Department of Engineering

October 29, 2021

ADDENDUM # 3
Little Hills Expressway and Mel Wetter Parkway Intersection Improvements
PROJECT NUMBER CMAQ #4917(602)
BID # 4527

ATTENTION ALL PLAN HOLDERS:

The City of St. Charles is issuing this Addendum to the Little Hills Expressway and Mel Wetter Parkway Intersection Improvement Plan Sheets and Bid Documents. The purpose of the addendum is to make modifications to the stamped brick median, traffic control plans, sign posts, and the MSE wall. The revised bid information is as follows:

1. On the plan sheet #3, the typical section for the median has changed to clarify that Type 5 Aggregate is incidental to the median. The call out for "Stamped Brick Median" has changed to "Pigmented and Textured Median" to match the bid item.

2. On plan sheets #12-16, the traffic control plan for phase 1 & 2 changed. Phase 1 added a quality for temporary asphalt on the east and west ends of the roundabout in order to shift westbound traffic into the roundabout for phase 2. Phase 2 plan sheets shows the necessary traffic control to navigate westbound drivers to utilize the northern portion of the roundabout.

    a. JSP B – Work Zone Traffic Management Plan section 4.2-4.2.2 have been revised to reflect these modifications.
    b. Plan Sheets 2A, 2B and #11 have been updated.
    c. A temporary asphalt pavement detail has been added to plan sheet #3.

3. On plan sheet #20, general note #2 removed ornamental with square tube posts. Also, an extra note #4 was added, stating, "Wayfinding signs shall be mounted on two sign post each".

    a. JSP Q – Roadway Signs/Sign Posts, section 1.3 removed u-channel post and replaced with black square tube post

Department of Engineering

4. On plan sheet #24, the mechanically stabilized earth (MSE) wall height was shortened which reduced the MSE quantity from 8,802 to 5,894 SQFT. Soil reinforcement length changed from .7H to 1.0H which is shown on plan sheet #25.

    a. Plan Sheets #2A, #2B, #4, #5, Cross section sheets #36 & 37, and the Report of Subsurface Exploration and Geotechnical Engineering have been updated.

5. The Project Bid Form has been revised to accommodate these changes.

Please adjust your bid accordingly.

_____

CONTRACTOR'S SIGNATURE **DATE**

_____

Printed Name

_____

Company Name

****

A COPY OF THIS NOTICE SHALL BE STAPLED TO THE BID PROPOSAL AND MUST BE SIGNED ACKNOWLEDGING RECEIPT

Item Number	Item Description	Unit	Quantity
	ROADWAY:		
201-20.10	CLEARING AND GRUBBING	ACRE	1.5
202-20.10	REMOVAL OF IMPROVEMENTS	LS	1
202-22.95	SAWCUT (ANY DEPTH/MATERIAL)	LF	199
203-10.00	CLASS "A" EXCAVATION*	CY	15000
203-60.00	COMPACTING EMBANKMENT	CY	500
304-05.04	TYPE 5 AGGREGATE BASE (4" THICK)	SY	6704.9
405-30.30	TYPE "X" BITUMINOUS CONCRETE (BASE)	TONS	9.2
502-11.08	CONCRETE PAVEMENT (8" NON-REINFORCED)	SY	6264.5
603-10.99	ADJUST UTILITY COVER TO GRADE	EA	1
604-14.01	AREA INLET, SINGLE, OPEN 1 SIDE, UNTRAPPED	EA	1
604-20.26	ADJUST GRATE INLET TO GRADE	EA	3
607-01.60	CHAIN LINK FENCE (60")	LF	474
608-10.00	CONCRETE MEDIAN	SY	460.1
609-10.41	CONCRETE GUTTER, TYPE "A"	LF	78
609-10.55	CURB AND GUTTER, MOUNTABLE (3")	LF	384
609-10.99	CONCRETE GUTTER, MODIFIED TYPE "A"	LF	474
609-20.11	INTEGRAL CURB (6" HEIGHT AND UNDER)	LF	469
609-60.98	FURNISHING TYPE 3 ROCK DITCH LINER	CY	296
609-60.99	PLACING TYPE 3 ROCK DITCH LINER	CY	296
609-70.00	BEDDING MATERIAL FOR ROCK DITCH LINER	CY	108
612-10.20	MOVEABLE BARRICADES WITH MODEL "B" AMBER FLASHERS (2 EACH PER BARRICADE)	EA	21
612-70.20	CHANGEABLE MESSAGE BOARD (NOISELESS), RENTAL	EA	3
616-10.05	CONSTRUCTION SIGNS	SF	392
616-10.25	CHANNELIZER (TRIM LINE)	EA	95
617-30.00	PERMANENT CONCRETE MEDIAN BARRIER, TYPE "D"	LF	55
619-00.00	MOBILIZATION	LS	1
627-40.99	CONTRACTOR FURNISHED SURVEYING AND STAKING	LS	1
703-05.00	GRAFITTI PROTECTION SYSTEM	LS	1
703-05.99	CONCRETE AND MASONRY PROTECTION SYSTEM	LS	1
720-10.00	MECHANICALLY STABILIZED EARTH WALL SYSTEMS*	SF	5894
726-13.12	12" CLASS III REINFORCED CONCRETE PIPE CULVERT	LF	37
731-00.48	PRECAST CONCRETE MANHOLE (48")	EA	1
803-10.00	SODDING	SY	3114
804-10.00	TOPSOIL	CY	346
805-10.00	SEEDING	ACRE	0.4
806-00.99	SEDIMENT REMOVAL	CY	28.0
806-20.00	PERMANENT EROSION CONTROL BLANKET	SY	250.0
806-30.01	ROCK DITCH CHECK	EA	26
806-50.00	TEMPORARY SEEDING AND MULCHING	ACRE	1.0
806-70.00	SILT FENCE	LF	193

Item Number	Item Description	Unit	Quantity
	PEDESTRIAN FACILITIES:		
404-30.10	TYPE "C" ASPHALTIC CONCRETE	TONS	7
608-60.07	CONCRETE SIDEWALK, CURB RAMP (7" THICK)	SY	25.5
608-60.98	TRUNCATED DOMES FOR CURB RAMPS (NEW CONSTRUCTION)	SF	133
	STRIPING, SIGNING, AND LIGHTING:		
620-99.01	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 8 IN. YELLOW	LF	2339
620-99.02	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 8 IN. WHITE	LF	2169
620-99.03	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 12 IN. WHITE	LF	61
620-99.04	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24 IN. WHITE	LF	260
620-99.05	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24 IN. YELLOW	LF	180
620-99.06	PREFORMED THERMOPLASTIC PAVEMENT MARKING, STRAIGHT ARROW	EA	1
620-99.07	PREFORMED THERMOPLASTIC PAVEMENT MARKING, LEFT/RIGHT ARROW	EA	1
620-99.08	PREFORMED THERMOPLASTIC PAVEMENT MARKING, COMBINATION STR/LT/RT	EA	5
620-99.09	PREFORMED THERMOPLASTIC, PAVEMENT MARKING, BIKE LANE	EA	3
620-99.10	PREFORMED THERMOPLASTIC PAVEMENT MARKING, WORD (YIELD)	EA	3
628-00.10	ROADWAY SIGNS (FURNISH AND INSTALL, PERMANENT)	SF	111
628-00.98	SH-FLAT SHEET	SF	50
628-00.99	GROUND MOUNTED SIGN POST	EA	32
901-10.30	LIGHTING POLE, 30 FT, TYPE AT (POWDER COATED BLACK)	EA	10
901-13.12	LUMINAIRE, LED-B, TENON MOUNT (POWDER COATED BLACK)	EA	10
901-30.02	CONDUIT, 2" RIGID, IN TRENCH	LF	1038
901-30.03	CONDUIT, 3" RIGID, IN TRENCH	LF	207
901-30.04	CONDUIT, 4" RIGID, IN TRENCH	LF	15
901-40.03	CONDUIT, 3" RIGID, PUSHED	LF	188
901-61.10	PULL BOX, PREFORMED CLASS 1	EA	6
901-70.08	CABLE, #8 AWG, 1 CONDUCTOR	LF	3500
901-71.10	POLE & BRACKET CABLE	LF	1020
901-70.08	WIRE, #8 AWG, BARE NEUTRAL	LF	1750
901-82.30	POLE FOUNDATION, 30 FT	EA	10
901-86.12	POWER SUPPLY ASSEMBLY & CONTROLLER, 240 V LTG	EA	1
901-99.01	REMOVAL OF EXIST. LIGHTING EQUIPMENT	LS	1
901-99.02	BRACKET ARM, 2 FT, DECORATIVE (POWDER COATED BLACK)	EA	3
901-99.03	PEDESTRIAN LIGHT POLE & FOUNDATION	EA	8
901-99.04	PEDESTRIAN LUMINAIRE	EA	11
	LANDSCAPING/STREESCAPING:		
840-90.99	LANDSCAPING	LS	1

*GROUND REMEDIATION AND ANY REQUIRED EXCAVATION ARE TO BE CONSIDERED INCIDENTAL TO MECHANICALLY STABILIZED EARTH WALL SYSTEMS PAY ITEM.

2

STATE OF MISSOURI
JARRETT D. JASPER
NUMBER PE-2005005570
PROFESSIONAL ENGINEER
10/28/2021

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED
10/28/2021

ROUTE | STATE
MO

DISTRICT | SHEET NO.
2A

COUNTY
ST. CHARLES

JOB NO.
CMAQ#4917(602)

CONTRACT ID.

PROJECT NO.
19STR30

BRIDGE NO.

DATE	DESCRIPTION
10/25/21	ADDENDUM 2

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

HORNER SHIFRIN
THE POWER HOUSE AT UNION STATION
401 S. 18th St. Ste. 400
ST. LOUIS, MO 63103-2296
314-531-4321 FAX: 314-531-6966
www.HornerShifrin.com
Certificate of Authority: 000159
Expiration Date: December 31, 2020

LITTLE HILLS EXPRESSWAY
SUMMARY OF QUANTITIES
SHEET 1 OF 2

MOBILIZATION

LUMP SUM = 1

REMOVAL OF IMPROVEMENTS

LUMP SUM = 1

CONTRACTOR FURNISHED SURVEYING AND STAKING

LUMP SUM = 1

CLEARING AND GRUBBING

LOCATION	SIDE	AREA	REMARKS
		(AC)	
LITTLE HILLS EXPRESSWAY	BOTH	1.46	
TOTAL		1.46	
USE		1.5	

2 EARTHWORK

LOCATION	CLASS 'A' EXCAVATION	COMPACTING EMBANKMENT	REMARKS
	VOLUME (CY)	VOLUME (CY)	
LITTLE HILLS EXPRESSWAY	10300	500	
MSE WALL A	4700		
TOTAL	15000	500	
USE	15000	500	

CONCRETE PAVEMENT

LOCATION	CONCRETE PAVEMENT (8" NON-REINFORCED)	TYPE 5 AGGREGATE FOR BASE (4" THICK)	PIGMENTING AND TEXTURING CONCRETE PAVEMENT, TRUCK APRON	REMARKS
	AREA (SY)	AREA (SY)	AREA (SY)	
LITTLE HILLS EXPRESSWAY	6264.5	6507.2	408.4	
TOTAL	6264.5	6507.2	408.4	
USE	6264.5	6507.2	408.4	

CONCRETE MEDIAN

LOCATION	STATION	STATION	CONCRETE MEDIAN	PIGMENTING AND TEXTURING CONCRETE PAVEMENT AND MEDIAN	REMARKS
			(SY)	(SY)	
LITTLE HILLS - WEST	202+28.68	203+41.96	263.0	263.0	
LITTLE HILLS - EAST	300+80.86	301+06.20	43.4	43.4	
LITTLE HILLS - EAST	301+16.49	301+71.97	20.7	20.7	
MEL WETTER PARKWAY	59+91.40	60+19.92	33.0	33.0	
MEL WETTER PARKWAY	60+29.97	60+61.31	100.0	100.0	
	TOTAL		460.1	460.1	
	USE		460.1	460.1	

SAWCUT

LOCATION	STATION	SAWCUT (ANY DEPTH/MATERIAL)	REMARKS
		LENGTH (LF)	
LITTLE HILLS - WEST	200+00.00	43.0	
LITTLE HILLS - EAST	302+88.48	41.6	
MEL WETTER PARKWAY	59+60.47	54.3	
MEL WETTER PARKWAY	60+08.40	10.5	GREENWAY
LITTLE HILLS INDUSTRIAL	71+38.88	49.7	
TOTAL		199.1	
USE		199	

ADJUSTMENTS

LOCATION	STATION	ADJUST GRATE INLET TO GRADE	ADJUST UTILITY COVER TO GRADE	REMARKS
		EACH (EA)	EACH (EA)	
MEL WETTER PARKWAY	59+92.03	1		
MEL WETTER PARKWAY	60+76.03	1		
LITTLE HILLS INDUSTRIAL	70+53.49	1		
LITTLE HILLS - EAST	300+97.11		1	
	TOTAL	3	1	
	USE	3	1	

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JARRETT D. JASPER
NUMBER PE-2005005570
PROFESSIONAL ENGINEER
10/25/2021

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED: 10/28/2021
ROUTE: | STATE: MO
DISTRICT: | SHEET NO.: 2B
COUNTY: ST. CHARLES
JOB NO.: CMAQ#4917(602)
CONTRACT ID.:
PROJECT NO.: 19STR30
BRIDGE NO.:

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LITTLE HILLS EXPRESSWAY
SCHEDULE OF QUANTITIES
SHEET 1 OF 5

CURB & GUTTER

LOCATION	STATION	STATION	SIDE	INTEGRAL CURB (6" HEIGHT AND UNDER)	CURB AND GUTTER, MOUNTABLE (3")	CONCRETE GUTTER, TYPE "A"	REMARKS
				LENGTH (LF)	LENGTH (LF)	LENGTH (LF)	
LITTLE HILLS EXPRESSWAY	10+00.00	15+78.05	LEFT	320.4			CENTER ISLAND
LITTLE HILLS EXPRESSWAY	10+00.00	15+78.05	LEFT		383.3		
LITTLE HILLS INDUSTRIAL	70+16.92	70+75.20	LEFT	21.8			
LITTLE HILLS INDUSTRIAL	70+19.87	70+75.20	LEFT	61.2			
LITTLE HILLS INDUSTRIAL	70+55.06	70+75.20	RIGHT	65.5			
LITTLE HILLS - WEST	200+45.57	200+49.59	LEFT			6.3	
LITTLE HILLS - EAST	301+00.65	301+48.04	LEFT			71.4	
		TOTAL		468.9	383.3	77.7	
		USE		469	384	78	

