TRAFFIC DATA

	TOTAL A.D.T.		TOTAL A.D.T.	
	2017	2037		
SHAFFER ROAD	1034	1372	60 MPH	55 MPH

MIDLAND COUNTY ROAD COMMISSION
MIDLAND, MICHIGAN
SHAFFER ROAD BRIDGE OVER BLISS CREEK RECONSTRUCTION

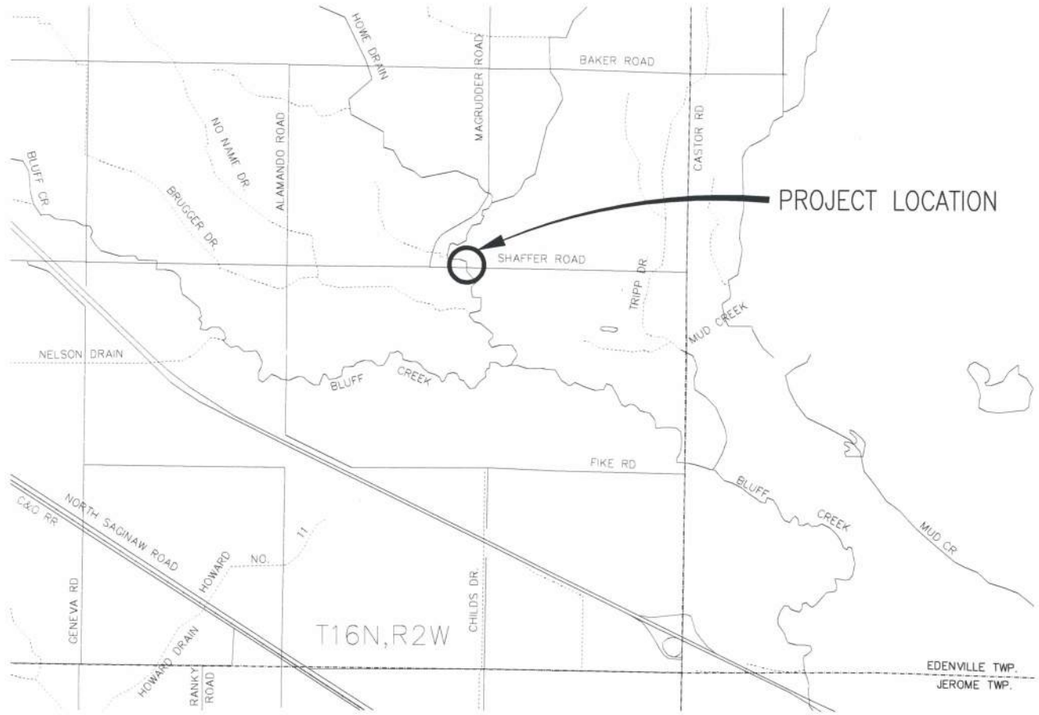
JN: 201251A CS: 56000
FED ITEM: RT0741 FED. #: ER-1756(016)

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	COVER SHEET
2	TYPICAL SHEET
3	LEGEND SHEET
4-5	LOG OF BORINGS
6	REMOVAL SHEET
7	GENERAL PLAN OF SITE
8	GENERAL PLAN OF STRUCTURE
9	ABUTMENTS - GENERAL PLAN OF STRUCTURE
10	DECK PANEL REINFORCEMENT DETAILS
11	DETAIL SHEET
12	MAINTAINING TRAFFIC

M.D.O.T. STANDARD PLANS	
TITLE	PLAN NO.
GUARDRAIL AT BRIDGES AND EMBANKMENTS	R-59-E
GUARDRAIL TYPES A, B, BD, T, TD, MGS-8, MGS-8D, MGS-0 & MGS-0D	R-60-J*
SOIL EROSION & SEDIMENTATION CONTROL MEASURES	R-96-E
SEEDING AND TREE PLANTING	R-100-H
GRADING CROSS-SECTIONS	R-105-D

* SPECIAL DETAILS

M.D.O.T WORK ZONE DEVICES	
TITLE	PLAN NO.
GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS	WZD-100-A
TEMPORARY TRAFFIC CONTROL DEVICES	WZD-125-E



LOCATION MAP
N.T.S.

NOTES:

THE WORK COVERED BY THESE PLANS INCLUDES ROAD WORK, EARTH EXCAVATION, REMOVAL OF THE CULVERTS, CONSTRUCTION OF THE PROPOSED BRIDGE, GUARDRAIL, MAINTENANCE OF TRAFFIC, HMA PAVING, PLACING GRANULAR MATERIAL, SLOPE PROTECTION, AND RIPRAP TO THE LIMITS SHOWN.

THE CONTRACTOR SHALL LOCATE ALL ACTIVE UNDERGROUND UTILITIES PRIOR TO STARTING WORK AND SHALL CONDUCT HIS OPERATIONS IN SUCH A MANNER AS TO ENSURE THAT THOSE UTILITIES NOT REQUIRING RELOCATION WILL NOT BE DISTURBED. THERE ARE SEVERAL EXISTING UTILITIES EXPOSED FROM THE WASH OUT. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES TO MAINTAIN UTILITIES TO REMAIN AND PLACE UTILITIES IN EMBANKMENT.

SHAFFER ROAD TRAFFIC IS TO BE DETOURED OVER OTHER EXISTING ROADS.

PLAN ELEVATIONS REFER TO NAVD88.

WATER LEVEL IS SUBJECT TO CHANGE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING A DETERMINATION OF WATER LEVELS THAT MAY EXIST DURING CONSTRUCTION.

MEASURES SHALL BE TAKEN TO PREVENT DEBRIS IN WATERWAY. IF DEBRIS FALLS INTO THE WATERWAY, IT SHALL BE REMOVED WITHIN 24 HOURS. SINCE DISTURBANCE OF THE WATERWAY BOTTOM MAY BE AS HARMFUL AS THE DEBRIS ITSELF, THE PREVENTATIVE MEASURES MUST BE EFFECTIVE.

IMMEDIATELY AFTER THE CONSTRUCTION OF AN ABUTMENT IS COMPLETED, SLOPE PROTECTION AND SEEDING OR SODDING SHALL BE PLACED ON THE ADJACENT EMBANKMENT SLOPES.

THE DESIGN OF THIS STRUCTURE IS BASED ON 1.2 TIMES THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATION HL-93 LOADING WITH THE EXCEPTION THAT THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION SHALL BE REPLACED BY A SINGLE 60 KIP AXLE LOAD BEFORE APPLICATION OF THIS 1.2 FACTOR. THE RESULTING LOAD IS DESIGNATED HL-93 MOD. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

THE DESIGN OF THE STRUCTURAL MEMBERS IS BASED ON MATERIAL OF THE FOLLOWING GRADES AND STRESSES:

PRECAST CONCRETE	f'c = 5,000 psi
STEEL REINFORCEMENT	fy = 60,000 psi

THE INITIAL FORCE IN THE TRANSVERSE POST-TENSIONING TENDONS SHALL BE 120,000 LBS. EACH. LOCATE POST TENSIONING DUCTS AT $\frac{1}{3}$ POINTS OF BEAMS.

CONTRACT FOR:
CONSTRUCTION OF NEW BRIDGE USING GEOSYNTHETICALLY REINFORCED SOIL ABUTMENTS AND PRECAST CONCRETE SUPERSTRUCTURE.

OHM
Advancing Communities
415 E Main St | Midland, MI 48640
P (989) 956-2020

PREPARED UNDER THE SUPERVISION OF:

STATE OF MICHIGAN
CRAIG D. SCHRIPSEMA
ENGINEER
No. 45096
LICENSED PROFESSIONAL ENGINEER

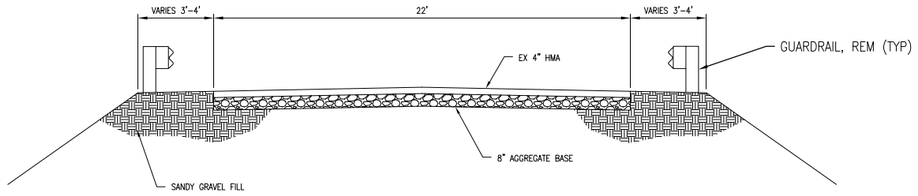
CRAIG D. SCHRIPSEMA

45096
Registration No.

9/12/17
Date

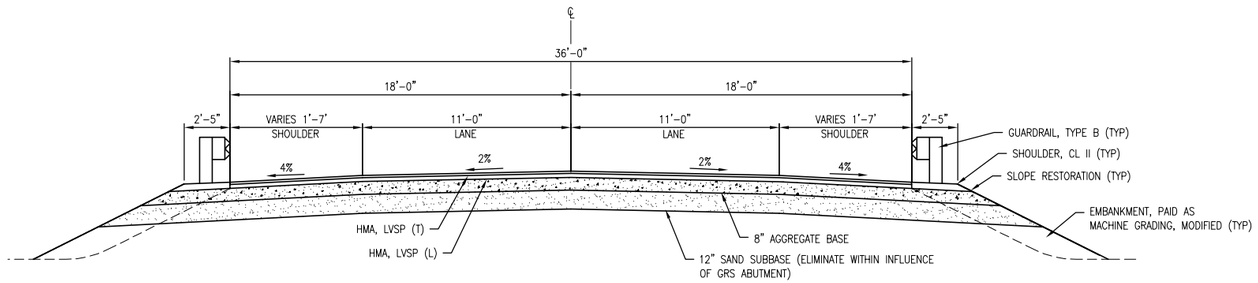
REVISIONS

PROJECT NO.	SHEET NO.
5025-17-0010	1 OF 12



EXISTING TYPICAL SECTION

STA 4+41.19 (POB) TO STA 5+51.32 (POE)



TYPICAL SECTION

STA 4+41.19 (POB) TO STA 4+81.31
STA 5+11.31 TO STA 5+51.32 (POE)

INFORMATIONAL EARTH QUANTITIES (POB TO POE)

MACHINE GRADING, MODIFIED	
ITEM	VOLUME
EXCAVATION, EARTH	250 CYDS
EMBANKMENT, CIP	220 CYDS
NOTE: QUANTITIES SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE INCLUDED WITH PAYMENT FOR MACHINE GRADING, MODIFIED. CONTRACTOR RESPONSIBLE FOR DETERMINING OWN CUT/FILL QUANTITIES.	

HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE (#/SYD)	PERF. GRADE	REMARKS
L	HMA, LVSP	220	58-28	LEVELING COURSE
T	HMA, LVSP	220	58-28	TOP COURSE

NOTES: 1) THE AGGREGATE WEAR INDEX (AWI) FOR THE TOP COURSE SHALL BE 220.
2) RECLAIMED ASPHALT PAVEMENT (RAP) IS LIMITED TO 15% IN THE HMA TOP COURSES
3) PLACE HMA BOND COAT AT 0.05 TO 0.15 GAL/SYD BETWEEN LAYERS AS DIRECTED BY THE ENGINEER (INCLUDED IN PAYMENT FOR HMA PAVING ITEMS)

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REVISIONS:

DATE 9/12/17 | PROJ NUMBER 5025-17-0010 | ENG OHM ADVISORS | PROJ MGR CDS | CADD MDH | COUNTY MIDLAND | CITY/VILLAGE/TOWNSHIP COLEMAN | SCALE H: NTS V: NTS | HORZ DATUM | VERT DATUM

MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK
TYPICAL SHEET

SHEET 2 OF 12

WATER & SEWER UTILITY SYMBOLS

EXISTING

- ST — STORM MANHOLE
- SQUARE CATCH BASIN
- ROUND CATCH BASIN
- CULVERT
- CULVERT W/O END SECTION
- CULVERT W/END SECTION
- S — SANITARY MANHOLE
- CO — CLEAN OUT
- GW — GATE VALVE & WELL
- GATE VALVE & BOX
- W — WATER STOP BOX
- FIRE HYDRANT
- MP — METER PIT
- WATER METER
- SH — SPRINKLER HEAD
- IRRIGATION VALVE

PROPOSED

- STORM MANHOLE
- INLET/CATCH BASIN
- CULVERT END SECTION
- SANITARY MANHOLE
- GV&W — GATE VALVE & WELL
- GV&B — GATE VALVE & BOX
- TSV&W — TAPPING SLEEVE VALVE & WELL
- TSV&B — TAPPING SLEEVE VALVE & BOX
- FIRE HYDRANT

REAL ESTATE SYMBOLS

- CONTIGUOUS PROPERTY SYMBOL
- XXXX — PARCEL NUMBER BOX
- XXXX — NO ROW IMPACTS

MISCELLANEOUS UTILITY SYMBOLS

EXISTING

- GUY WIRE
- GP — GUY POLE
- U — UTILITY POLE
- U — UTILITY POLE W/LIGHT
- LIGHT/DECOR LAMP POLE
- FLOOD LIGHT
- GAS VALVE
- GAS VENT
- G — GAS METER
- G — GAS RISER
- TRAFFIC SIGNAL
- P — PEDESTRIAN RISER
- E — TRANSFORMER PAD
- U — PRIVATE UTILITY MANHOLE
- R X R — RAILROAD CROSSING
- E — ELECTRIC METER
- PB — PHONE BOOTH
- TS — TRAFFIC SIGNAL CONTROLLER
- HAND HOLE
- E — ELECTRIC RISER
- T — TELEPHONE RISER
- C — CABLE TV RISER
- W — MONITORING WELL
- UNDERGROUND MARKER

MISCELLANEOUS SYMBOLS

EXISTING

- RIPRAP
- SIGN
- FLOW DIRECTION
- STUMP
- WETLAND
- CONIFEROUS TREE — CL 1 1" TO 5", CL 2 6" TO 17", CL 3 18" TO 35", CL 4 36" AND UP
- DECIDUOUS TREE
- CONIFEROUS SHRUB
- DECIDUOUS SHRUB
- SB# — SOIL BORING
- SECTION CORNER
- MON — MONUMENT
- IRON ROD/PIPE
- PK — PK NAIL
- BM# — BENCHMARK
- TP# — TRAVERSE POINT
- MAIL/NEWSPAPER BOX
- FP — FLAG POLE
- POST
- HAZARDOUS OR FLAMMABLE MATERIAL — USED WITH UNDERGROUND GAS & ELECTRICAL LINES
- CAUTION – CRITICAL UNDERGROUND UTILITY — USED WITH TELEPHONE & FIBER OPTIC LINES

PROPOSED

- RIPRAP
- SIGN
- FLOW DIRECTION
- XX XX XXX — STRUCTURE NUMBER WM SAN STM
- ADA SIDEWALK RAMP

UTILITY PATTERN

EXISTING

- ELEC — ELECTRICAL *
- 6" (COMPANY) GAS — GAS\OIL
- (COMPANY) CABLE/TEL — CABLE/TELEPHONE *
- FIBER OPTIC — FIBER OPTIC *
- 12" WM — WATER
- 12" SAN — SANITARY
- 12" STM — STORM

PROPOSED

- 12" — STORM/SANITARY/WATER
- 12" — PRIMARY UTILITY WILL HAVE A CONTINUOUS LINESTYLE, WITH THE SECONDARY UTILITY MATCHING ITS RESPECTIVE EXISTING UTILITY LINESTYLE

*OH = OVERHEAD , UG = UNDERGROUND

ROW PATTERN

EXISTING

- ROW — ROW
- SECTION
- PROPERTY/PARCEL

PROPOSED

- ROW — ROW

TOPO PATTERN

EXISTING

- HEDGE/TREE
- FENCE
- GUARDRAIL
- CENTERLINE OF DITCH
- RAILROAD
- WETLAND/EDGE OF WATER

PROPOSED

- GRADING LIMIT (SLOPE STAKE)
- CENTERLINE OF DITCH
- GUARDRAIL
- FENCE

REMOVAL LEGEND

- SIDEWALK REMOVAL
- BRICK REMOVAL
- HMA SURFACE REMOVAL
- PAVEMENT REMOVAL
- COLD MILLING HMA SURFACE
- HMA BASE CRUSHING AND SHAPING
- EXCAVATION, EARTH, MODIFIED
- CURB AND GUTTER, REM
- TREE, REM
- S- XXXXXX — SALVAGE
- B- XXXXXX — BULKHEAD
- A- XXXXXX — ABANDON
- R- XXXXXX — REMOVE
- ADJ- XXXXXX — ADJUST
- REL- XXXXXX — RELOCATE
- REC- XXXXXX — RECONSTRUCT
- R B/O- XXXXXX — REMOVE BY OTHERS
- ADJ B/O- XXXXXX — ADJUST BY OTHERS
- REL B/O- XXXXXX — RELOCATE BY OTHERS

IF NECESSARY FOR CLARITY

- (S) — SALVAGE
- (B) — BULKHEAD
- (A) — ABANDON
- (C) — CLEARING
- (R) — REMOVE
- (REL) — RELOCATE
- (REC) — RECONSTRUCT
- (REL B/O) — RELOCATE BY OTHERS
- (ADJ B/O) — ADJUST BY OTHERS

SPECIAL LEGEND

- HEAVY RIPRAP
- SILT FEDCE

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REVISIONS:

DATE	PROJ NUMBER	ENG	PROJ MGR	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORZ DATUM	VERT DATUM
9/12/17	5025-17-001OHM	ADVISORS	CDS	MDH	MIDLAND	COLEMAN	H: NTS	V: NTS	

MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK

LEGEND SHEET

SHEET 3 OF 12

BORING B-01

DATE STARTED:	5/1/17
DATE COMPLETED:	5/1/17
COMPLETION DEPTH	20.0 ft
BENCHMARK:	N/A
ELEVATION:	N/A
LATITUDE:	
LONGITUDE:	
STATION:	N/A **OFFSET:** N/A
REMARKS:	None
DRILL COMPANY:	PSI
DRILLER: D. Guajardo	**LOGGED BY:** M. Nabil
DRILL RIG:	CME-75
DRILLING METHOD:	3 1/4" HSA
SAMPLING METHOD:	SS
HAMMER TYPE:	Automatic
EFFICIENCY	N/A
REVIEWED BY:	M. Nabil

Water

While Drilling	N/A
Upon Completion	N/A
Cave Depth	N/A

BORING LOCATION:
See Boring Loction Diagram

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					4" ASPHALT 8" Brown Sandy GRAVEL BASE				
				1	12	Brown CLAYEY SAND, trace Silt, trace Gravel, moist, loose		3-4-4 N=8	7	
	5			2	10		SC	3-2-2 N=4	9	
				3	18			2-2-4 N=6	11	
	10			4	18	Gray SILTY SANDY CLAY, trace Gravel, moist, hard		3-4-4 N=8	12	
	15			5	18		CL	3-4-6 N=10	8	
	20			6	18	Boring terminated at 20 feet due to auger refusal - possible large cobble.		22-22-50/6" N=72	7	>>

STANDARD PENETRATION TEST DATA
N in blows/ft @
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

ESTIMATED SCOUR 672.96
EAST ABUT BOTT 672.39
WEST ABUT BOTT 672.20

Intertek psi
Professional Service Industries, Inc.
3120 Sovereign Drive, Suite C
Lansing, MI 48911
Telephone: (517) 394-5700

PROJECT NO.: 0408-1623
PROJECT: Proposed New Bridge and Pavement
LOCATION: Midland, Michigan

The stratification lines represent approximate boundaries. The transition may be gradual.

BORING B-02

DATE STARTED:	5/1/17
DATE COMPLETED:	5/1/17
COMPLETION DEPTH	13.5 ft
BENCHMARK:	N/A
ELEVATION:	N/A
LATITUDE:	
LONGITUDE:	
STATION:	N/A **OFFSET:** N/A
REMARKS:	None
DRILL COMPANY:	PSI
DRILLER: D. Guajardo	**LOGGED BY:** M. Nabil
DRILL RIG:	CME-75
DRILLING METHOD:	3 1/4" HSA
SAMPLING METHOD:	SS
HAMMER TYPE:	Automatic
EFFICIENCY	N/A
REVIEWED BY:	M. Nabil

Water

While Drilling	N/A
Upon Completion	N/A
Cave Depth	N/A

BORING LOCATION:
See Boring Loction Diagram

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	Additional Remarks
	0					4"ASPHALT 8" Brown Sandy GRAVEL BASE				
				1	17	Brown SANDY SILTY CLAY, trace Gravel, moist, very stiff		6-6-6 N=12	10	
	5			2	18		CL	3-3-4 N=7	11	
				3	18	Brown fine to medium SAND, trace Gravel, trace weathered Limestone, moist, loose		2-3-2 N=5	9	
	10			4	18		SP	3-4-5 N=9	8	
						Boring terminated at 13.5 feet due to auger refusal - possible large cobble.				

