

# ENGINEER'S REPORT

## I-70 Added Travel Lanes



**From 0.5 Mile East of Mt. Comfort Rd. to 0.8 Mile East of SR 9.  
Hancock County**

**Des. No.: 0200700**

Prepared By:



Prepared For:

**Engineering Assessment Section  
Division of Environment, Planning and Engineering  
Indiana Department of Transportation**

## Table of Contents

A.	PURPOSE OF REPORT:.....	1
B.	PROJECT LOCATION: .....	1
C.	PROJECT'S NEED AND PURPOSE: .....	1
D.	EXISTING CONDITIONS:.....	1
E.	TRAFFIC DATA AND THROUGH CAPACITY ANALYSIS:.....	4
F.	CRASH DATA: .....	4
G.	PROJECT ALTERNATES AND RECOMMENDATIONS: .....	5
H.	ENVIRONMENTAL ISSUES:.....	8
I.	RELATED PROJECTS, CONSISTENCY:.....	8
J.	COORDINATION, MEETINGS, CONCURRENCE:.....	9
K.	CHANGES TO PROPOSAL:.....	9

## APPENDIX

### **Section A      Graphics**

LOCATION MAPS .....	A-1-2
PROJECT AREA PHOTOS .....	A-3-6
AERIAL PHOTOGRAPH/ PLAN SHEETS .....	A-7-21
TYPICAL SECTION - BRIDGE OVER SUGAR CREEK .....	A-22
TYPICAL SECTION - BRIDGE OVER BRANDYWINE CREEK .....	A-23-24
TYPICAL SECTION - TRAFFIC MAINTENANCE ..	A-25

### **Section B      Data and Analysis**

TRAFFIC DATA .....	B-1-2
PRELIMINARY PAVEMENT DESIGN .....	B-3

### **Section C      Other Items**

FIELD CHECK MINUTES .....	C-1-2
ENVIRONMENTAL FIELD CHECK MINUTES .....	C-3-4

# Engineer's Report

Des. No. 0200700  
I-70 Added Travel Lanes Project  
From 0.5 Mile East of Mt. Comfort Road to 0.8 Mile East of SR 9  
Hancock County

By: Dennis Fitzgerald, E.I.  
USI Consultants, Inc.

May 18, 2006

## A. PURPOSE OF REPORT:

This Engineer's Report documents the engineering assessment phase, including an outline of the proposal for improvements to I-70. This report includes the relevant background data and provides conclusions and recommendations that will guide the ongoing environmental and ensuing survey and design phases. (This Engineer's Report is a pre-decisional document, pending completion of the environmental study.)

## B. PROJECT LOCATION:

This project begins 0.5 mile east of the Mt. Comfort Road interchange (RP 96+39, Station 468+50) and proceeds 8.55 miles east to 0.8 mile east of the SR 9 interchange (RP 104+94, Station 919+94). The project is in Hancock County, within the Greenfield District.

The adjacent map, and the location maps of Appendices A-1 and A-2 depict the project location.



## C. PROJECT'S NEED AND PURPOSE:

Need for the improvement is based on increasing traffic volumes and the facility's limited highway capacity as well as the undermined and deteriorating concrete pavement condition. Additionally, the I-70 interchange at SR 9 has substandard entrance ramps.

The purpose of this project is to add capacity, restore the pavement condition, bring this project to current design standards and improve the traffic flow/mobility and safety along the I-70 corridor.

## D. EXISTING CONDITIONS:

See the ground level photographs, pages A-3 through A-6 of the Appendix and the aerial photographs in Appendix A-7 to A-21 for existing conditions throughout the project area.

I-70 is classified as an *Urban Interstate*. It is on INDOT's 4R network, it is on the National Highway System (NHS), the National Truck Network, and it is listed as a Statewide Mobility Corridor in the INDOT 2000 – 2025 Long Range Plan.



**Cross Section:**

The prevailing cross section along I-70 consists of 2-12' lanes in each direction separated by a 60' median, bordered by a 10' paved outside shoulder (11' usable) and a 4' paved inside shoulder (5' usable). Prevailing apparent right-of-way through the corridor is 130' (half-width). Roadside drainage ditches are located throughout the project. Side slopes are typically 4:1 and with a 3' bottom ditch. Side slopes that are 2:1 are protected by guardrail.

**Road History:**

1966	10" Reinforced Concrete Pavement RP 99+88 to 107+17
1968	10" Reinforced Concrete Pavement RP 93+76 to 99+88
1983	4" Asphalt Resurface RP 99+88 to 103+00
1984	4" Asphalt Resurface RP 88+91 to 99+88
1993	6" Asphalt Resurface RP 93+76 to 100+46
1997	Crack and seat with a 6" Asphalt Overlay RP 101+00 to 104+00
1999	Concrete Patching RP 93+76 to 99+88
2001	Pavement Repair from RP 90+00 to RP 101+00
2003	Pavement Repair from RP 92+72 to RP 104+94

Existing road plans for the 1993 project, Contract No. R-19515 (east of Post Road to Sugar Creek), and the 1997 project, Contract No. R-22923 are available at the INDOT central office.

**Pavement Condition:**

The last resurface took place in 1993 under contract R-19515 and in 1997 under Contract R-22923. The concrete pavement was patched in 1999.

INDOT's 2003 pavement surface report indicates the section of I-70 has a Pavement Condition Rating (PCR) of 95 (excellent condition), average rut depth rating of 0.18 inch and International Roughness Index of 75 (excellent condition).

The 2001 and 2003 current pavement repair contracts were designed to be a short-term maintenance project, providing an acceptable surface condition until development and construction of the subject project are completed.

**Horizontal and Vertical Alignments:**

The I-70 interstate runs in an east-west direction. There is 1 horizontal curve along I-70 within the project limits. The curve meets INDOT design criteria for the design speed. (See aerial plan sheets for existing curve information.)

The prevailing vertical terrain along the I-70 corridor is considered level. There are no areas of substandard vertical alignment for the posted speed within the project limits. (For the existing profile, see Appendix from A-7 to A-21).

The posted speed is 65 mph within the project limits.

### Interchange:

There is one diamond shaped interchange within the project limits, at SR 9 (Sta. 855+00). The exit and entrance ramps are signalized at their intersection with SR 9. The entrance ramp acceleration lanes are substandard. The SR 9 bridge over I-70 is currently under construction to have the superstructure replaced (Des. No. 0101431). The intersecting roadway sight distance is summarized in the following table.

Intersecting Roadway (Existing Conditions)	RP (Sta.)	Intersecting Angle	Intersection Sight Distance (ISD Passenger Car Right Turn)	ISD CEDS (4R)	Leg Width	Posted Speed Limit on Crossroad
Ramp A & B (I-70 EB exit and entrance ramp)	RP 103+63 (Sta. 853+70)	90 °	>410'	>40 mph	24'	40 mph
Ramp C & D (I-70 WB exit and entrance ramp)	RP 103+63 (Sta. 853+70)	90 °	>410'	>40 mph	24'	40 mph

### Small Drainage Structures:

Approximately 15 cross culverts are located within the project limits. Inlets are located within the median and drain into the roadside ditches that parallel the I-70 roadway.

### Bridge Structures:

There are 8 bridge structures within the project limits. Of the 8 bridges, 4 bridges pass over I-70 and 4 bridges span over a waterway. The following table summarizes the type, age, clear roadway, and condition of each structure. Bridges inspection reports are included on the CD. (Brad, I will add this to the CD for the final copy)

Structure #	Description	Sufficiency Rating	Deck, Superstructure, Substructure	Type & Size	Clear Roadway	Year Constructed/ Last Repaired
I70-97-05388	CR 400W over I-70	86.8	7,7,7	Steel Beam 2 Span (98'-98')	25'-4"	1967/NA
I70-100-05389A	CR 200W over I-70	93.3	6,7,7	Steel Beam 2 Span (98'-98')	30'-4"	1967/1994
I70-101-05127B EBL & I70-101-05127BWBL	I-70 over Sugar Creek	96.6(EB) 96.6(WB)	6,7,7  6,7,7	Steel Beam 3 Span (56'-68'-56')	39'-6"	1965/1992
I70-102-05129A	Fortville Pike over I-70	93.0	6,7,6	Steel Beam/Concrete Girder 4 Span (40'-71.5'-71.5'-40')	31'-6"	1965/1988
009-30-05130A	SR 9 over I-70	77.7	5,7,6	Steel Beam/Concrete Girder 4 Span (40'-65'-65'-40')	69'-0"	1965/1983

Structure #	Description	Sufficiency Rating	Deck, Superstructure, Substructure	Type & Size	Clear Roadway	Year Constructed/ Last Repaired
I70-104-05128JAEB & I70-104-05128AWBL	I-70 over Brandywine Creek	95.9(EB) 92.7(WB)	7,7,7  7,7,7	Reinforced Concrete Slab 3 Span (44'-62'-44')	51'-4" (EB) 71'-10" (WB)	1965/1989

**Utilities:**

Various utilities are located within the study limits of this project. High voltage power lines and fiber optic telephone lines cross the interstate at various locations.

**Land Use:**

The land use in the area is primarily agricultural. However, near the SR 9 interchange the land use transitions to industrial and commercial.

**E. TRAFFIC DATA AND THROUGH CAPACITY ANALYSIS:**

The mainline volumes along I-70 and ramp volumes at the SR 9 interchange are included in this report. The following is a summary of the data supplied by the INDOT Statistics Traffic unit and are included in the Appendix on Sheets B-1 and B-2.

Under the direction of INDOT – Program Development, a growth factor of 2% was utilized on this forecast. Using the 2% rate and a 2004 base year the growth factors for the anticipated Construction Year of 2010 and the Design Year of 2030 are 1.12 and 1.52.

Projected Average Annual Daily Traffic (AADT) is summarized in the adjacent table.

LOS Summary							
Roadway Segment	AADT			Existing Configuration		Proposed Configuration	
				2010 LOS	2030 LOS	2010 LOS	2030 LOS
	2002	2010	2030				
I-70 AM	56,800	63,600	86,330	D	F	C	C
I-70 PM	56,800	63,600	86,330	D	F	C	D
Existing and Proposed Configuration uses 16% trucks and buses							

Under 4R standards the desirable LOS is B and the minimum is D for an urbanized interstate. The additional travel lane will improve the LOS for this section of interstate.

**F. CRASH DATA:**

The INDOT database shows 213 recorded crashes (accidents) from 0.5 mile east of Mt. Comfort Road to 0.8 mile east of SR 9 during the 4 year period from January 1997 to December 2000. The following table describes the distribution of crash events by mile post marker, with the number of crashes shown, followed by the number of crashes resulting in personal injury in parentheses.

