WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
Division of Highways
1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

Joe Manchin III
Governor

September 23, 2010

MEMORANDUM

TO: DD

FROM: DDC SB

SUBJECT: State Project S225-218-10.86
Federal Project BR-0218(013)D
Basnettville Bridge Replacement Study
Marion County

The Design Study Unit of the Initial Design Section (DDC) has completed the Study Report for the replacement of the Basnettville Bridge Replacement, and recommended Alternative No. 1 as the preferred alternative for construction. A commenting period ended on July 20, 2010. A copy of the report is attached for your review and comment. If you have any questions, please contact Steve Boggs (304-558-9662).

SB:fl

Attachments

cc: HP, DDC(SB), DDE

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
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Joe Manchin III
Governor

June 28, 2010

MEMORANDUM

TO: DD

FROM: DDC

SUBJECT: State Project S225-218-10.86
Federal Project BR-0218(013)D
Basnettville Bridge Replacement Study
Marion County

The Design Study Unit of the Initial Design Section (DDC) has completed a Draft Study Report for the Basnettville Bridge Replacement, and chosen a preferred alternative for construction. A copy of the report is attached for your review and comment.

A Field Review/Office Review is scheduled to be held July 20, 2010. The main purpose of this meeting is to discuss all alternatives listed in the study. Those wishing to attend shall meet at the project site at 11:00 a.m. to review and discuss the alternatives within the Draft Study. Please provide written comments to Steve Boggs, either at this meeting or via e-mail at Steve.D.Boggs@wv.gov.

We look forward to your participation and input with regard to this project. If you have any questions, please contact Steve Boggs (304-558-9662).

SB:fl

Attachments

cc: DDC(SB), DDM(ME), DDR(Road, Util.), DDI(Br., Geo.), DDT(Perm.), DDE, DT(Des, Opns), CP(GTI, GA), DR-Est., D4-E/M, D4-R/W, D4-Bridge, HP, CH(CR)

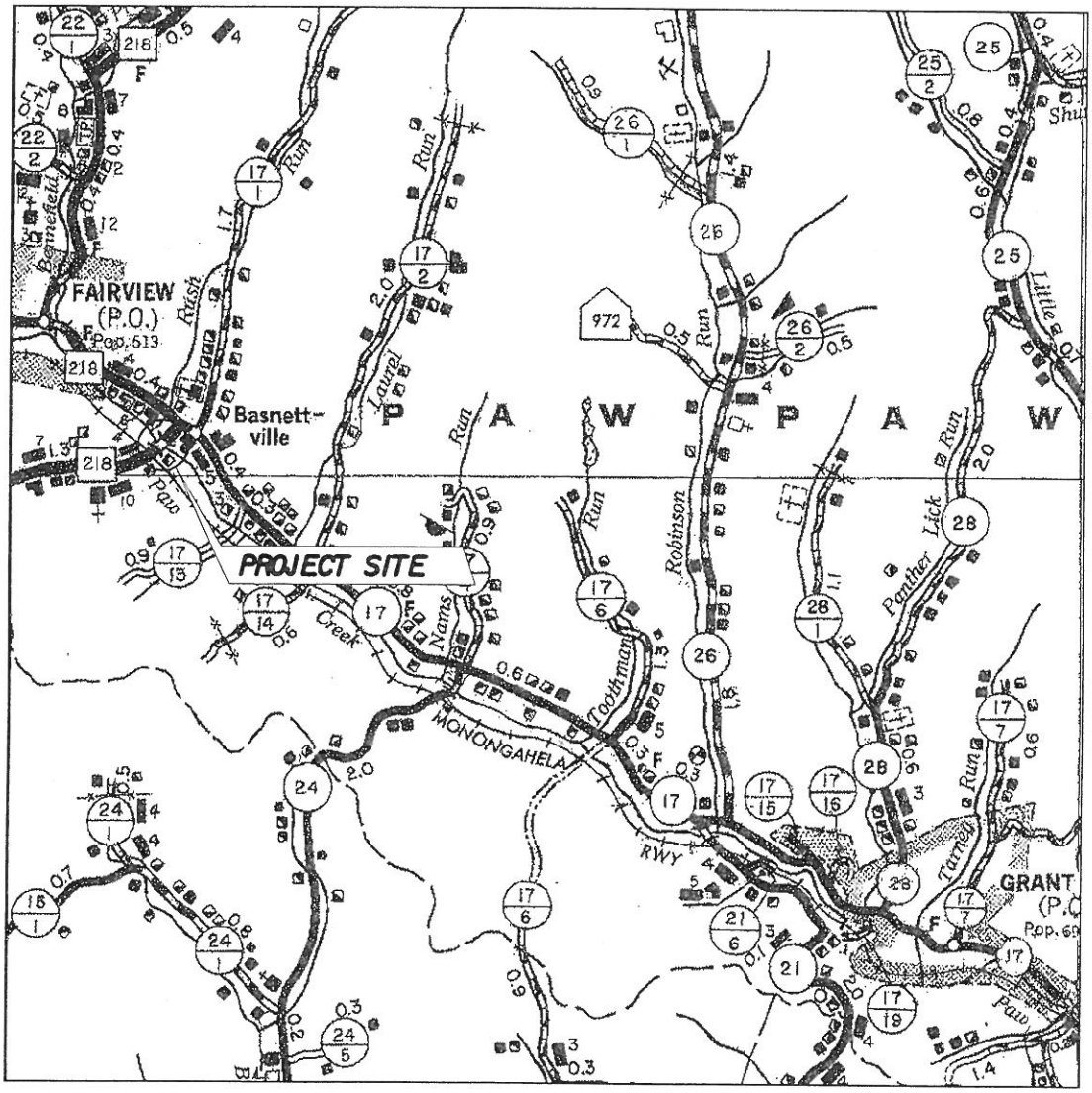
BRIDGE REPLACEMENT STUDY

BASNETTVILLE BRIDGE

STATE PROJECT NO. S225-218-10.86

FEDERAL PROJECT NO. BR-0218(013)D

MARION COUNTY



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

ENGINEERING DIVISION

SEPTEMBER 2010

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LOCATION MAP

BASNETTVILLE BRIDGE
STATE PROJECT NO. S225-218-10.86
FEDERAL PROJECT NO. BR-0218(013)D
MARION COUNTY

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PROJECT SUMMARY

The Initial Design Section (DDC) conducted a study to evaluate and determine the most suitable and economical location for the replacement of the existing Basnettville Bridge in Marion County. The bridge carries WV Route 218 over Paw Paw Creek and is located approximately 0.03 miles south of the intersection of WV Route 218 with Marion County Route (CR) 17. WV Route 218 is functionally classified as a Rural Collector with traffic consisting of all types of vehicles, including trucks, school buses and mail carriers. Current traffic data (2009) indicates the average daily traffic (ADT) as 2,400 vehicles per day (VPD) with a 20-year (2029) projected design ADT of 3,200. The speed limit on WV Route 218 is posted at 25 miles per hour (mph); but changes to 45 miles per hour just south of the at grade railroad crossing.

The study was conducted utilizing information obtained from an initial field visit, the bridge inspection report, a detailed survey, and information gathered from various other sources. Major factors taken into consideration were cost comparison of the alternative alignments, safety to all users of the facility, right-of-way acquisitions, constructability issues, and environmental impacts.

Because this is a project utilizing bridge replacement funding, the focus and evaluation of this project centered solely on the most suitable and feasible location to accommodate its replacement. It is our estimate that the bridge and approaches are above the 100-year flood elevation, and the proposed waterway opening for all alternatives would adequately pass the desired Q50 design storm. The preliminary hydraulic analysis indicates that there is no increase in the backwater elevation.

Based on the information collected and evaluated, the Initial Design Section recommends a 100-foot single span bridge be built at the existing location using a detour roadway and temporary bridge downstream of the existing bridge to maintain traffic (Alternative No. 1).

