	30.0
Hopkins	B00143	33.872	P&L RAILWAY SPUR & OAK RD	260	33.0	30.0
Hopkins	B00143P	33.872	P&L RAILWAY SPUR & OAK RD	260	33.0	30.0
Hopkins	B00144	36.900	CSX TRANSPORTATION	448	33.0	30.0
Hopkins	B00144P	36.900	CSX TRANSPORTATION	448	33.0	30.0
Hopkins	B00145	38.311	BREATHITT PARKWAY	226	47.2	44.3
Hopkins	B00145P	38.311	BREATHITT PARKWAY	226	45.0	42.1

Bridge over 200' long with horizontal clearance less than 38'

Bridge under 200' long with horizontal clearance less than 38'

On the Breathitt Parkway, of the 28 mainline bridges, 14 fail to meet the minimum horizontal clearance criteria. Of these, 8 are over 200 feet long.

Table 12 – Summary of Substandard Lateral Clearances Along the Breathitt Parkway

County	Bridge No.	MP	Features Intersected	Length	Width	Horizontal Clearance
BREATHITT PARKWAY						
Hopkins	B00095	37.054	P&L RR-FLAT CREEK-KY 813	318	36.0	30.0
Hopkins	B00095P	37.054	P&L RR-FLAT CREEK-KY 813	318	36.0	30.0
Hopkins	B00096P	39.774	KY 2171	265	36.0	30.0
Hopkins	B00096	39.774	KY 2171	265	37.0	34.0
Hopkins	B00100P	42.418	KENTUCKY 70	192	36.0	30.0
Hopkins	B00100	42.418	KENTUCKY 70	192	37.0	34.0
Hopkins	B00101P	43.438	CSX RAILROAD	159	36.0	30.0
Hopkins	B00101	43.438	CSX RAILROAD	159	37.0	34.0
Hopkins	B00020P	48.805	OTTER CREEK	144	40.0	38.0
Hopkins	B00020	48.805	OTTER CREEK	144	40.0	38.0
Hopkins	B00210	48.970	OTTER CREEK	132	28.3	26.2
Hopkins	B00211	48.971	OTTER CREEK	182	28.3	26.2
Hopkins	B00021	48.979	KY 260 @ HANSON	161	39.0	38.0
Hopkins	B00021P	48.979	KY 260 @ HANSON	161	39.0	38.0
Hopkins	B00012	54.070	KY 138	174	40.0	38.0
Hopkins	B00012P	54.070	KY 138	174	40.0	38.0
Webster	B00069P	56.523	KY 147	163	40.0	38.0
Webster	B00069	56.523	KY 147	163	40.0	38.0
Webster	B00071P	59.280	DEER CREEK	368	33.0	30.0
Webster	B00071	59.280	DEER CREEK	368	33.0	30.0
Webster	B00072	60.476	KY 370	166	40.0	38.0
Webster	B00072P	60.476	KY 370	166	40.0	38.0
Webster	B00074	63.887	GROVES CREEK	260	33.0	30.0
Webster	B00074P	63.888	GROVES CREEK	260	33.0	30.0
Henderson	B00062P	65.393	ACCESS RD-BIG RIVERS RR	183	41.0	38.0
Henderson	B00062	65.393	ACCESS RD-BIG RIVERS RR	183	41.0	38.0
Henderson	B00068	75.360	ELAM DITCH	141	40.0	38.0
Henderson	B00068P	75.360	ELAM DITCH	141	40.0	38.0

Bridge over 200' long with horizontal clearance less than 38'

Bridge under 200' long with horizontal clearance less than 38'

The locations of all bridges that fall short of the 38’00’’ minimum lateral clearance are shown on **Figures 10** through **13.** Please note that there is no map for Henderson County since there are no bridges in that county with widths below the minimum guidelines.