SIDEWALK

LOCATION	TYPE "C" ASPHALTIC CONCRETE	CONCRETE SIDEWALK, CURB RAMP (7" THICK)	TYPE 5 AGGREGATE FOR BASE (4" THICK)	TRUNCATED DOMES FOR CURB RAMPS (NEW CONSTRUCTION)	REMARKS
	(TONS)	AREA (SY)	AREA (SY)	AREA (SF)	
LITTLE HILLS EXPRESSWAY	7.0	25.5	197.7	132.6	
TOTAL	7.0	25.5	197.7	132.6	
USE	7.0	25.5	197.7	133	

STORM SEWER

LOCATION	STATION	OFFSET	STRUCTURE NUMBER	TO STRUCTURE	PIPE OPENINGS	AREA INLET, SINGLE, OPEN 1 SIDE, UNTRAPPED	PRECAST CONCRETE MANHOLE (48")	12" CLASS III REINFORCED CONRETE PIPE CULVERT	REMARKS
						EACH (EA)	EACH (EA)	LENGTH (FT)	
MEL WETTER PARKWAY	60+21.31	47.04	1-1	1-2	1-12"		1	36.9	
MEL WETTER PARKWAY	60+47.05	77.3	1-2		1-12"	1			
					TOTAL	1	1	37	
					USE	1	1	37	

WALL

2

LOCATION	STATION	STATION	MECHANICALLY STABILIZED EARTH WALL SYSTEMS	CONCRETE GUTTER, MODIFIED TYPE "A"	CHAIN LINK FENCE (60")	GRAFFITI PROTECTION SYSTEM	CONCRETE AND MASONRY PROTECTION	WALL LETTERING AND MOUNTING	WALL MOUNTED SIGN LIGHTING SYSTEM	REMARKS
			AREA (SF)	LENGTH (LF)	LENGTH (LF)	LUMP SUM (LS)	LUMP SUM (LS)	LUMP SUM (LS)	LUMP SUM (LS)	
LITTLE HILLS EXPRESSWAY	10+00.00	14+71.70	5894.1	474.0	474.0	1	1	1	1	
TOTAL			5894.1	474.0	474.0	1	1	1	1	
USE			5894	474	474	1	1	1	1	

STATE OF MISSOURI
JARRETT D. JASPER
NUMBER PE-2005005570
PROFESSIONAL ENGINEER
3/4/2021

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LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED
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ADDENDUM 2	10/25/21

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LITTLE HILLS EXPRESSWAY
SCHEDULE OF QUANTITIES
SHEET 2 OF 5

TEMPORARY TRAFFIC CONTROL

LOCATION	SIGN	SIZE	QUANTITY	CONSTRUCTION SIGNS	DESCRIPTION	MOVEABLE BARRICADES WITH MODEL "B" AMBER FLASHERS (2 EACH PER BARRICADE)	CHANNELIZER (TRIM-LINE)	CHANGEABLE MESSAGE BOARD (NOISELESS), RENTAL
	(LF)	(IN)	(EA)	(SF)		(EA)	(EA)	(EA)
LITTLE HILLS EXPRESSWAY	W020-1	48X48	2	32	ROAD WORK AHEAD			
LITTLE HILLS EXPRESSWAY	G020-2	48X24	2	16	END ROAD WORK			
LITTLE HILLS EXPRESSWAY	W01-4L	48X48	1	16	REVERSE CURVE (LEFT)			
LITTLE HILLS EXPRESSWAY	W01-4R	48X48	1	16	REVERSE CURVE (RIGHT)			
LITTLE HILLS EXPRESSWAY	W021-5	48X48	2	32	SHOULDER WORK AHEAD			
LITTLE HILLS EXPRESSWAY	W020-4	48X48	0	0	ONE LANE ROAD AHEAD			
LITTLE HILLS EXPRESSWAY	W020-7a	48X48	0	0	FLAGGER WITH FLAGS			
LITTLE HILLS EXPRESSWAY	W5-1	48X48	1	16	ROAD NARROWS			
LITTLE HILLS EXPRESSWAY	R11-2	48X30	5	50	ROAD CLOSED			
LITTLE HILLS EXPRESSWAY	M04-9L	30X24	5	25	DETOUR (LEFT)			
LITTLE HILLS EXPRESSWAY	M04-9R	30X24	5	25	DETOUR (RIGHT)			
LITTLE HILLS EXPRESSWAY	M04-8	24X12	4	8	DETOUR			
LITTLE HILLS EXPRESSWAY	M6-3	24X12	4	8	STRAIGHT ARROW			
LITTLE HILLS EXPRESSWAY	M04-8a	24X18	1	3	END DETOUR			
LITTLE HILLS EXPRESSWAY	W020-3	48X48	1	16	ROAD CLOSED AHEAD			
LITTLE HILLS EXPRESSWAY	R11-3A	60X30	2	25	LOCAL TRAFFIC AHEAD			
LITTLE HILLS EXPRESSWAY	SPECIAL SIGN	30X18	15	56	FIFTH ST			
LITTLE HILLS EXPRESSWAY	SPECIAL SIGN	48x36	2	24	PROJECT INDENTIFICATION - CITY			
LITTLE HILLS EXPRESSWAY	SPECIAL SIGN	48x36	2	24	PROJECT INDENTIFICATION - COUNTY			
LITTLE HILLS EXPRESSWAY						21		
LITTLE HILLS EXPRESSWAY							95	
LITTLE HILLS EXPRESSWAY								3
				2		2		
			TOTAL	392.0		21	95	3

2 2 2

SODDING

LOCATION	SODDING	TOPSOIL	REMARKS
	AREA (SY)	VOLUME (CY)	
LITTLE HILLS EXPRESSWAY	3113.5	345.9	
TOTAL	3113.5	345.9	
USE	3114	346	

ASPHALT PAVEMENT

LOCATION	BITUMINOUS PAVEMENT MIXTURE PG64-22 (BASE)					REMARKS
	AREA (SF)	DEPTH (FT)	VOLUME (CY)	CONVERSION (TONS/CY)	TONS	
LITTLE HILLS EXPRESSWAY	226.7	0.5	4.2	2.2	9.2	
TOTAL					9.2	
USE					9.2	

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3/4/2021

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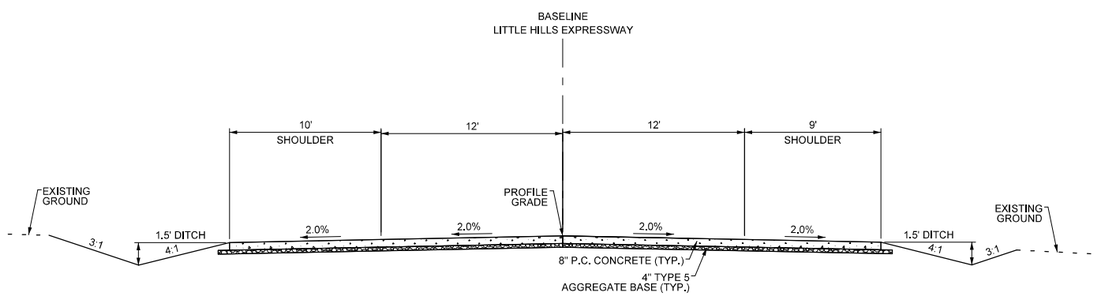
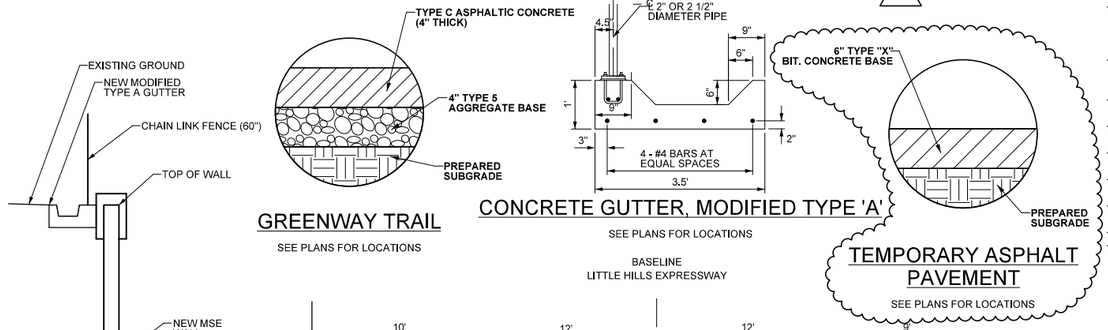
LITTLE HILLS EXPRESSWAY
SCHEDULE OF QUANTITIES
SHEET 4 OF 5



LITTLE HILLS EXPRESSWAY - WEST

STA. 200+00.00 - STA. 200+50.00



GREENWAY TRAIL

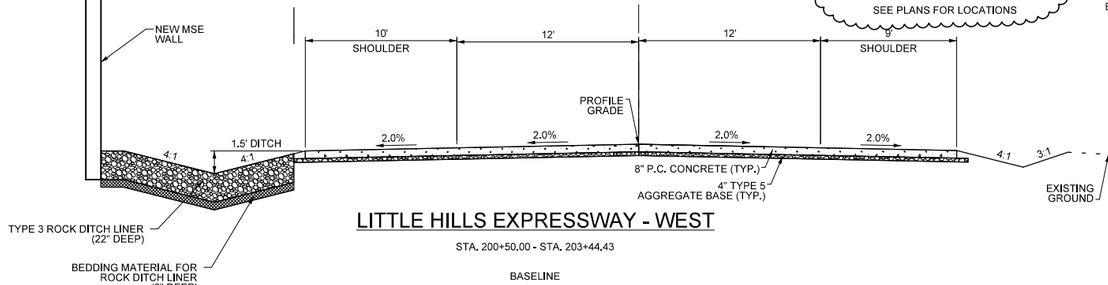
SEE PLANS FOR LOCATIONS

CONCRETE GUTTER, MODIFIED TYPE 'A'