EXISTING CONDITIONS[1]

The existing bridge was built in 1954 by Nunnally and Hayhurst, and currently has a sufficiency rating of 49.2. The structure consists of three (3) spans which are Continuous Span Wide Flange Beams (CSWB) supported by reinforced concrete stub abutments and concrete column piers. The abutments are founded on steel piling driven to refusal with solid concrete piers footings founded into hard bedrock. The overall length of the bridge is 93 feet with a middle span length of 35 feet and end spans of 27 feet. The 6 ½-inch concrete deck has been overlaid with a 3-inch Hot Laid Bituminous Concrete (HLBC) wearing surface. The structure has 10-inch barrier concrete curbs without a sidewalk. The clear deck width (curb to curb) measures 24 feet with the overall width measuring 32 feet – 2 inches (parapet to parapet). The structure is not posted for weight restrictions. Both approaches consist of asphalt pavement with two (2) 11-foot lanes with 3-foot shoulders.

A Norfolk Southern railroad grade crossing is located approximately 65 feet south of the end of the bridge. The At Grade Crossing has a railroad signal with flashing lights on each side of WV 218 and a control cabinet on the upstream side of the crossing.

Existing Roadway Geometry

The existing structure is located on a tangent section of roadway. The abutments of the structure are parallel to Paw Paw Creek. West Virginia Route 218 has a T-intersection with separate turning lanes located approximately 30 feet north of the end of the bridge. The legs are approximately 50 feet long. Motorists making a left turn onto WV 218/CR 17 and continuing northwest onto WV 218 must stop before entering the intersection of WV 218 with Marion CR 17. Motorists making a right turn onto CR 17 must stop before entering the intersection and continuing southeast on CR 17. The right turn off of WV 218 traveling southwest appears to be a through movement requiring motorists turning left off of CR 17 to yield to this through movement.

Paw Paw Creek Hydraulic Analysis

The FEMA Flood Insurance Rate Map[2] No. 540097 0030 B for Marion County, dated July 4, 1988, indicates that the existing bridge is above Zone AE as designated on

[1] See Figure 1.

the map. The Base Flood Elevation is approximately at elevation 989.00. The existing structure is built on a 2.2% grade with the northern roadway surface approximately at elevation 993.00 and southern roadway surface approximately at elevation 995.00 (depth of structure is approximately 2.8').

Rush Run intersects Paw Paw Creek approximately 100 feet upstream from the bridge.

One commercial business is located approximately 215 feet upstream. Several dwellings are located downstream, the nearest is approximately 150 feet from the project and situated along the north bank of Paw Paw Creek.

A HEC-RAS model has been developed by the DOH Hydraulic Unit for Paw Paw Creek. Based on their model, the water surface elevation for the 100-year storm was determined to be at elevation 988.95. The proposed structure was also modeled. The preliminary results indicate that there is no increase to the back water hydraulic grade line. The Preliminary Hydrology and Hydraulic Report was not completed at the time of the final report, however will be added to Appendix D once complete.

Existing Properties and Utilities

The Basnettville Bridge is situated in a rural area of Marion County. The surrounding properties consist largely of undeveloped land and residential dwellings. Utilities in area include: water line, gas line, sanitary sewer, and overhead utilities lines. The underground water line crosses WV 218 approximately 10 feet north of the existing bridge and parallels the downstream side approximately 25 feet from the bridge. Overhead utility lines are located approximately 10 feet downstream from the bridge. A 16-inch high pressure gas line crosses approximately 100 feet downstream of the bridge, and crosses under WV 218 near the at-grade railroad crossing south of the bridge. There are no encroachments on the structure. There is a USGS marker located on the top of the upstream wingwall of the north abutment, stamped with an elevation of 994 feet above sea level.

[2] See Appendix C.

DESIGN CRITERIA AND GUIDELINES

West Virginia Route 218 is currently classified as a Rural Major Collector with a 2009 average daily traffic of 2,400 vehicles. During our site visit, an assessment was made of the local terrain within the general area of the project site. It was determined that this project falls within the rolling terrain criteria in accordance with the AASHTO Design Guide.

Design Criteria Description	Design Criteria As per DD-601
Terrain Type	Rolling
Roadway Classification	Rural Major Collector
Minimum Design Speed	50 mph (Exhibit 6-1)
Maximum Grade	7% (Exhibit 6-4)
Minimum Roadway Width	24 feet (Exhibit 6-5)
Minimum Shoulder Width	8 feet (Exhibit 6-5)
Minimum Stopping Sight Distance	495 feet (Exhibit 6-2)
Minimum Radii for Design Speed	960 feet (Exhibit 3-27) DD-603
Minimum Clear Roadway Width for Bridges	40 feet (Exhibit 6-6)

No sidewalk currently exists on the bridge; therefore, we do not anticipate the need to accommodate pedestrian or bicycle traffic.

GEOTECHNICAL OVERVIEW

A geotechnical engineer researched readily available information and visited the site. The geotechnical findings and evaluation are listed with the comments in Appendix D. This study did not reveal any significant problems on site or with the proposed alternative.

ENVIRONMENTAL OVERVIEW

The existing Basnettville Bridge in Marion County will need to be evaluated for historical and archeological significance by the Environmental Section. No mussel survey or Fish and Wildlife consultation will be required. Once all the environmental

documentation is obtained, the Environmental Section will prepare a Programmatic Categorical Exclusion to clear the Environmental Policy Act (NEPA) requirements for the preferred alternative.

DESIGN ALTERNATIVES

Four alternatives were evaluated for this project. The first alternative proposes placing a new bridge at its existing location, with a downstream temporary detour for all traffic during construction. The second alternative proposes a new bridge downstream from the existing structure with the existing bridge and approaches to maintain traffic during construction. The third alternative proposes placing a new bridge at its current location using a temporary bridge and roadway upstream of its current location to maintain traffic during construction. The fourth alternative is a No-Build alternative.

A new bridge upstream from the existing structure was not evaluated as it would require a large cut into the hill side to the south and would impact Rush Run's large drainage structure, 8-foot corrugated metal pipe, under US 218.

Given the proximity of the bridge and the adjacent T-intersection, the project was discussed with Traffic Engineering Division (DT). DT recommended a channelized T-intersection with a small channelized right turn lane (comments from DT are included in Appendix D).

During our initial phases of the study, DDC proposed a typical section of two (2) 11-foot lanes with 3-foot shoulders. Through coordination with the Program Planning and Administration Division (CP), who sent the project information to citizens in the bicycle/pedestrian community for comment, CP recommended that the shoulders on the structure be expanded to 4 feet to allow disabled pedestrian access and to give bicyclists a better "escape" zone if traffic conflict occurs on the bridge (comments from Bill Robinson are included at the end of the report). The bridge will have two (2) 11-foot lanes with 4-foot paved shoulders[3]. For estimating purposes, it was assumed that a steel superstructure would be used.

[3] See figure 2.

Design Criteria Description	Design Criteria	Design Exception
Design Speed	40 mph	Yes
Roadway width	22 feet	Yes
Shoulder Width	4 feet shoulders	Yes
Bridge Clear Width curb to curb	30 feet	Yes

a) Alternative No. 1

Alternative No. 1[4] consists of replacing the Basnettville Bridge at its existing location while utilizing a temporary bridge and roadway downstream of its current location to maintain traffic during construction.

This alternative proposes a single span bridge of approximately 100 feet in length with a 30-foot clear width. Approximately 50 feet of new approach work would be necessary south of the proposed bridge and approximately 200 feet of new approach work to the north of the proposed bridge to reconstruct the T-intersection. The existing railroad crossing will need to be replaced with a concrete crossing and temporary railroad crossing and warning lights will be required during construction.