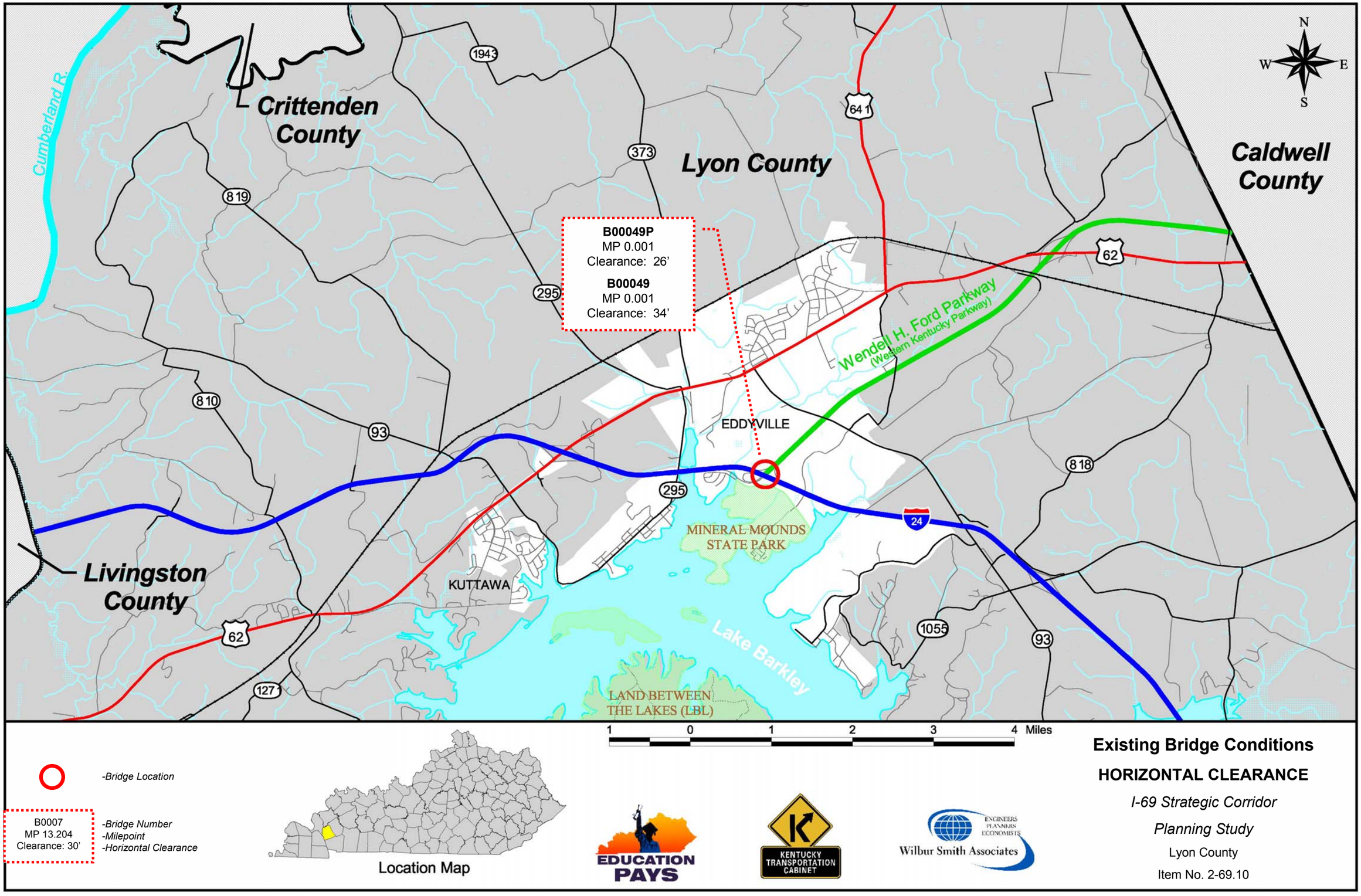

Figure 10. Substandard Horizontal Bridge Clearances for Lyon County

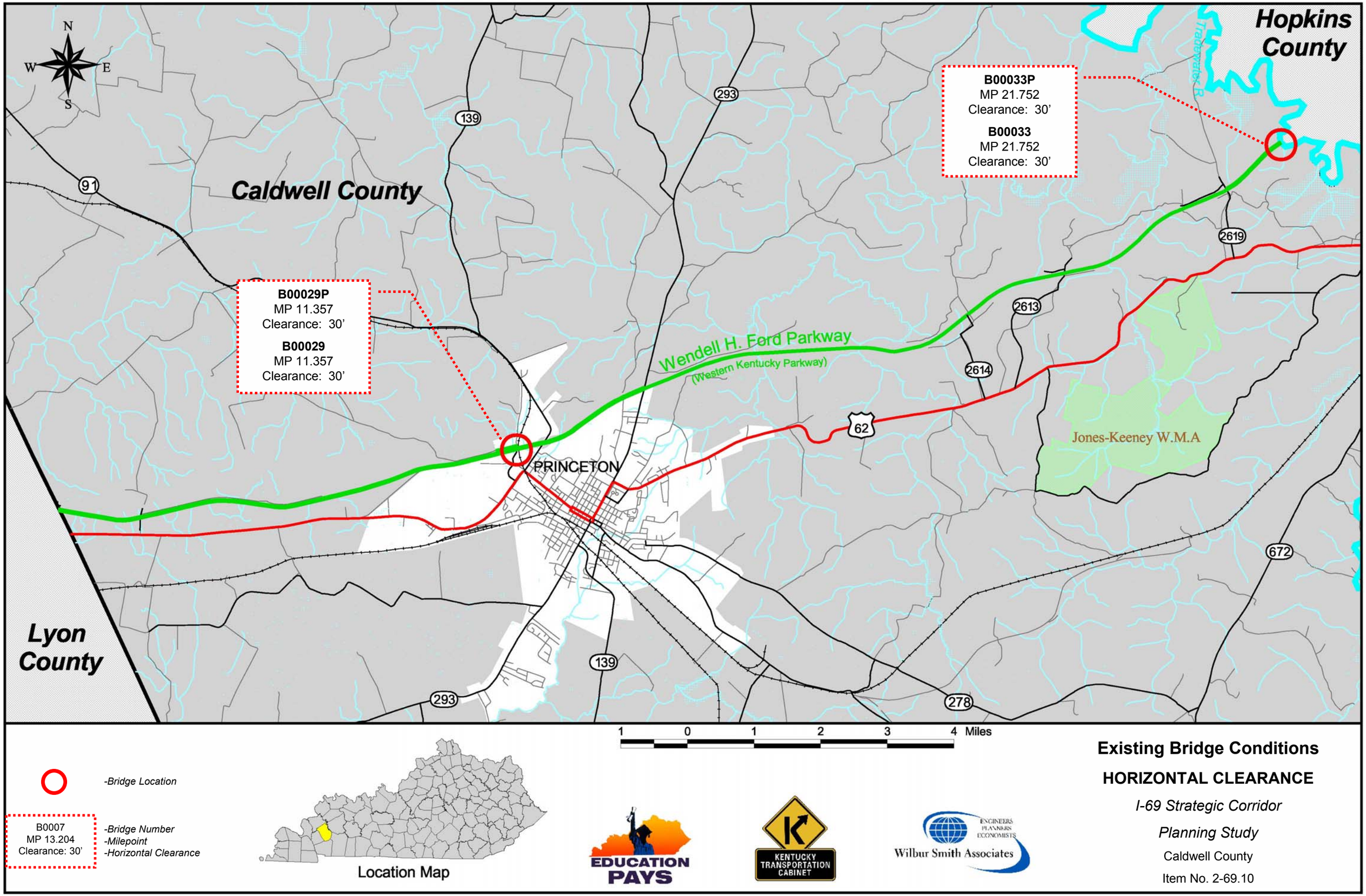

Figure 11. Substandard Horizontal Bridge Clearances for Caldwell County *5-6*

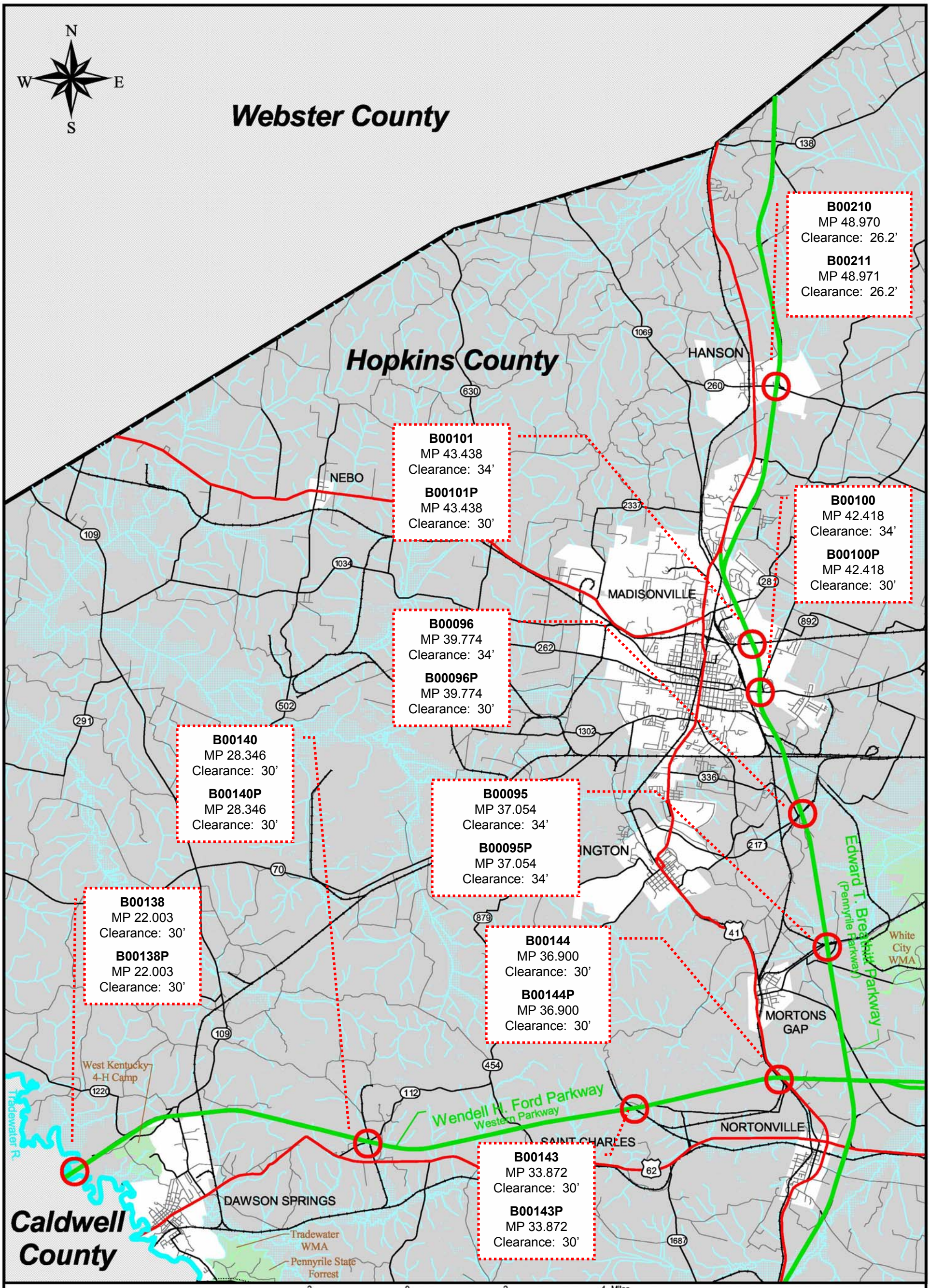

Figure 12. Substandard Horizontal Bridge Clearances for Hopkins County

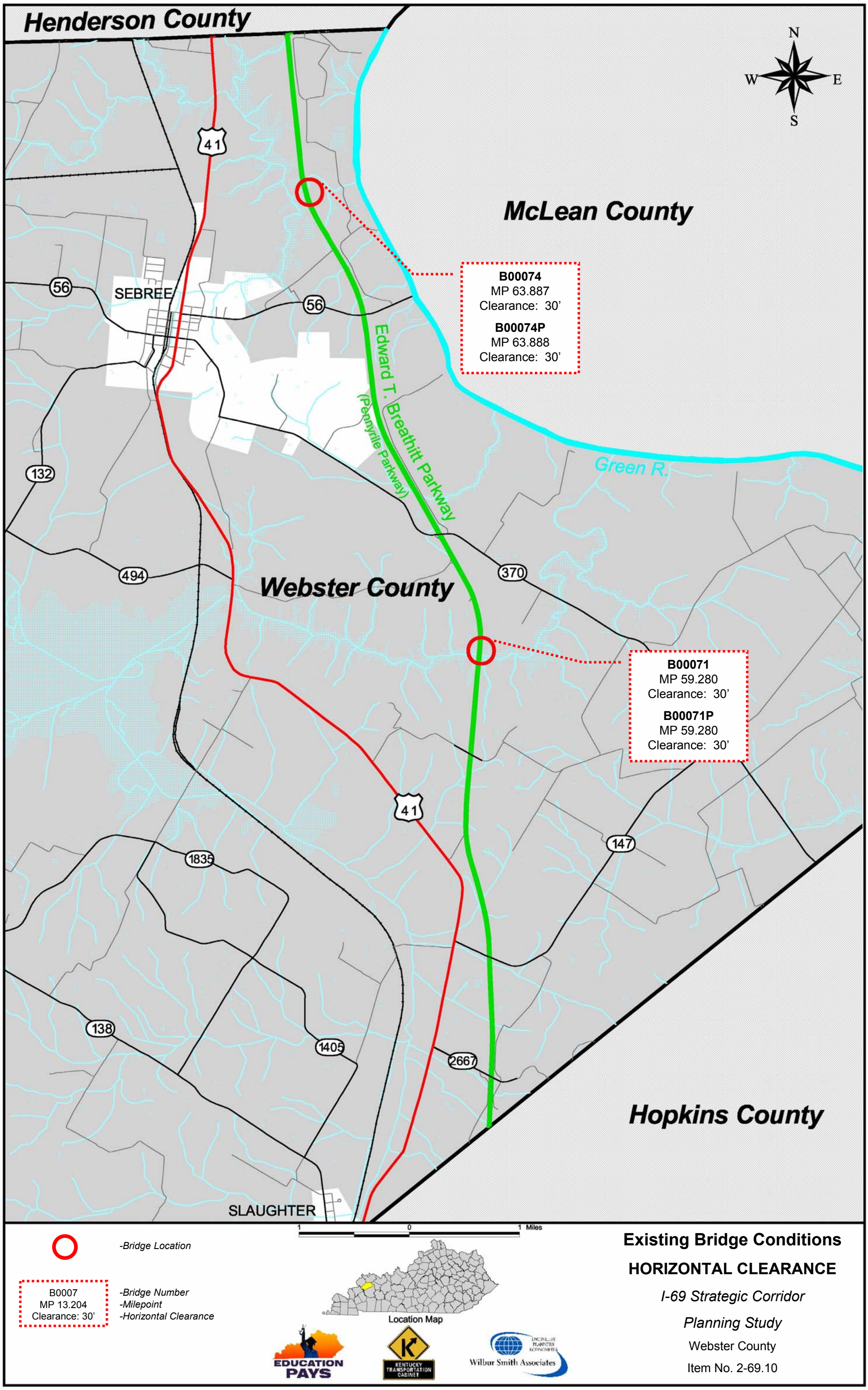

Figure 13. Substandard Horizontal Bridge Clearances for Webster County

B. Vertical Clearances of Overpasses

Vertical clearance, or the minimum height between the pavement and the bottom of bridge structures (overpasses) crossing over the Parkways, should be at least 16 feet across the entire roadway width, including auxiliary lanes and usable width of shoulder, in accordance with AASHTO guidelines. Additional allowances should be made for future staged paving or resurfacing. However, with the current practice of pavement recycling, the additional clearance may not be required if the existing pavement meets structural requirements for anticipated traffic loading.

The recommended vertical clearance (height) of bridges over the Parkways is 16 feet over each of the travel lanes and the outside shoulders.

Vertical clearances for those bridges that pass over the Parkways were collected from the KYTC Highway Information System (HIS) database. The clearances are recorded over the left edge of the passing lane, the centerline and the right edge of the driving lane. AASHTO guidelines also recommend that the clearance be recorded over the useable shoulder which, in the case of the Ford and Breathitt Parkways, would be the outside shoulders. Additional data collection would be required to obtain the clearance at the edge of the outside shoulder.

The clearances for the two Parkways are shown on **Tables 13** and **14**. As shown in **Table 13**, the Ford Parkway has four (4) bridges that have clearances less than 16', all located in Caldwell County. The lowest clearance is 14'09" on Bridge Number B00060 eastbound over KY 2614.