SEE PLANS FOR LOCATIONS

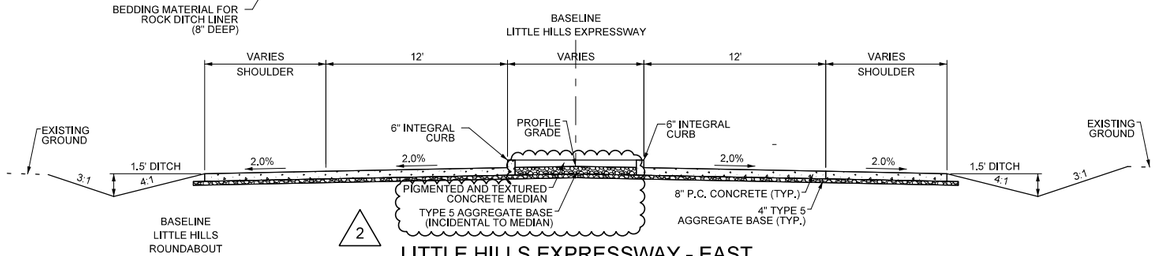
TEMPORARY ASPHALT PAVEMENT

SEE PLANS FOR LOCATIONS



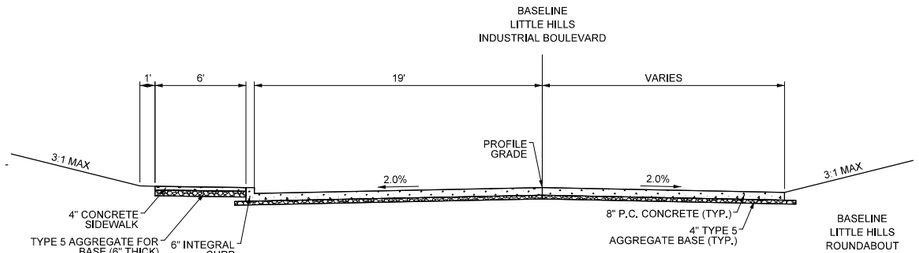
LITTLE HILLS EXPRESSWAY - WEST

STA. 200+50.00 - STA. 203+44.43



LITTLE HILLS EXPRESSWAY - EAST

STA. 300+78.73 - STA. 302+88.48



LITTLE HILLS INDUSTRIAL BOULEVARD

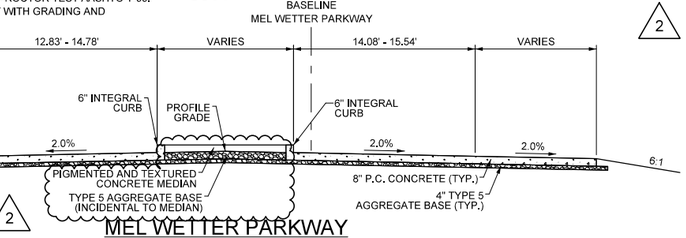
STA. 70+00.00 - STA. 70+75.00

LITTLE HILLS EXPRESSWAY - ROUNDABOUT

STA. 10+00.00 - STA. 15+78.05

GENERAL NOTES

1. ALL IMPROVEMENTS CONSTRUCTED HEREIN SHALL COMPLY WITH THE CODE OF ORDINANCES OF THE CITY OF ST. CHARLES.
2. UNDERGROUND UTILITES HAVE BEEN PLOTTED FROM AVAILABLE INFORMATION AND THEREFORE THEIR LOCATIONS SHALL BE CONSIDERED APPROXIMATE ONLY. THE VERFICATION OF THE LOCATION OF ALL UNDERGROUND UTILITIES, EITHER SHOWN OR NOT SHOWN ON THESE PLANS, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE LOCATED PRIOR TO ANY GRADING OR CONSTRUCTION OF THE IMPROVEMENTS.
3. NO AREA SHALL BE CLEARED WITHOUT THE PERMISSION OF THE ENGINEER.
4. THE CITY OF SAINT CHARLES SHALL BE NOTIFIED 48 HOURS PRIOR TO CONSTRUCTION FOR COORDINATION AND INSPECTION.
5. ALL EXISTING SITE IMPROVEMENTS DISTURBED, DAMAGED, OR DESTROYED SHALL BE REPAIRED OR REPLACED TO CLOSELY MATCH PRE-CONSTRUCTION CONDITIONS AND AT NO ADDITIONAL COST TO THE CITY.
6. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OUTLINED IN THE "INFORMATION FOR BIDDERS AND SPECIFICATIONS"
7. ALL DIMENSIONS ARE TO THE BACK OF CURB UNLESS OTHERWISE NOTED.
8. ALL UTILITES ARE EXISTING UNLESS OTHERWISE NOTED.
9. ALL CONSTRUCTION METHODS AND PRACTICES SHALL CONFORM WITH OSHA STANDARDS.
10. CONTRACTOR SHALL PROVIDE AND MAINTAIN EROSION CONTROL MEASURES AS REQUIRED BY THE ENGINEER AND DNR. EROSION CONTROL SHALL CONSIST OF, BUT NOT LIMITED TO, STAKE STRAW BALES AND EROSION CONTROL FENCING. CONTRACTOR SHALL BE RESPONSIBLE FOR CREATING AND MAINTAINING A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND OBTAINING ANY NECESSARY LAND DISTURBANCE PERMITS.
11. IF PROPERTY IS GREATER THAN 1 ACRE, A LAND DISTURBANCE PERMIT FROM THE MISSOURI DEPARTMENT OF NATURAL RESOURCES IS REQUIRED PRIOR TO COMMENCING ANY DEMOLITION, CLEARING OR CONSTRUCTION ON SITE. PROVIDE COPY OF APPROVAL FROM THE DEPARTMENT OF NATURAL RESOURCES TO THE PUBLIC WORKS DEPARTMENT. (PERMIT #_____)
12. SILTATION CONTROL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE IN ACCORDANCE WITH THE SWPP PLAN. ADDITIONAL SILTATION CONTROL MAY BE REQUIRED AS DIRECTED BY THE CITY ENGINEER. (CODE SECTION 510.090.B)
13. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE TRAFFIC CONTROL PER THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ROADWAY MAINTENANCE DURING CONSTRUCTION.
15. ALL VEGETATED AREAS DISTURBED DURING CONSTRUCTION SHALL BE EITHER SODDED OR SEEDED BASED ON DELINEATION AS SHOWN ON PLANS.
16. WHEN GRADING OPERATIONS ARE COMPLETED OR SUSPENDED FOR MORE THAN 30 DAYS, PERMANENT GRASS MUST BE ESTABLISHED TO CONTROL EROSION. (CODE SECTION 510.090.D.1)
17. ALL MUD AND DEBRIS FROM CONSTRUCTION SITE TO BE KEPT OFF OF CITY MAINTAINED STREETS. STREETS SHALL BE SWEPT TWICE DAILY. (CODE SECTION 510.090.E)
18. GRADES CANNOT EXCEED A 3:1 SLOPE. (CODE SECTION 510.090.A)
19. ALL FILLED PLACES IN PROPOSED ROADS SHALL BE COMPACTED FORM THE BOTTOM OF THE FILL UP TO 90% MAXIMUM DENSITY AS DETERMINED BY MODIFIED AASHTO T-180 COMPACTION TEST OR 95% OF MAXIMUM DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST AASHTO T-99. ALL TESTS SHALL BE VERIFIED BY A SOILS ENGINEER CONCURRENT WITH GRADING AND BACKFILLING OPERATIONS.
20. ALL STORM SEWER CONSTRUCTION SHALL BE PER MOST RECENT MSD STANDARDS.
21. THE CONTRACTOR IS TO MAKE ARRANGEMENTS WITH THE US POST OFFICE TO ALLOW FOR DELIVERY OF THE MAIL DURING THE PROJECT. THE CONTRACTOR IS TO PROVIDE TEMPORARY MAILBOXES AND RESET OR REPLACE ANY EXISTING MAILBOXES DISTURBED BY THE CONSTRUCTION, THIS ITEM SHALL BE INCIDENTAL AND THE CONTRACTOR WILL NOT RECEIVE ANY DIRECT PAYMENT FOR THIS ITEM.
22. ALL STREET AND SIDEWALK CONSTRUCTION IS TO BE PER THE LATEST ST. CHARLES CITY STANDARDS.
23. ALL SIDEWALKS AND RAMPS SHALL BE CONSTRUCTED PER PROWAG REQUIREMENTS. ANY SIDEWALK CROSS SLOPE EXCEEDING 2% SHALL BE REMOVED AND REPLACED AT NO ADDITIONAL COST.
24. ALL TRUNCATED DOMES AT NEW RAMP LOCATIONS MUST BE THE PRE-CAST STYLE. THE ADHERED-TYPE MAY BE USED IN RAISED ISLAND CUT-OUTS. NO CAST IN PLACE ARE ALLOWED.
25. BRICK STORM AND SANITARY STRUCTURES WILL NOT BE ALLOWED.
26. THE GENERAL REQUIREMENTS, PROVISIONS, AND TECHNICAL SPECIFICATIONS GOVERNING THE COMPLETION OF THE WORK CONTEMPLATED SHALL BE THE LATEST ST. CHARLES CITY STANDARDS, TOGETHER WITH THE GENERAL AND JOB SPECIAL PROVISIONS AND OTHER STATE AND FEDERAL REQUIREMENTS CONTAINED IN THE CONTRACT DOCUMENTS. MSD SPECIFICATIONS SHALL BE USED TO GOVERN THE CONSTRUCTION OF STORM SEWER IMPROVEMENTS ON THIS PROJECT.
27. EMPC CONRETE SHALL BE USED. MIX DESIGNS FOR ALL CONCRETE PLACED ON THIS PROJECT SHALL BE SUBMITTED TO AND APPROVED BY THE EASTERN MISSOURI PAVEMENT CONSORTIUM.
28. ALL NECESSARY PAVEMENT MARKINGS WILL COMPLY WITH THE CURRENT EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD.)
29. THE CONTRACTOR SHALL MAINTAIN EXISTING TRAFFIC CONTROL SIGNS (STREET NAME, STOP, NO PARKING, ONE-WAY, TURN, ETC.) UNTIL SUCH TIME AS THEY NEED TO BE REMOVED/RELOCATED FOR CONSTRUCTION OPERATIONS. TEMPORARY SIGNING SHALL BE IN ACCORDANCE WITH THE CURRENT VERSION OF MUTCD CHAPTER 6F (TEMPORARY TRAFFIC CONTROL ZONE DEVICES). EXISTING SIGNS SHALL NOT LIE ON THE GROUND FOR ANY PERIOD OF TIME. PORTABLE SUPPORTS SHALL NOT BE LOCATED ON SIDEWALKS OR AREAS DESIGNATED FOR PEDESTRIAN TRAFFIC. SIGNS SHALL BE BE CRASHWORTHY AND PROPERLY MAINTAINED FOR CLEANLINESS AND VISIBILITY AND PROPER POSITIONING.
30. ALL WATER MAIN CONSTRUCTION INCLUDING VALVES, SLEEVES, METERS, HYDRANTS, AND FITTINGS MUST CONFORM TO CITY OF ST. CHARLES WATER SPECIFICATIONS.
31. WHEN A SANITARY SEWER LATERAL CROSSES OVER A WATER LINE, A MINIMUM VERTICAL CLEARANCE OF 18" SHALL BE PROVIDED. IF THIS CLEARANCE IS NOT POSSIBLE, THEN BOTH THE WATER LINE AND THE SEWER LINE WILL BE ENCASED IN CONCRETE UNTIL THERE IS A 10' HORIZONTAL CLEARANCE BETWEEN THE TWO LINES.
32. CONSTRUCTION ACTIVITIES SHALL ABIDE BY THE NOISE RESTRICTIONS AS OUTLINED IN CODE SECTION 230.
33. GROUND REMEDIATION AND ANY REQUIRED EXCAVATION ARE TO BE CONSIDERED INCIDENTAL TO MECHANICALLY STABILIZED EARTH WALL SYSTEMS PAY ITEM.



MEL WETTER PARKWAY

STA. 59+60.47 - STA. 60+62.04

STATE OF MISSOURI
JARRETT D. JASPER
NUMBER
PE-2005005570
PROFESSIONAL ENGINEER
3/1/2021

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED
10/28/2021

ROUTE	STATE
.	MO
DISTRICT	SHEET NO.
.	3

COUNTY
ST. CHARLES

JOB NO.
CMAQ#4917(602)

CONTRACT ID.
.

PROJECT NO.
19STR30

BRIDGE NO.
.

DATE	DESCRIPTION
10/25/21	ADDENDUM 2

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

HORNER SHIFRIN
THE POWER HOUSE AT UNION STATION
401 S. 18th St. Ste. 400
ST. LOUIS, MO 63103-2296
314-531-4321 FAX: 314-531-6966
www.HornerShifrin.com
Certificate of Authority: 000159
Expiration Date: December 31, 2020

LITTLE HILLS EXPRESSWAY
TYPICAL SECTIONS

NOTE: GROUND REMEDIATION AND ANY REQUIRED EXCAVATION ARE TO BE CONSIDERED INCIDENTAL TO MECHANICALLY STABILIZED EARTH WALL SYSTEMS PAY ITEM.

CURVE LHE_WEST1_1
PI 199+00.16
PC 198+00.00
PCC 200+00.00
Δ 7° 57' 27.9" (LT)
D 3° 58' 43.9"
L 200.00'
T 100.16'
R 1,440.00'

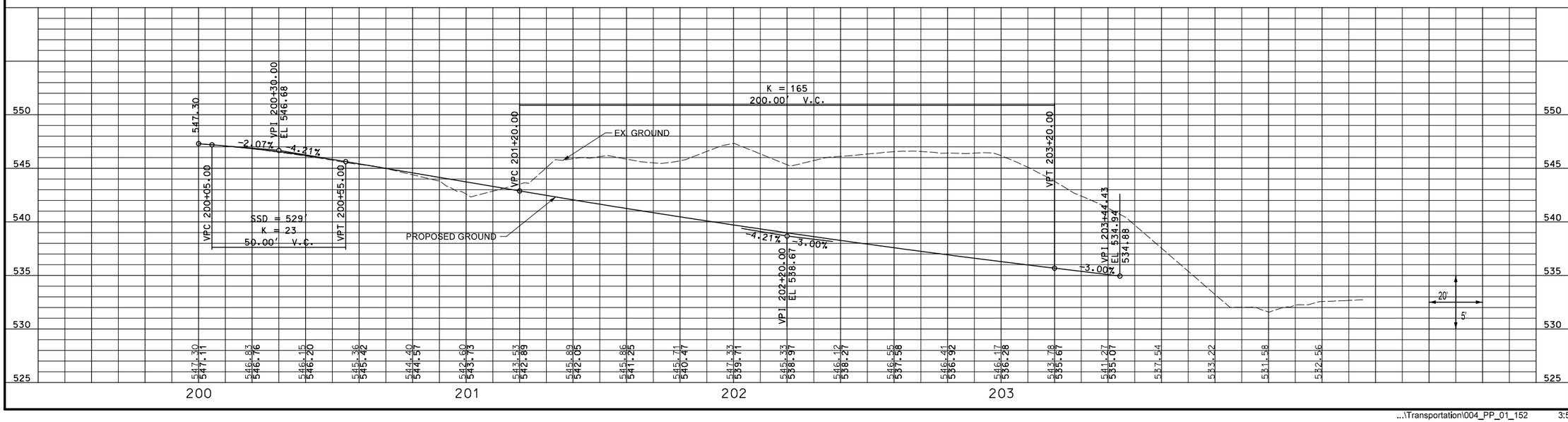
CURVE LHE_WEST_2
PI 200+36.91
PC 200+00.00
PT 200+72.46
Δ 26° 57' 27.7" (LT)
D 37° 12' 18.2"
L 72.46'
T 36.91'
R 154.00'

CURVE LHE_WEST_3
PI 203+01.81
PC 202+56.76
PT 203+41.41
Δ 48° 30' 08.2" (RT)
D 57° 17' 44.8"
L 84.65'
T 45.05'
R 100.00'

CURVE LHE_EX_3
PI 476+16.38
PC 470+62.13
PT 481+20.28
Δ 42° 06' 08.9" (LT)
D 3° 58' 43.9"
L 1,058.15'
T 554.24'
R 1,440.00'

SCALE
0 20 40 60

EX. LITTLE HILLS EXPRESSWAY ℄
199+00
CURVE 1
PC STA 198+00.00
EX. R/W
NEW WATER MAIN
EX. TREE MASS
SLOPE LIMITS
BEGIN LANE TRANSITION LITTLE HILLS EXPRESSWAY WEST STA. 200+77.59
BEGIN MSE WALL STA. 10+00.00
TYPE 3 ROCK DITCH LINER
PROPOSED MSE WALL
V-BOTTOM DITCH
BEGIN SHOULDER TRANSITION LITTLE HILLS EXPRESSWAY WEST STA. 202+47.93
NEW BLACK POWDER COATED CHAINLINK FENCE (60")
NEW MODIFIED TYPE A GUTTER
PC STA 202+56.76
CURVE 3
BEGIN CONSTRUCTION LITTLE HILLS EXPRESSWAY WEST STA. 200+00.00 = EX. LITTLE HILLS EXPRESSWAY STA. 473+68.50
PCC STA 200+00.00
PT STA 200+72.46
CURVE 2
LITTLE HILLS EXPRESSWAY WEST
202+00
201+00
S 86° 03' 59" E
MATCHLINE STA. 203+00.00
NEW STAMPED BRICK MEDIAN ISLAND
10'
12'
12'
9'
FULL-DEPTH SAWCUT
EX. R/W
NEW LIGHT
EX. MULTI-USE PATH
BEGIN GUARDRAIL REMOVAL STA. 200+37.66
EX. GUARDRAIL (T.B.R.)
EX. SIGN (T.B.R.)
NEW LIGHT
END GUARDRAIL REMOVAL STA. 200+75.16
EX. TEL. MANHOLE (T.B.R.&R.B.O.)
BEGIN LANE TRANSITION LITTLE HILLS EXPRESSWAY WEST STA. 200+63.37
EX. GUARDRAIL END SECTION (T.B.R.&REL)
SLOPE LIMITS
V-BOTTOM DITCH
NEW LIGHT
BEGIN SHOULDER TRANSITION LITTLE HILLS EXPRESSWAY WEST STA. 202+19.40
EX. PAVED DITCH (T.B.R.)
NEW WATER MAIN
EX. CONCRETE PAVEMENT (T.B.R.)
EX. LIGHT (T.B.R.)
SEE SHEETS 31-34 FOR WATER MAIN DETAILS
NEW LIGHT



STATE OF MISSOURI
JARRETT D. JASPER
NUMBER PE-2005005570
PROFESSIONAL ENGINEER
10/28/2021

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED
10/28/2021

ROUTE	STATE
	MO
DISTRICT	SHEET NO.
	4

COUNTY
ST. CHARLES

JOB NO.
CMAQ#4917(602)

CONTRACT ID.