STANDARD PENETRATION TEST DATA
N in blows/ft @
× Moisture ◪ PL ✚ LL
0 25 50
STRENGTH, tsf
▲ Qu ✳ Qp
0 2.0 4.0

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Lansing, MI 48911
Telephone: (517) 394-5700

PROJECT NO.: 0408-1623
PROJECT: Proposed New Bridge and Pavement
LOCATION: Midland, Michigan

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Mt. Pleasant, MI 48858
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REVISIONS:

DATE: 9/12/17 | PROJ NUMBER: 5025-17-0010OHM | ENG: ADVISORS | PROJ MGR: CDS | CADD: MDH | COUNTY: MIDLAND | CITY/VILLAGE/TOWNSHIP: COLEMAN | SCALE: H: NTS V: NTS | HORIZ DATUM: ---- | VERT DATUM: ----

MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK
LOG OF BORINGS

SHEET 4 OF 12

DRAWING PATH: P:\5000_5499\5025170010_MCRC-Shaffer_Road_over_Bliss_Cr\Drawings\Civil\Miss\170010B0R.dwg Sep 12, 2017 - 10:47am

BORING HA-01

DATE STARTED:	3/1/17	**DRILL COMPANY:**	PSI
DATE COMPLETED:	3/1/17	**DRILLER:**	T. Lane **LOGGED BY:** T. Lane
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	
BENCHMARK:	N/A	**DRILLING METHOD:**	Hand Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION:	N/A **OFFSET:** N/A	**REVIEWED BY:**	M. Nabil

REMARKS: East half of maintenance garage, center bay, 4' east of C/L

Water		
	While Drilling	N/A
	Upon Completion	N/A
	Cave Depth	N/A

BORING LOCATION: See Hand Auger Location Diagram

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✱ LL 0 25 50 / STRENGTH, tsf ▲ Qu ✳ Qp 0 2.0 4.0	Additional Remarks
	0					Brown fine to medium SAND, moist	SP			
	5					Brownish orange fine to medium SAND, moist	SP			
	10					Brownish orange SILTY SAND, wet	SM			
	15					Hand auger terminated 15 feet below existing ground surface.				

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3120 Sovereign Drive, Suite C
Lansing, MI 48911
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PROJECT NO.: 0408-1623
PROJECT: Proposed New Bridge and Pavement
LOCATION: Midland, Michigan

The stratification lines represent approximate boundaries. The transition may be gradual.

Sheet 1 of 1

BORING HA-02

DATE STARTED:	3/1/17	**DRILL COMPANY:**	PSI
DATE COMPLETED:	3/1/17	**DRILLER:**	T. Lane **LOGGED BY:** T. Lane
COMPLETION DEPTH	15.0 ft	**DRILL RIG:**	
BENCHMARK:	N/A	**DRILLING METHOD:**	Hand Auger
ELEVATION:	N/A	**SAMPLING METHOD:**	
LATITUDE:		**HAMMER TYPE:**	Automatic
LONGITUDE:		**EFFICIENCY**	N/A
STATION:	N/A **OFFSET:** N/A	**REVIEWED BY:**	M. Nabil

REMARKS: East half of maintenance garage, center bay, 4' west of outside wall

Water		
	While Drilling	N/A
	Upon Completion	N/A
	Cave Depth	N/A

BORING LOCATION: See Hand Auger Location Diagram

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATERIAL DESCRIPTION	USCS Classification	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft ◎ × Moisture ◪ PL ✱ LL 0 25 50 / STRENGTH, tsf ▲ Qu ✳ Qp 0 2.0 4.0	Additional Remarks
	0					Brown fine to medium SAND, moist	SP			
	5					Brownish orange SILTY SAND, moist to wet Soil sample was wet starting at 7 feet	SM			
	10									
	15					Hand auger terminated 15 feet below existing ground surface.				

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Sheet 1 of

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REVISIONS:

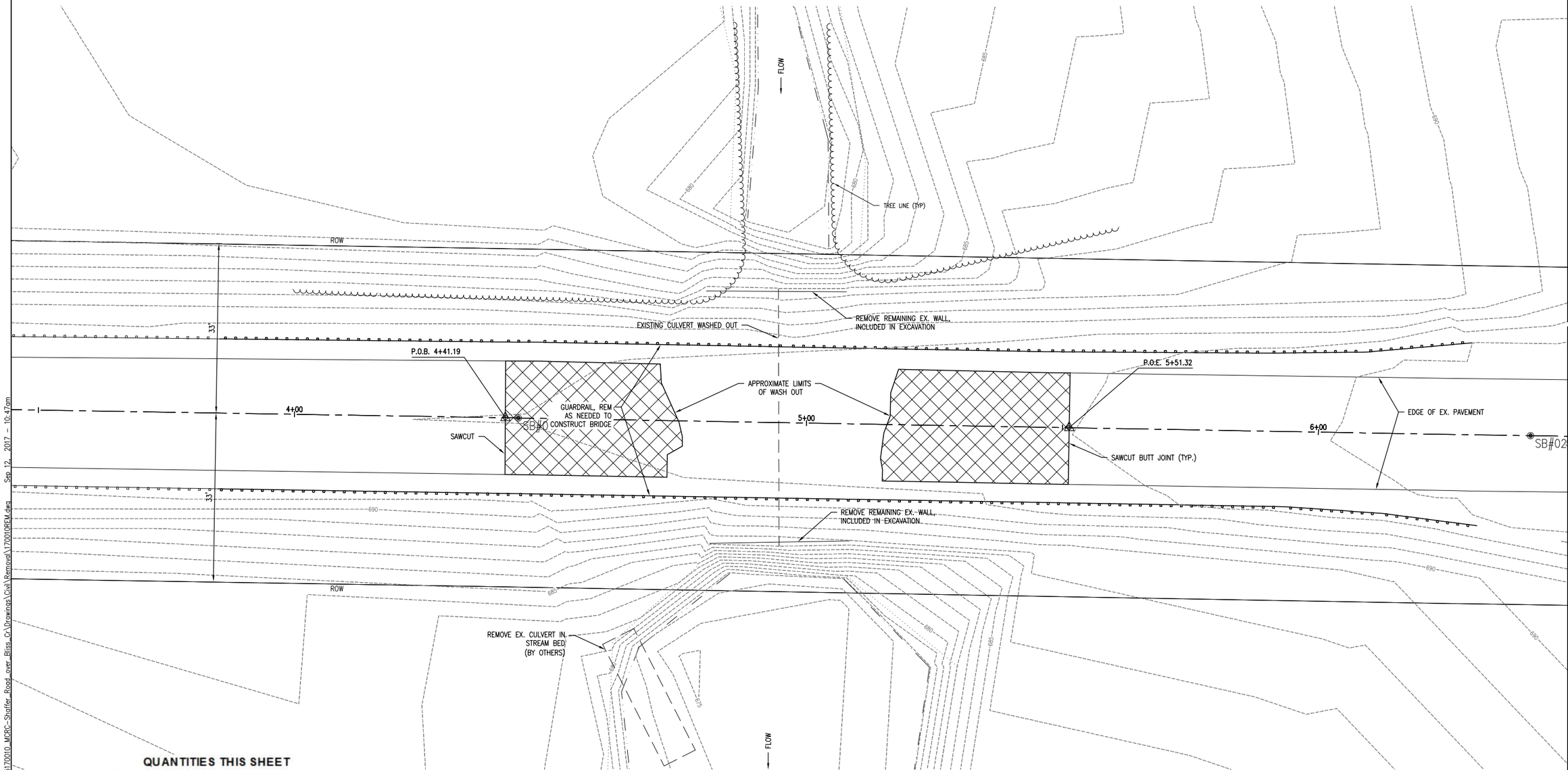
DATE	PROJ NUMBER	ENG	PROJ MGR	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORIZ DATUM	VERT DATUM
9/12/17	5025-15-002OHM	ADVISORS	CDS	MDH	MIDLAND	COLEMAN	H: NTS	V: NTS	

MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK
LOG OF BORINGS

SHEET 5 OF 12

W SHAFFER RD

BLISS CREEK



QUANTITIES THIS SHEET

TOTAL	UNIT	DESCRIPTION
492	Ft	Guardrail, Rem
50	Cyd	Subgrade Undercutting, Type II
1	Sta	Machine Grading, Modified
1623	Cyd	Excavation, Fdn
166	Syd	HMA Surface, Rem

Know what's **below.** **Call** before you dig.

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415 E Main St
Midland, MI 48640
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REVISIONS:

DATE 9/12/17 | PROJ NUMBER 5025-17-GIYOHM ADVISORS | ENG | PROJ MGR CDS | CADD MCH | COUNTY MIDLAND | CITY/VILLAGE/TOWNSHIP COLEMAN | SCALE H: 1"=20' V: 1"=20' | HORIZ DATUM | VERT DATUM

MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK

REMOVAL SHEET

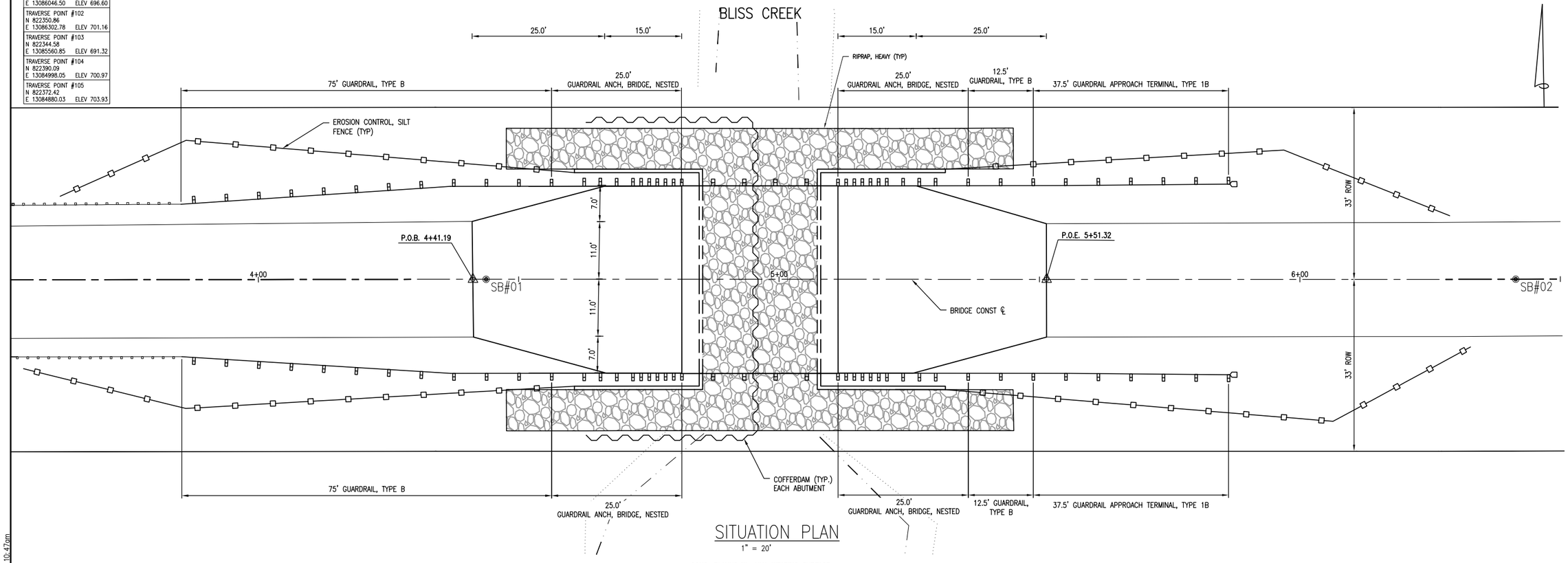
SHEET 6 OF 12

DRAWING PATH: P:\5000_5499\5025170010_MCRC-Shaffer Road over Bliss_Cx\Drawings\Civil\Removal\170010REM.dwg
Sep 12, 2017 - 10:47am