Location	Rear end	Animal	Sideswipe	Head On	Right Angle	Off Road	Left Turn	Right Turn	Unknown	Pedestrian	Totals
MP 96 to MP 97	17(3)	3(0)	4(0)	1(0)	3(1)	6(0)	0(0)	1(0)	1(0)	0(0)	33(4)
MP 97 to MP 98	1(0)	0(0)	3(2)	0(0)	0(0)	2(1)	0(0)	0(0)	0(0)	0(0)	6(3)
MP 98 to MP 99	6(6)	1(0)	5(5)	1(2)	1(0)	8(3)	2(3)	1(1)	1(0)	1(1)	27(21)
MP 99 to MP 100	5(1)	1(0)	3(0)	2(0)	1(1)	0(0)	0(0)	1(1)	0(0)	0(0)	13(3)
MP 100 to MP 101	7(1)	0(0)	8(2)	3(0)	5(6)	2(0)	0(0)	0(0)	1(0)	0(0)	26(9)
MP 101 to MP 102	8(6)(1)	0(0)	5(2)	1(0)	3(0)	3(1)	0(0)	0(0)	2(1)	0(0)	22(10)(1)
MP 102 to MP 103	6(3)(1)	2(0)	3(0)	1(1)	0(0)	7(4)	0(0)	0(0)	2(0)	0(0)	21(8)(1)
MP 103 to MP 104	11(6)	1(0)	7(0)	3(1)	2(0)	11(4)	0(0)	0(0)	2(1)	0(0)	37 (12)
MP 104 to MP 105	8 (1)	3(1)	6(0)	2(0)	2(0)	4(2)	0(0)	0(0)	0(0)	0(0)	25(4)
<b>TOTALS</b>	<b>69(27)(2)</b>	<b>11(1)</b>	<b>44(11)</b>	<b>14(4)</b>	<b>17(8)</b>	<b>43(15)</b>	<b>2(3)</b>	<b>3(2)</b>	<b>9(2)</b>	<b>1(1)</b>	<b>213(74)(2)</b>
<b>% of Total Accidents</b>	<b>32.5</b>	<b>5.2</b>	<b>20.6</b>	<b>6.6</b>	<b>7.9</b>	<b>20.2</b>	<b>0.9</b>	<b>1.4</b>	<b>4.2</b>	<b>0.5</b>	<b>100</b>

(includes 2 fatalities)

As can be seen in the above table, 73.3 % of the crashes were classified as either rear end, sideswipe, or off road. The highest number of crashes (per mile of roadway), 33 and 37, occurred around MP 69 to 97 and 103 to 104, respectively, which are near the Mt. Comfort Road and SR 9 interchanges. Substandard acceleration lanes at the interchanges could be contributing to sideswipe and rear end crashes.

Added travel lanes, along with improvements to the acceleration lane at the SR 9 interchange are expected to reduce the risk of crashes along I-70.

## G. PROJECT ALTERNATES AND RECOMMENDATIONS:

This project is programmed as an Added Travel Lanes project. 4R standards are appropriate since this is a full pavement replacement on an Interstate.

The following items are considered necessary and are to be included in the final design.

<b>Design Criteria</b>	
Functional Classification:	<i>Urban Interstate</i>
Design Class:	Geometric Design Criteria for Freeways (Table 53-1) (See Typical Section, page A-7)
Terrain	Level
Design Speed	70 mph
Access Control	Limited
FHWA Oversight	Required for design and construction
Typical Sections	See Plan Sheets A-7

## Pavement Recommendation:

A request for INDOT pavement recommendation was made on August 8, 2004. The Preliminary Pavement is included with this report. (See Appendix B-3) The report recommends the new pavement to be 16" +/- 4" thickness. The final pavement type and design will be determined after completion and receipt of the geotechnical report and traffic data.

## Horizontal and Vertical Alignments:

(See Plan & Profile Sheets (A-7 to A-21),

The existing horizontal alignment can be maintained. No design exceptions for horizontal alignment are anticipated for I-70 interstate.

The vertical alignment will be designed to satisfy current 4R design standards. The proposed vertical alignment will provide SSD and ISD that meets design criteria for the design speed. No design exceptions for vertical alignment are anticipated.

## Hydraulic Recommendations:

The hydraulic recommendation has not yet been received. The preliminary structure sizes for cross culverts (small drainage structures) and bridges within the project limits (approximately 15 crossings have been identified and 4 bridges (over Sugar Creek and Brandywine Creek) will be included in this report as an addendum when it is received. For purposes of this report, it was assumed that all culverts will be replaced with structures of similar size.

## Bridge Treatment:

The existing I-70 bridge structures over Sugar Creek and Brandywine Creek within the project limits will be widened and rehabilitated. The bridge structures that overpass I-70 will not require any additional work. Since the additional lane will be added in the median, the existing overpass structures will not need to be modified. This recommendation was coordinated with George Snyder, Bridge Rehabilitation Engineer Supervisor (see Appendix for Bridge Typical Sections of Sugar Creek and Brandywine Creek, A-22 to A-24). The adjacent table summarizes the type of work required.

Structure #	Description	Type of Work Required
I70-97-05388	Steel Beam 2 Span	None Required
I70-100-05389A	Steel Beam 2 Span	None Required
I70-101-05127BEBL & I70-101-05127BWBL	Steel Beam 3 Span	Bridge Widening, Concrete Overlay, Barrier Wall Modification
I70-102-05129A	Steel Beam/Concrete Girder 4 Span	None Required
009-30-05130A	Steel Beam/Concrete Girder 4 Span	None Required
I70-104-05128J AEB & I70-104-05128AWBL	Reinforced Concrete Slab 3 Span	Bridge Widening, Concrete Overlay, Barrier Wall Modification

**Interchange:**

The I-70 and SR 9 interchange is located within the project limits. The existing SR 9 interchange acceleration lanes are substandard. The following chart shows the existing deceleration and acceleration lengths and the proposed lengths that are required to meet the INDOT design standards. The proposed length for the following table is based on figure 48-4D of the IDM for a Highway speed of 70 mph and 45 mph entrance curve design speed. The ramp geometrics at the SR 9 intersections should not change as part of this project.

Description	Existing Length	Proposed Length
Ramp A I-70 EB Exit Ramp	1100'	No change
Ramp B I-70 EB Entrance Ramp	300'	660'
Ramp C I-70 WB Exit Ramp	1000	No Change
Ramp D I-70 WB Entrance Ramp	800'	No Change

**Survey Requirements:**

The mainline survey should extend from 200' west of Buck Creek (Station 467+00) to 4400' east of SR 9 (Station 898+00). Length of mainline survey: 8.66 miles. The survey should extend a minimum distance of approximately 130 feet east and west of the centerline or the Limited Access right of way fence, whichever is greater.

**Traffic Maintenance:**

If a state detour were to be utilized, the anticipated official state detour would utilize I-465, US 40 and SR 109. The total detour length is approximately 33 miles, however the length of additional travel is approximately 8 miles. Assuming a road closure for 300 days and \$0.25 per mile, the estimated user cost of a state detour is approximately \$32,200,000. Due to the added amount of traffic amount of traffic on these state roads, high estimated user cost and traffic delays this alternate is not recommended.

Due to this route being part of the interstate system, high AADT, and importance of this route to the traveling public, it is desirable to maintain traffic through the project. Two alternates were investigated that would maintain traffic through the project limits. The two alternates are to maintain one lane of traffic or to maintain two lanes of traffic for each direction throughout the project limits. Per this INDOT Interstate Highway Lane Closure policy, the Quickzone software was used to analyze the delay costs due to reducing one lane in each direction. Using Quickzone delay cost parameters of 8 dollars per hour for a passenger car and 24 dollars per hour for a truck, the delay cost for utilizing only one lane of traffic for 2010 construction year was \$41,600,000 dollars for a one year project duration. These delay cost far exceed the traffic maintenance cost to maintain two lanes of traffic for each direction. Additionally, this route must maintain two lanes of traffic per the INDOT Interstate Highway Lane-Closure Policy. Therefore, allowing two lanes of traffic for each direction throughout the project limits would be the recommended alternate.

To maintain two lanes of traffic, the outside shoulder would be utilized as a travel lane in the first traffic maintenance phase. The proposed inside shoulder and two proposed 12' inside lanes would be constructed for Phase I of construction. (See Appendix A-25) A temporary concrete barrier would be placed on the existing outside travel lane and traffic would use the existing outside lane, outside shoulder. (18' existing pavement + 6' of shoulder = 2 - 12' lanes) An estimated 4' of the existing pavement is required for working area to construct the inside travel lane and median.

The INDOT Research division will need to investigate the possibility of utilizing the existing outside shoulder for phase one on the maintenance of traffic. If the existing outside shoulder is not structurally sound enough to be utilized in the Phase I of the traffic maintenance, another traffic maintenance phase will be required to remove the existing shoulder and place temporary pavement for the outside travel lane.

Phase II of the traffic maintenance plan would utilize the constructed median and 12' inside travel lane. A temporary barrier would be placed on the inside travel lane and an additional 2' of buffer area would be utilized between the temporary concrete barrier and the travel lane. The proposed concrete median barrier would be constructed in Phase I and separate the EB and WB traffic. (8' constructed travel lane + 14' of median).

**Right-of-Way Summary:**

The apparent existing right of way varies, but is typically 130' each side of the centerline. The widening of the additional travel lane on the inside median should not require any right of way. The extension of the acceleration and deceleration ramp for the SR 9 interchange may require the designer to adjust the side slope and provide addition barriers where necessary to prevent the need for additional right of way. It is anticipated that no additional right of way will be required for this project.

**Estimated Costs (Year 2005):**

Road Construction	\$52,500,000
Bridge Rehabilitation	
- Str. No. I70-101-05127BWBL	\$424,000
- Str. No. I70-101-05127BEBL	\$424,000
- Str. No. I70-104-05128J AEB	\$347,000
- Str. No. I70-104-05128AWBL	\$373,000
<b>CONSTRUCTION TOTAL</b>	<b>\$54,068,000</b>
Right-of-Way Services	\$0
Right-of-Way	\$0
<b>RIGHT-OF-WAY TOTAL</b>	<b>\$0</b>
Engineering (Includes Survey)	\$2,800,000
<b>PROJECT TOTAL</b>	<b>\$13,710,000</b>

**H. ENVIRONMENTAL ISSUES:**

The primary environmental considerations on this project involve the environmental permitting. A preliminary assessment of the environmental concerns for this project was performed by a sub-consultant to the Environmental Assessment Section. Minutes from their field inspection are included in the Appendix (C-3 to C-4). The INDOT Environmental Assessment Section is preparing the project's environmental document. The designer shall continually confer with the environmental scientist in the Environmental Assessment Section (or its agent) as the project advances.

**I. RELATED PROJECTS, CONSISTENCY:**

The subject project is scheduled as ready for contracts (RFC) in January 2010. According to the 2004 Directory of INDOT Highway Projects and the INDOT Project Database (as of 11/17/03), there are several projects scheduled for future construction, which may affect this subject project. The projects are as follows:

Des. Number	Project Description	Comments
0200699	I-70 from 0.6 mile east of Post Road to 0.6 mile east of Mt. Comfort Road	Letting Date: 08/10 This added travel lane project is scheduled to be constructed at the same time as this project. Coordination of this project will be necessary during the design phase as well as the construction phase of this project.