PROJECT NO.
19STR30

BRIDGE NO.

DATE	DESCRIPTION
10/25/21	ADDENDUM 2

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HORNER SHIFRIN
THE POWER HOUSE AT UNION STATION
401 S. 18th St. Ste. 400
ST. LOUIS, MO 63103-2296
314-531-4321 FAX: 314-531-6966
www.HornerShifrin.com
Certificate of Authority: 000159
Expiration Date: December 31, 2020

LITTLE HILLS EXPRESSWAY

PLAN/PROFILE SHEET 1 OF 3

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CURVE LHE_RA2_1
PI 10+00.00
PC 10+00.00
PT 15+78.05
Δ 360° 00' 00.0" (LT)
D 62° 16' 40.9"
L 578.05'
T 0.00'
R 92.00'

CURVE LHE_EAST_1
PI 301+98.94
PC 301+74.69
PCC 302+23.04
Δ 11° 04' 55.0" (LT)
D 22° 55' 05.9"
L 48.35'
T 24.25'
R 250.00'

CURVE LHE_EAST_2
PI 302+79.08
PC 302+23.04
PT 303+35.06
Δ 4° 27' 25.5" (LT)
D 3° 58' 43.9"
L 112.02'
T 56.04'
R 1,440.00'

CURVE MWPKWY_1
PI 60+19.68
PC 59+71.84
PT 60+66.92
Δ 15° 33' 50.5" (LT)
D 16° 22' 12.8"
L 95.08'
T 47.83'
R 350.00'

CURVE MWPKWY_1
PI 60+21.25
PC 59+48.50
PT 60+92.18
Δ 22° 11' 22.4" (LT)
D 15° 26' 37.0"
L 143.68'
T 72.75'
R 371.00'

SCALE
0 20 40 60

NOTE: GROUND REMEDIATION AND ANY REQUIRED EXCAVATION ARE TO BE CONSIDERED INCIDENTAL TO MECHANICALLY STABILIZED EARTH WALL SYSTEMS PAY ITEM.

MATCHLINE STA. 203+00.00

LITTLE HILLS EXPRESSWAY WEST

LITTLE HILLS ROUNDABOUT

LITTLE HILLS EXPRESSWAY EAST

MEL WETTER PARKWAY

LITTLE HILLS INDUSTRIAL BLVD.

NEW MODIFIED TYPE A GUTTER
NEW MSE WALL
NEW LIGHT
BEGIN LANE TRANSITION LITTLE HILLS ROUNDABOUT STA. 11+32.25
NEW BLACK POWDER COATED CHAINLINK FENCE (60")
BEGIN SHOULDER TRANSITION LITTLE HILLS EXPRESSWAY EAST STA. 300+58.22
END MSE WALL STA. 14+71.70
SLOPE LIMITS
PT STA 203+44.44
3" MOUNTABLE CURB
MOUNTABLE TRUCK APRON (STAMPED BRICK)
8" INTEGRAL CURB
NEW WATER MAIN
EX. SIGN (T.B.R.)
NEW STAMPED BRICK MEDIAN ISLAND
NEW LIGHT
EX. TREE MASS
EX. SIGN (T.B.R.)
V-BOTTOM DITCH
NEW TYPE A GUTTER
END SHOULDER TRANSITION LITTLE HILLS EXPRESSWAY EAST STA. 301+29.46
EX. TEL. MANHOLE (A.T.G.B.O.)
EX. ASPHALT SHOULDER (T.B.R.)
TYPE 3 ROCK DITCH LINER
EX. SIGN (T.B.R.)
EX. TEL. MANHOLE (A.T.G.B.O.)
ROCK DITCH LINER TIE-IN TO PAVED DITCH
FULL-DEPTH SAWCUT
EX. SIGN (U.I.P.)
EX. SIGN (T.B.R.)
EX. PAVED DITCH (U.I.P.)
END CONSTRUCTION LITTLE HILLS EXPRESSWAY EAST STA. 302+88.48 = EX. LITTLE HILLS EXPRESSWAY STA. 480+68.53
EX. ASPHALT SHOULDER (T.B.R.)
EX. SIGN (T.B.R.)
END SHOULDER TRANSITION LITTLE HILLS ROUNDABOUT STA. 12+91.02
POT STA 61+42.62
POT STA 300+00.00
POT STA 204+36.92
PC STA 10+00.00
PC STA 301+74.69
PGC STA 302+23.04
PT STA 303+35.06
NEW LIGHT
EX. CONCRETE PAVEMENT (T.B.R.)
BEGIN LANE TRANSITION LITTLE HILLS ROUNDABOUT STA. 13+32.76
LITTLE HILLS INDUSTRIAL BLVD. STA. 61+19.82 = LITTLE HILLS EXPRESSWAY EAST STA. 477+63.90
NEW LIGHT
EX. TEL. MANHOLE (T.B.R.&R.B.O.)
EX. SIGN (T.B.R.)
EX. ISLAND (T.B.R.)
EX. LIGHT (T.B.R.)
EX. TEL. MANHOLE (T.B.R.&R.B.O.)
EX. ISLAND (T.B.R.)
EX. TEL. MANHOLE (D.N.D.)
EL. = 528.19
EL. = 528.44
EL. = 527.73
EL. = 528.32
EX. SIGNS (U.I.P.)
SLOPE LIMITS
EX. SIGN (T.B.R.)
EX. TREE (D.N.D.)
EX. SIGN (T.B.R.)
EX. TEL. MANHOLE (T.B.R.&R.B.O.)
EX. BOULDERS (T.B.R.&R.E.L.)
EX. GRATE INLET (A.T.G.)
EX. SIGN (T.B.R.)
EX. TRASH RECEPTACLE (T.B.R.&R.E.L.)
EX. GUARDRAIL (T.B.R.)
EX. MANHOLE (T.B.R.)
NEW 12" PIPE
END FENCE REMOVAL STA. 60+36.07
PROPOSED EVERSTREAM RELOCATION
NEW LIGHT
NEW MULTI-USE PATH
NEW 48" MANHOLE
NEW TYPE D BARRIER TRANSITION
EX. HANDHOLE (U.I.P.)
BEGIN FENCE REMOVAL STA. 60+14.17
EX. MULTI-USE PATH
EX. SIGN (T.B.R.)
EX. TREE (T.B.R.)
EX. TREE (D.N.D.)
EX. AREA INLET (GRADE TO DRAIN)
NEW LIGHT
EX. 12" CMP (T.B.R.)
EX. GRATE INLET (T.B.R.)
EX. CURB (T.B.R.)
NEW TYPE D BARRIER
EX. 12" RCP (U.I.P.)
EX. FENCE (T.B.R. TO CONSTRUCTION LIMITS)
FULL-DEPTH SAWCUT
BEGIN CONSTRUCTION MEL WETTER PARKWAY STA. 59+60.47
EX. 12" CMP (U.I.P.)
EX. CONCRETE PAVEMENT (T.B.R.)
EX. SIGNS (U.I.P.)
PC STA 59+71.84
EX. 12" CMP (U.I.P.)
EX. INLET (U.I.P.)
EX. GRATE INLET (A.T.G.)
NEW LIGHT
EX. BARRIER (U.I.P.)
EX. SIDEWALK (U.I.P.)
NEW STAMPED BRICK MEDIAN ISLAND
EX. R/W
EX. 12" CMP
EX. 12" RCP (U.I.P.)
FULL-DEPTH SAWCUT
WARP PAVEMENT TO MEET EX. BARRIER
EX. LANDSCAPING (T.B.R.)
EX. TRASH RECEPTACLE (T.B.R.&R.E.L.)
EX. SIGN (U.I.P.)
EX. TRUCTED DOMES (T.B.R.)
EX. 12" RCP (U.I.P.)
EX. SIDEWALK (T.B.R.)
EX. BOLLARD (T.B.R.&R.E.L.)
EX. TREE (D.N.D.)
EX. AREA INLET (U.I.P.)
EX. SIGN (T.B.R.)
EX. 12" RCP (U.I.P.)
EX. TREE (D.N.D.)
EX. LIGHT (T.B.R.)
EX. R/W
EX. MULTI-USE PATH
EX. 12" RCP (U.I.P.)
EX. GRATE INLET (A.T.G.)
EX. LIGHT (D.N.D.)
EX. WATER METER (A.T.G.)
EX. SIGN (T.B.R.)
EX. TREES (D.N.D.)
EL. = 530.53
EL. = 532.61
EL. = 532.21
EL. = 532.09
EX. TREES (D.N.D.)
NEW LIGHT
6" INTEGRAL CURB
FULL-DEPTH SAWCUT
EX. CURB (T.B.R.)
6" INTEGRAL CURB
EX. SIDEWALK (T.B.R.)
NEW 6' SIDEWALK
EX. CONCRETE PAVEMENT (T.B.R.)
TYPE S CURB
EX. FES (U.I.P.)
EX. 12" RCP (U.I.P.)
EX. CURB (T.B.R.)
NEW WATER MAIN
LITTLE HILLS INDUSTRIAL BLVD. STA. 70+00.00 = LITTLE HILLS EXPRESSWAY EAST STA. 302+20.49
POT STA 70+00.00
POT STA 71+58.29
EX. R/W
EX. LITTLE HILLS EXPRESSWAY
EX. SIGN (U.I.P.)
END CONSTRUCTION LITTLE HILLS INDUSTRIAL BLVD. STA. 70+75.00

SEE SHEET 28 FOR LANDSCAPING DETAILS
SEE SHEETS 31-34 FOR WATER MAIN DETAILS

STATE OF MISSOURI
JARRETT D. JASPER
NUMBER PE-2005005570
PROFESSIONAL ENGINEER
3/4/2021

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED
10/28/2021

ROUTE	STATE
	MO
DISTRICT	SHEET NO.
	5

COUNTY
ST. CHARLES

JOB NO.
CMAQ#4917(602)

CONTRACT ID.

PROJECT NO.
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DATE	DESCRIPTION
10/25/21	ADDENDUM 2

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LITTLE HILLS EXPRESSWAY
PLAN/PROFILE
SHEET 2 OF 3

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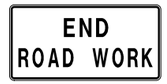
TRAFFIC CONTROL LEGEND

- WORK AREA
- SIGN (SINGLE SIDED)
- CHANNELIZER (TRIM-LINE)
- TYPE III MOVEABLE BARRICADE
- FLAGGER LOCATION

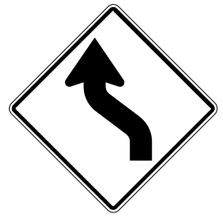
W020-1

(1)



G020-2

(2)



W01-4L

(3)

W01-4R

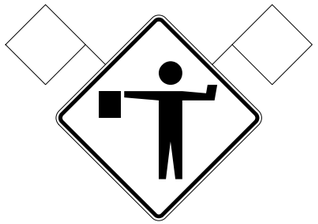
(4)

W021-5

(5)

W020-4

(6)



W020-7a

(7)

R11-2

(8)

W5-1

(15)

GENERAL NOTES:

1) DO NOT SCALE DRAWING. FOLLOW DIMENSIONS.

2) ALL SIGNING SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

3) NO DIRECT PAYMENT WILL BE MADE FOR RELOCATION OF TCP SIGNS AND DEVICES.

4) ANY EXISTING SIGNS THAT CONFLICT WITH TEMPORARY TRAFFIC CONTROL SHALL BE COVERED OR REMOVED.

5) ALL TRAFFIC CONTROL ITEMS WHICH ARE NOT INCLUDED IN THE PAY ITEMS ARE TO BE CONSIDERED INCIDENTAL.

6) CONTRACTOR SHALL MAINTAIN TEMPORARY STRIPING DURING CONSTRUCTION.

