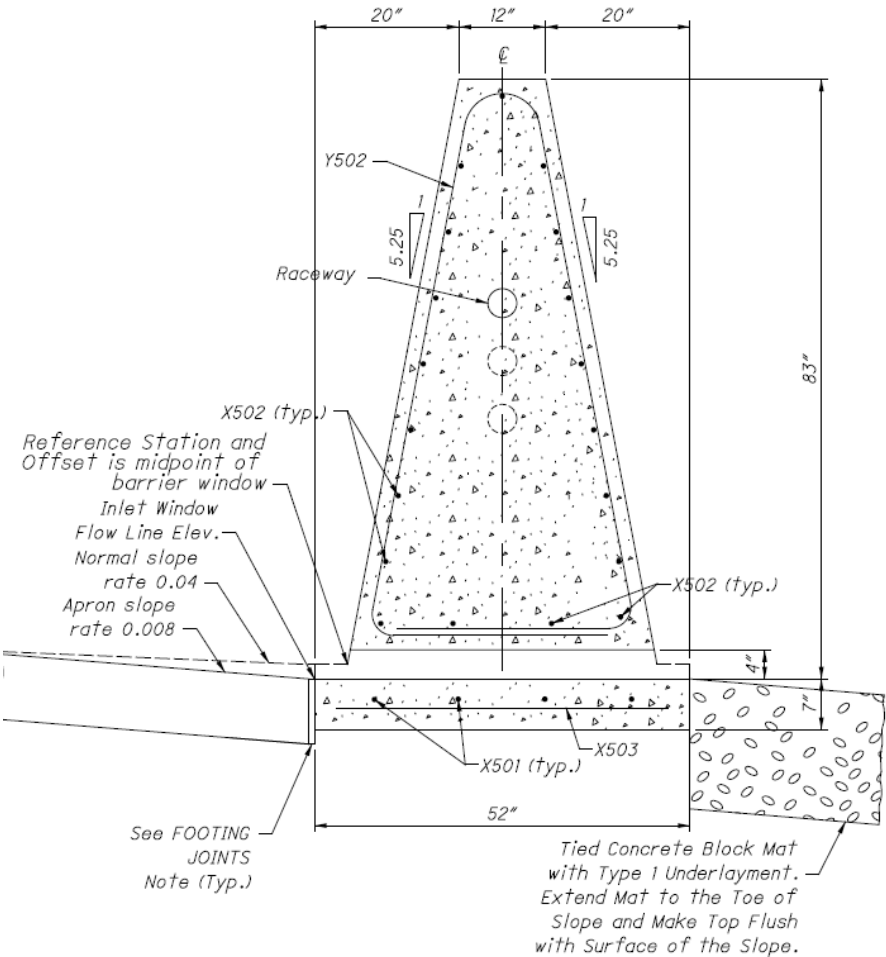


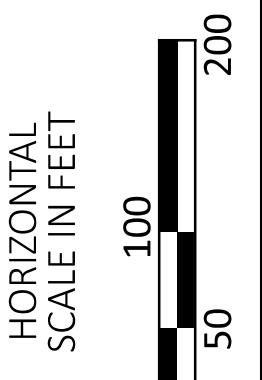