TRAVERSE POINT #101	
N 822334.80	
E 13086046.50	ELEV 696.60
TRAVERSE POINT #102	
N 822350.86	
E 13086302.78	ELEV 701.16
TRAVERSE POINT #103	
N 822344.58	
E 13085560.85	ELEV 691.32
TRAVERSE POINT #104	
N 822390.09	
E 13084998.05	ELEV 700.97
TRAVERSE POINT #105	
N 822372.42	
E 13084880.03	ELEV 703.93

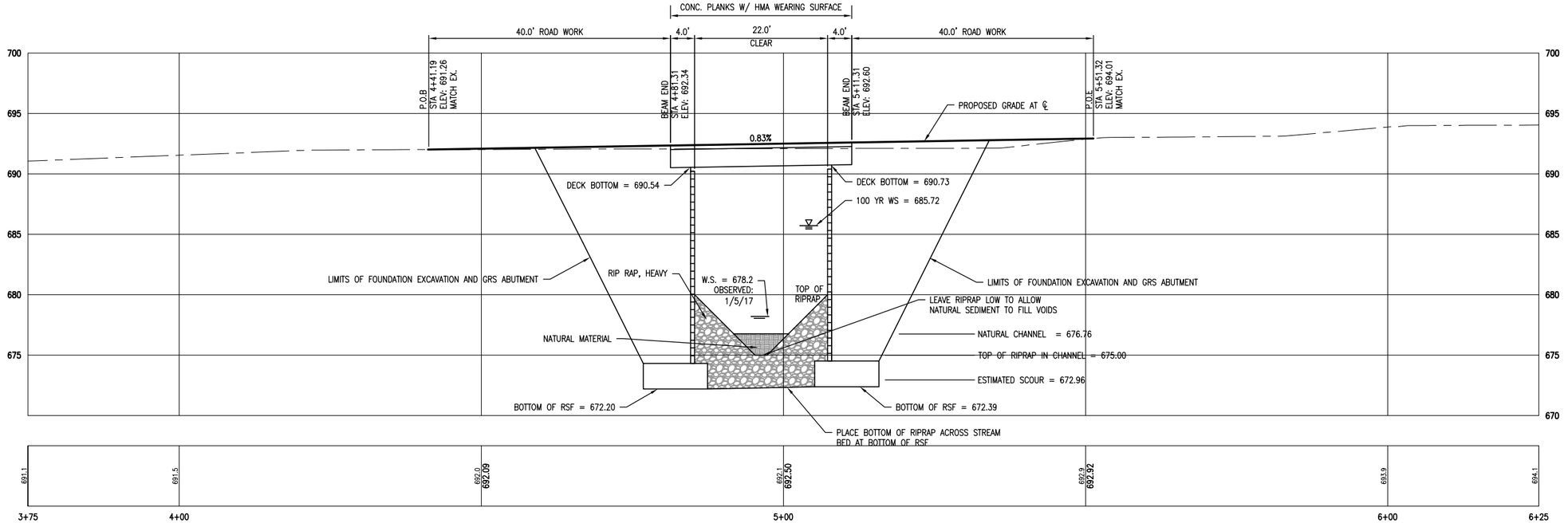
W SHAFFER RD

BLISS CREEK



SITUATION PLAN

1" = 20'



PROFILE ALONG CONSTRUCTION ℄ – WEST SHAFFER ROAD

VERT SCALE: 1" = 10'
HORIZ SCALE: 1" = 20'

RSF = REINFORCED SOIL FOUNDATION
GRS = GEOSYNTHETIC REINFORCED SOIL

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415 E Main St
Midland, MI 48640
P (989) 956-2020
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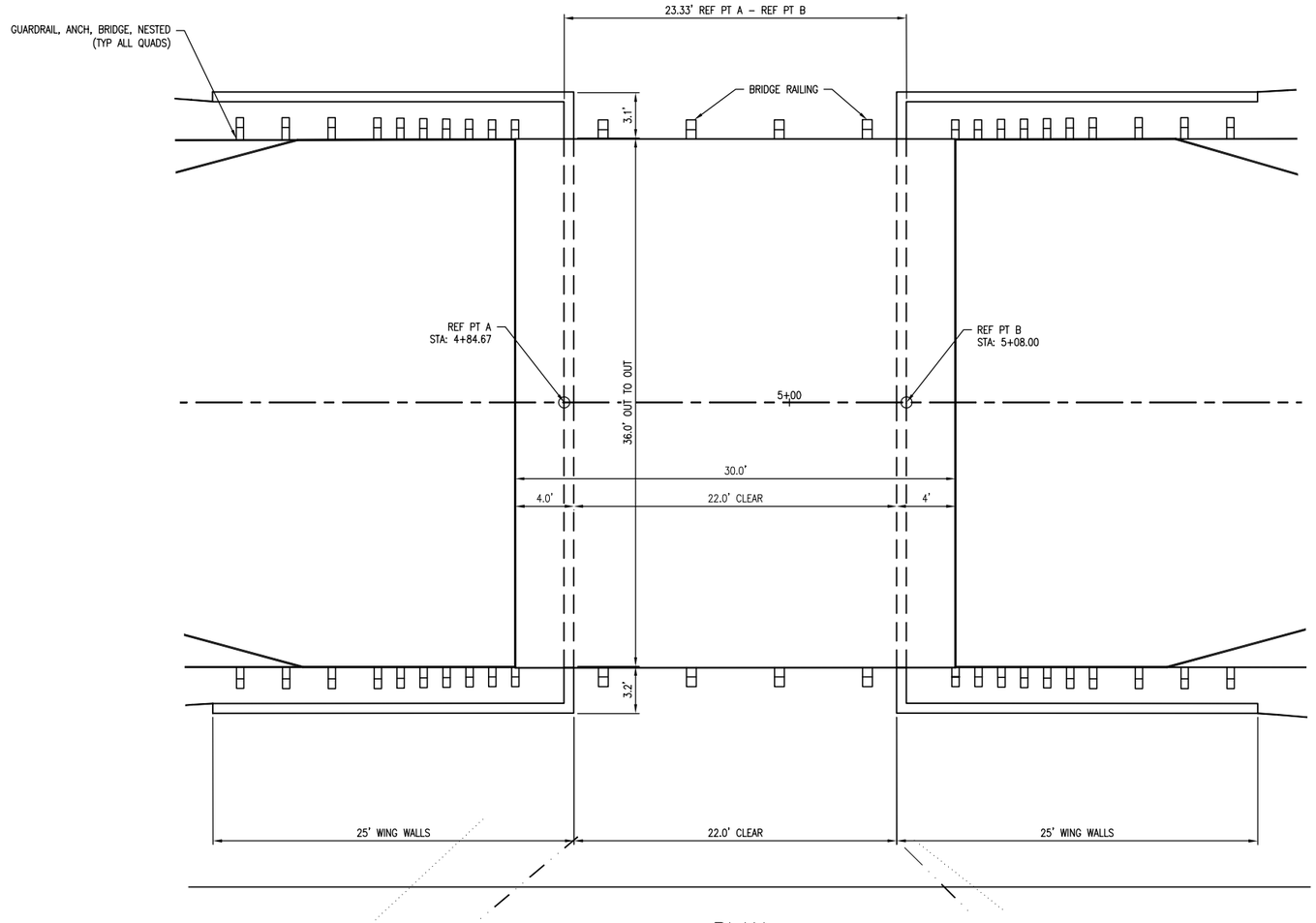
REVISIONS:

DATE	PROJ NUMBER	ENG	PROJ MGR	CADD	COUNTY	CITY/VILLAGE/TOWNSHIP	SCALE	HORIZ DATUM	VERT DATUM
9/12/17	5025-17-0010HM	ADVISORS	CDS	MCH	MIDLAND	COLEMAN	H: 1"=20'	---	---
							V: 1"=10'	---	---

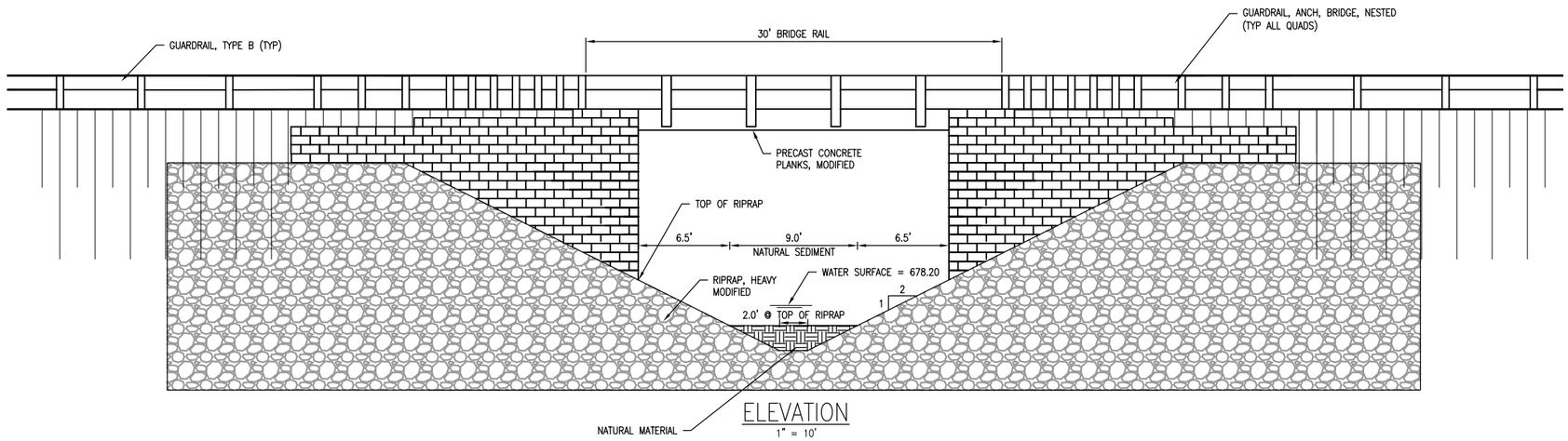
MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK
GENERAL PLAN OF SITE