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED
10/28/2021

ROUTE	STATE
	MO
DISTRICT	SHEET NO.
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COUNTY
ST. CHARLES

JOB NO.
CMAQ#4917(602)

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LITTLE HILLS EXPRESSWAY

TRAFFIC CONTROL PLAN

TRAFFIC CONTROL - PHASE 1

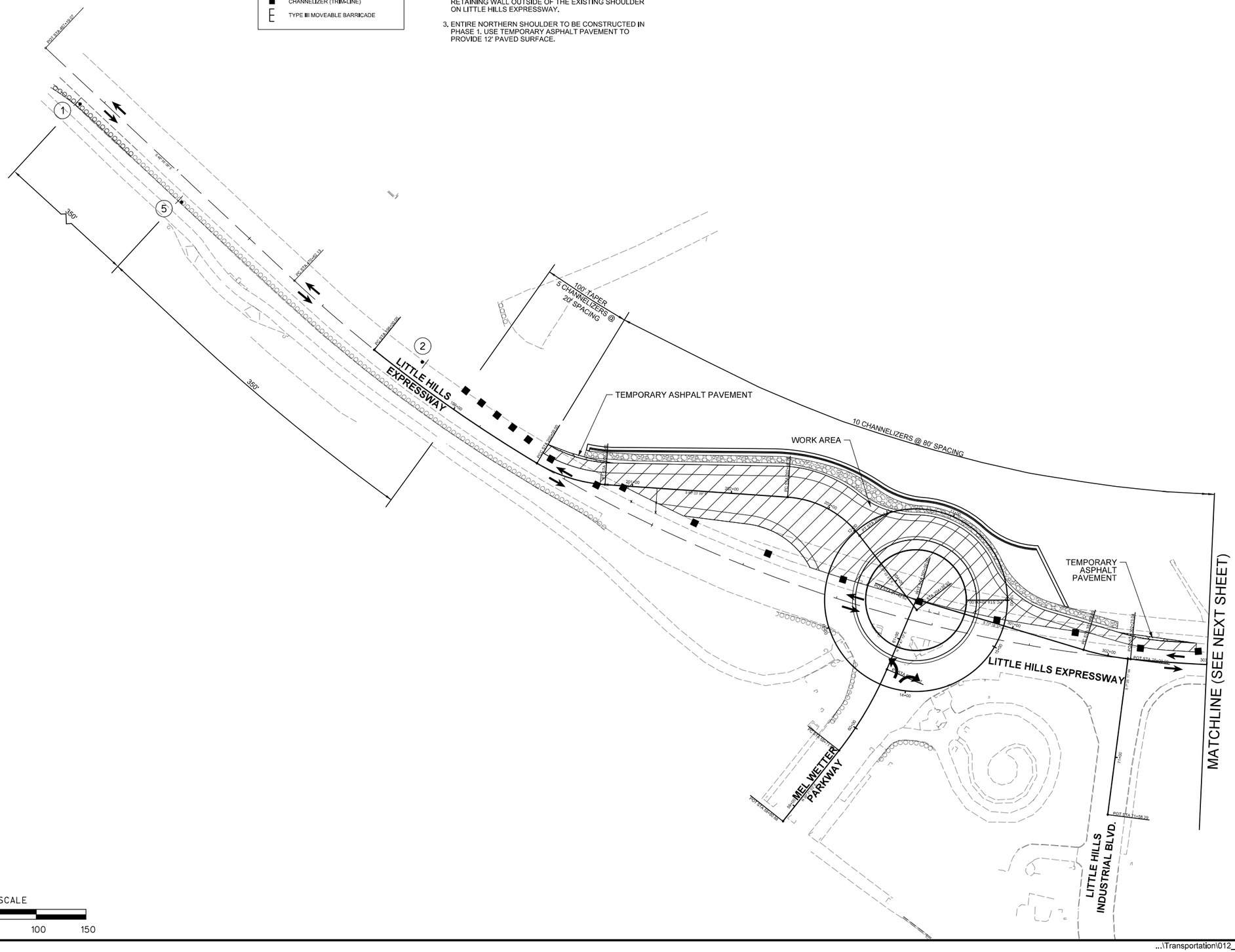
TRAFFIC CONTROL LEGEND

- WORK AREA
- SIGN (SINGLE SIDED)
- CHANNELIZER (TRIM-LINE)
- E TYPE III MOVEABLE BARRICADE

PHASE 1 - CONSTRUCTION SEQUENCE:

1. INSTALL TRAFFIC CONTROL DEVICES AND SIGNING
2. CONSTRUCT NORTH PORTION OF ROUNDABOUT AND RETAINING WALL OUTSIDE OF THE EXISTING SHOULDER ON LITTLE HILLS EXPRESSWAY.
3. ENTIRE NORTHERN SHOULDER TO BE CONSTRUCTED IN PHASE 1. USE TEMPORARY ASPHALT PAVEMENT TO PROVIDE 12' PAVED SURFACE.

2 SHEET REVISED



SCALE

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STATE OF MISSOURI
JARRETT D. JASPER
NUMBER PE-2005005570
PROFESSIONAL ENGINEER
3/1/2021

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED
10/28/2021

ROUTE	STATE
	MO
DISTRICT	SHEET NO.
	12

COUNTY
ST. CHARLES

JOB NO.
CMAQ#4917(602)

CONTRACT ID.

PROJECT NO.
19STR30

BRIDGE NO.

DESCRIPTION	DATE
ADDENDUM 2	10/25/21

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

HORNER SHIFRIN
THE POWER HOUSE AT UNION STATION
401 S. 18th St., Ste. 400
ST. LOUIS, MO 63103-2296
314-531-4321 FAX: 314-531-6966
www.HornerShifrin.com
Certificate of Authority: 000159
Expiration Date: December 31, 2020

LITTLE HILLS EXPRESSWAY
TRAFFIC CONTROL PLAN
PHASE 1
SHEET 1 OF 2

TRAFFIC CONTROL - PHASE 1

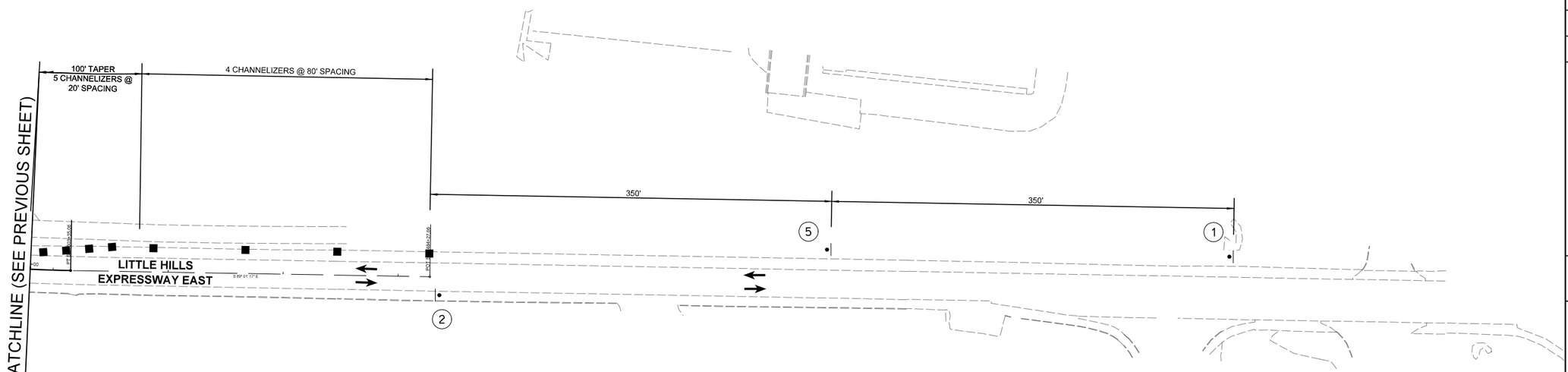
TRAFFIC CONTROL LEGEND

- WORK AREA
- SIGN (SINGLE SIDED)
- CHANNELIZER (TRIM-LINE)
- TYPE III MOVEABLE BARRICADE

PHASE 1 - CONSTRUCTION SEQUENCE:

1. INSTALL TRAFFIC CONTROL DEVICES AND SIGNING
2. CONSTRUCT NORTH PORTION OF ROUNDABOUT AND RETAINING WALL OUTSIDE OF THE EXISTING SHOULDER ON LITTLE HILLS EXPRESSWAY.
3. ENTIRE NORTHERN SHOULDER TO BE CONSTRUCTED IN PHASE 1. USE TEMPORARY ASPHALT PAVEMENT TO PROVIDE 12' PAVED SURFACE.

2 SHEET REVISED



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STATE OF MISSOURI
JARRETT D. JASPER
NUMBER PE-2005005570
PROFESSIONAL ENGINEER
10/28/2021

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED: 10/28/2021

ROUTE	STATE
	MO
DISTRICT	SHEET NO.
	13

COUNTY: ST. CHARLES

JOB NO.: CMAQ#4917(602)

CONTRACT ID.:

PROJECT NO.: 19STR30

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LITTLE HILLS EXPRESSWAY
TRAFFIC CONTROL PLAN
PHASE 1
SHEET 2 OF 2

TRAFFIC CONTROL - PHASE 2

TRAFFIC CONTROL LEGEND

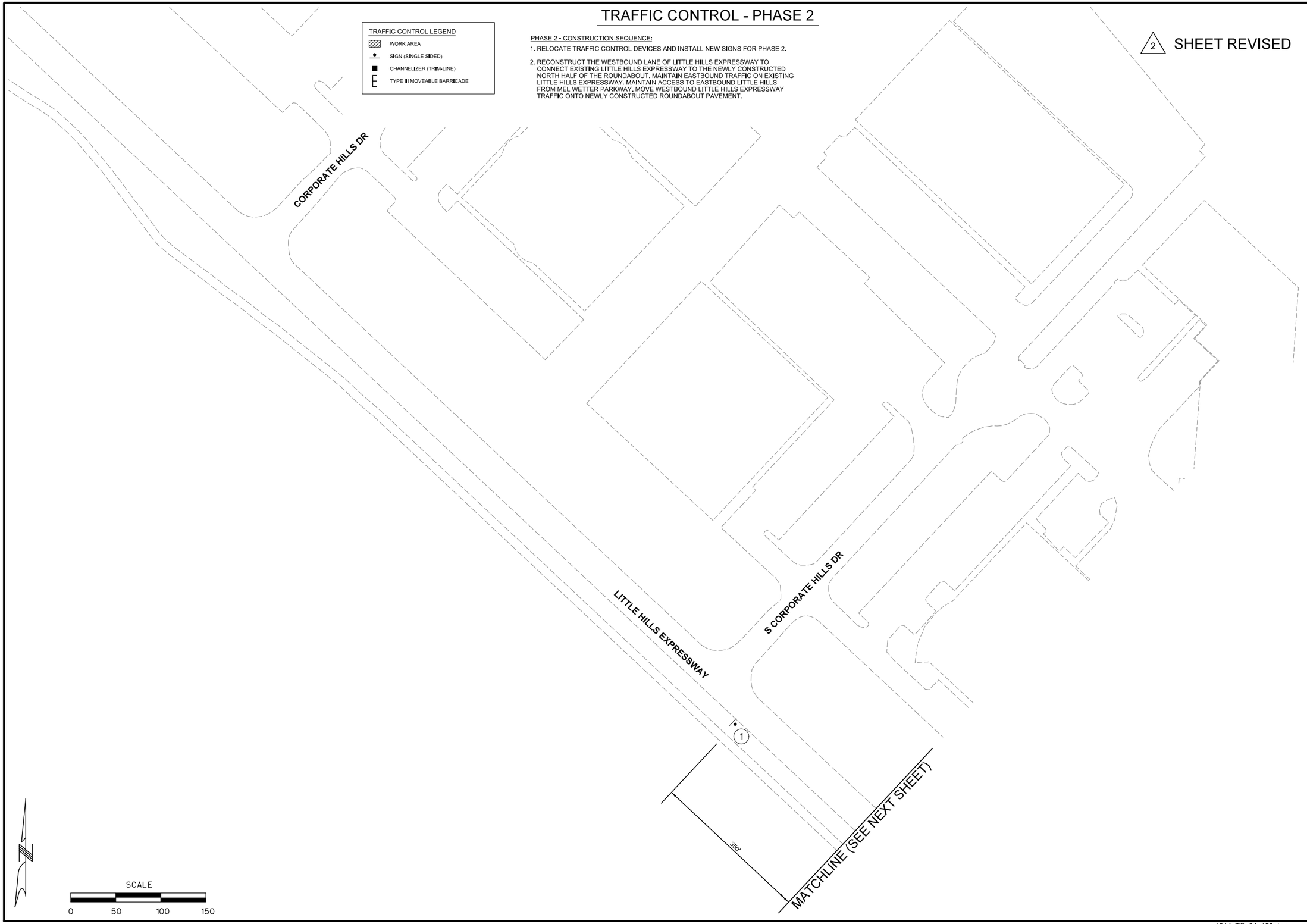
- WORK AREA
- SIGN (SINGLE SIDED)
- CHANNELIZER (TRIM-LINE)
- TYPE III MOVEABLE BARRICADE

PHASE 2 - CONSTRUCTION SEQUENCE:

1. RELOCATE TRAFFIC CONTROL DEVICES AND INSTALL NEW SIGNS FOR PHASE 2.

2. RECONSTRUCT THE WESTBOUND LANE OF LITTLE HILLS EXPRESSWAY TO CONNECT EXISTING LITTLE HILLS EXPRESSWAY TO THE NEWLY CONSTRUCTED NORTH HALF OF THE ROUNDABOUT. MAINTAIN EASTBOUND TRAFFIC ON EXISTING LITTLE HILLS EXPRESSWAY. MAINTAIN ACCESS TO EASTBOUND LITTLE HILLS FROM MEL WETTER PARKWAY. MOVE WESTBOUND LITTLE HILLS EXPRESSWAY TRAFFIC ONTO NEWLY CONSTRUCTED ROUNDABOUT PAVEMENT.

2 SHEET REVISED



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STATE OF MISSOURI
JARRETT D. JASPER
NUMBER
PE-2005005570
PROFESSIONAL ENGINEER
3/11/2021

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
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DATE PREPARED
10/28/2021

ROUTE	STATE
	MO
DISTRICT	SHEET NO.
	14

COUNTY
ST. CHARLES

JOB NO.
CMAQ#4917(602)

CONTRACT ID.

PROJECT NO.
19STR30

BRIDGE NO.