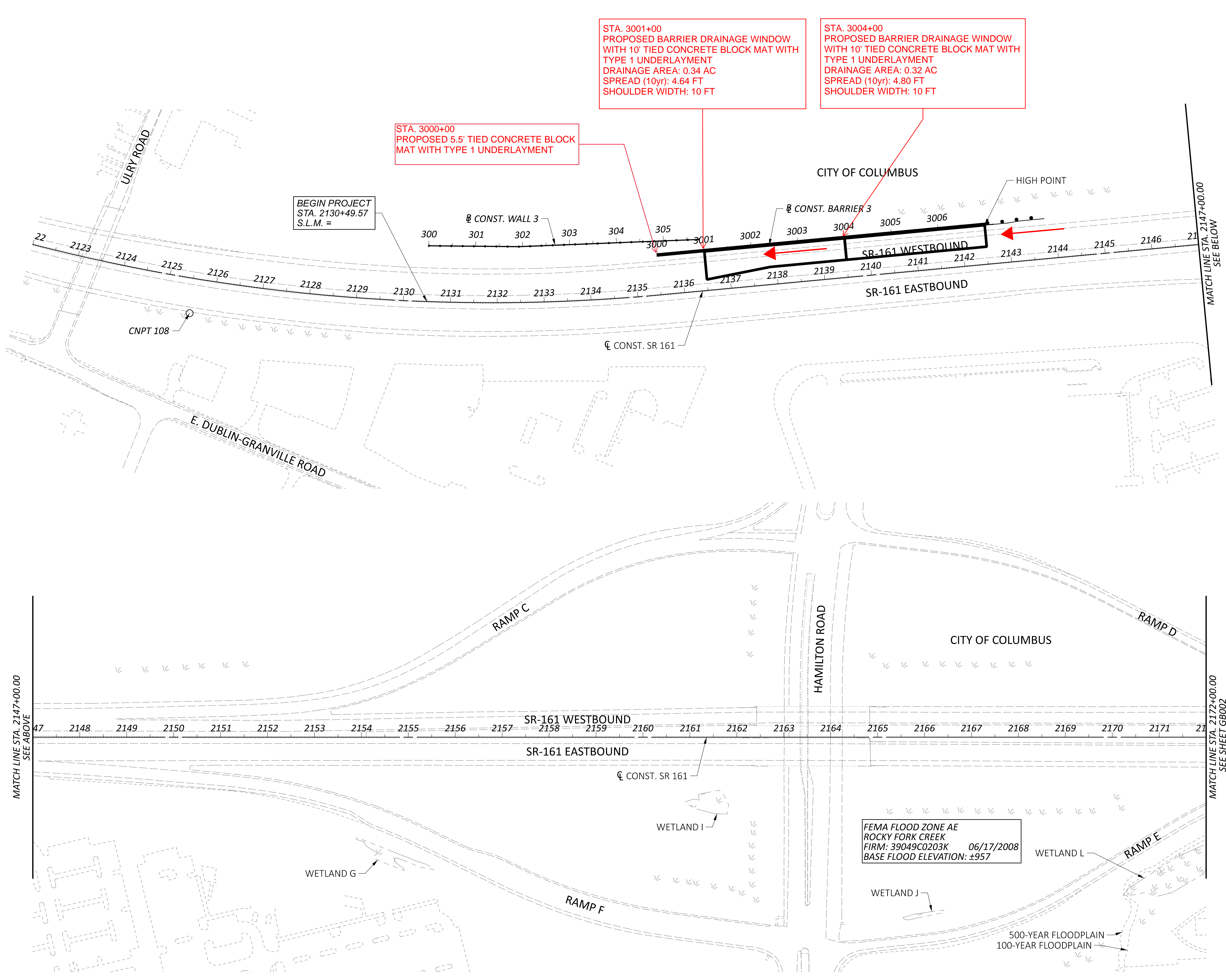
Ohio Department of Transportation