SHEET 7 OF 12

W SHAFFER RD



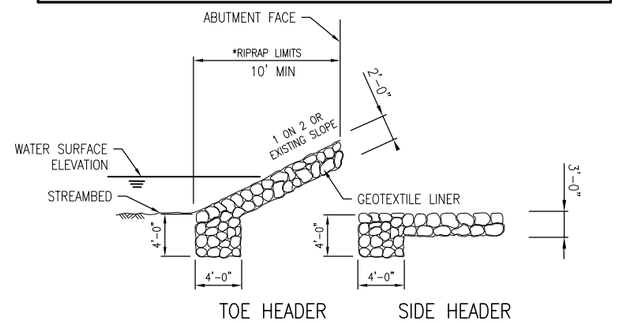
PLAN
1" = 10'



ELEVATION
1" = 10'

SUMMARY OF HYDRAULIC ANALYSIS							
		EXISTING		PROPOSED			
FLOOD DATA	DISCHARGE (CFS)	WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	VELOCITY IN D/S CHANNEL IN (FPS)	WATER SURFACE ELEVATION AT U/S FACE OF STRUCTURE	VELOCITY IN D/S CHANNEL IN (FPS)	WATERWAY AREA (SFT) AT D/S FACE	CHANGE IN WS EL __ U/S OF PROPOSED STRUCTURE
50-YEAR	490	692.52	13.26	682.43	4.84	117.35	-10.09
100-YEAR	650	692.92	13.26	683.60	5.17	143.35	-9.32
MAXIMUM BRIDGE AREA BELOW LOW CHORD IS 297.35 SQUARE FT							

BLISS CREEK AT WEST SHAFFER ROAD, SECTION 23/26, T16N, R2W, WARREN TOWNSHIP, MIDLAND COUNTY, HAS A DRAINAGE AREA OF 15.05 SQUARE MILES. THE 10%, 2%, 1%, 0.5%, AND 0.2% CHANCE PEAK FLOWS ARE ESTIMATED TO BE 230 CUBIC FEET PER SECOND (CFS), 490 CFS, 650 CFS, 800 CFS, AND 1200 CFS, RESPECTIVELY. (WATERSHED BASIN NO. 32D TITTABAWASSEE).



RIPRAP HEADER DETAILS

TOP OF RIPRAP MUST BE AT OR BELOW EXISTING STREAMBED/ SLOPE ELEVATION.

AN APPROPRIATE METHOD OF WATER DIVERSION FOR PLACING RIPRAP SHALL BE PROPOSED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. IF WATER IS SHALLOW (LESS THAN TWO FEET), TEMPORARY CONCRETE BARRIERS OR SANDBAGS MAY BE USED TO DIVERT FLOW.

THE RIPRAP SCHEME SHOWN IS A MINIMUM REQUIREMENT FOR SCOUR.

*RIPRAP LIMITS ARE APPROXIMATE. RIPRAP SHALL EXTEND FROM TOP OF BANK TO BOTTOM OF EXISTING CHANNEL AT A 1 ON 2 SLOPE.

QUANTITIES THIS SHEET

TOTAL	UNIT	DESCRIPTION
1	LSUM	Mobilization, Max
400	Ft	Erosion Control, Silt Fence
50	Ft	Erosion Control, Turbidity Curtain, Shallow
38	Cyd	Subbase, CIP
312	Syd	Aggregate Base, 8 inch
85	Ton	HMA, LVSP
1	LSUM	Cofferdams
1	LSUM	Precast Concrete Planks, Modified
60	Ft	Bridge Railing
221	Ft	Guardrail, Type B
2	Ea	Guardrail Approach Terminal, Type 1B
4	Ea	Guardrail Anch, Bridge, Nested
444	Ft	Pavt Mrkg, Waterborne, 6 inch, White
278	Ft	Pavt Mrkg, Waterborne, 6 inch, Yellow
275	Syd	Riprap, Heavy, Modified
910	Syd	Slope Restoration, Modified

Know what's **below.** **Call** before you dig.

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REVISIONS:

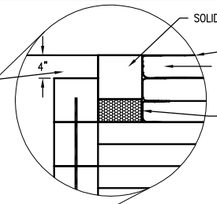
DATE 9/12/17 | PROJ NUMBER 5025-17-0010OHM ADVISORS | ENG PROJ MGR CDS | CADD MCH | COUNTY MIDLAND | CITY/VILLAGE/TOWNSHIP COLEMAN | SCALE H: 1"=10' V: 1"=10' | HORIZ DATUM --- | VERT DATUM ---

MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK
GENERAL PLAN OF STRUCTURE

SHEET 8 OF 12

DRAWING PATH: P:\5000_5499\5025170010_MCRC-Shaffer_Road_over_Bliss_Co\Drawings\Civil Plans_Const\170010C0N.dwg Sep 12, 2017 - 10:47am

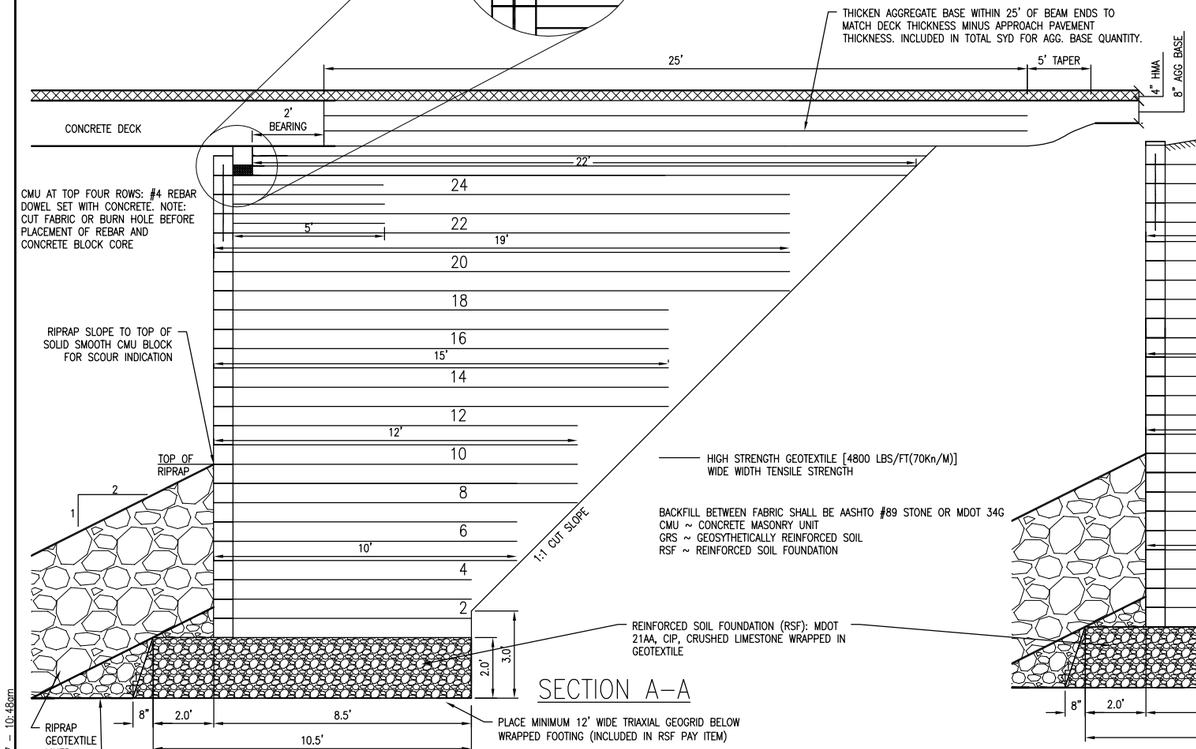
LOADING INFORMATION
DECK WEIGHT: 243,000 LB
BEARING PRESSURE: 100 LBS/SFT DEAD LOAD
BEARING PRESSURE: 1000 LBS/SFT LIVE LOAD HL93 WITH IMPACT