The designer shall periodically check for any new projects posted after this date during the design process for compatibility with the proposed work.

## J. COORDINATION, MEETINGS, CONCURRENCE:

This project has involved coordination with the following individuals, among others:

Tom Stingley	INDOT, Greenfield District
Tim Muench	INDOT, Design
Ryan Scott	BF&S, INDOT Environmental Assessment Section representative
Tom Byrne	INDOT, Greenfield District, Development

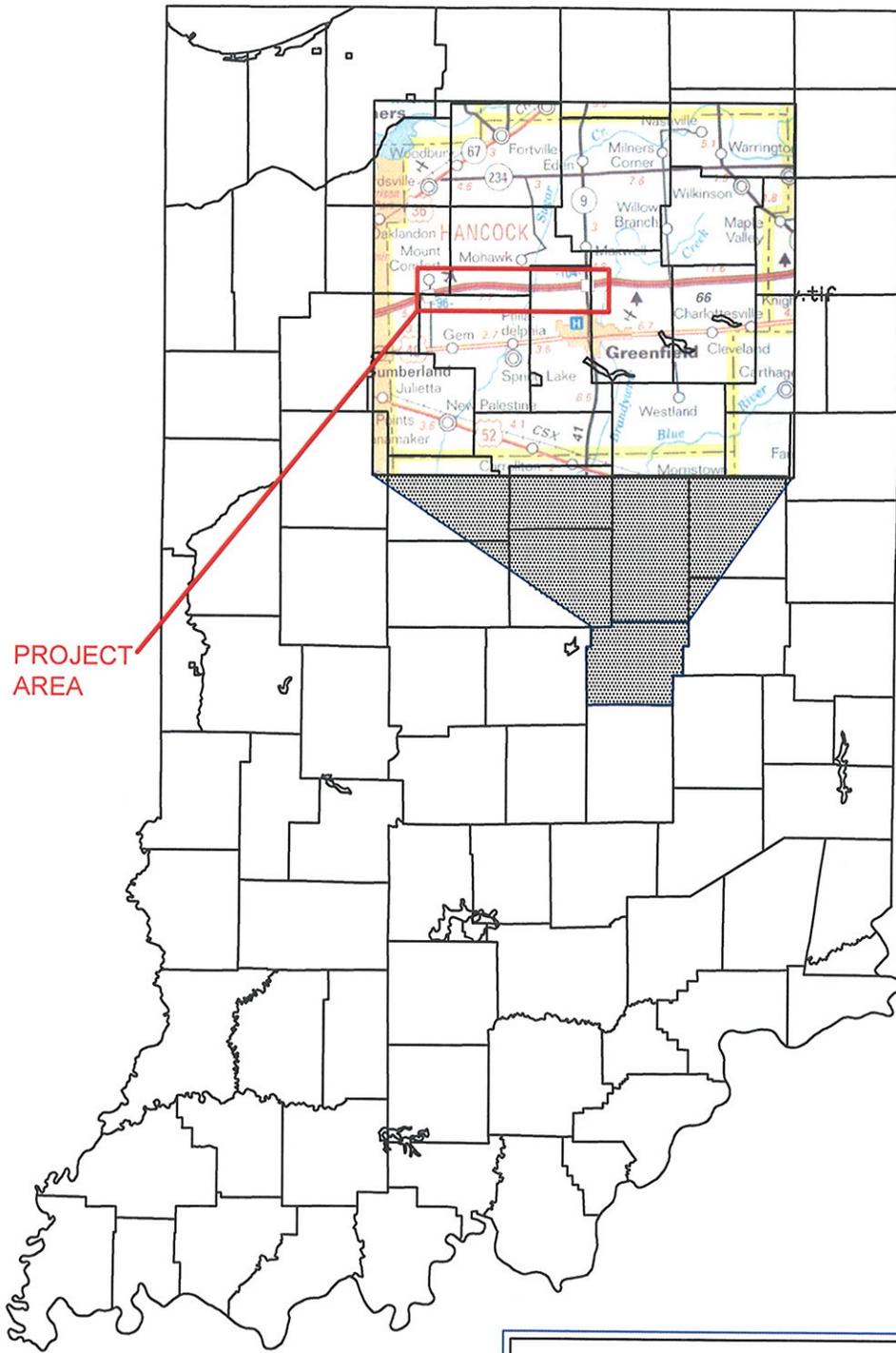
The first three individuals attended the field check meeting held on May 25, 2004 and provided their input into this project. The major issues relative to the field investigation are detailed in the Field Check Minutes, located in Appendix C-1 through C-2. BF&S's memo on the Environmental Impact Comparison on widening inside vs. outside on I-70 are included in the Appendix, pages C-3 to C-4.

Draft copies were sent to Tom Byrne (Greenfield District), Niru Shah (representing the INDOT Design Division), for their review and comments.

## K. CHANGES TO PROPOSAL:

The Engineering Assessment Section shall be consulted if deviation from the proposal is determined to be necessary during a later phase of project development. The person initiating the change should send a memo to the Engineering Assessment Section Manager for concurrence. The designer should route the memo through the Design Division Section Manager. The memo should include justification for the change and the estimated cost difference.

cc: Kim Peters (3), INDOT Project Coordinator  
Niru Shah, Design Division Section Manager  
Mike Holowaty, INDOT, Design, Specialty Group  
Matt Thomas, INDOT, Design, Utilities Engineer  
William Schmidt, INDOT Design-Location Survey Section  
Robert Cales, Standards Section, contracts and Construction Division  
Lyle Sadler, INDOT Environmental Assessment Section Manager  
Athar Khan, INDOT Materials & Test, Design  
Bob Rebling/Tom Byrne, INDOT, Greenfield District, Development  
Brad Steckler, Engineering Assessment Section File  
USI File 2003-950

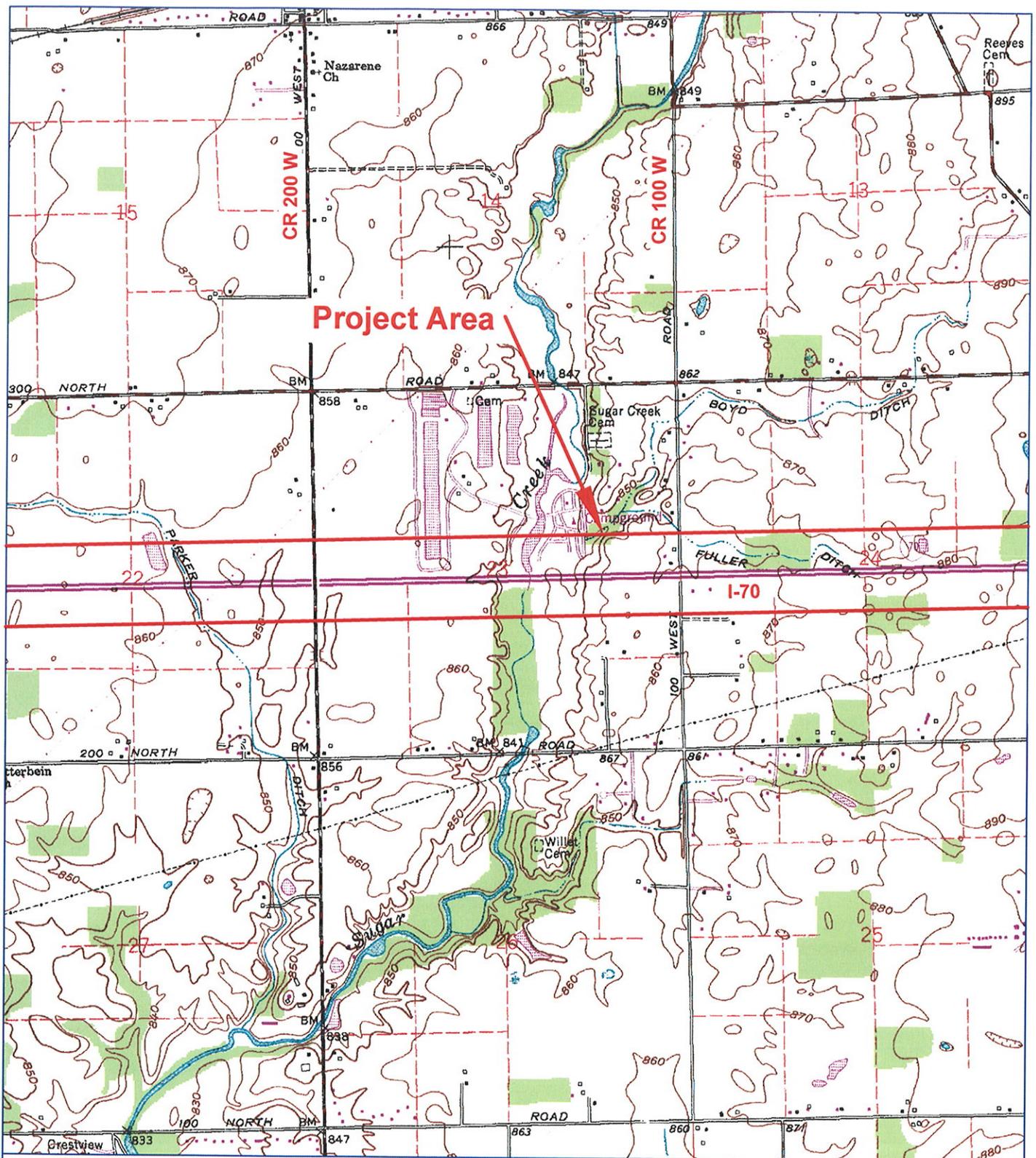


PROJECT  
AREA



Des. No. 0200700  
Project No. STP-  
I-70 from 0.5 Mile East of Mt. Comfort Rd.  
to 0.8 Mile East of S.R. 9  
Hancock County