The temporary detour would require fill material to be placed in an unnamed tributary which flows along WV 218 into Paw Paw Creek; a temporary channel or an extension to the 5-foot diameter pipe crossing under the railroad would be necessary. The detour would also impact two (2) 24-inch pipes along the railroad ditch line.

Right-of-way involvement would be moderate. It will include coordination with Norfolk Southern Railroad, permanent right-of-way for WV 218, and temporary construction easement for the detour. Possible utility relocations include a water line, gas line, sanitary line, and overhead utility lines.

Estimated cost for Alternative No. 1 is as follows:

100-foot Bridge (single span)	$ 674,800
250 feet of Roadway	$ 308,500
Detour	$ 295,400
E&C (19%)	$ 243,000
Total Construction	$1,521,700

[4] See Figures 2, 3, and 4.

Future Value[5]	$1,724,000
Preliminary Engineering	$ 300,000
Right-of-Way	$ 55,000
Railroad / Utility	$ 345,000
Total	$2,424,000

A 100-foot three-span structure with a 40-foot center span with 30-foot end spans was also evaluated; its cost is shown below:

100-foot Bridge (three-span)	$ 858,800

b) Alternative No. 2

Alternative No. 2[6] would replace the bridge approximately 42 feet (centerline to centerline) downstream from the current location while utilizing the existing bridge to maintain traffic during construction. The new bridge would parallel the existing bridge. The total length of construction will be approximately 900 feet including a 100-foot bridge.

The northern roadway approach would require fill material to be placed over a private residential driveway and a new access provided. A new pipe under the railroad track will be necessary to direct flow away from the bridge abutment relocating approximately 75 feet of the unnamed tributary. The new alignment would require a new signalized railroad crossing to be constructed.

Permanent right-of-way will be required for the approaches and new bridge, permanent drainage easements for installation of a new pipe under the railroad tracks, and temporary construction easement for the relocation of one residential access. Possible utility relocations include water line, gas line, sanitary line, and overhead utility lines.

Estimated cost for Alternative No. 2 is as follows:

100-foot Bridge	$ 711,500
800 feet of Roadway	$ 573,400
E&C (19%)	$ 244,200
Total Construction	$1,529,100

[5] Note: Future value of construction cost using compound interest { FV=PV(1+i)^n} has been calculated from the estimate date of June 2010 to construction period midpoint of spring 2013, using inflation rate of 5%.

[6] See Figures 2, 5 and 7.

Future Value[5]	$1,732,000
Preliminary Engineering	$ 375,000
Right-of-Way	$ 310,000
Railroad / Utility	$ 380,000
Total	$2,797,000

c) Alternative No. 3

Alternative No. 3[7] consists of replacing the Basnettville Bridge at its existing location while utilizing a temporary bridge and roadway upstream of its current location to maintain traffic during construction. This alternative proposes a single span bridge of approximately 100 feet in length with a 30-foot clear width. Approximately 50 feet of new approach work would be necessary south of the proposed bridge and approximately 200 feet of new approach work to the north of the bridge to construct T-intersection with CR 17.

The temporary detour cuts approximately 75 feet into the hillside west of the bridge and would impact the existing railroad crossing control cabinet and warning lights. The existing railroad crossing will need to be replaced with a concrete crossing. A temporary crossing and warning lights will be required during construction.

Right-of-way involvement would be moderate. It may include coordination with Norfolk Southern Railroad, permanent right-of-way for widening the new bridge, and temporary construction easements for the temporary detour and construction equipment. Possible utility relocations include water line, gas line, sanitary line, and overhead utility lines.

Estimated cost for Alternative No. 3 is as follows:

100-foot Bridge	$ 674,800
250 feet of Roadway	$ 306,800
Detour	$ 238,000
E&C (19%)	$ 231,800
Total Construction	$1,451,400

[7] See Figures 2, 6, and 7.

Future Value [5]	$1,665,000
Preliminary Engineering	$ 300,000
Right-of-Way	$ 35,000
Railroad / Utility	$ 435,000
Total	$2,435,000

d) No-Build Alternative

Due to the deteriorating condition of the existing structure, the No-Build Alternative would eventually result in the permanent closure of the bridge, resulting in a 7.7 mile detour via CR 17, CR 24, CR 24/1, CR 15/1, and WC 218. The detour would be burdensome on commercial traffic, school buses, and residential traffic. Due to the limitations of the detour the No-Build is not a prudent alternative.

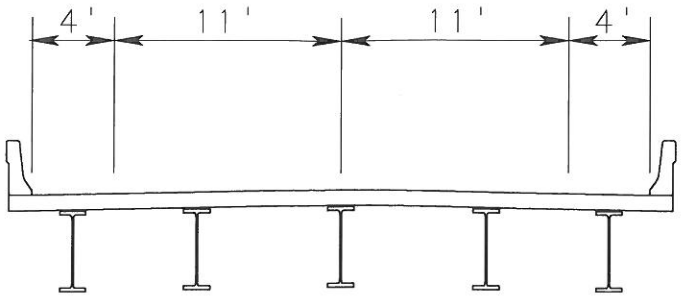
CONCLUSION / RECOMMENDATION

Our investigation and study recommends that Alternative No. 1, which proposes replacing the Basnettville Bridge at its existing location, as the preferred alternative. Maintenance of traffic would utilize a temporary bridge and roadway downstream of its current location during construction. Alternative No. 1 has the least impact to the surrounding area. Alternative No. 2 has the highest estimated cost and impacts to the adjacent residential property. Alternative No. 3's detour would cut into the hillside and impact the railroad at a higher cost than Alternative 1 or 2.

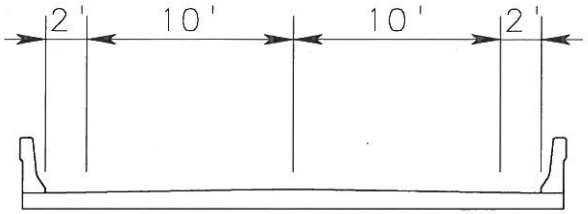
A temporary construction easement and permanent right-of-way for construction, coordination with Norfolk Southern Railroad, and utility relocations would be required. The preliminary Hydrology and Hydraulic report indicates this alternative will not increase the backwater elevation.

APPENDIX "A"

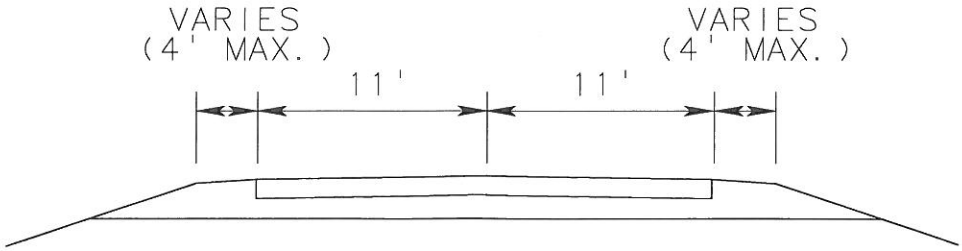
Public Roads Div. | State Dist. No. | State Project No. | Federal Project No. | Fiscal Year | County | Sheet No. | Total Sheets
W. V. | 4 | S225-218-10.86 | | | MARION | |
TO FAIRVIEW
218
EX. R/W
NORFOLK SOUTHERN RAILROAD
EX. RAILROAD R/W
MAP 05-09
PARCEL 19
MAP 05-09
PARCEL 22
MAP 05-09
PARCEL 23
MAP 05-09
PARCEL 24
MAP 05-10
PARCEL 100
MAP 05-10
PARCEL 7
MAP 05-10
PARCEL 21
MAP 05-10
PARCEL 18.3
1050
990
17
NOTE:
PROPERTY INFORMATION FROM PAW PAW DISTRICT - TAX MAPS
FIGURE 1
SCALE : 0 40 ft.
REVISION NUMBER | SHEET NUMBER | REVISION | DATE | BY
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
EXISTING CONDITIONS
PLAN SHEET