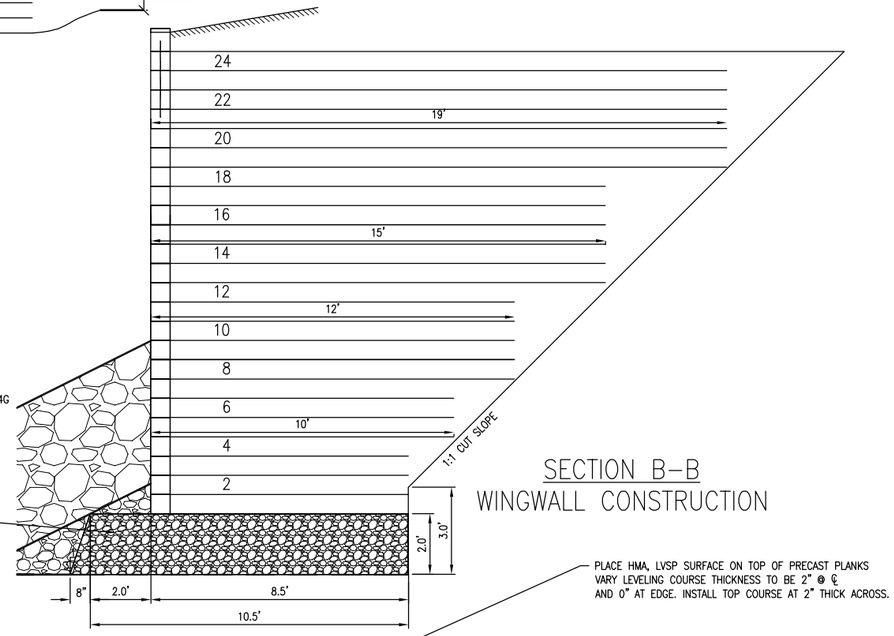
NOTE: WRAP EACH OF THE 4" LAYERS BEHIND TOP COURSE OF BLOCK MAKING UP BEAM SEAT

QUANTITIES THIS SHEET

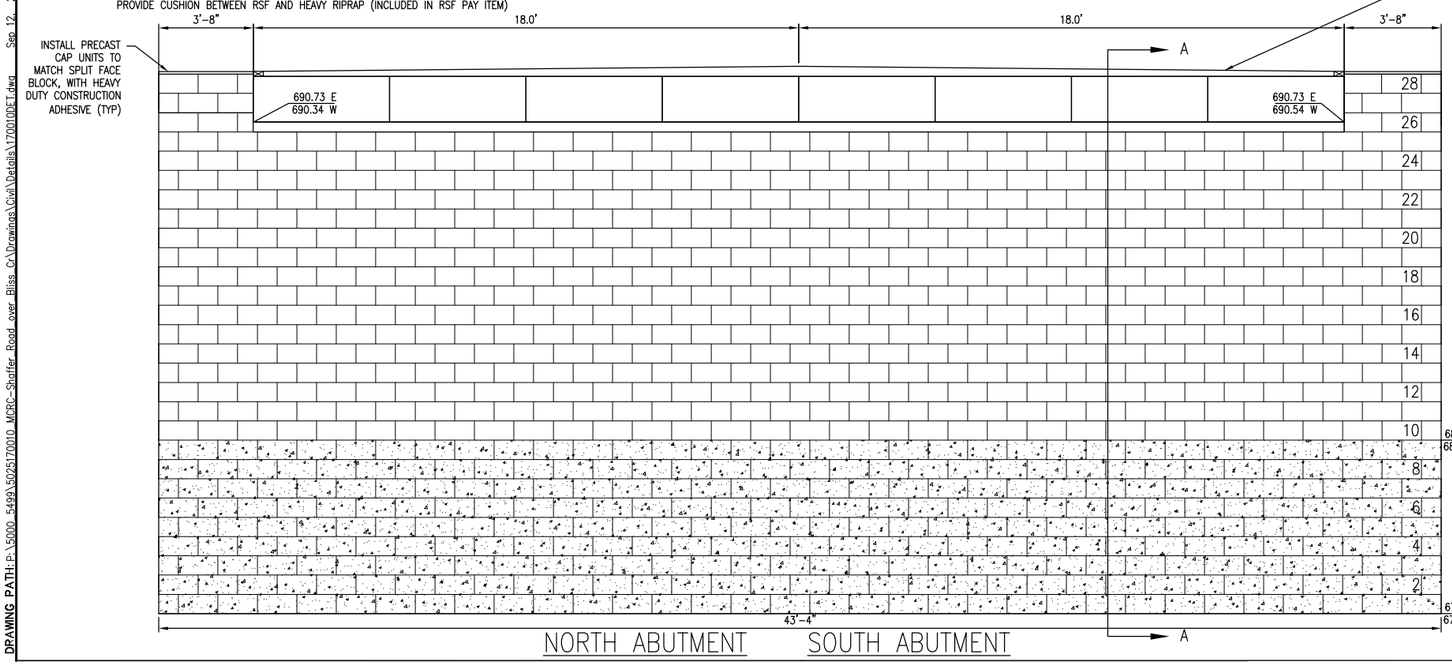
TOTAL	UNIT	DESCRIPTION
1352	Cyd	Granular Embankment, AASHTO #89 Stone
125	Cyd	RSF, MDOT 21AA, CIP, Crushed Limestone
8236	Syd	High Strength Woven Polypropylene Fabric
722	Ft	Reinforcement, Steel, Epoxy Coated Dowel
112	Ft	Concrete Cap
2618	Ea	Splitface Concrete Masonry Block
1386.0	Ea	Solid Concrete Masonry Block



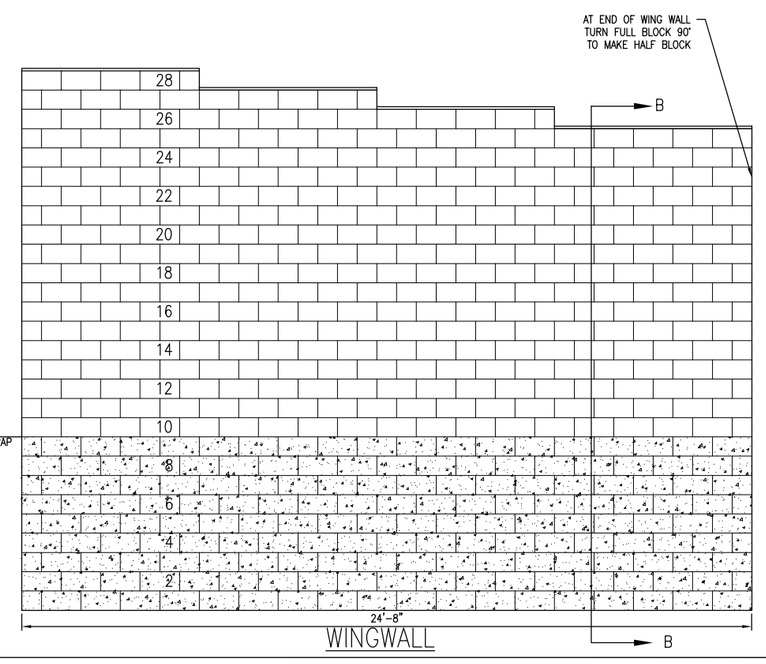
SECTION A–A



SECTION B–B
WINGWALL CONSTRUCTION



NORTH ABUTMENT SOUTH ABUTMENT



WINGWALL

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REVISIONS:

HORZ DATUM: VERT DATUM:

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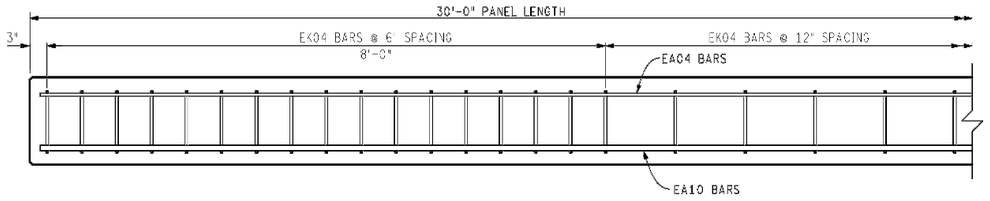
9/12/17	5035-17-0010HM	ADVISORS	CDS	MDH	MIDLAND	COLEMAN	H: 1"=10' V: 1"=10'

MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK
ABUTMENTS - GENERAL PLAN OF STRUCTURE

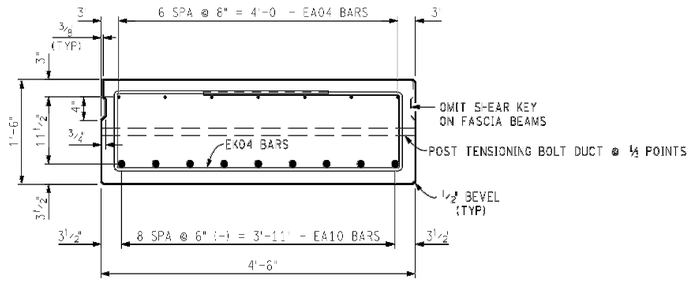
SHEET 9 OF 12

DRAWING PATH: P:\5000_5499\5025170010_MCRC-Shaffer Road over Bliss Cr\Drawings\Civil\Details\1700100ET.dwg Sep 12, 2017 - 10:48am

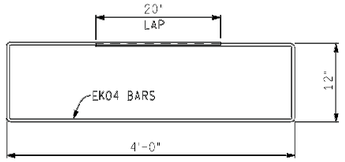


DECK PANEL ELEVATION

(ADJUST EK04 SPACING TO ACCOMMODATE POST-TENSIONING DUCTS)
(EK04 BARS SYMETRICAL ABOUT DECK PANEL)



DECK PANEL SECTION



K BAR DETAIL

NOTES:

THE INITIAL FORCE IN THE TRANSVERSE POST-TENSIONING TENDONS SHALL BE 120,000 LBS. EACH. LOCATE POST TENSIONING DUCTS AT 1/3 POINTS ON BEAMS

NOTES:

–SPLITFACE CONCRETE MASONRY BLOCK – THIS ITEM SHALL CONSIST OF FURNISHING AND PLACING SPLITFACE HOLLOW CORE CONCRETE MASONRY UNITS (CMU) MEETING ASTM C90 WITH THE MODIFICATIONS THAT THE BLOCK SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AND A MAXIMUM ABSORPTION RATE OF 6.5%. PLACE CMU BLOCKS SIDE BY SIDE FOR THE FULL LENGTH OF EACH COURSE OF THE WALL. CHECK WALL PLUMBNESS A MINIMUM OF EVERY 3 LAYERS AND CORRECT DEVIATIONS GREAT THAN ¼". CORRECT MISALIGNED, IMPROPERLY SEATED OR OUT OF LEVEL CMU BLOCKS. ASSURE THAT THE TOPS OF ALL CMU BLOCKS ARE FREE OF LOOSE MATERIAL PRIOR TO THE PLACEMENT OF THE NEXT LAYER OF GEOTEXTILE AND CMU BLOCKS.

–SOLID CONCRETE MASONRY BLOCK – THIS ITEM SHALL CONSIST OF FURNISHING AND PLACING SOLID CONCRETE MASONRY UNITS (CMU) MEETING ASTM C90 WITH THE MODIFICATIONS THAT THE BLOCK SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AND A MAXIMUM ABSORPTION RATE OF 6.5%. BEGIN CONSTRUCTION OF THE ABUTMENT BY PLACING ONE FULL LENGTH OF COURSE OF CMU BLOCK AT A TIME. PLACE THE FIRST COURSE OF CMU BLOCK ON TOP AND IN FULL CONTACT WITH THE REINFORCED SOIL FOUNDATION. THE FIRST ROW OF CMU BLOCK MUST BE CAREFULLY LEVELED IN BOTH DIRECTIONS TO ENSURE PROPER ALIGNMENT FOR THE BALANCE OF THE WALL. CHECK WALL PLUMBNESS A MINIMUM OF EVERY 3 LAYERS AND CORRECT DEVIATIONS GREATER THAN ¼". CORRECTED MISALIGNED, IMPROPERLY SEATED OR OUT OF LEVEL CMU BLOCKS. ASSURE THAT THE TOPS OF ALL CMU BLOCKS ARE FREE OF LOOSE MATERIAL PRIOR TO THE PLACEMENT OF THE NEXT LAYER OF GEOTEXTILE AND CMU BLOCKS.