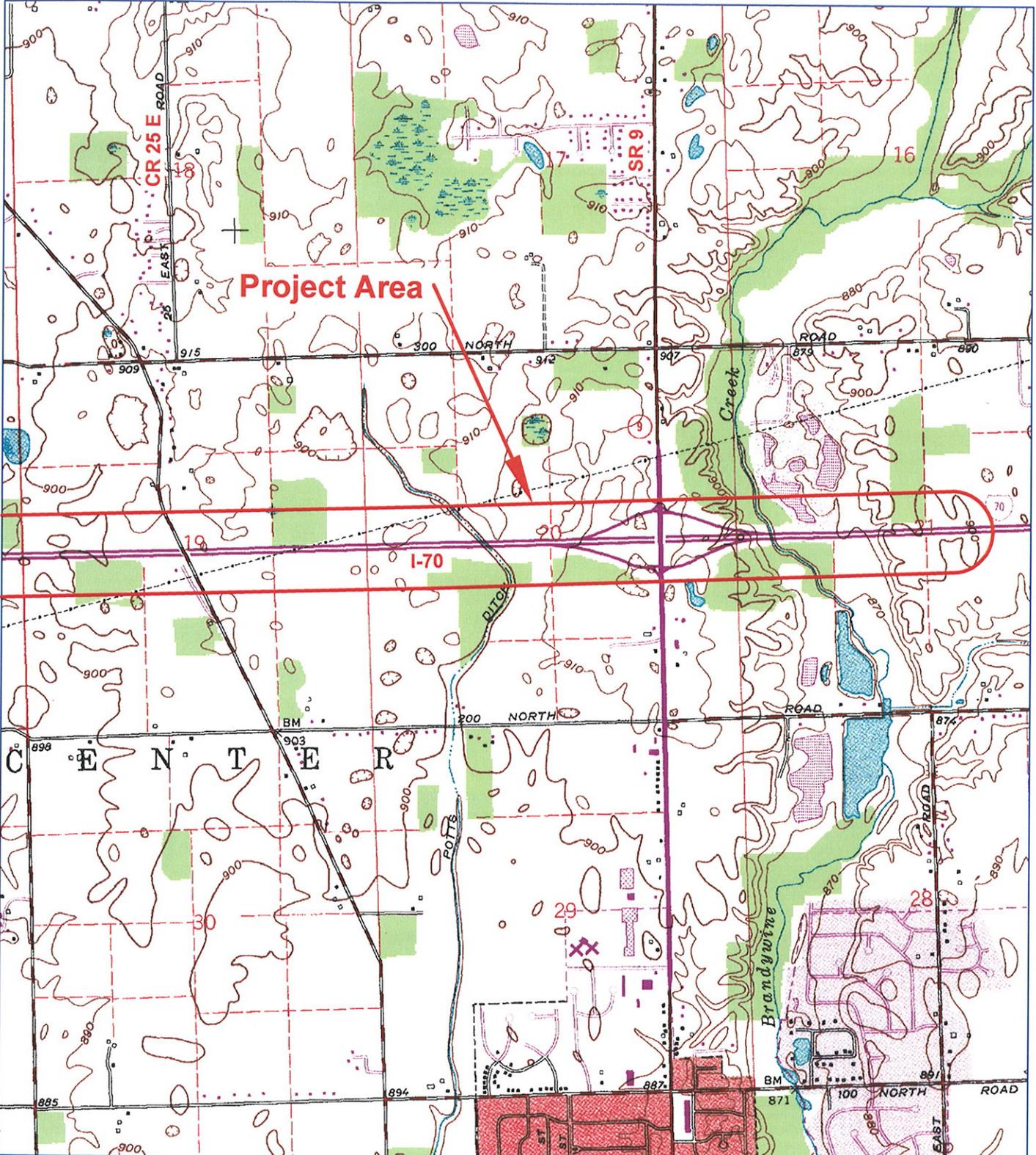




Greenfield Quadrangle, IN  
Scale = 1" = 2000'

Des. No. 0200700  
Project No. STP-  
I-70 from 0.5 Mile East of Mt.  
Comfort Rd. to 0.8 Mile East of SR 9  
Hancock County  
Added Travel Lanes

A-2b



**Greenfield Quadrangle, IN**  
**Scale = 1" = 2000'**

**Des. No. 0200700**  
**Project No. STP-**  
**I-70 from 0.5 Mile East of Mt.**  
**Comfort Rd. to 0.8 Mile East of SR 9**  
**Hancock County**  
**Added Travel Lanes**

**A-2c**

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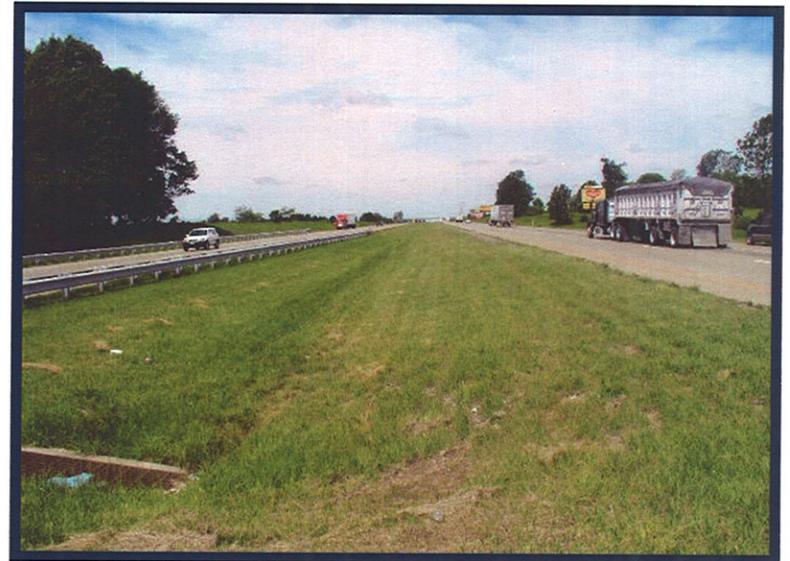
**FACING WEST ALONG I-70  
(WEST OF CR 400 W BRIDGE)  
RP 97+88, STA 548+00**



**FACING WEST ALONG I-70  
(PIPE WEST OF CR 200W BRIDGE)  
RP 99+88, STA 655+00**



**FACING WEST ALONG I-70  
(BOX CULVERT WEST OF CR 200 W BRIDGE)  
RP 99+88, STA 655+00**



**FACING WEST ALONG I-70  
(WEST OF BIG SUGAR CREEK)  
RP 100+46, STA 685+00**

# **I-70 Added Travel Lanes**



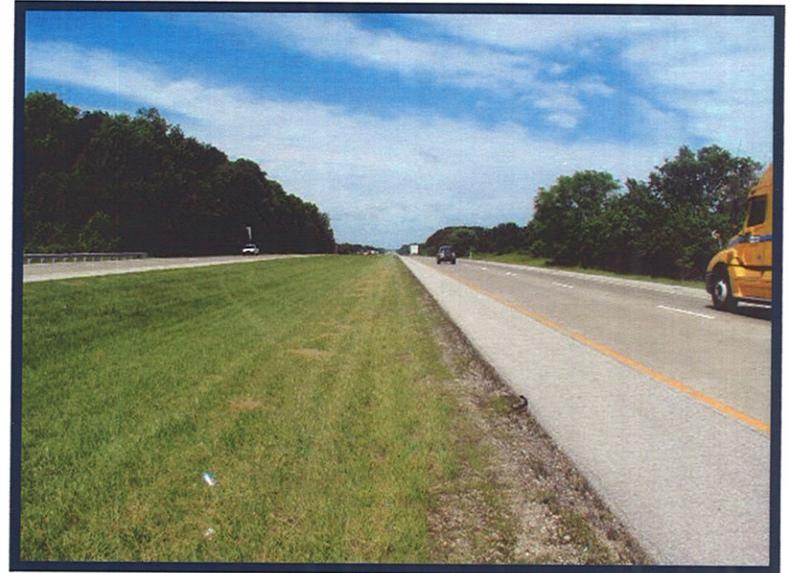
**FACING EAST ALONG I-70  
(WEST OF BIG SUGAR CREEK BRIDGE)  
RP 100+46, STA 685+00**



**FACING EAST ALONG I-70  
(WEST OF SUGAR CREEK BRIDGE)  
RP 100+46, STA 685+00**

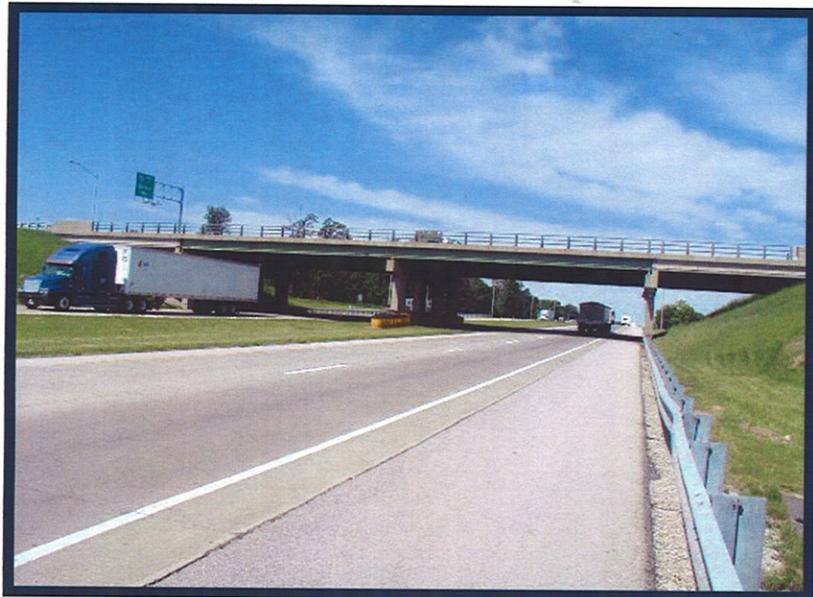


**FACING EAST ALONG I-70  
(WEST OF FORTVILLE PIKE BRIDGE)  
RP 102+33, STA 785+00**



**FACING WEST ALONG I-70  
(WEST OF FORTVILLE PIKE BRIDGE)  
RP 102+33, STA 785+00**

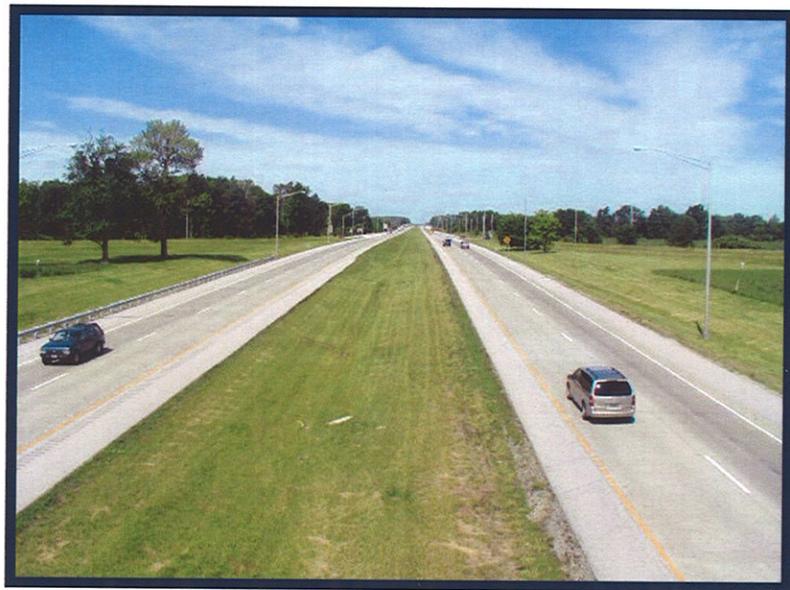
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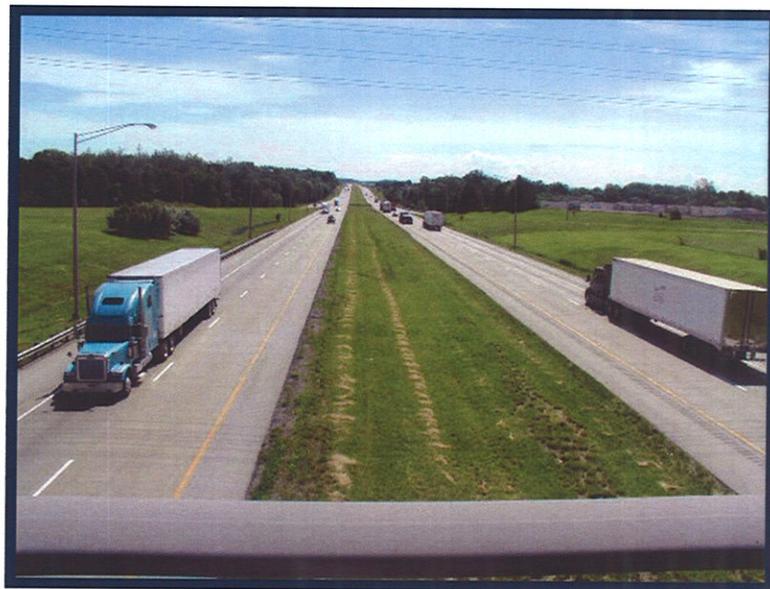
**FACING WEST ALONG I-70  
(EAST OF SR 9 BRIDGE)  
RP 103+63, STA 854+00**