PROPOSED BRIDGE



DETOUR BRIDGE

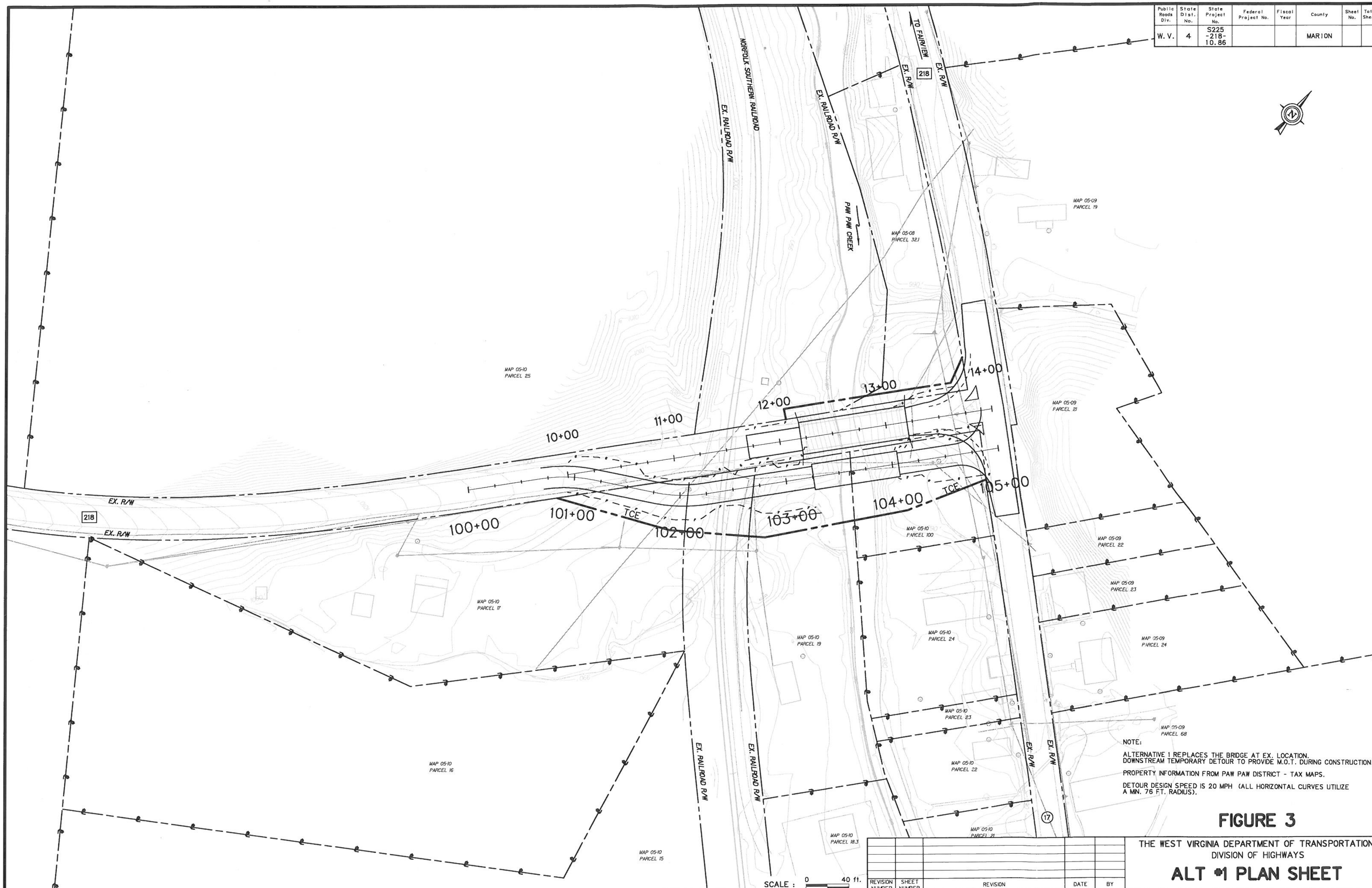


ROADWAY TYPICAL SECTION

FIGURE 2

ROADWAY FUNCTION CLASSIFICATION MAJOR COLLECTOR - RURAL DESIGN EXCEPTION NEEDED YES	A.D.T. (2009) 2,400	BRIDGE REPLACEMENT STUDY BASNETTVILLE BRIDGE STATE PROJECT NO. S225-218-10.86 FEDERAL PROJECT NO. BR-0218(013)D MARION COUNTY THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION
SUFFICIENCY RATE. 49.2 INVENTORY NO. 25A029	(2029) 3,200	

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.	4	S225 -218- 10.86			MARION		



NOTE:

ALTERNATIVE 1 REPLACES THE BRIDGE AT EX. LOCATION.
DOWNSTREAM TEMPORARY DETOUR TO PROVIDE M.O.T. DURING CONSTRUCTION.

PROPERTY INFORMATION FROM PAW PAW DISTRICT - TAX MAPS.

DETOUR DESIGN SPEED IS 20 MPH (ALL HORIZONTAL CURVES UTILIZE A MIN. 76 FT. RADIUS).

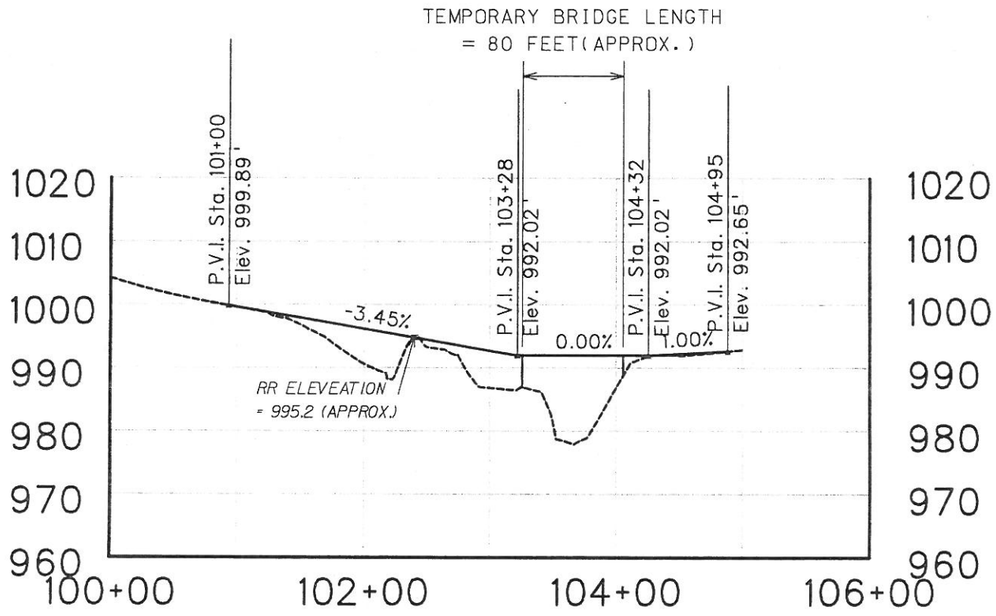
FIGURE 3

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

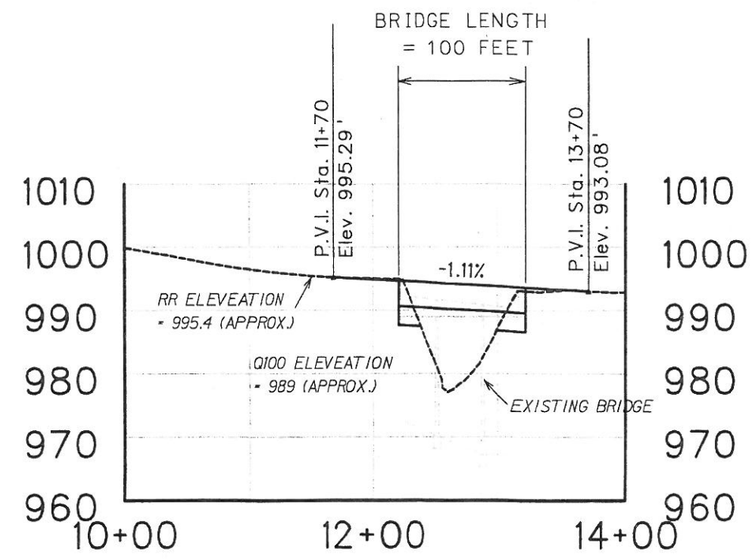
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ALT #1 PLAN SHEET