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LITTLE HILLS EXPRESSWAY
TRAFFIC CONTROL PLAN
PHASE 2
SHEET 1 OF 3

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TRAFFIC CONTROL - PHASE 2

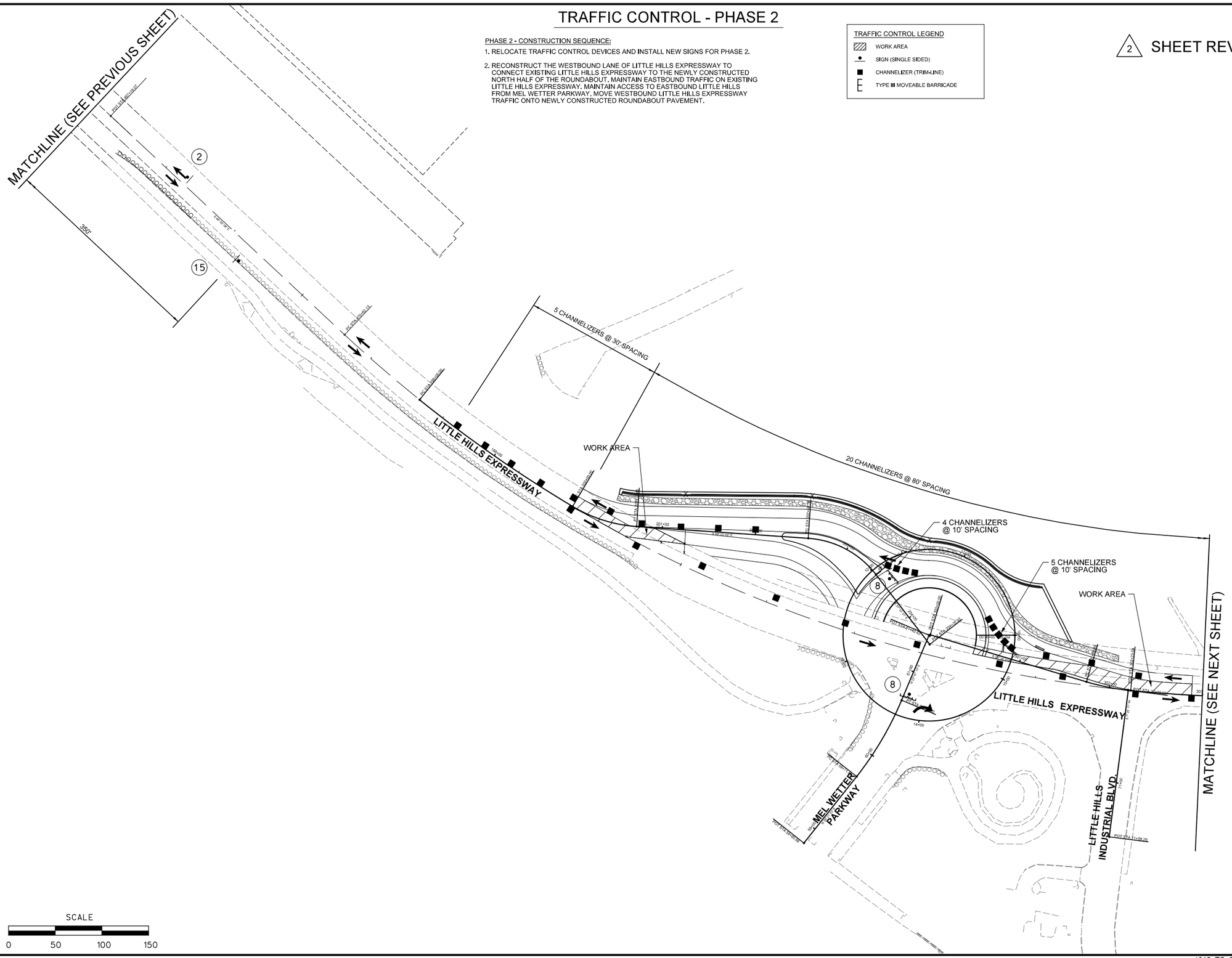
PHASE 2 - CONSTRUCTION SEQUENCE:

1. RELOCATE TRAFFIC CONTROL DEVICES AND INSTALL NEW SIGNS FOR PHASE 2.
2. RECONSTRUCT THE WESTBOUND LANE OF LITTLE HILLS EXPRESSWAY TO CONNECT EXISTING LITTLE HILLS EXPRESSWAY TO THE NEWLY CONSTRUCTED NORTH HALF OF THE ROUNDABOUT. MAINTAIN EASTBOUND TRAFFIC ON EXISTING LITTLE HILLS EXPRESSWAY. MAINTAIN ACCESS TO EASTBOUND LITTLE HILLS FROM MEL WETTER PARKWAY. MOVE WESTBOUND LITTLE HILLS EXPRESSWAY TRAFFIC ONTO NEWLY CONSTRUCTED ROUNDABOUT PAVEMENT.

TRAFFIC CONTROL LEGEND

- WORK AREA
- SIGN (SINGLE SIDED)
- CHANNELIZER (TRIM-LINE)
- TYPE III MOVEABLE BARRICADE

2 SHEET REVISED



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STATE OF MISSOURI
JARRETT D. JASPER
NUMBER PE-2005005570
PROFESSIONAL ENGINEER
3/4/2021

NAME:	JARRETT D. JASPER
DISCIPLINE:	CIVIL ENGINEER
LICENSE NO.:	2005005570
EXPIRATION DATE:	12-31-2021

DATE PREPARED: 10/28/2021

ROUTE	STATE
	MO
DISTRICT	SHEET NO.
	15

COUNTY: ST. CHARLES

JOB NO.: CMAQ#4917(602)

CONTRACT ID.:

PROJECT NO.: 19STR30

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LITTLE HILLS EXPRESSWAY
TRAFFIC CONTROL PLAN
PHASE 2
SHEET 2 OF 3

TRAFFIC CONTROL - PHASE 2

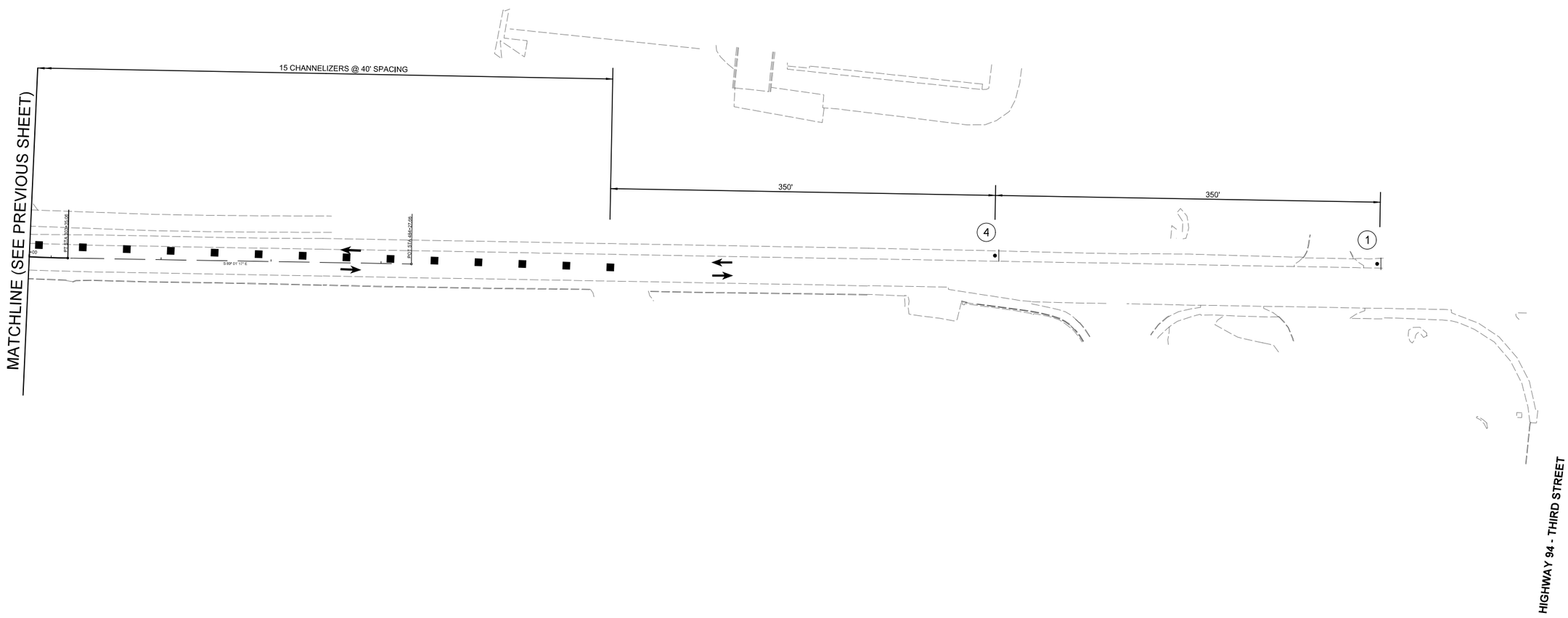
TRAFFIC CONTROL LEGEND

- WORK AREA
- SIGN (SINGLE SIDED)
- CHANNELIZER (TRIM-LINE)
- E TYPE III MOVEABLE BARRICADE

PHASE 2 - CONSTRUCTION SEQUENCE:

1. RELOCATE TRAFFIC CONTROL DEVICES AND INSTALL NEW SIGNS FOR PHASE 2.
2. RECONSTRUCT THE WESTBOUND LANE OF LITTLE HILLS EXPRESSWAY TO CONNECT EXISTING LITTLE HILLS EXPRESSWAY TO THE NEWLY CONSTRUCTED NORTH HALF OF THE ROUNDABOUT. MAINTAIN EASTBOUND TRAFFIC ON EXISTING LITTLE HILLS EXPRESSWAY. MAINTAIN ACCESS TO EASTBOUND LITTLE HILLS FROM MEL WETTER PARKWAY. MOVE WESTBOUND LITTLE HILLS EXPRESSWAY TRAFFIC ONTO NEWLY CONSTRUCTED ROUNDABOUT PAVEMENT.

2 SHEET REVISED



SCALE
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ROUTE	STATE
	MO
DISTRICT	SHEET NO.
	16

COUNTY
ST. CHARLES

JOB NO.
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19STR30

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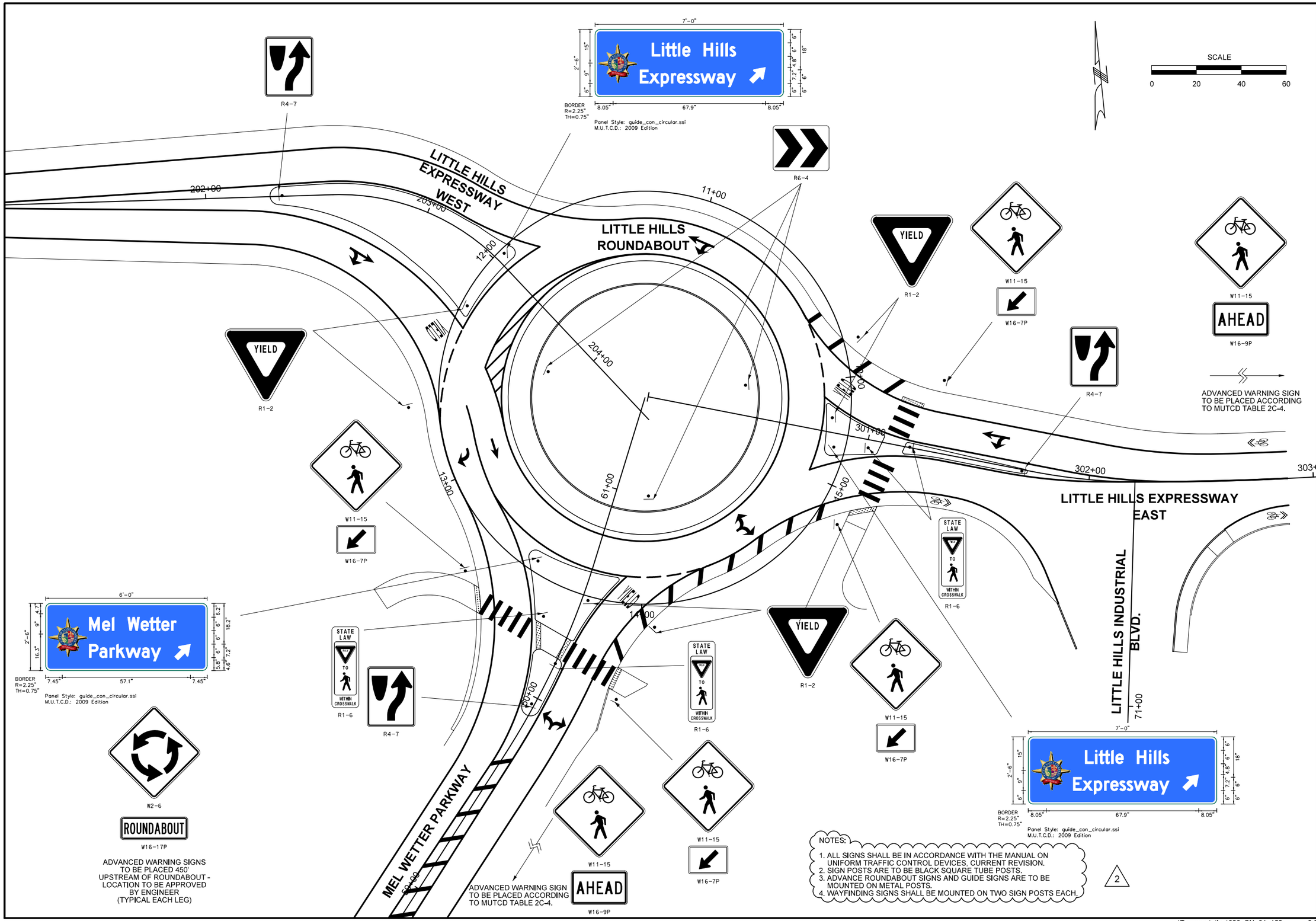
LITTLE HILLS EXPRESSWAY
TRAFFIC CONTROL PLAN
PHASE 2
SHEET 3 OF 3



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ROUTE	STATE
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DISTRICT	SHEET NO.
	20

COUNTY
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LITTLE HILLS EXPRESSWAY
SIGNING PLAN
SHEET 1 OF 1

General Notes:

Design Specifications:

2002 AASHTO LFD (17th Ed.) Standard Specifications (Section 5, ASD Design)
Seismic Performance Category D
Acceleration Coefficient = .186

Design Loading:

Φ_b = 20° for on-site soils and 35° for crushed stone and Unit weight, = 120 pcf (on-site soil) and 110 pcf (crushed stone) for retained backfill material to be retained by the mechanically stabilized earth wall system.

Φ_f = 20° for unimproved foundation ground where wall is to bear.

Actual $\Phi_r \geq 34°$ for the select granular backfill (reinforced backfill and wedge area backfill) for structural systems.

Design $\Phi_r = 34°$ for the select granular backfill (reinforced backfill) only for structural systems.

The allowable bearing pressure for unimproved foundation ground 1.50 ksf.