**FACING WEST ALONG I-70  
(WEST OF SR 9 BRIDGE)  
RP 103+63, 854+00**

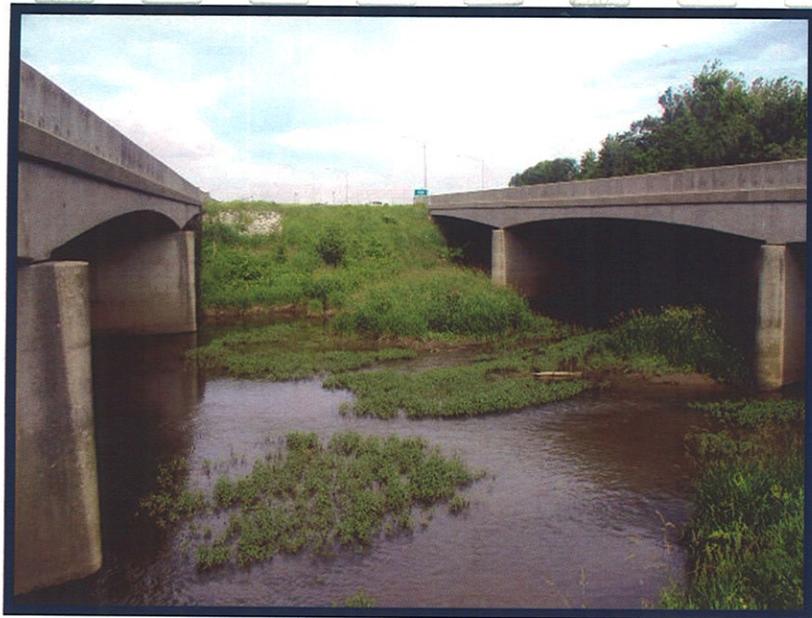


**FACING WEST ALONG I-70  
(ON SR 9 BRIDGE)  
RP 103+63, STA 854+00**



**FACING EAST ALONG I-70  
(ON SR 9 BRIDGE)  
RP 103+63, STA 854+00**

# **I-70 Added Travel Lanes**



**FACING EAST ALONG I-70  
(WEST OF BRANDYWINE BRIDGE)  
RP 103+93, STA 869+00**



**FACING NORTH  
(AT BRANDYWINE BRIDGE)  
RP 103+93, STA 869+00**

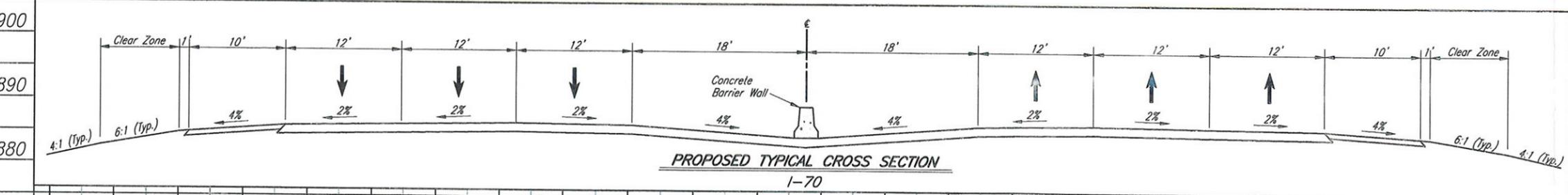
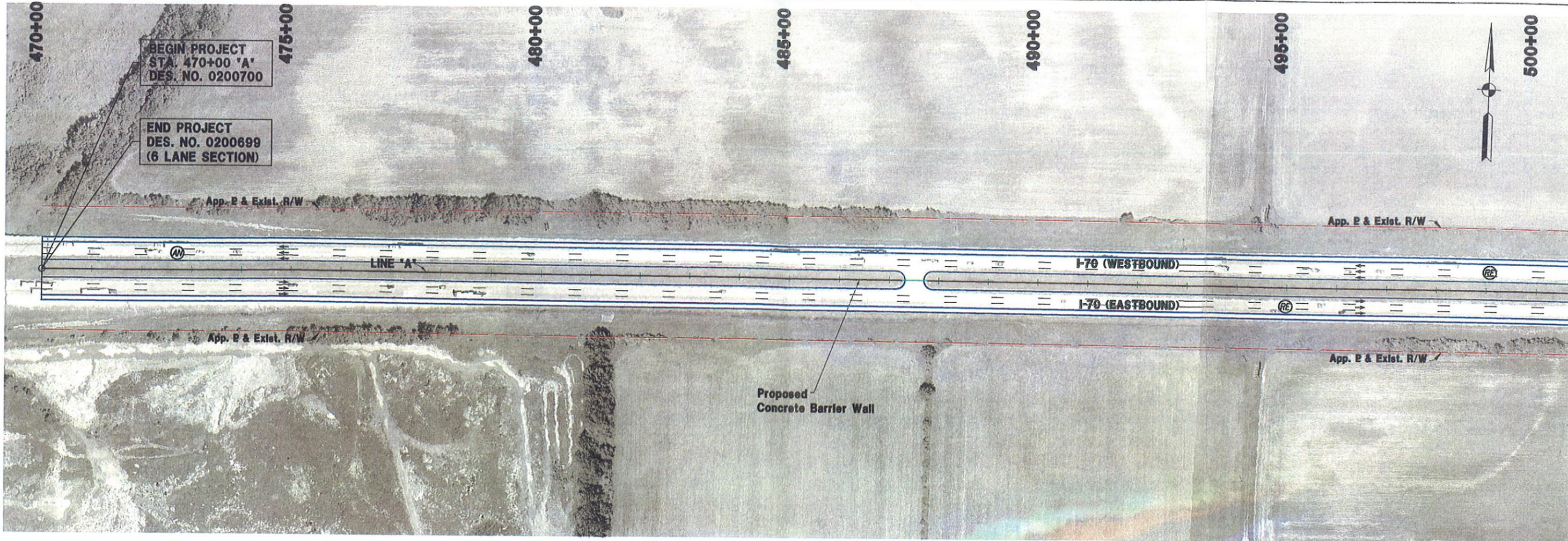


**FACING WEST ALONG I-70  
(WEST OF BRANDYWINE CREEK)  
RP 103+93, STA 869+00**

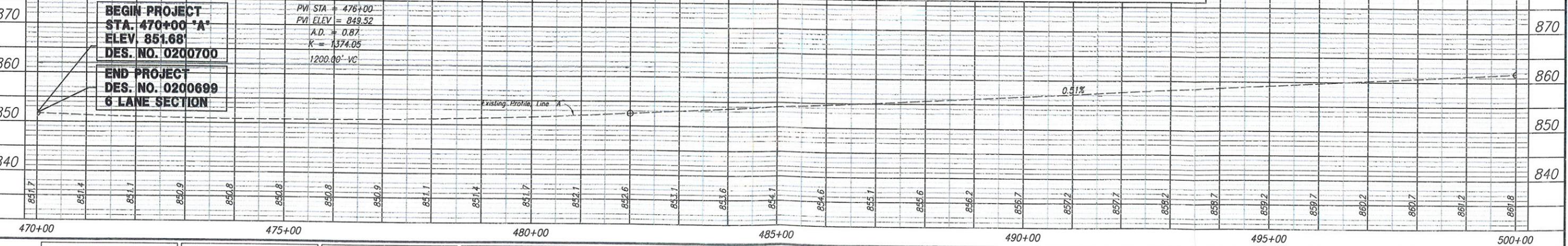


**FACING EAST ALONG I-70  
(WEST OF BRANDYWINE CREEK)  
RP 103+93, STA 869+00**

# **I-70 Added Travel Lanes**



CRASH TYPE LEGEND			
(AN) Animal	(RA) Right Angle	(RE) Rear End	(RT) Right Turn
(PE) Pedestrian	(SD) Same Direction Sideswipe	(U) Undetermined	(UT) U-turn
(HO) Head On	(OT) Opposite Direction Sideswipe		
(LT) Left Turn			
(OR) Off Road			



**BEGIN PROJECT**  
**STA. 470+00 'A'**  
**ELEV. 851.68'**  
**DES. NO. 0200700**

**END PROJECT**  
**DES. NO. 0200699**  
**6 LANE SECTION**

PVI STA = 476+00  
 PVI ELEV = 849.52  
 A.D. = 0.87  
 K = 1374.05  
 1200.00' VC

C:\2003\p03-99\g200\p03-99-Plan-Profile.dwg 1:196 44.2 1/15/02

**INDIANA**  
**DEPARTMENT OF TRANSPORTATION**

**I-70 - PLAN & PROFILE**  
**STA. 470+00 TO 500+00 'A'**

DESIGNED: NRW  
 CHECKED: DPF

DRAWN: NLC  
 CHECKED: GRW

HORIZONTAL SCALE 1" = 200'	BRIDGE FILE
VERTICAL SCALE 1" = 20'	DESIGNATION 0200700
SURVEY BOOK	SHEETS
CONTRACT	A-7 of PROJECT