As shown in **Table 14**, there is only one bridge on the Breathitt Parkway that does not have a 16' clearance over the travel lanes: Bridge Number B00011 at KY 2665 has 15'10" clearance over the Parkway centerline and a 15' 07" clearance over the right edge of the driving lane in the southbound direction.

Bridges that do not meet current interstate design guidelines for vertical clearance are shown on **Figure 14.**

Table 13 – Summary of Substandard Vertical Clearances Along the Ford Parkway

MP	Bridge #	Dir.	Location	County	Left Edge Passing Lane Clearance	Centerline Clearance	Right Edge Driving Lane Clearance
WENDELL H. FORD PARKWAY							
0.085		EB	UNDER KY 93	Lyon	17’09”	17’09”	18’03”
0.085	B00050	WB	UNDER KY 93	Lyon	17’00”	16’08”	16’09”
5.577		EB	UNDER KY 2611	Lyon	17’07”	17’04”	17’04”
5.577	B00029	WB	UNDER KY 2611	Lyon	18’00”	17’10”	18’00”
11.700		EB	UNDER KY 91	Caldwell	16'07"	16'02"	15'09"
11.700	B00037	WB	UNDER KY 91	Caldwell	17'07"	18'07"	19'02"
13.120		EB	UNDER KY 293	Caldwell	15'06"	15'06"	15'06"
13.120	B00007	WB	UNDER KY 293	Caldwell	16'03"	16'07"	17'01"
17.308		EB	UNDER KY 2614 LEWISTOWN RD	Caldwell	14'09"	14'10"	15'00"
17.308	B00060	WB	UNDER KY 2614 LEWISTOWN RD	Caldwell	15'03"	15'06"	15'10"
18.610		EB	UNDER KY 2613 LONGBREAK-FLYYN FORK RD	Caldwell	22'01"	22'02"	22'04"
18.610	B00061	WB	UNDER KY 2613 LONGBREAK-FLYYN FORK RD	Caldwell	22'01"	22'02"	22'04"
20.880		EB	UNDER KY 2619 DAWSON SPRINGS-EVANS MILL RD	Caldwell	15'07"	15'03"	15'00"
20.880	B00048	WB	UNDER KY 2619 DAWSON SPRINGS-EVANS MILL RD	Caldwell	15'07"	15'10"	16'02"
24.440		EB	UNDER KY 109	Hopkins	16'01"	16'08"	16'09"
24.440	B00070	WB	UNDER KY 109	Hopkins	16'05"	16'10"	17'03"
31.580		EB	UNDER KY 454	Hopkins	17'08"	17'06"	17'01"
31.580	B00117	WB	UNDER KY 454	Hopkins	19'01"	19'09"	20'06"
	Bridge with Vertical Clearance less than the AASHTO recommended minimum of 16 feet.						

Table 14 – Summary of Substandard Vertical Clearances Along the Breathitt Parkway