The maximum applied bearing pressure for the controlling design case at the foundation level shall be shown on the manufacturer's design plans where the maximum applied bearing pressure ≤ allowable bearing pressure. For seismic design the maximum applied bearing pressure ≤ two times allowable bearing pressure.

Factor of safety shall be 2.0 for overturning and 1.5 for sliding.

For seismic design the factor of safety shall be 1.5 for overturning and 1.1 for sliding.

Use default values for the pullout friction factor, F*, in accordance with AASHTO figure 5.8.5.2A. For approved steel strips not shown in AASHTO figure 5.8.5.2A, use F* ≤ 2.0 at zero depth and F* ≤ Tan Φ_r at 20 feet depth and Φ_r design = 34°. F* values shall be shown on the manufacturer's design plans.

Design Unit Stresses:

All concrete for leveling pad and coping shall be Class B or B-1 with f'c = 4000 psi.

Miscellaneous:

The MSE wall system shall be built vertical.

The MSE wall system shall be built in accordance with Sec 720.

The MSE wall system shall be a Keystone block wall system.

Panel and coping (or capstone) reinforcement shall be epoxy coated.

A filter cloth meeting the requirements for a Separation Geotextile material shall be placed between the select granular backfill for structural systems and the backfill being retained by the mechanically stabilized earth wall system.

Coping shall be required on this structure. Bond breaker (roofing felt or other approved alternate) between wall panel and coping required if coping is cast in place.

The top and bottom elevations are given for a vertical wall. If a fence is built on an extended gutter, then the height of the wall shall be adjusted further.

The contractor shall be solely responsible to coordinate construction of the wall with roadway construction and ensure that the roadway construction, resulting or existing obstructions, shall not impact the construction or performance of the wall. Soil reinforcement shall be designed and placed to avoid damage by pile driving, guardrail post installation, utility and sign foundations. (See Roadway plans.)

Minimum 18" wide Geotextile strips shall be centered at vertical and horizontal joints of panel. Geotextile material shall be adhered to back face of panel using an adhesive compound supplied by the manufacturer.

Aluminized soil reinforcement shall have edges coated with coating material per manufacturer.

If rock is encountered in the proposed reinforced backfill area or wedge area of the MSE wall before or during excavation, the contractor shall immediately cease excavating and notify the engineer.

Concrete and Masonry Protection shall be applied to exposed concrete face of proposed retaining wall.

Graffiti Protection System shall be applied to proposed retaining wall to a height of 12' above finished grade.

Ground remediation and any required excavation are to be considered incidental to Mechanically Stabilized Earth Wall Systems pay item.

* Wall contractor shall show the following items on the design drawings and/or on the fabricator shop drawings.

1. Leveling pad horizontal.
2. Leveling pad length and step elevations shall be based on wall manufacturer's recommendation. Top of leveling pad elevations shall not be higher than theoretical top of leveling pad elevations shown on these plans.

Estimated Quantities		
Item		Total
Mechanically Stabilized Earth Wall Systems	sq. foot	5894
Concrete and Masonry Protection	lump sum	1
Graffiti Protection System	lump sum	1

DEVELOPED ELEVATION

2 SHEET REVISED

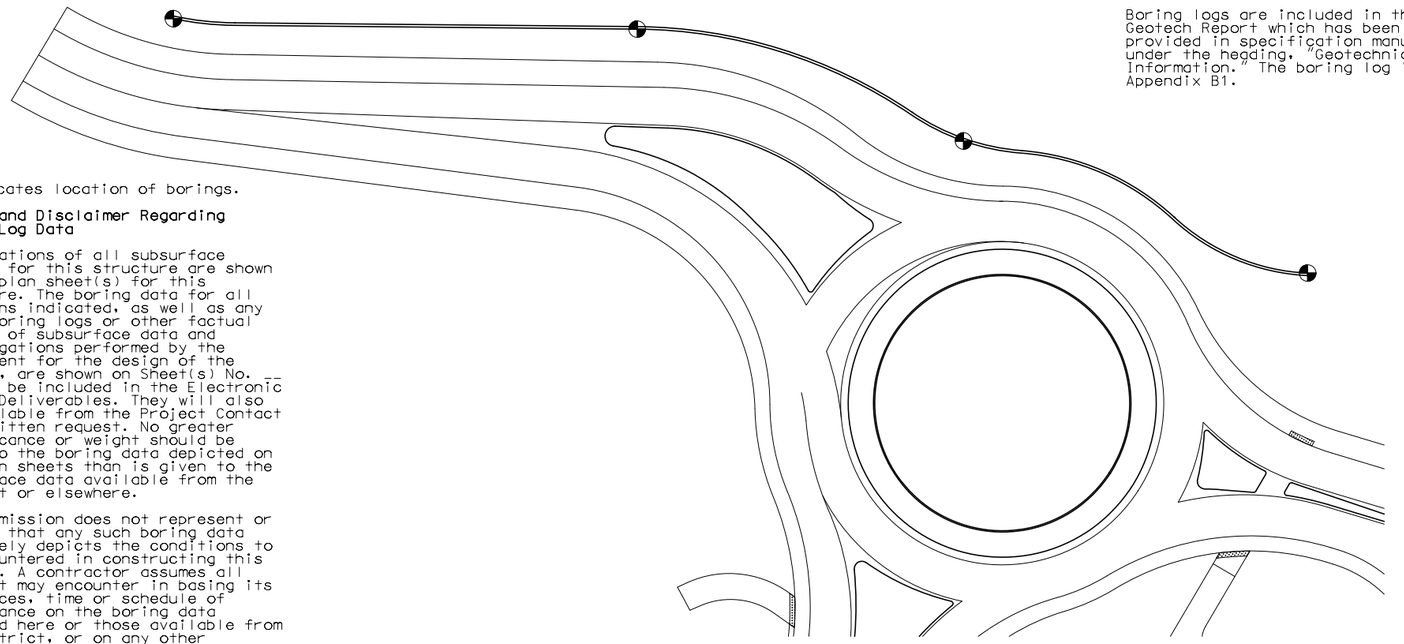
Boring logs are included in the Geotech Report which has been provided in specification manual under the heading, "Geotechnical Information." The boring log is Appendix B1.

⊕ Indicates location of borings.

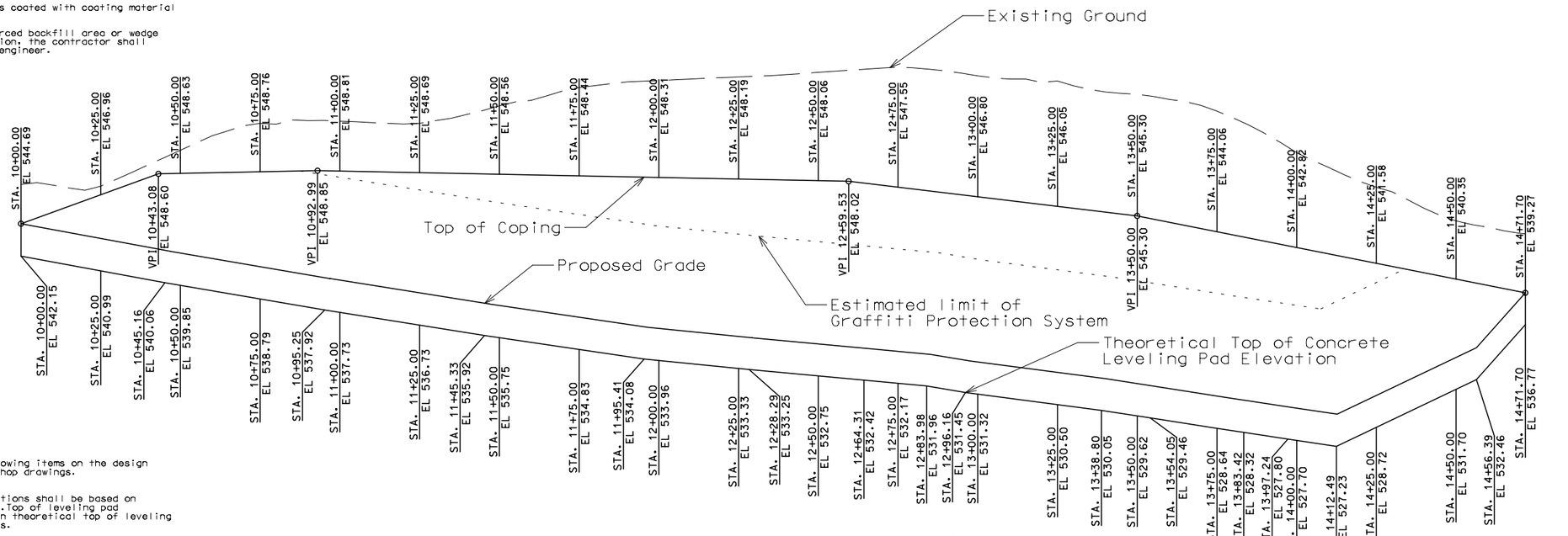
Notice and Disclaimer Regarding Boring Log Data

The locations of all subsurface borings for this structure are shown on the plan sheet(s) for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the department for the design of the project, are shown on Sheet(s) No. __ and may be included in the Electronic Bridge Deliverables. They will also be available from the Project Contact upon written request. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the district or elsewhere.

The Commission does not represent or warrant that any such boring data accurately depicts the conditions to be encountered in constructing this project. A contractor assumes all risks it may encounter in basing its bid prices, time or schedule of performance on the boring data depicted here or those available from the district, or on any other documentation not expressly warranted, which the contractor may obtain from the Commission.



PLAN



DEVELOPED ELEVATION

Concrete Leveling pad not shown for clarity. *

Note: This drawing is not to scale. Follow dimensions.

RETAINING WALL ALONG LITTLE HILLS EXPRESSWAY

LITTLE HILLS EXPRESSWAY
FROM STA. 473+68.50 TO STA. 481+15.12

STATE OF MISSOURI
JARRETT D. JASPER
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PROFESSIONAL ENGINEER
3/4/2021

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LICENSE NO.:	2005005570
EXPIRATION DATE:	12-31-2021

DATE PREPARED: 10/28/2021
ROUTE:
STATE: MO
DISTRICT:
SHEET NO.: 24
COUNTY: ST. CHARLES
JOB NO.: CMAQ#4917(602)
CONTRACT ID.:
PROJECT NO.: 19STR30
BRIDGE NO.:

DATE	DESCRIPTION
10/25/21	ADDENDUM 2

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LITTLE HILLS EXPRESSWAY
MSE WALL DETAILS
SHEET 1 OF 3

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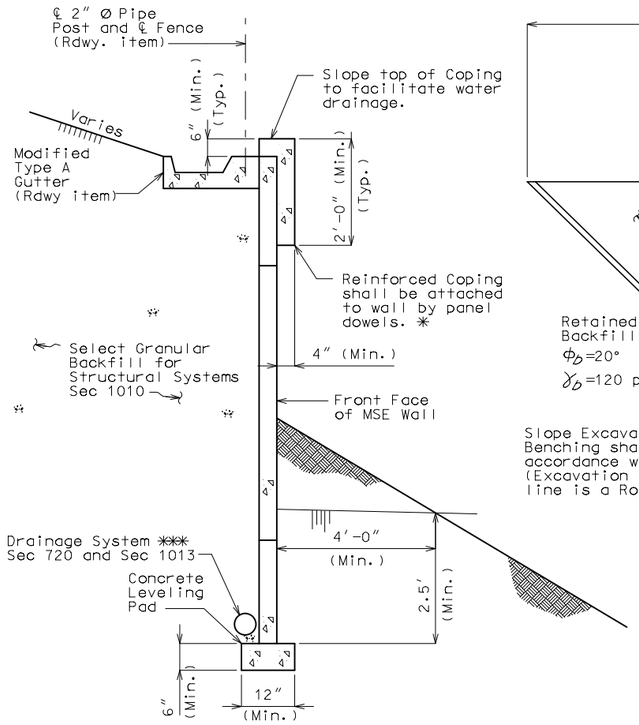
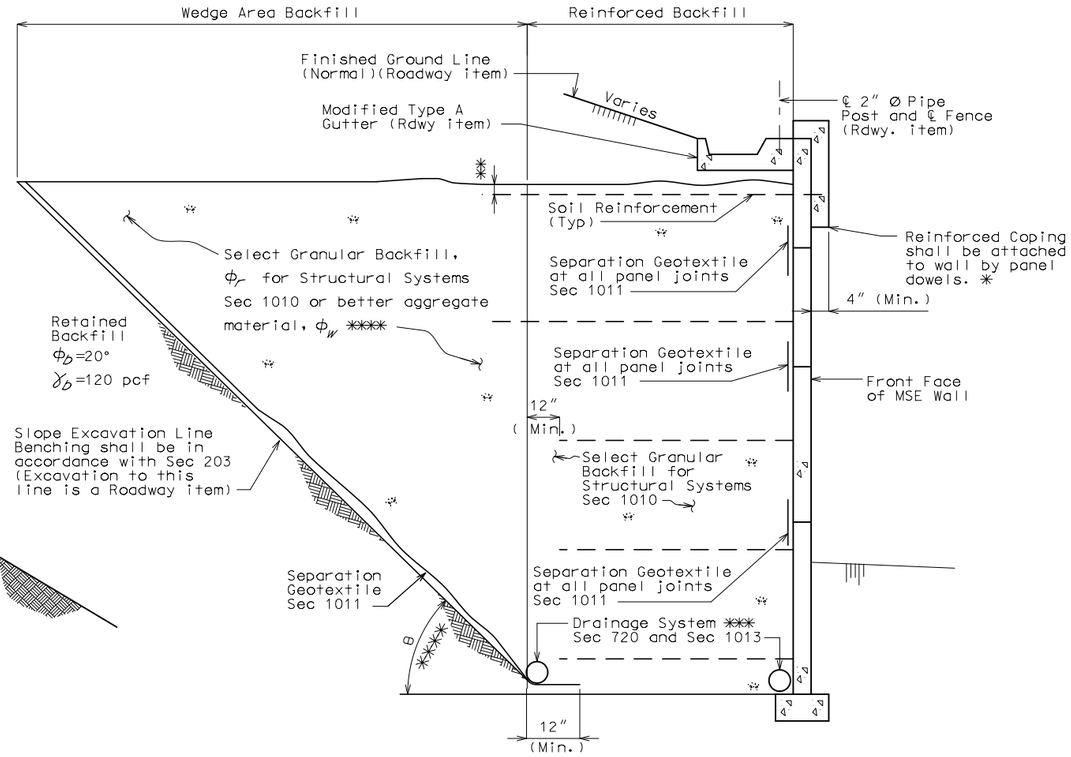


TYPICAL SECTION THRU
LARGE BLOCK WALL



TYPICAL SECTION THRU
LARGE BLOCK WALL SHOWING FILTER CLOTH

General Notes Cont.:

Upper two layers of soil reinforcement shall be extended 3 feet beyond the lower layers.