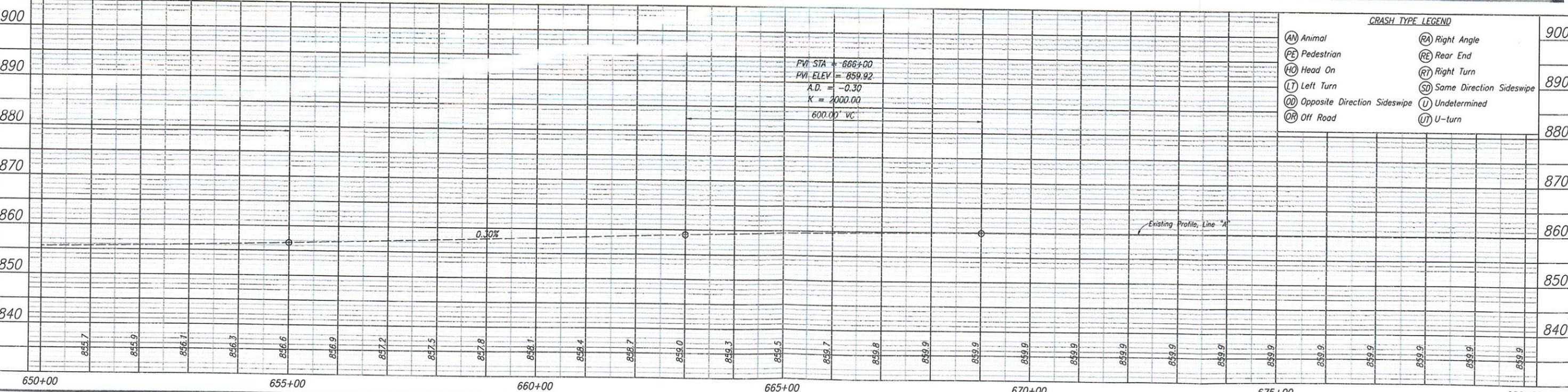
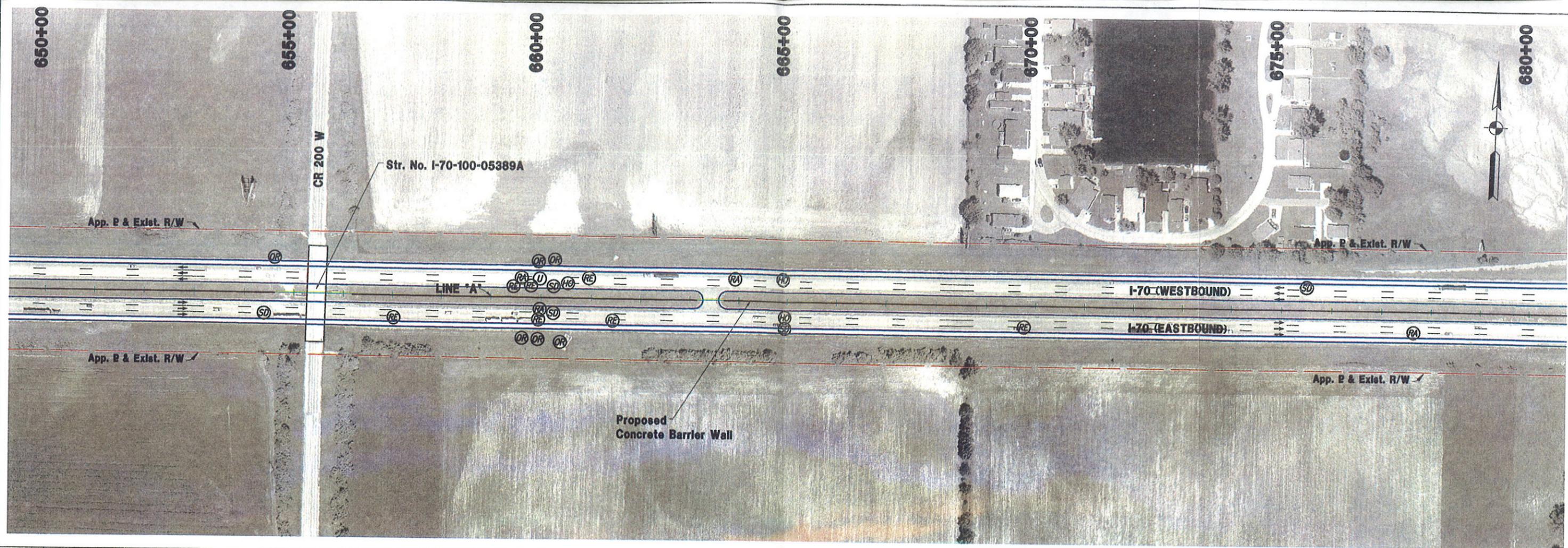












**CRASH TYPE LEGEND**

(AN) Animal	(RA) Right Angle
(PE) Pedestrian	(RE) Rear End
(HO) Head On	(RT) Right Turn
(LT) Left Turn	(SD) Same Direction Sideswipe
(OD) Opposite Direction Sideswipe	(U) Undetermined
(OR) Off Road	(UT) U-turn

12003-003-f vg20 1-Pla ie.dwg ies1+ 2/14/ 10:10 A, 1:1 5

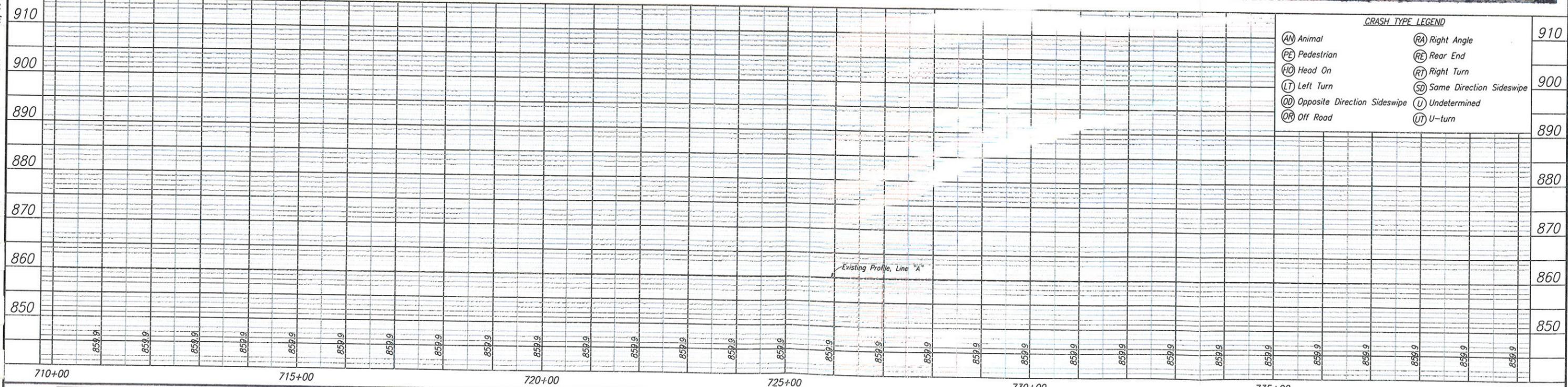
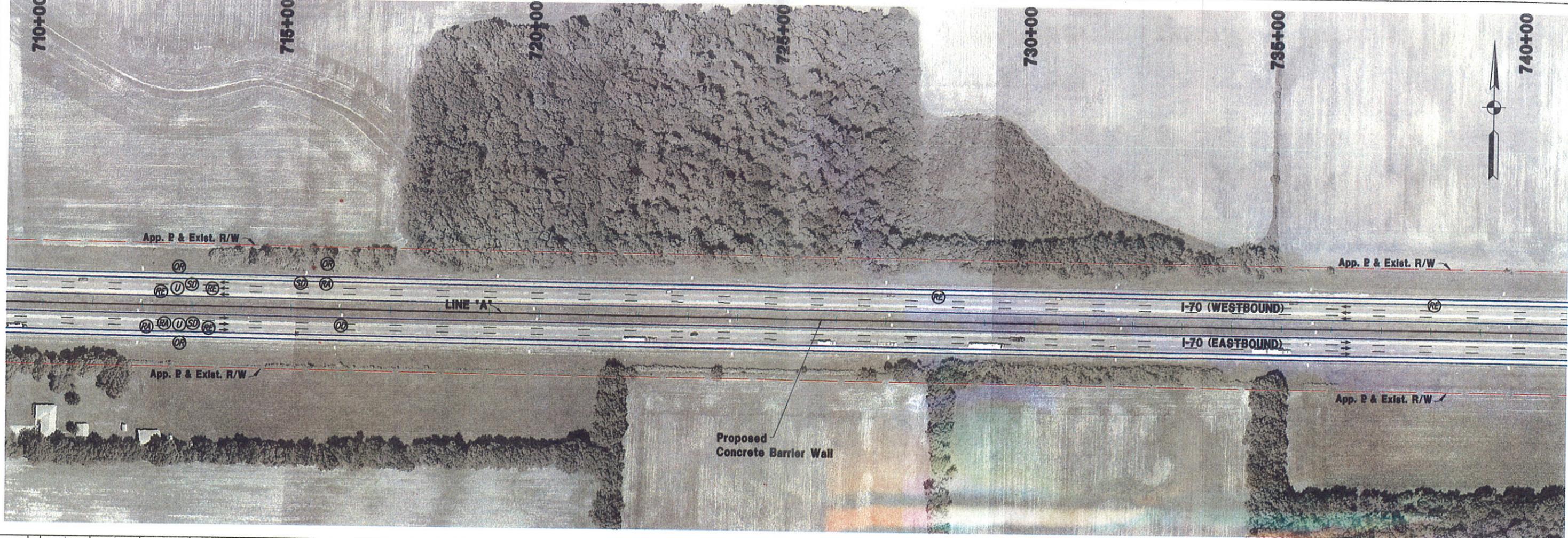
DESIGNED: NRW	DRAWN: NLC
CHECKED: DPF	CHECKED: GRW

**INDIANA**  
**DEPARTMENT OF TRANSPORTATION**  
 I-70 - PLAN & PROFILE  
 STA. 650+00 TO 680+00 "A"

HORIZONTAL SCALE 1" = 200'	BRIDGE FILE
VERTICAL SCALE 1" = 20'	DESIGNATION 0200700
SURVEY BOOK	SHEETS A-13 of
CONTRACT	PROJECT



S:\2003\2003-05-17\wg12\p00-51-Plt file.dwg 10:14 AM 11/5



DESIGNED: <u>NRW</u>		DRAWN: <u>NLC</u>		<b>INDIANA DEPARTMENT OF TRANSPORTATION</b> <b>I-70 -- PLAN &amp; PROFILE</b> <b>STA. 710+00 TO 740+00 "A"</b>		HORIZONTAL SCALE 1" = 200'		BRIDGE FILE	
CHECKED: <u>DPF</u>		CHECKED: <u>GRW</u>				VERTICAL SCALE 1" = 20'		DESIGNATION 0200700	
						SURVEY BOOK		SHEETS	
						CONTRACT		A-15 of PROJECT	