MP	Bridge #	Dir.	Location	County	Left Edge Passing Lane Clearance	Centerline Clearance	Right Edge Driving Lane Clearance
EDWARD T. BREATHITT PARKWAY							
40.996		NB	UNDER ICRR	Hopkins	23'03"	23'00"	22'09"
40.996	B00102	SB	UNDER ICRR	Hopkins	23'07"	23'07"	24'00"
41.060		NB	UNDER L&N RR SPUR	Hopkins	16'06"	16'03"	16'02"
41.060	RR0602	SB	UNDER L&N RR SPUR	Hopkins	16'04"	16'06'	16'10"
45.206		NB	US 41 N.B. LANE	Hopkins	19'09"	20'07"	21'07"
45.206	B00016	SB	UNDER US 41 N.B. LANE	Hopkins	18'02"	17'03"	16'02"
46.435		NB	UNDER KY 2657 JOHN FOWLER RD	Hopkins	16'10"	16'08"	16'09"
46.435	B00018	SB	UNDER KY 2657 JOHN FOWLER RD	Hopkins	16'10"	16'08"	16'10"
47.472		NB	UNDER KY 862	Hopkins	17'02"	16'10"	16'10"
47.472	B00019	SB	UNDER KY 862	Hopkins	17'07"	17'07"	18'00"
51.941		NB	UNDER KY 2655 HERBERT BROWN RD	Hopkins	16'03"	16'07"	16'10"
51.941	B00011	SB	UNDER KY 2655 HERBERT BROWN RD	Hopkins	16'03"	15'10"	15'07"
55.449		NB	UNDER KY 2667	Webster	17'08"	17'08"	18'06"
55.449	B00068	SB	UNDER KY 2667	Webster	17'00"	16'05"	16'01"
58.396		NB	UNDER KY 2666	Webster	16'09"	16'03"	16'04"
58.396	B00070	SB	UNDER KY 2666	Webster	16'06"	16'05"	16'09"
62.637		NB	UNDER KY 56	Webster	17'01"	16'09"	16'06"
62.637	B00073	SB	UNDER KY 56	Webster	17'05"	17'07"	17'10"
66.835		NB	UNDER KY 2678	Henderson	18'03"	18'03"	18'10"
66.835	B00063	SB	UNDER KY 2678	Henderson	17'06"	17'00"	16'10"
68.363		NB	UNDER KY 416	Henderson	16'08"	16'08"	16'03"
68.363	B00064	SB	UNDER KY 416	Henderson	16'08"	16'08"	17'00"
69.674		NB	UNDER KY 2675	Henderson	16'08"	16'06"	16'07"
69.674	B00065	SB	UNDER KY 2675	Henderson	16'08"	16'05"	16'06"
72.346		NB	UNDER KY 136	Henderson	17'02"	16'09"	16'06"
72.346	B00066	SB	UNDER KY 136	Henderson	17'00"	17'02"	17'03"
73.256		NB	UNDER KY 2677	Henderson	16'08"	16'03"	16'02"
73.256	B00067	SB	UNDER KY 2677	Henderson	17'02"	17'01"	17'04"
	Bridge with Vertical Clearance less than the AASHTO recommended minimum of 16 feet.						