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.	4	S225 -21B- 10.86			MARION		



ALT #1 - TEMPORARY BRIDGE



ALT #1 - PROPOSED BRIDGE

FIGURE 4

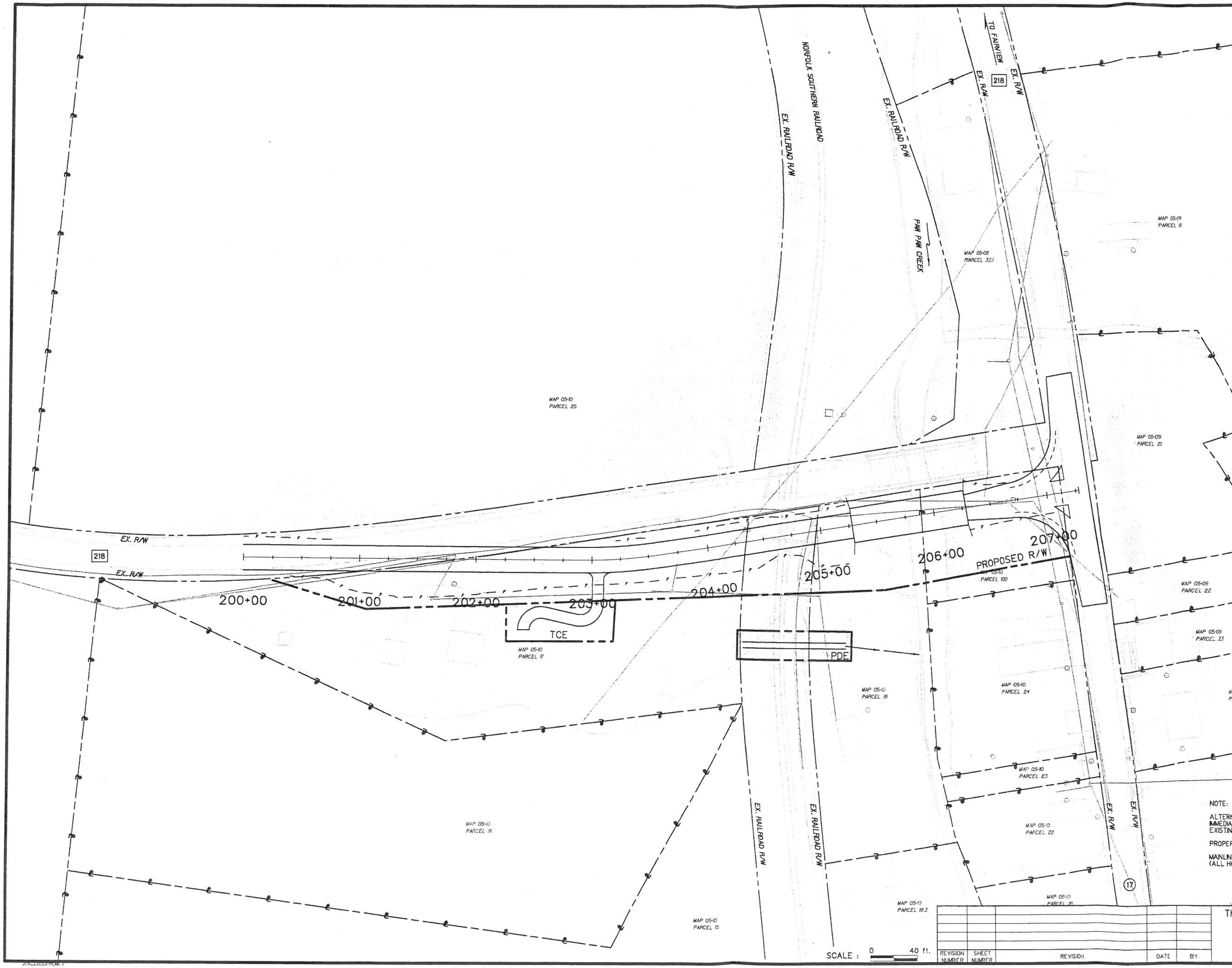
SCALE : 0 NTS

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ALT #1 PROFILE

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.	4	S225 -218- 10.86			MARION		



NOTE:

ALTERNATIVE 2 PROPOSES REPLACING THE BRIDGE ON A NEW ALIGNMENT IMMEDIATELY DOWNSTREAM FROM THE EXISTING BRIDGE.
EXISTING BRIDGE TO PROVIDE M.O.T. DURING CONSTRUCTION.

PROPERTY INFORMATION FROM PAW PAW DISTRICT - TAX MAPS.

MAINLINE DESIGN SPEED IS 40 MPH.
(ALL HORIZONTAL CURVES UTILIZE A MIN. 444 FT. RADIUS).

FIGURE 5

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

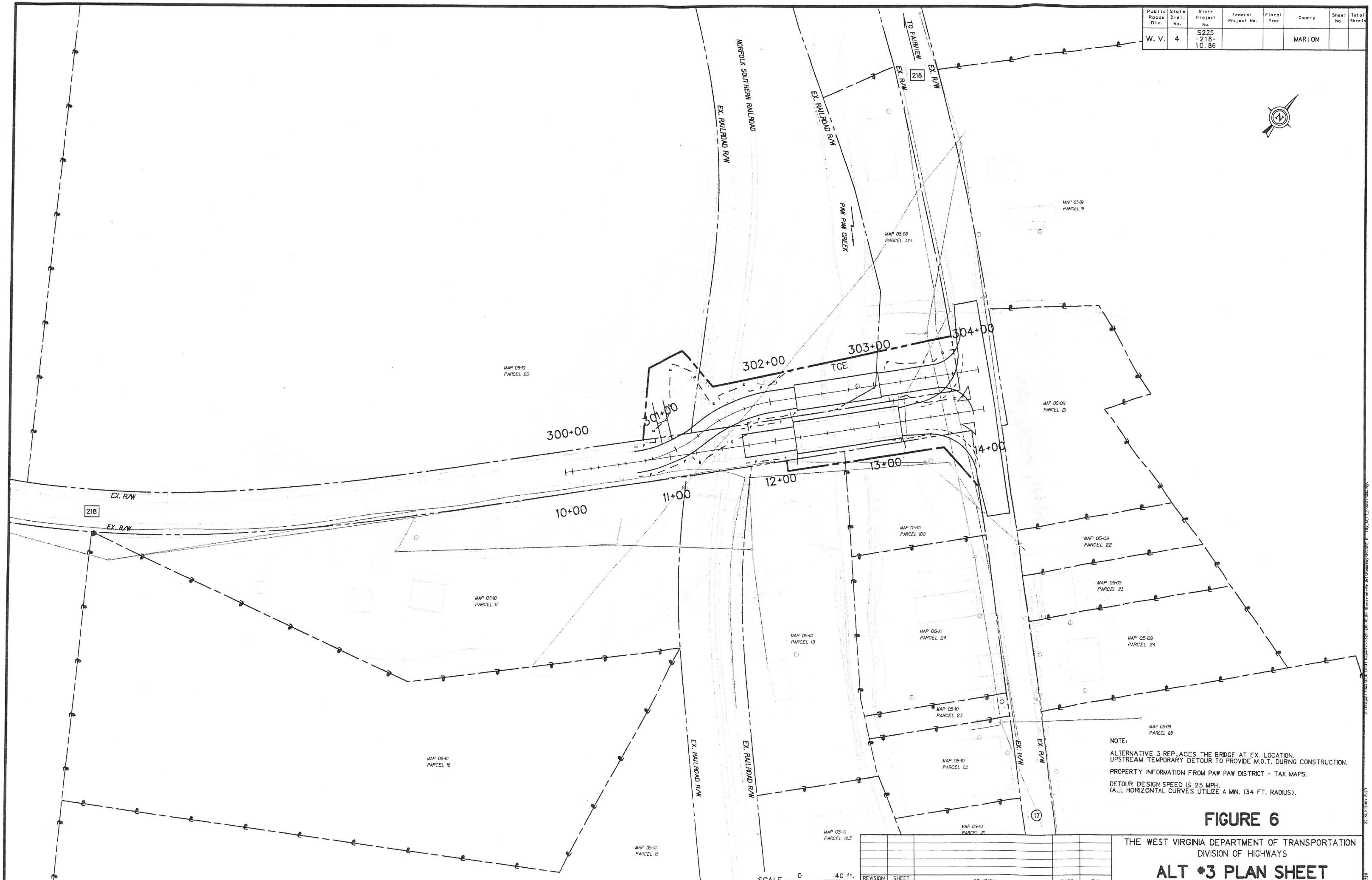
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ALT #2 PLAN SHEET