–HIGH STRENGTH WOVEN POLYPROPYLENE FABRIC – THIS ITEM SHALL HAVE A WIDE WIDTH TENSILE STRENGTH OF 4800/LBS PER FOOT IN BOTH DIRECTIONS AS PER ASTM D-4595. THE GEOSYNTHETIC REINFORCEMENT SHALL BE PLACED AS SHOWN ON SHEET. THE WIDTH AND LENGTH VARY AS SHOWN ON THE DRAWING. GEOSYNTHETIC REINFORCEMENT SHALL EXTEND BETWEEN THE LAYERS OF CMU BLOCK TO PROVIDE A FRICTIONAL CONNECTION. THE GEOSYNTHETIC REINFORCEMENT SHALL NEARLY COMPLETELY COVER THE TOP OF THE CMU BLOCK. PULL THE GEOSYNTHETIC REINFORCEMENT TAUT PRIOR TO BACKFILLING TO REMOVE WRINKLES. THE PRICED BID SHALL INCLUDE FURNISHING AND PLACING THIS MATERIAL. TO LIMIT CONSTRUCTION DAMAGE TO THE GEOTEXTILE REINFORCEMENT, CONSTRUCTION EQUIPMENT SHALL NOT DRIVE DIRECTLY OVER THE GEOTEXTILE. AN AGGREGATE THICKNESS OF 6" IS SUFFICIENT TO PREVENT EQUIPMENT FROM DAMAGING THE GEOTEXTILE. NO LAPPING OF FABRIC SHALL BE PERMITTED ALONG THE FACE. WHERE LAPPED ELSEWHERE A 0.25" THICKNESS OF STONE SHALL BE SPREAD BETWEEN PIECES OF FABRIC.

–THE STONE BACKFILL SHALL BE PLACED BEHIND EACH LAYER OF CMU BLOCK IN A LIFT THICKNESS NOT TO EXCEED THE CMU BLOCK HEIGHT. PLACEMENT OF THE AGGREGATE SHALL BE FROM THE WALL FACE BACKWARD TO PREVENT THE FORMATION OF AND TO REMOVE ANY WRINKLES IN THE GEOTEXTILE. FILL SHALL BE PLACED IN A MANNER TO AVOID WRINKLING OF THE GEOSYNTHETIC REINFORCEMENT. COMPACTION GENERALLY ACHIEVED BY:

1) RODDING THE AGGREGATE FILL BEHIND EACH CMU BLOCK APPROXIMATELY EVERY FOOT WHILE EXERTING DOWNWARD PRESSURE ON THE CMU BLOCK TO PREVENT LATERAL MOVEMENT
2) USING A VIBRATORY PLATE COMPACTOR (> 4 PASSES) DIRECTLY BEHIND THE CMU BLOCK WHILE EXERTING DOWNWARD PRESSURE ON THE CMU BLOCK TO PREVENT LATERAL MOVEMENT
3) LARGER VIBRATORY COMPACTORS MAY BE USED FOR THE BALANCE OF THE AREA MORE THAN 2' BEHIND THE CMU BLOCK. MULTIPLE PASSES OF A VIBRATORY PLATE COMPACTOR CAN ALSO ACHIEVE PROPER DENSITY.

–AT THE END OF A DAY'S OPERATIONS, SLOPE THE LAST LIFT OF BACKFILL AWAY FROM THE WALL FACE TO DIRECT SURFACE RUNOFF AWAY FROM THE WALL. DO NOT ALLOW SURFACE RUNOFF FROM ADJACENT AREAS TO ENTER THE WALL CONSTRUCTION AREA.

OHM	NO SCALE		DATE: 02/10/17
		SHAFFER ROAD BRIDGE RECONSTRUCTION	DRAWING SHEET
	JN: 5025-17-0010	MIDLAND COUNTY ROAD COMMISSION	
		DECK PANEL REINFORCEMENT DETAILS	1

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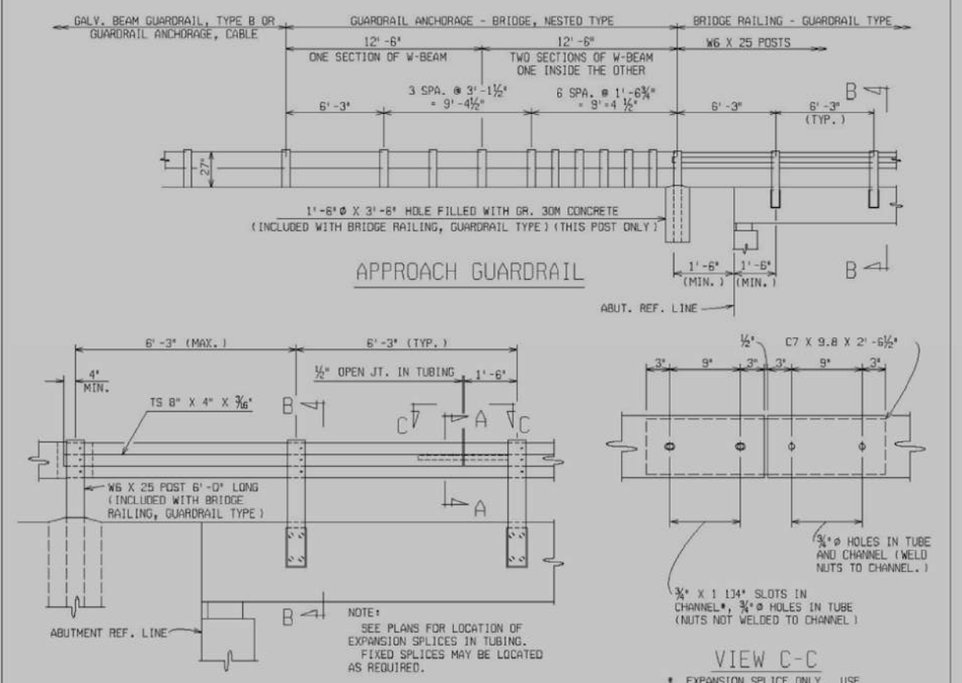
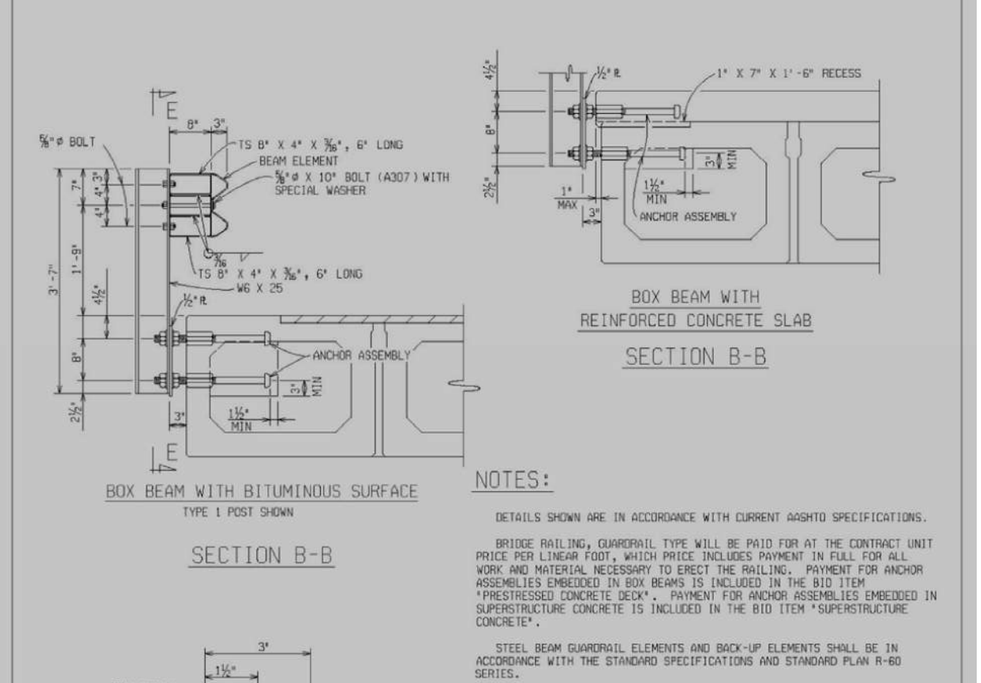
MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK
DECK PANEL REINFORCEMENT DETAILS

SHEET 10 OF 12



PREPARED BY DESIGN DIVISION	ENGINEER OF CONSTRUCTION	ENGINEER - BRIDGE DESIGN	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS STANDARD PLAN FOR BRIDGE RAILING, GUARDRAIL TYPE AND GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE		
	ENGINEER OF MAINTENANCE	ENGINEER OF DESIGN			
DRAWN BY: EJ-1	ENGINEER OF MATERIALS & TECHNOLOGY				
CHECKED BY:	ENGINEER OF TRAFFIC AND SAFETY	DEPUTY DIRECTOR - HIGHWAYS	F.H.W.A. APPROVAL	09/25/90 PLAN DATE	X-31A — SHEET 1 OF 2



NOTES:

DETAILS SHOWN ARE IN ACCORDANCE WITH CURRENT AASHTO SPECIFICATIONS.

BRIDGE RAILING, GUARDRAIL TYPE WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER LINEAR FOOT, WHICH PRICE INCLUDES PAYMENT IN FULL FOR ALL WORK AND MATERIAL NECESSARY TO ERECT THE RAILING. PAYMENT FOR ANCHOR ASSEMBLIES EMBEDDED IN BOX BEAMS IS INCLUDED IN THE BID ITEM *PRESTRESSED CONCRETE DECK*. PAYMENT FOR ANCHOR ASSEMBLIES EMBEDDED IN SUPERSTRUCTURE CONCRETE IS INCLUDED IN THE BID ITEM *SUPERSTRUCTURE CONCRETE*.

STEEL BEAM GUARDRAIL ELEMENTS AND BACK-UP ELEMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND STANDARD PLAN R-60 SERIES.