# FRA-161-15.80 Noise Walls – 81” Barrier Drainage Opening Spread Analysis

PID 117607

January 22, 2024

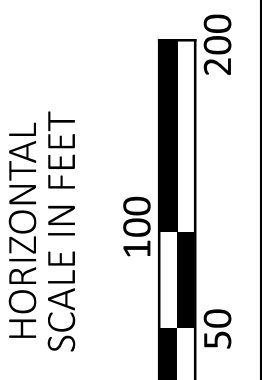
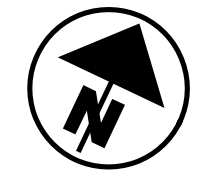
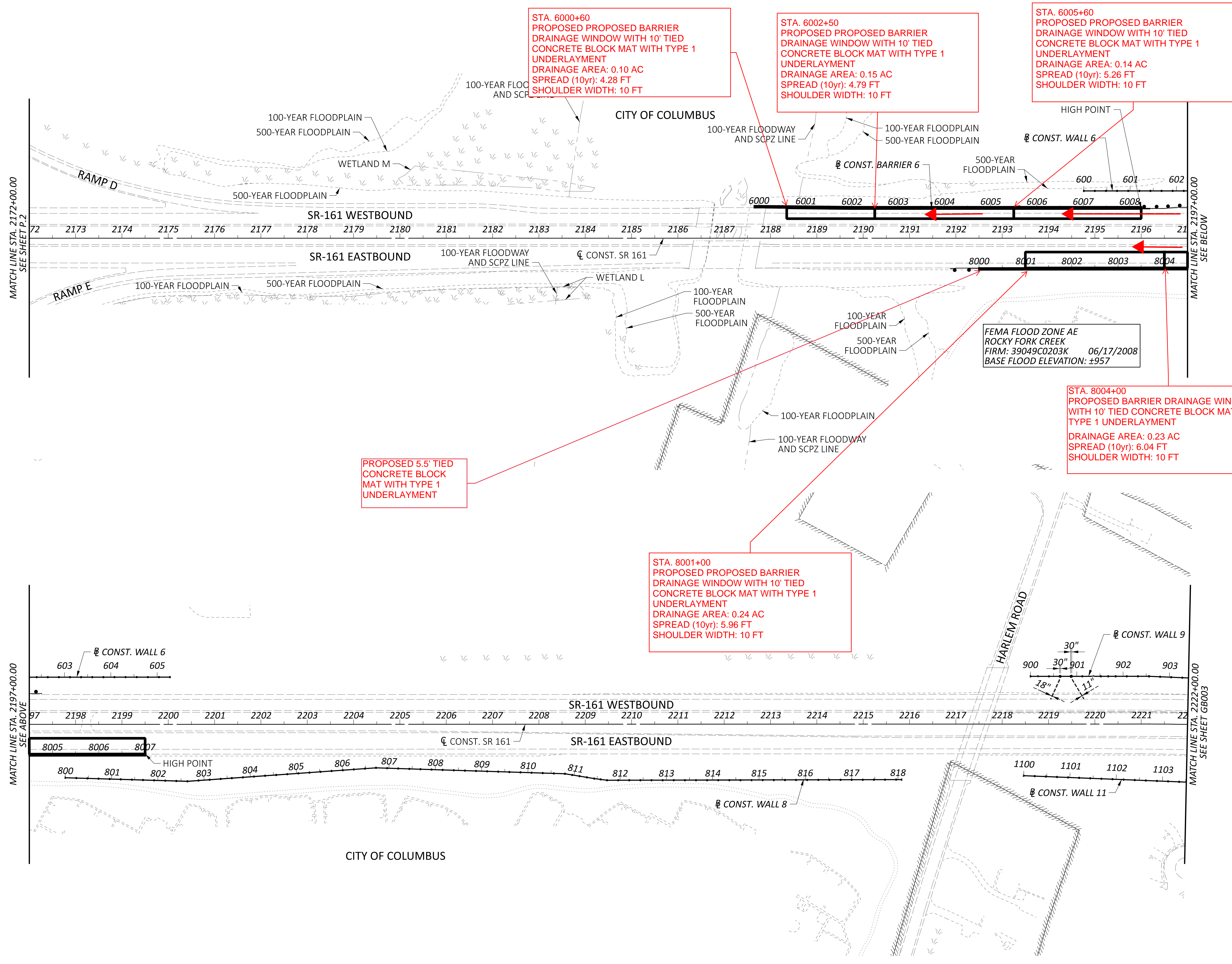




**SCHEMATIC PLAN WITH 81" BARRIER DRAINAGE AREAS AND SPREAD CALC SUMMARIES**  
 STA. 2122+00.00 TO STA. 2172+00.00

DESIGN AGENCY	
ARCADIS	
8101 NORTHERN BUCKLE CIRCLE, SUITE 100 COLUMBUS, OHIO 43235 (614) 818-4900 www.arcadis.com	
DESIGNER	
MDB	
REVIEWER	
JDH 1-22-2024	
PROJECT ID	
117607	
SHEET	TOTAL
1	3