22-SEP-2010 15:23

A015726

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.	4	S225 -218- 10.86			MARION		



NOTE:

ALTERNATIVE 3 REPLACES THE BRIDGE AT EX. LOCATION.
UPSTREAM TEMPORARY DETOUR TO PROVIDE M.O.T. DURING CONSTRUCTION.

PROPERTY INFORMATION FROM PAW PAW DISTRICT - TAX MAPS.

DETOUR DESIGN SPEED IS 25 MPH.
(ALL HORIZONTAL CURVES UTILIZE A MIN. 134 FT. RADIUS).

FIGURE 6

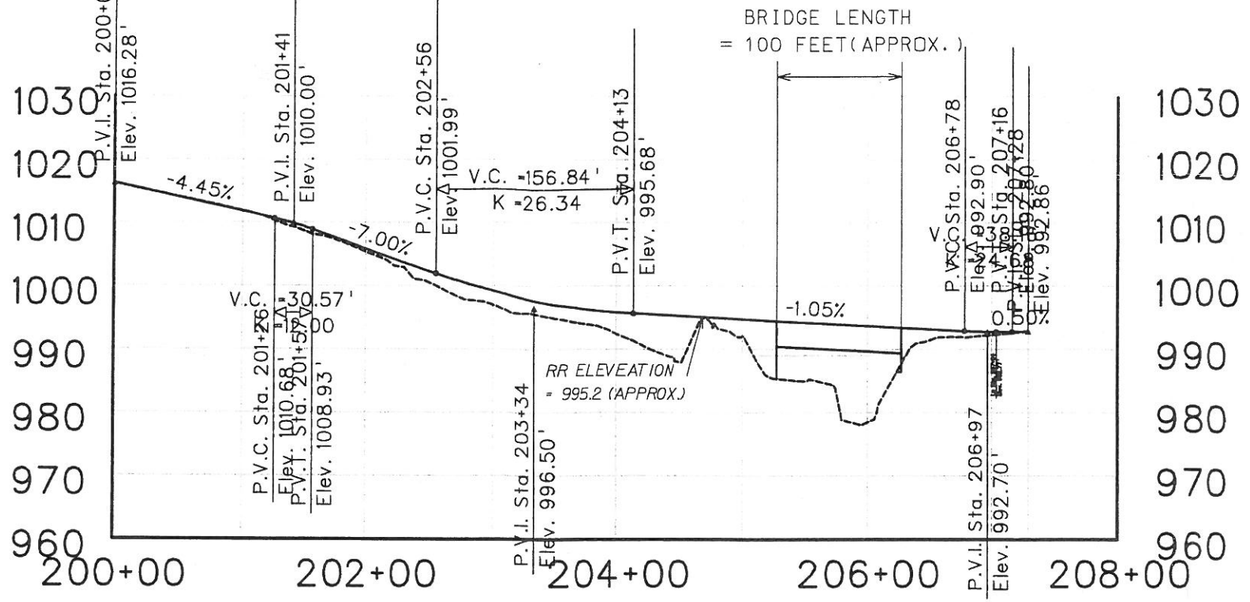
REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

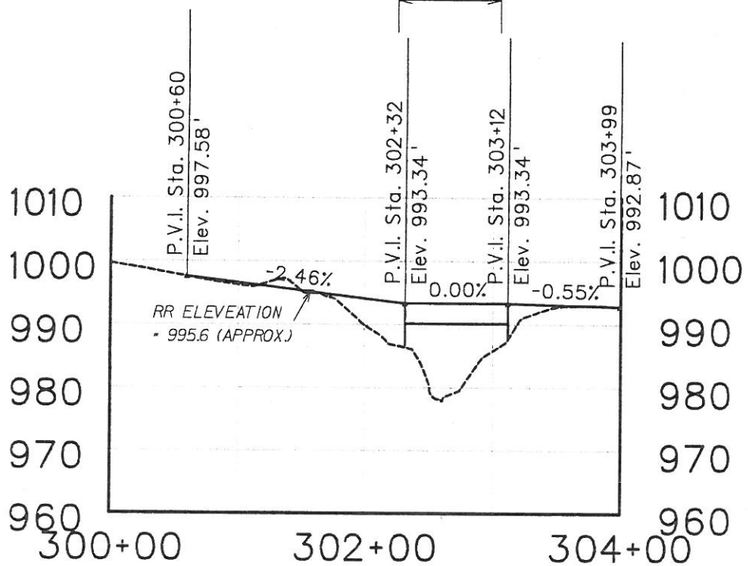
ALT #3 PLAN SHEET

22-SEP-2010 15:23
A015726

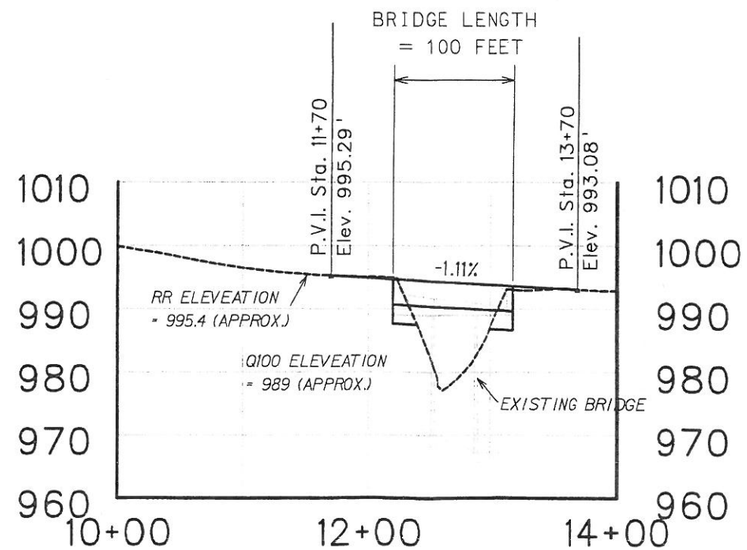
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.	4	S225 -218- 10.86			MARION		



ALT #2 - PROPOSED BRIDGE



ALT #3 - TEMPORARY BRIDGE



ALT #3 - PROPOSED BRIDGE

FIGURE 7

SCALE : 0 NTS

REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

ALT #2 & #3 PROFILE

APPENDIX "B"