RAIL TUBE ELEMENTS SHALL MEET THE REQUIREMENTS OF A500 GRADE B, WITH A SILICON CONTENT OF LESS THAN 0.06% OR BETWEEN 0.15% & 0.25% AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM 123. RAIL TUBE ELEMENTS FROM ALL HEATS SUPPLIED SHALL BE TESTED PRIOR TO DELIVERY OF THE RAIL TO THE CONTRACTOR. SEE SPECIAL PROVISION FOR BRIDGE RAILING, GUARDRAIL TYPE.

POST ASSEMBLIES AND CHANNELS SHALL MEET THE REQUIREMENTS OF ASTM A36, WITH A SILICON CONTENT OF LESS THAN 0.06% OR BETWEEN 0.15% & 0.25% AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

POST ASSEMBLIES AND CHANNELS SHALL MEET THE CHARPY V-NOTCH REQUIREMENTS AS SPECIFIED IN 9.06.04 OF THE STANDARD SPECIFICATIONS AT A TEST TEMPERATURE OF 10°F(-12°C).

EXCEPT WHERE NOTED, ALL BOLTS, NUTS, AND STUDS FOR BRIDGE RAILING GUARDRAIL TYPE SHALL CONFORM TO THE PHYSICAL REQUIREMENTS OF ASTM A325 EXCEPT THAT THE MINIMUM ELONGATION SHALL BE 10%. THE CHEMICAL PROPERTIES ARE WAIVED. WASHERS SHALL MEET THE MECHANICAL REQUIREMENTS OF ASTM F436. ALL HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153. GALVANIZED NUTS SHALL BE TAPPED OVERSIZE PER THE REQUIREMENTS OF ASTM A563.

ANCHOR ASSEMBLIES CAST IN THE BRIDGE SLAB SHALL BE PRESET BY USE OF A TEMPLATE IN ACCORDANCE WITH 7.06.03 OF THE STANDARD SPECIFICATIONS. FOR PLACEMENT OF RAIL POSTS, SEE PLANS.

GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE, WILL PAID FOR AT THE CONTRACT UNIT PRICE EACH, WHICH INCLUDES PAYMENT IN FULL FOR ALL WORK AND MATERIAL NECESSARY TO ERECT THE GUARD RAIL.

GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE, SHALL CONFORM TO THE DIMENSIONS FOR GALVANIZED BEAM GUARDRAIL, TYPE B, STANDARD PLAN R-60 SERIES, AND SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS, EXCEPT WHERE MODIFIED BY THIS STANDARD.

AT POSTS ADJACENT TO TUBE EXPANSION SPLICES, NUTS FOR ⅝"ø BOLTS SHALL BE INSTALLED FINGER TIGHT WITH THE THREADS BURRED.

PREPARED BY DESIGN DIVISION	ENGINEER OF CONSTRUCTION	ENGINEER - BRIDGE DESIGN	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS STANDARD PLAN FOR BRIDGE RAILING, GUARDRAIL TYPE AND GUARDRAIL ANCHORAGE-BRIDGE, NESTED TYPE		
	ENGINEER OF MAINTENANCE	ENGINEER OF DESIGN			
DRAWN BY: EJ-1	ENGINEER OF MATERIALS & TECHNOLOGY				
CHECKED BY:	ENGINEER OF TRAFFIC AND SAFETY	DEPUTY DIRECTOR - HIGHWAYS	F.H.W.A. APPROVAL	09/25/90 PLAN DATE	X-31A — SHEET 2 OF 2

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9/12/17	5025-17-001OHM ADVISORS	CDS	MCH	MIDLAND	COLEMAN		H: 1"=40'	V:	

MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK
DETAIL SHEET

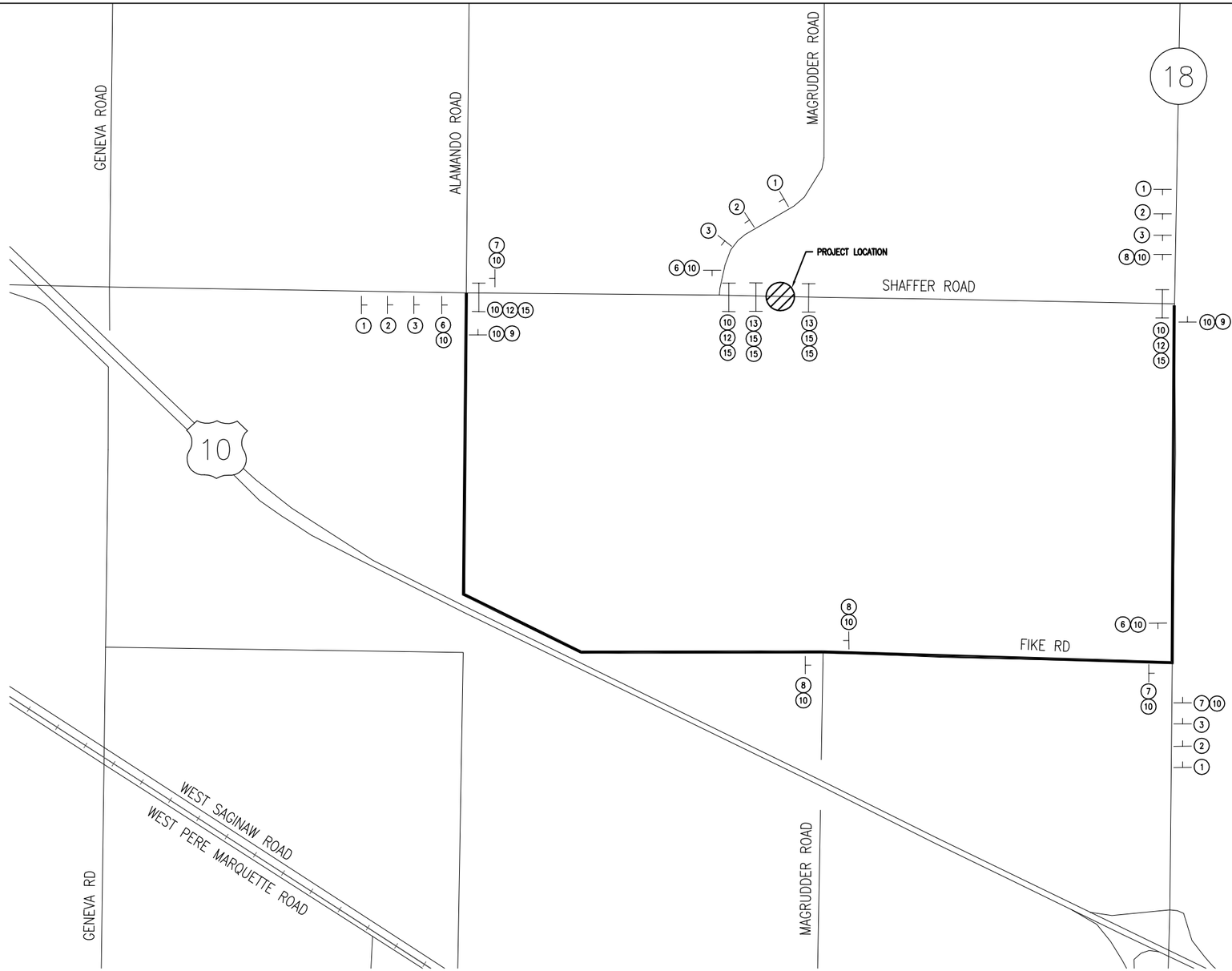
SHEET 11 OF 12

SIGN LEGEND

NO	SIGN	SIGN DESIGNATION	SIZE	NUMBER REQUIRED (FOR INFORMATION ONLY)	AREA (SQ. FT)
1	ROAD WORK AHEAD	W20-1	48"x48"	4	64
2	DETOUR AHEAD	W20-2	48"x48"	4	64
3	ROAD CLOSED AHEAD	W20-3	48"x48"	4	64
4	WORK ZONE BEGINS / TRAFFIC FINES DOUBLED	R5-18cLA	60"x42"	0	0
5	INJURE/KILL A WORKER / FINES - $ 7500 JAIL - 15 YRS	R5-18bLA	60"x42"	0	0
6	DETOUR	M4-9(R)	30"x24"	3	15
7	DETOUR	M4-9(L)	30"x24"	3	15
8	DETOUR	M4-9(S)	30"x36"	3	22.5
9	DETOUR ENDS	M4-8a	24"x18"	2	6
10	N SHAFFER RD	D3-1A	30"X12"	14	35
12	ROAD CLOSED AHEAD LOCAL TRAFFIC ONLY	R11-3	30"x48"	3	30
13	ROAD CLOSED	R11-2	30"x48"	2	20
14	END ROAD WORK	G20-2	48"x24"	0	0
15		TYPE III* BARRICADE	8'	7	

TRAFFIC NOTES:

1. DISTANCES SHOWN ARE APPROXIMATE AND MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER TO AVOID CONFLICT OR OBSTRUCTION BY EXISTING TREES, SIGNS, DRIVEWAYS ETC, PRESENT IN THE FIELD BUT NOT SHOWN ON THE PLANS.
2. ALL CONSTRUCTION SIGNS SHALL CONFORM WITH THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
3. ALL TRAFFIC CONTROL DEVICES INCLUDING SIGNS, BARRICADES, PLASTIC DRUMS AND WARNING LIGHTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
4. SIGNS, IF REQUIRED WITH THE TYPE III BARRICADES, SHALL BE MOUNTED ABOVE THE BARRICADES ON SEPARATE SUPPORTS.
5. TRAFFIC CONTROL DEVICES ARE TO BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF THE PROJECT. NIGHT PATROLS OF THE CONSTRUCTION AREA AND DETOUR ROUTE SHALL BE CONDUCTED BY THE CONTRACTOR AND WILL NOT BE PAID SEPARATELY, BUT WILL BE INCLUDED IN THE UNIT PRICE BID FOR TEMPORARY TRAFFIC CONTROL ITEMS.
6. ALL SIGNS SHALL BE RETRO-REFLECTIVE WITH A MATERIAL THAT HAS A SMOOTH, SEALED OUTER SURFACE.
7. ALL SPECIAL SIGNS SHALL BE PLACED ONE (1) WEEK PRIOR TO CONSTRUCTION.



DETOUR/ADVANCED SIGNING PLAN
NTS

LEGEND

- TEMP SIGN
- TYPE III BARRICADES

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MIDLAND COUNTY ROAD COMMISSION
SHAFFER ROAD BRIDGE OVER BLISS CREEK
MAINTAINING TRAFFIC

SHEET 12 OF 12