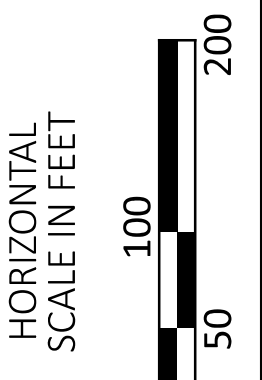
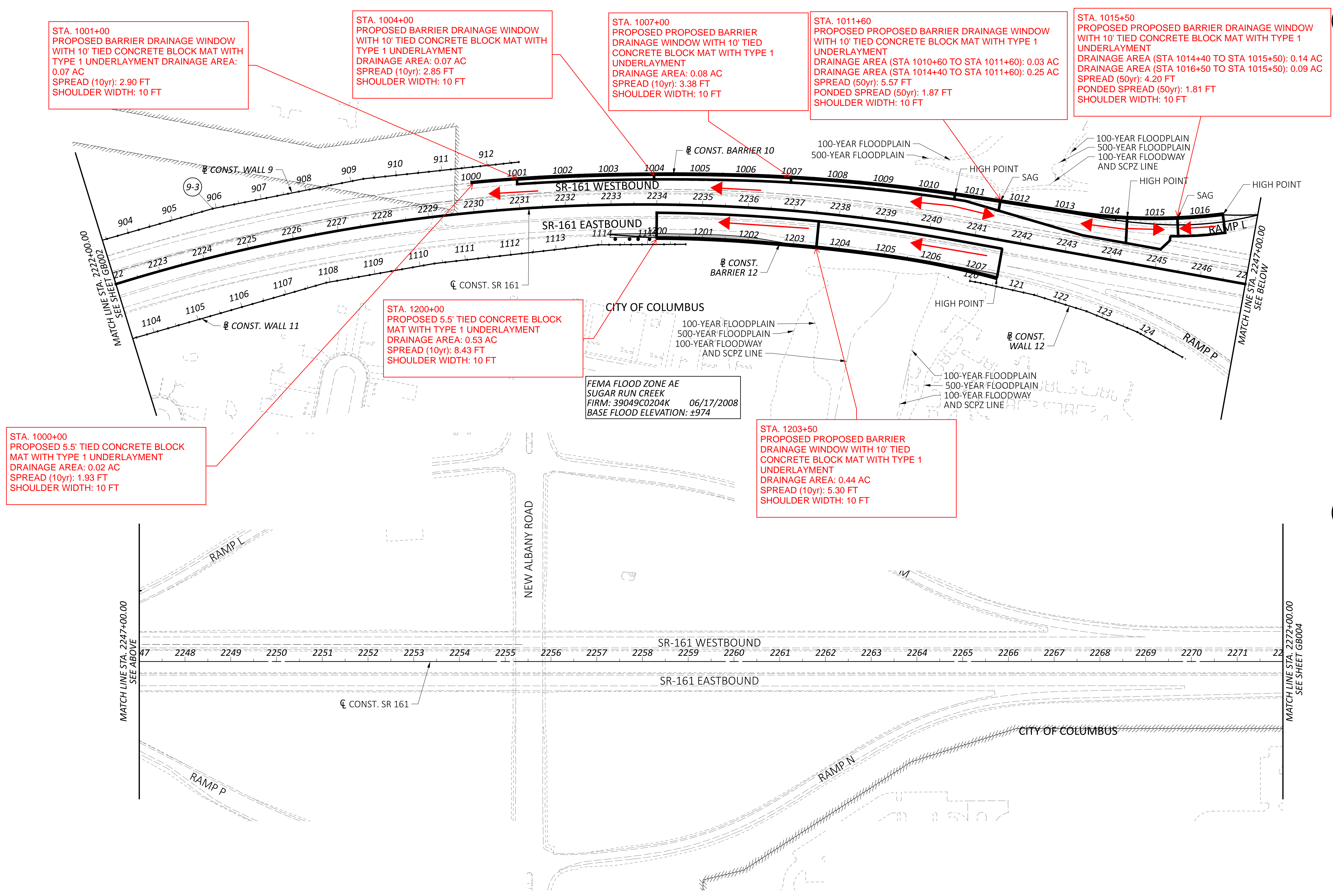




**SCHEMATIC PLAN WITH 81" BARRIER DRAINAGE AREAS AND SPREAD CALC SUMMARIES**  
 STA. 2172+00.00 TO STA. 2222+00.00

DESIGN AGENCY	
801 NORTHCHURCH ST SUITE 100 COLUMBUS OHIO 43260 (614) 818-4900 www.arcadis.com	
DESIGNER	
MDB	
REVIEWER	
JDH 1-22-2024	
PROJECT ID	
117607	
SHEET	TOTAL
2	3





**SCHEMATIC PLAN WITH 81" BARRIER DRAINAGE AREAS AND SPREAD CALC SUMMARIES**  
 STA. 2222+00.00 TO STA. 2272+00.00

DESIGN AGENCY	
<b>ARCADIS</b>	8101 NORTH HICKORY SUITE 100 COLUMBUS OHIO 43235 (614) 818-4900 www.arcadis.com
DESIGNER	
<b>MDB</b>	
REVIEWER	
JDH 1-22-2024	
PROJECT ID	
117607	
SHEET	TOTAL
3	3