ALTERNATIVE 1

CONSTRUCTION COST WORKSHEET

ITEM		COST
ROADWAY		
CLEARING AND GRUBBING	$	10,000
EARTHWORK	$	20,500
HMA WEARING & BASE	$	25,200
AGGREGATE (BASE & SHOULDER)	$	15,000
SUBGRADE	$	7,800
DRAINAGE	$	4,000
M.O.T.	$	57,300
EROSION CONTROL	$	15,000
APPROACH SLAB	$	26,700
ALL OTHER ITEMS	$	89,800
MOBILIZATION	$	37,200
TOTAL ROADWAY CONSTRUCTION	**$**	**308,500**
DETOUR REMOVAL	$	23,300
DETOUR	$	272,100
TOTAL DETOUR CONSTRUCTION	**$**	**295,400**
BRIDGE		
DISMANTLING STRUCTURE	$	75,000
STRUCTURE EXCAVATION	$	15,600
SELECT MATERIAL FOR B.F.	$	6,800
SLOPE PROTECTION	$	22,500
CL B CONCRETE	$	38,900
CL K CONCRETE	$	14,400
CL H CONCRETE	$	101,000
REINFORCING STEEL BARS	$	12,700
EPOXY REINFORCING STEEL BARS	$	30,500
STEEL SUPERSTRUCTURE	$	213,000
STEEL BEARING PILES	$	32,000
ALL OTHER ITEMS	$	112,400
TOTAL BRIDGE CONSTRUCTION	**$**	**674,800**

ALTERNATIVE 2

CONSTRUCTION COST WORKSHEET

ITEM		COST
ROADWAY		
CLEARING AND GRUBBING	$	15,000
EARTHWORK	$	59,500
HMA WEARING & BASE	$	80,700
AGGREGATE (BASE & SHOULDER)	$	48,100
SUBGRADE	$	24,900
DRAINAGE	$	90,000
M.O.T.	$	43,300
EROSION CONTROL	$	15,000
APPROACH SLAB	$	26,700
ALL OTHER ITEMS	$	132,800
MOBILIZATION	$	37,400
TOTAL ROADWAY CONSTRUCTION	**$**	**573,400**
BRIDGE		
DISMANTLING STRUCTURE	$	75,000
STRUCTURE EXCAVATION	$	19,000
SELECT MATERIAL FOR B.F.	$	8,800
SLOPE PROTECTION	$	22,500
CL B CONCRETE	$	55,500
CL K CONCRETE	$	14,400
CL H CONCRETE	$	101,000
REINFORCING STEEL BARS	$	21,300
EPOXY REINFORCING STEEL BARS	$	30,500
STEEL SUPERSTRUCTURE	$	213,000
STEEL BEARING PILES	$	32,000
ALL OTHER ITEMS	$	118,500
TOTAL BRIDGE CONSTRUCTION	**$**	**711,500**

ALTERNATIVE 3

CONSTRUCTION COST WORKSHEET

ITEM		COST
ROADWAY		
CLEARING AND GRUBBING	$	10,000
EARTHWORK	$	20,500
HMA WEARING & BASE	$	25,200
AGGREGATE (BASE & SHOULDER)	$	15,000
SUBGRADE	$	7,800
DRAINAGE	$	4,000
M.O.T.	$	57,300
EROSION CONTROL	$	15,000
APPROACH SLAB	$	26,700
ALL OTHER ITEMS	$	89,700
MOBILIZATION	$	35,600
TOTAL ROADWAY CONSTRUCTION	**$**	**306,800**
DETOUR REMOVAL	$	23,400
DETOUR	$	214,600
TOTAL DETOUR CONSTRUCTION	**$**	**238,000**
BRIDGE		
DISMANTLING STRUCTURE	$	75,000
STRUCTURE EXCAVATION	$	15,600
SELECT MATERIAL FOR B.F.	$	6,800
SLOPE PROTECTION	$	22,500
CL B CONCRETE	$	38,900
CL K CONCRETE	$	14,400
CL H CONCRETE	$	101,000
REINFORCING STEEL BARS	$	12,700
EPOXY REINFORCING STEEL BARS	$	30,500
STEEL SUPERSTRUCTURE	$	213,000
STEEL BEARING PILES	$	32,000
ALL OTHER ITEMS	$	112,400
TOTAL BRIDGE CONSTRUCTION	**$**	**674,800**

APPENDIX "C"

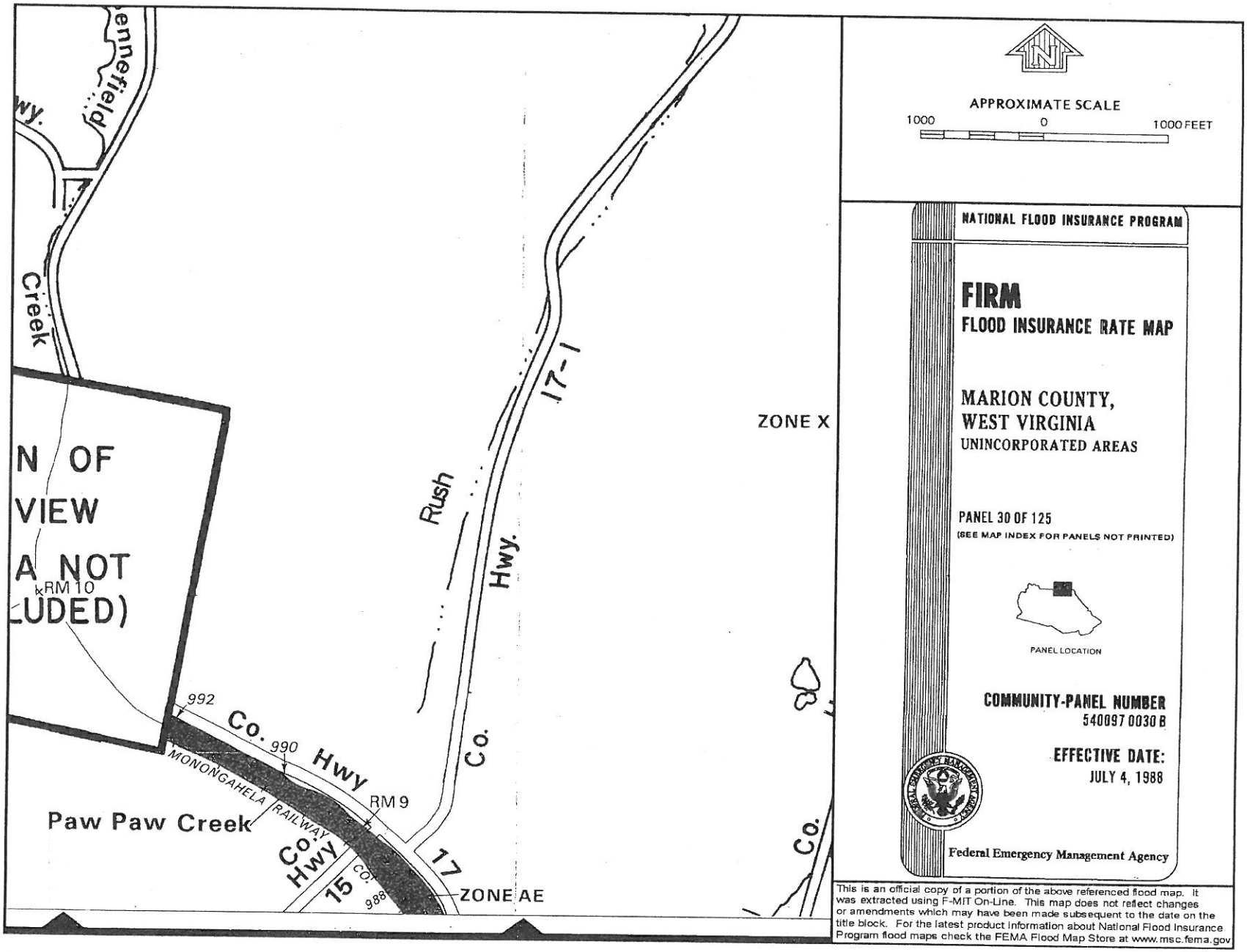
Looking South on WV 218 toward Basnettville Bridge