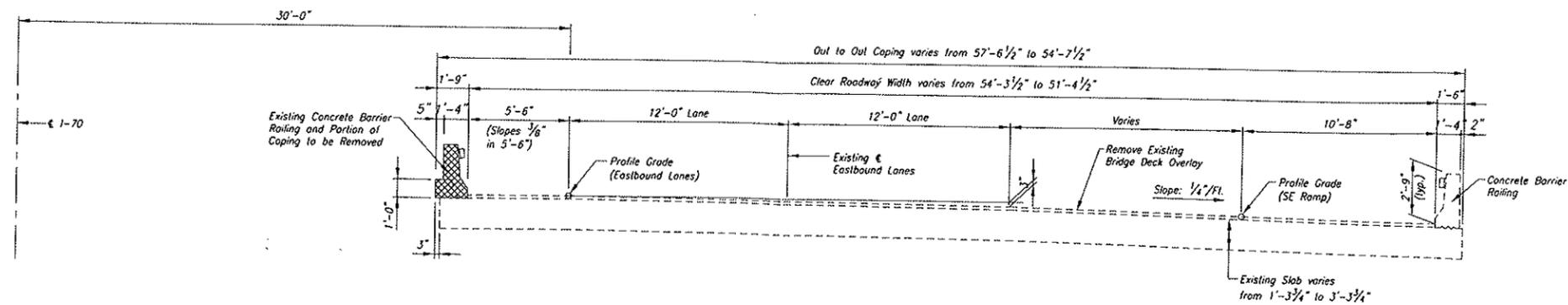




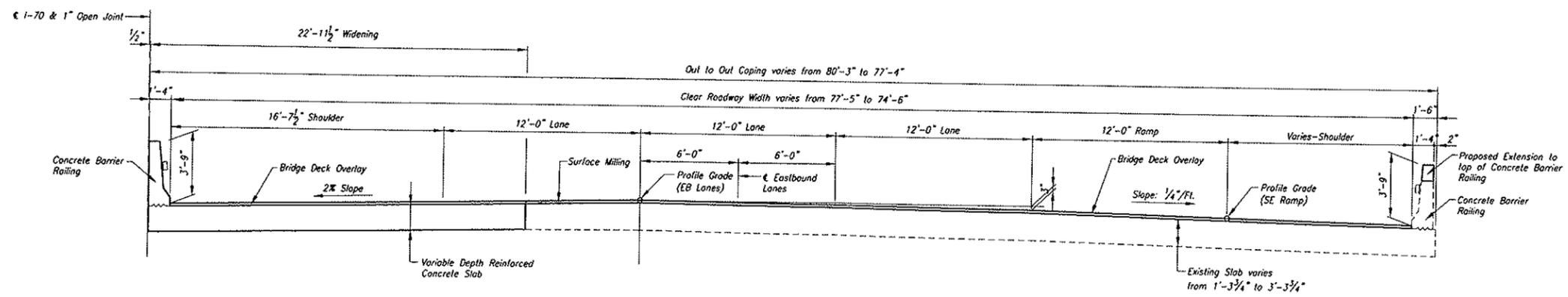








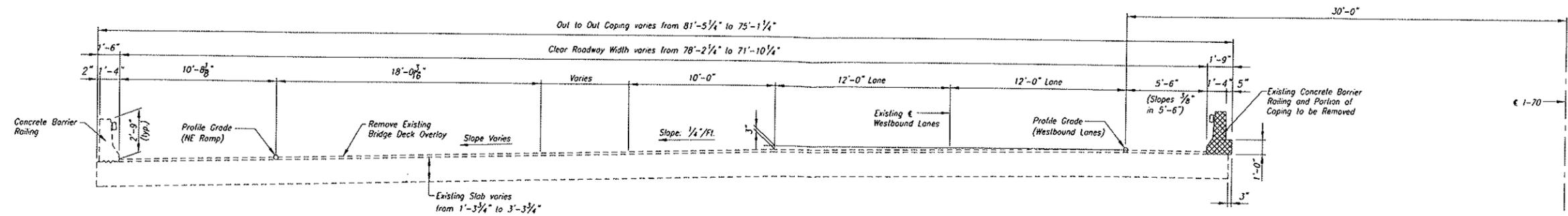
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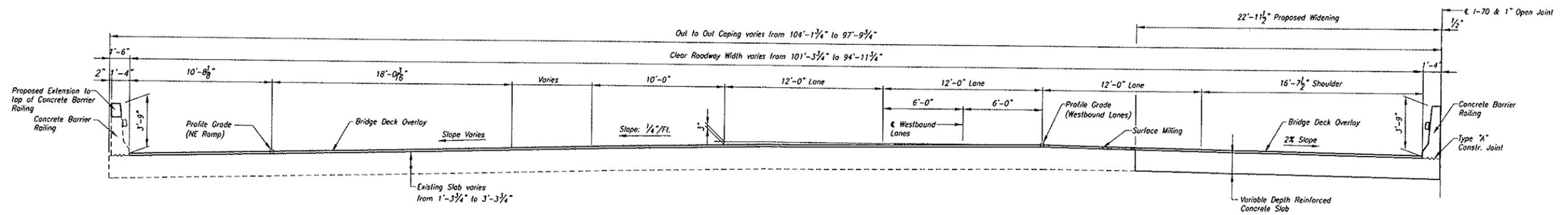
**PROPOSED TYPICAL SECTION—EASTBOUND LANES**

**I-70 OVER BRANDYWINE CREEK  
EASTBOUND LANES  
BRIDGE FILE: I-70-104-5128**

003P...03-95...j\Brat...e Creek...and...y...e Creek...ing.dwg, model, 2/10/2005 9:43:42 AM, 1:100.571

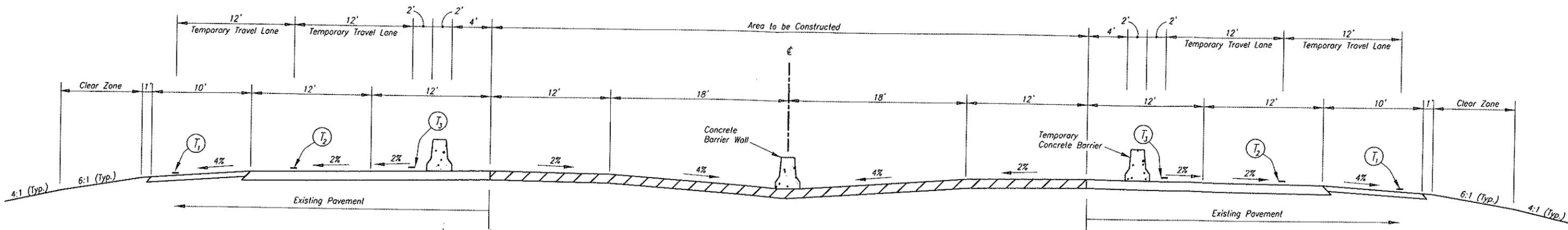


**EXISTING TYPICAL SECTION-WESTBOUND LANES**

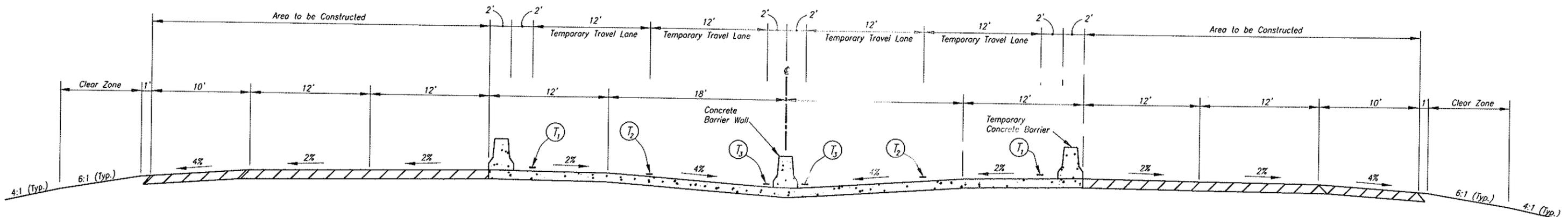


**PROPOSED TYPICAL SECTION-WESTBOUND LANES**

**I-70 OVER BRANDYWINE CREEK  
WESTBOUND LANES  
BRIDGE FILE: I-70-104-5128**



**PHASE I**  
I-70



**PHASE II**  
I-70

**LEGEND**

-  Construction Area
-  Concrete
-  Temporary Pavement Marking, Solid, White
-  Temporary Pavement Marking, Broken, White
-  Temporary Pavement Marking, Solid, Yellow

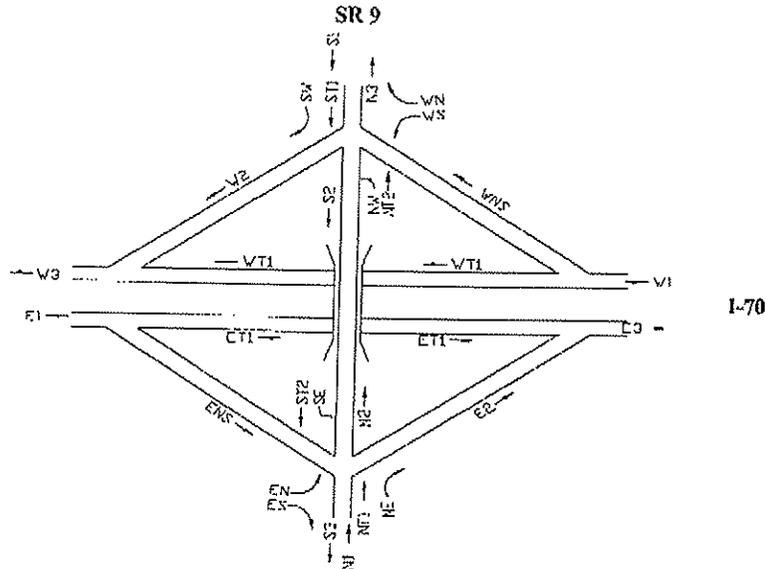
2003 103-9 0116 2/16/03 9:37 AM 1:20:13

DESIGNED: GRW CHECKED: DPF		DRAWN: NLC CHECKED: GRW		<b>INDIANA DEPARTMENT OF TRANSPORTATION</b>		HORIZONTAL SCALE 1" = 20'		BRIDGE FILE	
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						SURVEY BOOK		SHEETS A-25 of	
						CONTRACT		PROJECT	

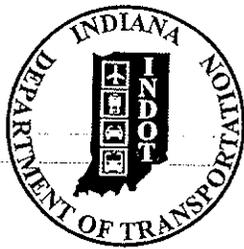


### TRAFFIC VOLUME FORECAST FOR INTERSECTIONS

Date: July 2004  
 Project: Des. No. 0200699  
 Route: I-70 at State Road 9  
 County: Marion and Hancock Counties  
 Other Info: PM-DHV