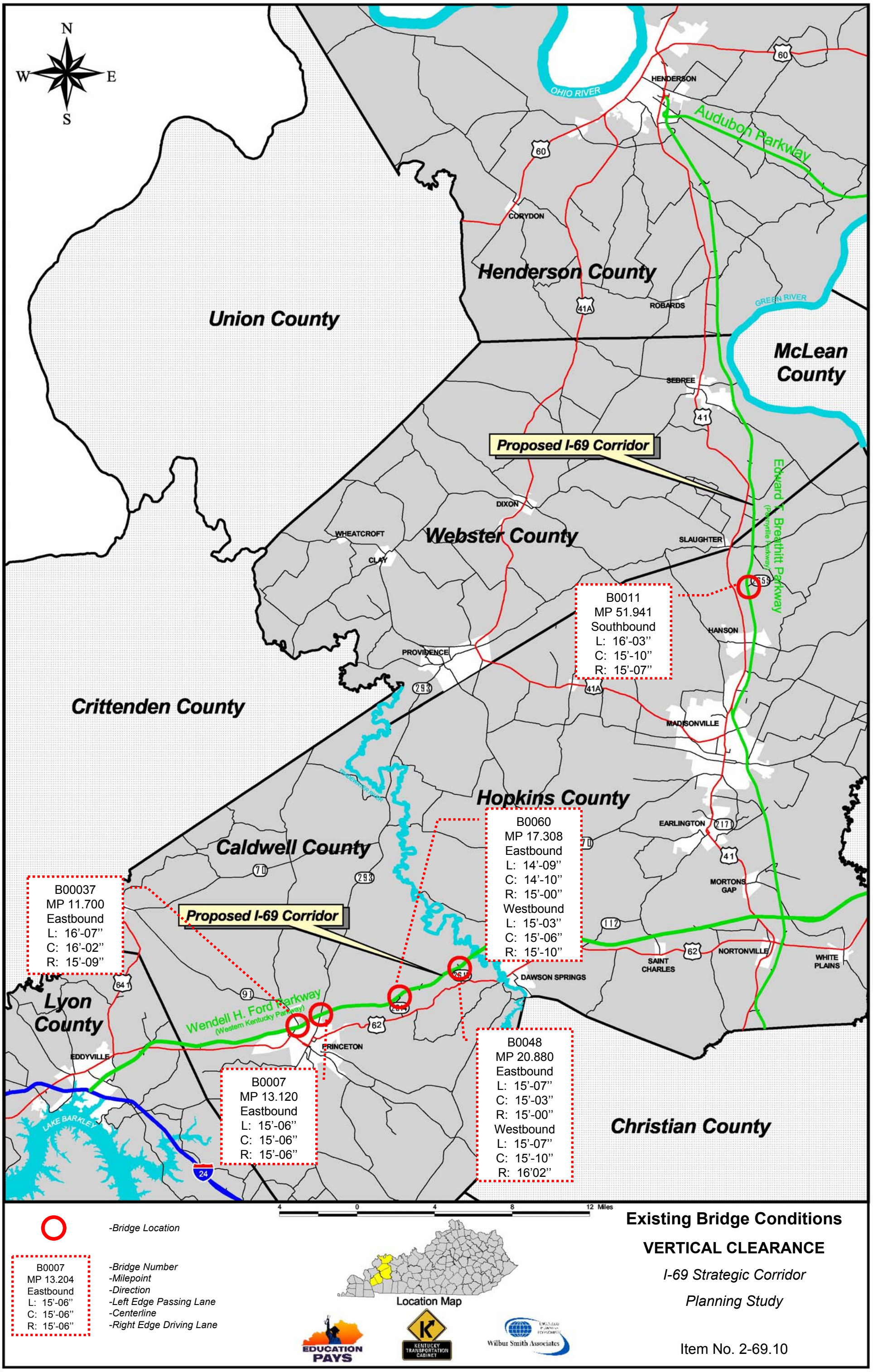

Figure 14. Substandard Vertical Bridge Clearances

C. Bridge Conditions

According to the KYTC Bridge Division, a bridge is eligible for Federal rehabilitation funds when it meets two criteria: (1) the bridge has a sufficiency rating below 50.0 and (2) the bridge is considered either structurally deficient or functionally obsolete. In KYTC's Highway Information Systems (HIS) database, several of the bridge structures are shown as either Functionally Obsolete or Structurally Deficient. By Federal definition, bridges are classified as functionally obsolete when they do not meet current geometric design guidelines, such as lane width, approach alignment, overhead clearances, etc. A classification as structurally deficient indicates that a bridge is no longer able to carry the vehicle weight it was originally designed to carry. In the HIS database, the determination of whether a bridge is functionally obsolete is based on information in the "Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges". Based on functional classification, the Parkways are compared against the criteria for "Other Multilane Divided Facilities" as opposed to "Interstate and Other Divided Freeways". If each bridge was compared to the criteria for Interstates, then additional bridges would be classified functionally obsolete adding to the 15 discussed below.

Information related to structurally deficient or functionally obsolete bridges is included in the bridge table in **Appendix F**. Of the 50 mainline bridges and 23 overpasses along the proposed corridor, two (2) are considered structurally deficient and 13 are considered functionally obsolete.

The two (2) structurally deficient bridges are overpasses of the existing Parkways, including the following:

- One (1) is in Webster County on the Breathitt Parkway, with a sufficiency rating that falls below 50.0; and
- One (1) is in Caldwell County on the Ford Parkway, with a sufficiency rating of 54.6. Although this rating does not fall below 50.0, the structure should continue to be monitored for eligibility for Federal rehabilitation funds.

Of the thirteen (13) structures that are functionally obsolete, 2 are over the existing Parkways and 11 are mainline bridges. Of the two (2) bridges located over existing Parkways that are considered functionally obsolete:

- One (1) is in Hopkins County over the Ford Parkway; and
- One (1) is in Lyon County over the Ford Parkway, with a sufficiency rating of 57.1. The structure is not a mainline bridge, but passes over the Parkway. Although the rating did not fall below 50.0, the structure should continue to be monitored for eligibility for Federal rehabilitation funds.

Of the eleven (11) mainline bridges considered functionally obsolete:

- One (1) is along the Ford Parkway in Lyon County;
- Four (4) are along the Ford Parkway in Hopkins County;

- Five (5) are along the Breathitt Parkway in Hopkins County; and
- One (1) is along the Breathitt Parkway in Webster County.

Sufficient information is not available through the as-built plans to determine the condition or application of bridge safety appurtenances such as approach guardrail, type of bridge rail, pier protection, etc.