Looking North on WV 218 toward Basnettville Bridge

Paw Paw Creek - Looking downstream toward Basnettville Bridge

Looking Southeast along WV 218 toward intersection of WV 218 with CR 17

Flood Insurance Rate Map



APPENDIX "D"

Comments:

Mr. Don Meadows, Traffic Engineering Division (comment via e-mail)

Traffic Engineering has the following comments on the proposed project:

1. We would prefer that the intersection with CR 17 be changed from the existing Y-intersection to a T-intersection.
2. With a T-intersection layout, the approach from the bridge should consist of a left turn lane and a channelized right turn lane. The existing pavement appears that it could be left in place and simply be overlaid and remarked.
3. We will look into the intersection volumes a little closer to determine if this intersection should be changed to a 3-Way STOP condition. Currently, it appears that the approach from the bridge is the only one with a STOP condition, however, from the volumes you provided, it may warrant a 3-Way STOP. This is something we can review independent of the proposed project and determine if any changes are necessary.

During subsequent discussions of item #2 above, DT indicated that the intersection lanes wouldn't extend on the bridge.

The lane coming across the bridge would become the left turn lane and would go straight to the intersection, and the channelized right would almost remain the way it looks now.

Mr. Bill Robinson, WVDOH Bicycle/Ped. Coordinator (comment via e-mail)

1. Comment from citizen in the bicycle/pedestrian community:

   "Re: Basnettville Bridge. No traffic or speed limit was provided. As a bicyclist I would take the full lane to cross the bridge because 11 feet is not enough space to share a lane with a bike and a motor vehicle. The law would allow me to take the full lane.

   If there were a four foot paved shoulder, clean of debris, I might use the paved shoulder. If you added the 11ft + 4ft you could have a 15ft lane wide enough for a bike and a motor vehicle to share without marking lanes, and this would probably keep the debris from the area the bicyclist would be riding."

2. CP's comments were that the shoulders on this structure be expanded to 4' to allow disabled pedestrian access and to give bicyclists a better "escape" zone if traffic conflict occurs on the bridge.

Mr. Joseph Lake, Hydraulics and Hydrology, Engineering Division (comment via e-mail)

Basnettville hydraulic models (existing and proposed) looks good. I just need to write the H&H report.

The Preliminary Hydrology and Hydraulics Report was not complete at the time of final report. It will be added to Appendix D once complete.

A field review was held on July 20, 2010 at 11:00am. The following Personnel attended this review:

Steve Boggs	Initial Design Section	(304) 558-9662
Feras Tolaymat	Initial Design Section	(304) 558-9713
Mike Epperly	Regional Project Manager	(304) 558-9658
Bob Blosser	In-house Design – Bridge	(304) 558-9724
Chuck Bartley	Right-of-Way	(304) 558-9324

During the field review, it was recommended that an summary of the group's discussion on the intersection of WV 218 & CR 17 be included in the report. The general conscious was that the existing intersection appears to be working satisfactory 'as is'. Passenger cars along with a fairly high volume of truck traffic was observed going through the intersection without difficulty. Concern was expressed whether the channelized T-intersection shown in the report would facilitate traffic, specifically truck traffic, through the intersection; and whether conversion to a potential 3-way STOP would be beneficial, as it would limit intersection capacity, increase delays and intersection queues.

Mr. Nimal Suhir, Geotechnical Engineer, Engineering Division (via e-mail)

A geotechnical engineer visited the site and performed limited research of our records. Previously drilled boring information was not available for the existing bridge and no subsurface information at the site was readily available.

Our studies yielded partial information on the underlying geological formation of the region in question, including the location and depth of underlying coal seams and possible mining activity in the region. The project site is in the broad region of the Appalachian Plateau province, a westward-tilting plateau. The Dunkard Group consisting of sandstone, siltstone, red and grey shale, limestone and coal is found in the formations closer to the surface and extending downwards to the top of the Waynesburg Coal seam. Beneath this stratification is found the Monongahela Group, consisting of Sandstone, siltstone, red and grey shale, limestone and coal, which includes the Union town and Pittsburgh formations. It is the Monongahela Group of formation that is encountered at the project location at the elevations of the existing bridge and roadway. Future core boring should reveal this. Since sandstone is found at relatively shallow depths in this group, as evidenced in observations during the preliminary field review by the geotechnical engineer, the foundation of the new structure is not expected to be deep. The choice of shallow foundations such as spread footing, semi-integral abutments or even integral abutments with shorter pile lengths may be expected as competing alternatives at this site.

Our review of the web-based WVGES Interactive Mapping for mining permits, underground mines, and abandoned mine problem areas indicates that several coal seams are found in the region (or near vicinity) of the project site. The primary coal seams in the region are Waynesburg Coal A, Sewickley Coal and Pittsburgh Coal. The Waynesburg Coal A layer outcrops above the elevation of the existing bridge and

roadway, and is irrelevant for this project since it will not affect proposed site modifications and new construction. The Sewickley Coal underlies the project footprint and does not appear to be mined, however it is below drainage and should not affect the foundation design. The Pittsburgh coal seam found at the bottom of the Monongahela Group is approximately 180 ft beneath drainage at the project location. Although this coal has been extensively mined, its depth below surface will not affect the choice and design of an appropriate foundation for the new bridge.

The following are observations made during the geotechnical field review of the existing site. The stream bed and banks consist of brown silty sand. The banks are rather steep (approximately 1:1 slope) and covered with thick vegetative growth that hindered detailed observation. Smalls stones, rock fragments, medium sized boulders, slab-like rock formations and bits of asphalt were found variously around the abutments, especially the south side abutment. The stream bed was littered with small stones, cobbles and medium size boulders. The stones and cobbles appear to be migratory, having been washed downstream and deposited by stream flow. The boulders on the upstream side of the existing bridge is likely to be rock out-crop, or that they point towards the presence of a rock layer beneath the stream bed. The hillside north of the bridge and north of the T-intersection had visible rock outcrop, very indicative of the presence of bedrock not far beneath the surface.
The banks were in stable condition with no significant signs of erosion or undercutting present. The existing bridge is without skew and Paw Paw Creek flows perpendicular to it. There was nothing unusual observed about the stream alignment in the vicinity of the bridge except that some undercutting was observed around the south pier and a sedimentary deposit found around the north pier, scattered with cobbles and stones. Stream flow at low elevation was observed between the piers only. The ground surface between the abutments and piers is substantially higher than the stream bed elevation between the piers. Hence the water has to rise significantly to pass between the abutment and pier, under the bridge – a fact that points to the absence of any signs indicative of scour around the abutments.

With limited visibility through thick vegetative cover on the banks and murky stream flow, it is noted that no signs of impending slides was observed at this location.

Given the observations made at the preliminary site visit and presented above, a simple span structure with integral, semi-integral or full height abutment supported on spread-footing will be suitable at this site, from a geotechnical point of view. Straight wingwalls, long enough to retain earth on steep banks around the abutment is suggested. Placing the detour alignment and bridge on the downstream side is the recommended alternative from a geotechnical viewpoint. Placement of the detour on the upstream side will require extensive cut on the hillside in the south-west quadrant. The recommendation to use a simple span structure to replace the existing 3-span structure is appropriate from a geotechnical perspective as well. It eliminates the need to excavate and disturb surface alluvial deposits in the stream environment and the placement of a pier mid-stream.