# INLET SPACING DESIGN

**PID :** 117607    **Date :** 1-22-2024    **Project :** FRA-161-15.80

**Location :** Franklin County

**Description :** Wall 3 - 3007+00 to 3001+00

**Designer :** MDB

**Rainfall Area:** C

**Storm Frequency (yr.) :** 10

**Total Allow. Spread (ft.) :** 10.00

**Allowable Depth (ft.) :** 0.33

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
3007+00	Begin																	
3004+00	I-2-10	300.00	0.90	0.32	5.00	2.10	10.00	0.0143	0.0416	0.0156	10.00	0.1700	5.32	1.45	0.09	1.53	0.203	4.89
3001+00	I-2-10	300.00	0.90	0.34	5.00	1.77	10.00	0.0208	0.0416	0.0156	10.00	0.1700	5.32	1.49	0.23	1.71	0.198	4.75



# INLET SPACING DESIGN

**PID :** 117607    **Date :** 1-22-2024    **Project :** FRA-161-15.80

**Location :** Franklin County

**Description :** Wall 6 - 6008+25 to 6000+60

**Designer :** MDB

**Rainfall Area:** C

**Storm Frequency (yr.) :** 10

**Total Allow. Spread (ft.) :** 10.00

**Allowable Depth (ft.)** 0.33

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
6008+25	Begin																	
6005+60	I-2-10	265.00	0.90	0.14	5.00	5.32	10.32	0.0016	0.0416	0.0156	10.00	0.1700	5.26	0.66	0.00	0.66	0.223	5.36
6002+50	I-2-10	310.00	0.90	0.15	5.00	4.74	10.00	0.0032	0.0416	0.0156	10.00	0.1700	5.32	0.72	0.00	0.72	0.203	4.88
6000+60	I-2-10	190.00	0.90	0.10	5.00	3.50	10.00	0.0025	0.0416	0.0156	10.00	0.0000	5.32	0.47	0.00	0.47	0.181	4.36



# INLET SPACING DESIGN

**PID :** 117607    **Date :** 1-22-2024    **Project :** FRA-161-15.80

**Location :** Franklin County

**Description :** Wall 8 - 8007+00 to 8001+00

**Designer :** MDB

**Rainfall Area:** C

**Storm Frequency (yr.) :** 10

**Total Allow. Spread (ft.) :** 10.00

**Allowable Depth (ft.)** 0.33

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
8007+00	Begin																	
8004+00	I-2-10	300.00	0.90	0.23	5.00	4.75	10.00	0.0022	0.0416	0.0156	10.00	0.1700	5.32	1.10	0.00	1.10	0.256	6.15
8001+00	I-2-10	300.00	0.90	0.24	5.00	4.42	10.00	0.0025	0.0416	0.0156	10.00	0.1700	5.32	1.15	0.00	1.15	0.252	6.07



# INLET SPACING DESIGN

**PID :** 116707    **Date :** 1-22-2024    **Project :** FRA-161-15.80

**Location :** Franklin County

**Description :** Wall 10 - 1010+60 to 1014+40

**Designer :** MDB

**Rainfall Area:** C

**Storm Frequency (yr.) :** 50

**Total Allow. Spread (ft.) :** 10.00

**Allowable Depth (ft.) :** 0.33

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
1010+60	Begin																	
1011+60	I-2-10	100.00	0.90	0.03	5.00	2.04	10.00	0.0034	0.0416	0.0156	10.00	0.1700	6.50	*****	*****	0.18	0.120	2.89 Sag
1014+40	Begin																	
1011+60	I-2-10	280.00	0.90	0.25	10.00	3.84	13.84	0.0029	0.0416	0.0156	10.00	0.1700	5.73	*****	*****	1.28	0.256	6.15 End

## SUMP DATA

**Total Flow (cfs) :** 1.46

**Ponded Depth (ft.) :** 0.131

**Spread on Pavement (ft.) :** 2.23





# INLET SPACING DESIGN

**PID :** 116707    **Date :** 1-22-2024    **Project :** FRA-161-15.80

**Location :** Franklin County

**Description :** Wall 10 - 1014+40 to 1016+50

**Designer :** MDB

**Rainfall Area:** C

**Storm Frequency (yr.) :** 50

**Total Allow. Spread (ft.) :** 10.00

**Allowable Depth (ft.) :** 0.33

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)	
1014+40	Begin																		
1015+50	I-2-10	110.00	0.90	0.14	5.00	1.23	10.00	0.0059	0.0416	0.0156	10.00	0.1700	6.50	*****	*****	0.84	0.192	4.61	Sag
1016+50	Begin																		
1015+50	I-2-10	100.00	0.90	0.09	10.00	1.05	11.05	0.0107	0.0416	0.0156	10.00	0.1700	6.26	*****	*****	0.52	0.143	3.44	End