Turning Movements	AADT					DHV %	COMMERCIAL VEHICLES	
	2004	2007	2010	2020	2030		% AADT	% DHV
NE	2300	2440	2580	3040	3500	8	7	6
NW	7170	7600	8030	9460	10900	6	6	8
NT1	6780	7190	7590	8950	10310	8	7	6
NT2	8530	9040	9550	11260	12970	10	8	6
N2	15700	16640	17580	20720	23860	8	7	7
SE	330	350	370	440	500	7	8	12
SW	1450	1540	1620	1910	2200	5	9	9
ST1	6330	6710	7090	8360	9620	7	7	7
ST2	8690	9210	9730	11470	13210	7	7	7
S2	9020	9560	10100	11910	13710	7	7	7
ES	7200	7630	8060	9500	10940	12	14	8
EN	1750	1860	1960	2310	2660	15	12	6
ET1	19110	20260	21400	25230	29050	6	30	16
ENS	8950	9490	10020	11810	13600	13	14	8
E2	2630	2790	2950	3470	4000	8	7	7
WN	290	310	320	380	440	7	10	6
WS	2360	2500	2640	3120	3590	6	8	6
WT1	20120	21330	22530	26560	30580	6	29	26
WNS	2650	2810	2970	3500	4030	6	8	6
W2	8620	9140	9650	11380	13100	6	7	8
N1	16250	17230	18200	21450	24710	7	7	7
S3	15890	16840	17790	20980	24150	9	10	7
S1	8110	8600	9080	10710	12320	7	7	8
N3	8820	9360	9870	11640	13410	10	8	6
E1	28060	29750	31420	37040	42650	9	25	13
W3	28740	30470	32180	37940	43680	6	22	21
W1	22770	24140	25490	30060	34610	6	27	24
E3	21740	23050	24350	28700	33050	7	27	15



# Indiana Department of Transportation

## Materials and Tests Division

120 South Shortridge Road P. O. Box 19389  
Indianapolis, Indiana 46219-0389  
Phone: (317) 610-7251 Fax: (317) 356-9351

November 23, 2004

### MEMORANDUM

TO : Mr. Dennis Fitzgerald  
USI Consultants, Inc  
8415 East 56<sup>th</sup> Street  
Indianapolis, IN 46216

THRU: Mr. David H. Andrews *DHA*  
Materials Engineer

FROM: Mr. Kumar P. Dave *KPD*  
Pavement Design Engineer

RE : Preliminary Pavement Design  
Des No : 0200699, 0200700  
District : Greenfield District  
Route : I-70 (0200699) Added Travel Lane from 0.6 miles E. of Post Road to 0.5 miles E of Mt. Comfort Road (RP 91 + 21 to RP 96 + 39) & I-70 (0200700) from 0.5 mile E of Mt. Comfort Road to 0.8 mile E of SR 9 (RP 96 + 39 to RP 104 + 94)

The primary purpose of the project is reconstruction and added travel lanes of I-70 within the project limits.

This section of I-70 is classified as an URBAN Interstate. It is on INDOT 4R network, it is on the NHS, the national truck network, and it is listed as a statewide mobility corridor in the INDOT 2000-2025 Long Range Plan.

This roadway has 2 through lanes in each direction with central grass median. The current AADT is 69920 and projected in 2030 is 106280 with 25 to 30 % trucks. There are 2 interchanges and 17 bridges located within the project limits. The existing pavement type varies from plain jointed concrete pavement (approx 8.94 miles) to crack & seat and overlay section (3.40 miles) within the limits of this project. The JCP section has gone thru various CPR treatments like dowel bar retrofit and extensive patching. The overall pavement is in fair to poor condition.

This section of I-70 project is programmed for added travel lanes with complete pavement replacement. Based on the scope of this project it is recommended to reconstruct the pavement within the limits of this project. For new pavement along I-70 use 400 +/- 100 mm thickness. The final pavement type and thickness will be determined after completion and receipt of the geotechnical report and traffic data.

KPD

cc: Mroczka, File

B-3



**CONSULTANTS, INC.**  
Engineers • Land Surveyors

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Alejandro L. de Gortari, CPA, Treasurer  
Kathy M. Hall, Secretary

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Jeffrey J. Franciski, PLS  
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Michael J. Obergfell, PE  
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James D. Smale, PLS  
Brent L. Smith, PLS  
Harrison R. Smith, PE  
John H. Varner, PLS  
Gregory R. Wendling, PE  
Donald R. West, PLS

May 28, 2004

**MEMORANDUM**

**To:** Mr. Brad Steckler, P.E.  
INDOT Engineering Assessment Manager

**From:** Dennis Fitzgerald, E.I.  
Project Manager  
USI Consultants, Inc.

**Re: Minutes of Field Check**  
**Des. No.:** 0200699,0200700  
**Project No.:** STP - ( )  
**Route No.:** I-70  
**Location:** From 0.6 miles east of Post Rd. to 0.8 miles east of SR 9  
**County:** Marion, Hancock  
**Work Type:** Added Travel Lane

This memorandum is a summary of the observations and recommendations made at a field check held at the project on Tuesday, May 25, 2004. The field check was held to review the existing conditions and determine the scope of work for this engineering assessment. The following individuals were in attendance:

Tom Stingley	INDOT, Greenfield District	317-467-3491
Tim Muench	INDOT, Central Office, Design	317-232-5245
Ryan Scott	BF&S, Environmental Representative	317-713-4615
Dennis Fitzgerald	USI Consultants, Inc.	317-544-4996
Mike Halterman	USI Consultants, Inc.	317-544-4996
Greg Wendling	USI Consultants, Inc.	317-544-4996

The following issues were discussed at the field check:

1. This I-70 project was programmed for added travel lanes with complete pavement replacement. The decision to replace the existing pavement is based on a coordination meeting with Dave Holtz, Bill Flora, and the Greenfield District on 06/28/02. The final pavement design will be made per the recommendation from INDOT Materials and Tests.
2. It appears that adding a travel lane in the median would be the most cost effective alternative. Additional right of way costs and bridge costs would be incurred to add the travel lane on the outside.
3. A median barrier wall would likely be included with this project, if the roadway is widened on the inside. A median barrier exists, at the west project limits (Post Road interchange.)
4. The current pavement section has a roadway crown on the center of each of the two westbound and eastbound lanes. If the pavement is replaced, the roadway crown should have at least 2 lanes slope to the outside. If the pavement is widened, the inside lane will be sloped to the inside.

**OFFICE**

8415 East 56<sup>th</sup> Street, Suite A  
Indianapolis, IN 46216-2200  
Phone: 317-544-4996  
Fax: 317-544-4997

E-mail: postoffice@usiconsultants.com  
Web Address: www.usiconsultants.com

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Harrison R. Smith, PE  
John H. Varner, PLS  
Gregory R. Wendling, PE  
Donald R. West, PLS

5. The SR 9 and Mount Comfort Road interchanges ramps are substandard. The Mount Comfort Road interchange is currently being designed to meet INDOT design requirements (Des. No. 0300720, Des. No. 0006743, Des. No. 9706740). However, SR 9 interchange will need the ramp lanes extended to meet current criteria. Additional right of way may be required for the ramp extensions.
6. 17 bridges are located within the project limits. The 8 bridges along I-70 will need to be widened. 2 of the bridges that need to be widened have steel girders, 4 bridges to be widened are concrete flat slabs and the remaining 2 bridges have prestressed I-beams. The 9 remaining bridges (overpasses) should not be affected if I-70 is widened on the inside.
7. This section of I-70 requires executive approval to close a lane of traffic. Therefore, USI will investigate keeping two lanes of traffic open at all times.
8. The Greenfield district will supply USI traffic counts of the ramp at SR 9.
9. SR 9 bridge over I-70 is scheduled to have the superstructure replaced in 2004 (Des. No. 0101431).

This completed the items discussed. If there are any questions, additions, or revisions necessary concerning the items listed above, please contact me at my office.

DPF:df

cc: Attendees  
File 2003-950, 2003-951

OFFICE

8415 East 56<sup>th</sup> Street, Suite A  
Indianapolis, IN 46216-2200  
Phone: 317-544-4996  
Fax: 317-544-4997

E-mail: [postoffice@usiconsultants.com](mailto:postoffice@usiconsultants.com)  
Web Address: [www.usiconsultants.com](http://www.usiconsultants.com)

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Civil Engineers  
8450 Westfield Boulevard, Suite 300 • Indianapolis, Indiana 46240-8302  
317 713-4615 • FAX 317 713-4616  
email: BFS@BFSEngr.com

## MEMO ■ LETTER

**TO:** Greg Wendling, P.E.

**FROM:** Ryan Scott

**DATE:** June 2, 2004

**Job No.:** 3950.03A17 / 3950.03A18

**SUBJECT:** Environmental Impact Comparison: Widening Inside vs. Outside  
Additional Travel Lane on I-70 (Des. No. 0200699 & Des. No. 0200700)

The following is a comparison of potential environmental impacts associated with the above-referenced project.

### Outside Widening

**Noise:** Widening of the I-70 Corridor would move traffic lanes closer to adjacent residences and businesses (receivers). This would require a formal Highway Traffic Noise Study – the results of which may warrant the implementation of noise abatement measures.

**Wetlands:** The National Wetlands Inventory Map indicates the presents of several potential wetland areas that would likely be impacted if the I-70 Corridor was widened. Also, there are many side ditches along I-70, which may meet the criteria to be considered jurisdictional wetlands. All suspected wetland areas would require a wetland delineation to confirm their presence and boundaries. Additionally, there are approximately 8 bridges within the project limits would require widening – each widening activity is likely to impact (place fill and/or excavate) below the ordinary high water mark of the associated waterways.

**Hazardous Materials:** There are several adjacent properties that have registered underground storage tanks (UST) and some of those sites have known leaking underground storage tanks (LUST). A cursory review of the project area indicates that there are known UST/LUST facilities near the Mt. Comfort Road and SR 9 interchanges. Any permanent right-of-way needed from these known properties would require at least an Initial Site Assessment (Phase 1) and possibly a Preliminary Site Investigation (Phase 2).

Historic Impacts: Several historic sites are located adjacent to I-70 within the project limits; however, none of these sites appear to be listed on the National Register of Historic Places. Moving the roadway closer to these sites could potentially impact the characteristics that make these structures eligible for the National Register of Historic Places.

Archaeological: Widening of the I-70 Corridor may require the purchase of new permanent right-of-way. Any new permanent right-of-way acquired would need archaeological clearance. At minimum, a records review would be required – a field reconnaissance and possibly a sub-surface test may be required in certain areas based on the number/quality of archaeological sites found.

#### Inside (Median) Widening

Noise: Widening of the I-70 Corridor in the median would not move traffic lanes closer to adjacent residences and businesses (receivers); however, a noise study would still be required since additional travel lanes are being added.

Wetlands: The National Wetlands Inventory Map indicates the presents of one potential wetland area in the median of I-70 that may be impacted by widening in the median. This area is located just west of the Cumberland Road overpass. All other suspected wetland areas would require a wetland delineation to confirm their presence and boundaries. Additionally, there are approximately 8 bridges within the project limits would require widening – each widening activity is likely to impact (place fill and/or excavate) below the ordinary high water mark of the associated waterways.

Hazardous Materials: It is likely that no new permanent right-of-way will be required if the travel lanes are added to the median. Therefore, no soil testing would be required regardless of potential contamination on surrounding properties.

Historic Impacts: Several historic sites are located adjacent to I-70 within the project limits; however, none of these sites appear to be listed on the National Register of Historic Places. Widening in the median would not impact these sites since the roadway would not be moved any closer to them.

Archaeological: It is likely that no archaeological study for the project would be necessary since the median of I-70 is within existing right-of-way and is all previously disturbed land.