## SUMP DATA

**Total Flow (cfs) :** 1.36

**Ponded Depth (ft.) :** 0.125

**Spread on Pavement (ft.) :** 2.13



# INLET SPACING DESIGN

**PID :** 117607    **Date :** 1-22-2024    **Project :** FRA-161-15.80

**Location :** Franklin County

**Description :** Wall 10 - 1010+60 to 1000+00

**Designer :** MDB

**Rainfall Area:** C

**Storm Frequency (yr.) :** 10

**Total Allow. Spread (ft.) :** 10.00

**Allowable Depth (ft.)** 0.33

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
1010+60	Begin																	
1007+00	I-2-10	360.00	0.90	0.08	5.00	5.19	10.19	0.0056	0.0416	0.0156	10.00	0.1700	5.28	0.39	0.00	0.39	0.146	3.51
1004+00	I-2-10	300.00	0.90	0.07	5.00	3.51	10.00	0.0104	0.0416	0.0156	10.00	0.1700	5.32	0.33	0.00	0.33	0.121	2.92
1001+00	I-2-10	300.00	0.90	0.07	5.00	3.58	10.00	0.0100	0.0416	0.0156	10.00	0.0000	5.32	0.32	0.00	0.33	0.122	2.92



# INLET SPACING DESIGN

**PID :** 117607    **Date :** 1-22-2024    **Project :** FRA-161-15.80

**Location :** Franklin County

**Description :** Wall 12 - 1207+51 to 1200+00

**Designer :** MDB

**Rainfall Area:** C

**Storm Frequency (yr.) :** 10

**Total Allow. Spread (ft.) :** 10.00

**Allowable Depth (ft.)** 0.33

STATION	C.B. Type	GUTTER LENGTH (ft.)	RUNOFF COEF	AREA (acres)	CONC. TIME (min.)	GUTTER TIME (min.)	TIME USED (min.)	LONG. SLOPE (ft./ft.)	GUTT. SLOPE (ft./ft.)	PAVT. SLOPE (ft./ft.)	GUTT. WIDTH (ft.)	LOCAL DEPRESS. (ft.)	RAIN FALL (in./hrs.)	INTERCPTD FLOW (cfs.)	BYPASS FLOW (cfs.)	TOTAL FLOW (cfs.)	DEPTH FLOW (ft.)	PAVT. SPREAD (ft.)
1207+51	Begin																	
1203+50	I-2-10	401.00	0.90	0.53	5.00	5.48	10.48	0.0019	0.0416	0.0156	10.00	0.1700	5.23	2.49	0.00	2.49	0.357	8.59
1200+00	I-2-6	350.00	0.90	0.44	5.00	2.17	10.00	0.0159	0.0416	0.0156	10.00	0.1700	5.32	1.22	0.89	2.11	0.224	5.39



Date: 01/22/2024  
 Calculated By: MDB  
 Checked By: JDH



MAH-680 Barrier Window - Flume Shear Stress

Inlet Station	Embankment Slope	D = Water Surface Depth (per CDSS spread calculations)	Shear Stress (L&D 1102.3.2)	Tied Concrete Block Mat Acceptable (<12 lbs/ft^2)
	ft/ft	ft	tac = 62.4DS	
<b>Wall 3</b>				
3004+00	0.50	0.203	6.33	✓
3001+00	0.50	0.198	6.18	✓
<b>Wall 6</b>				
6005+60	0.50	0.223	6.96	✓
6002+50	0.50	0.203	6.33	✓
6000+60	0.50	0.181	5.65	✓
<b>Wall 8</b>				
8004+00	0.50	0.256	7.99	✓
8001+00	0.50	0.252	7.86	✓
<b>Wall 10</b>				
1015+50	0.50	0.192	5.99	✓
1011+60	0.50	0.256	7.99	✓
1007+00	0.50	0.146	4.56	✓
1004+00	0.50	0.121	3.78	✓
1001+00	0.50	0.122	3.81	✓
<b>Wall 12</b>				
1203+50	0.50	0.357	11.14	✓
1200+00	0.50	0.224	6.99	✓