✳ Inverted U-shape reinforced capstone may be used in lieu of coping. Panel dowels for level-up concrete shall be required, and provided by manufacturer. The dowels shall be field trimmed to clear the capstone by a minimum of 1 1/2 inches and a maximum of 2 1/2 inches.

✳✳ Topmost layer of reinforcement shall be fully covered with select granular backfill for structural systems, as approved by the wall manufacturer, before placement of the Separation Geotextile.

✳✳✳ Minimum 6″ diameter perforated PVC or PE pipe.

Manufacturer shall show drain details on design plans to be submitted as shown on MoDOT MSE wall plans and/or roadway plans.

Contractor shall modify the drain details as shown if it will improve flow as may be the case for stepped leveling pad, and for an uneven ground line (approval of the engineer required).

Material Properties Used in Design								
Reinf. Fill/Select Granular Backfill			Active Force Computations			Foundation		
ϕ°	γ (pcf)	C (psf)	ϕ°	γ (pcf)	C (psf)	ϕ°	γ (pcf)	C (psf)

Note: MSE Wall designer shall include table on shop drawings and provide values used in the design computations.

✳✳✳✳ Select granular backfill shall extend a minimum of 12″ beyond the end of all soil reinforcement. Where the angle, θ, between the retained backfill excavation/fill line and the horizontal is less than 90°, the wedge area backfill between θ and 90° shall be filled with select granular backfill for structural systems meeting the requirements of Section 1010.

– For $(45° + \phi_b/3) < \theta \leq 90°$, properties for retained backfill shall be used for active force computations.

– For $\theta \leq (45° + \phi_b/3)$, contractor shall have the option to use select granular backfill, ϕ_r, or better aggregate material, ϕ_w for active force computations in the wedge area backfill. For active force computations, the angle of internal friction for wedge area backfill material, ϕ_r or ϕ_w, shall be limited to 34° unless determined otherwise in accordance with Section 1010. If ϕ_r or ϕ_w > 34° is desired for wedge area backfill then test report shall be submitted with manufacturer's design plans. ϕ_r or ϕ_w shall not be greater than 40° for computations. Final configuration of this option shall be sent to Geotechnical Section for a new overall global stability analysis. Design ϕ_w shall be shown on manufacturer's plans if used.

The slope excavation line shall be benched and separation geotextile shall be placed between the retained backfill and either select granular backfill or better aggregate material, and between the select granular backfill and better aggregate material.

Show range of acceptable theta (θ) angle on shop drawings which must be consistent with design computations and proposed construction of wall. Show active force computation properties on shop drawings and in design computations. Coordination between wall designer (manufacturer) and contractor is required before shop drawing submittal.

2

Excavation quantities and pay items are given on the roadway plans. Excavation quantities are based on a soil reinforcement length of 15.1 ft (1.0H). The soil reinforcement length may vary based upon the wall design selected by the contractor. Plan excavation quantities will be paid regardless of any actual quantities removed based on the soil reinforcement length and design selected.

Note: This drawing is not to scale. Follow dimensions.

STATE OF MISSOURI
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PROFESSIONAL ENGINEER
10/25/2021

NAME: JARRETT D. JASPER
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ROUTE
STATE
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SHEET NO.
25
COUNTY
ST. CHARLES
JOB NO.
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DATE	DESCRIPTION
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LITTLE HILLS EXPRESSWAY
MSE WALL DETAILS
SHEET 2 OF 3

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2 SHEET REVISED

201+00.00

200+50.00

200+00.00

EX R/W

4.0%

3:1

4:1

29.56' LT
541.68

EX 542.60
PG 543.73

2.0%

26.93' RT
542.27

28.18' LT
543.84

EX 545.75
PG 545.83

5.0%

41.06' RT
544.41

6:1

26.06' LT
545.84

EX 547.30
PG 547.30

31.90' RT
545.88

10:1

10'
10'

STATE OF MISSOURI
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ROUTE	STATE
	MO

DISTRICT	SHEET NO.
	36

COUNTY
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LITTLE HILLS EXPRESSWAY

CROSS SECTIONS
LITTLE HILLS EXPRESSWAY WEST
SHEET 1 OF 2

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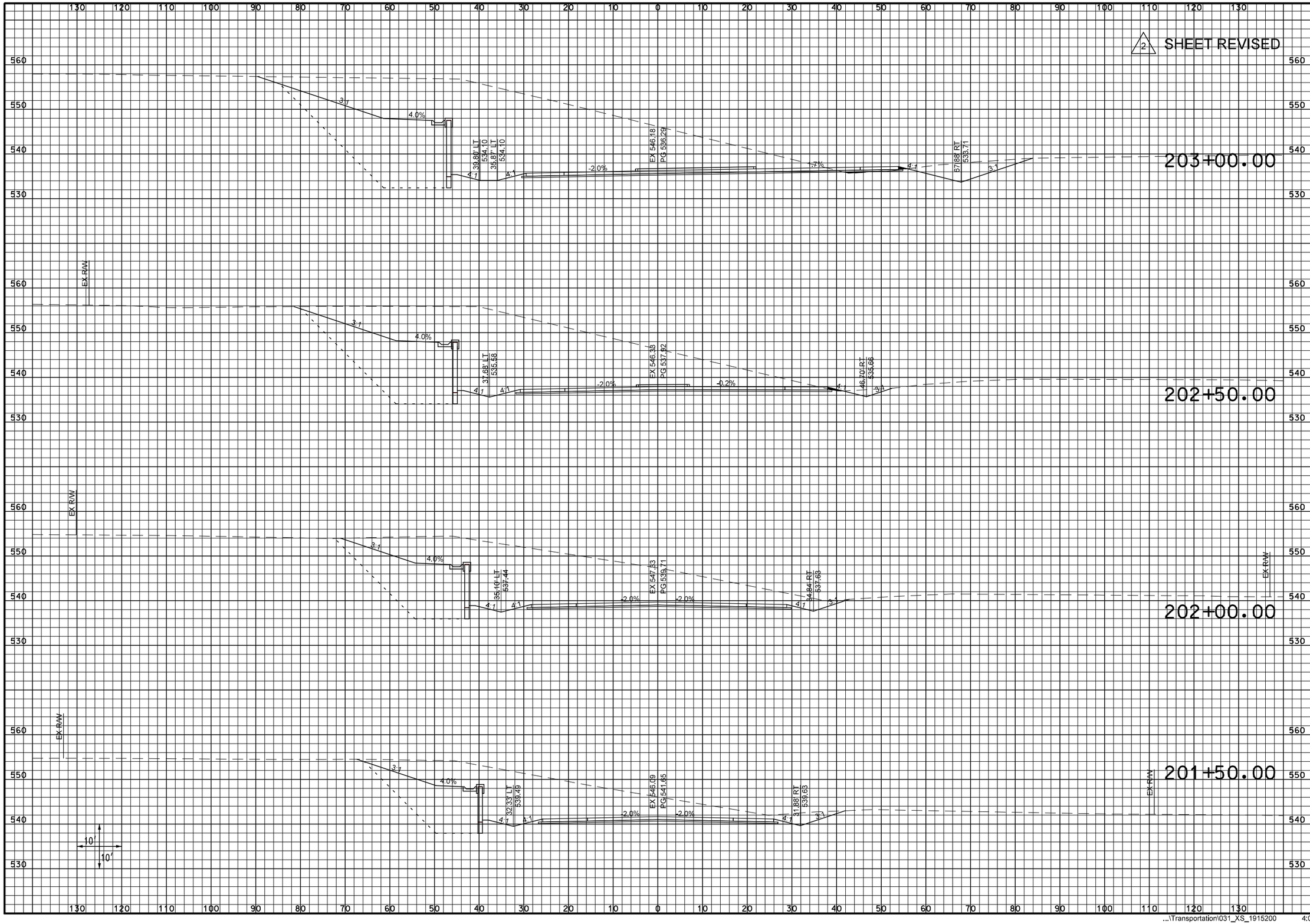

2 SHEET REVISED

STATE OF MISSOURI
JARRETT D. JASPER
NUMBER
PE-2005005570
PROFESSIONAL ENGINEER
10/28/2021

NAME: JARRETT D. JASPER
DISCIPLINE: CIVIL ENGINEER
LICENSE NO.: 2005005570
EXPIRATION DATE: 12-31-2021

DATE PREPARED
10/28/2021

ROUTE | STATE
MO

DISTRICT | SHEET NO.
37

COUNTY
ST. CHARLES

JOB NO.
CMAQ#4917(602)

CONTRACT ID.

PROJECT NO.
19STR30

BRIDGE NO.

DATE	DESCRIPTION
10/25/21	ADDENDUM 2

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

HORNER SHIFRIN
THE POWER HOUSE AT UNION STATION
401 S. 18th St., Ste. 400
ST. LOUIS, MO 63103-2296
314-531-4321 FAX: 314-531-6966
www.HornerShifrin.com
Certificate of Authority: 000159
Expiration Date: December 31, 2020

LITTLE HILLS EXPRESSWAY
CROSS SECTIONS
LITTLE HILLS EXPRESSWAY WEST
SHEET 2 OF 2

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3.0 Work Hour Restrictions.

3.1 There are three major summer holiday periods: Memorial Day, Independence Day, and Labor Day. All lanes shall be scheduled to be open to traffic during these holiday periods, from 12:00 noon on the last working day preceding the holiday until 9:00 a.m. on the first working day subsequent to the holiday. Normal daytime traffic operations shall be considered 8:00 a.m. to 4:00 p.m to avoid peak travel times.

4.0 Traffic Control Plan.

4.1 Traffic Control sign, cones & other devices to be provided by the contractor shall comply with the Manual of Uniform Traffic Control Devices (MUTCD), latest edition. The contractor shall have day to day responsibility for traffic control in work zone areas, and shall provide additional traffic control measures as they deem appropriate to provide for safe traffic and pedestrian control and related construction operations.

2

4.2 The contractor will ensure that two-way travel will be maintained on Little Hills Expressway during construction. Mel Wetter Parkway and Little Hills Industrial Boulevard will be closed for a short duration during construction. Signed detours will be set up during the road closures of Mel Wetter Parkway and Little Hills Industrial Boulevard. Below is a summary of the construction phasing for the project:

4.2.1 Phase 1: The northern portion of the roundabout and the new road north of existing Little Hills Expressway will be constructed. Two lanes and two-way traffic will be maintained on Little Hills Expressway in this phase.

4.2.2 Phase 2: Connections of the new roundabout to Little Hills Expressway will be constructed. Westbound traffic will be moved onto new roundabout. Eastbound traffic will continue to use existing Little Hills Expressway. Mel Wetter Parkway and Little Hills Industrial Boulevard will have access to eastbound Little Hills Expressway only.

4.2.3 Phase 3: The southern portion of the roundabout will be constructed, including the connections to Mel Wetter Parkway and Little Hills Industrial Boulevard. Two-way traffic will be maintained on the newly constructed north side of the roundabout. Mel Wetter Parkway and Little Hills Industrial Boulevard shall be closed during construction of Phase 3. The closure of Mel Wetter Parkway and Little Hills Industrial Boulevard shall be limited to 60 calendar days at which point the contractor is subject to liquidated damages in the amount of $1,100/day.

5.0 Greenway/Trail Access. Access to the trail crossing across Mel Wetter Parkway shall be provided whenever feasible. The crossing shall be returned to ADA compliance in a reasonably attainable manner as agreed upon by the City and the contractor.

6.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provisions, unless specified elsewhere in the contract document.

Q. ROADWAY SIGNS/SIGN POSTS

1.0 Description. This work shall consist of furnishing and installing signs as shown on the plans. All signs shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Any signs not detailed on the plans shall be in accordance with Standard Highway Signs by the U.S. Department of Transportation, Federal Highway Administration.

1.1 This work shall include all labor and equipment necessary to erect Roadway Signs and Ground Mounted Sign Posts.

1.2 Where called for on the Project Drawings, in the details, or as instructed by the Project Engineer, install appropriate Roadway Signs and Ground Mounted Sign Posts as directed in the plans.

2

1.3 Road signs shall be installed according to the AASHTO MUTCD. Road signs shall be installed on a single black square tube post with a breakaway assembly, where necessary.

2.0 Materials. Material shall conform to the Missouri Standard Specifications for Highway Construction, Division 1000 Materials Details.

3.0 Method of Measurement.

3.1 Measurement for these work items shall be as indicated below:

Roadway Signs (Furnish and Install, Permanent), measured per Square Foot
Ground Mounted Sign Posts, measured per Each

4.0 Basis of Payment

4.1 Payment for this work shall be as follows:

Roadway Signs (Furnish and Install, Permanent), measured per Square Foot
Ground Mounted Sign Posts, measured per Each

Project Bid Form
Little Hills Expressway and Mel Wetter Parkway Intersection Improvements
CMAQ#4917(602)
City of Saint Charles, Missouri

Item Number	Item Description	Unit	Quantity	Unit Price	Total
	ROADWAY:				
201-20.10	CLEARING AND GRUBBING	ACRE	1.5		
202-20.10	REMOVAL OF IMPROVEMENTS	LS	1		
202-22.95	SAWCUT (ANY DEPTH/MATERIAL)	LF	199		
203-10.00	CLASS "A" EXCAVATION	CY	15000		
203-60.00	COMPACTING EMBANKMENT	CY	500		
304-05.04	TYPE 5 AGGREGATE BASE (4" THICK)	SY	6704.9		
405-30.30	TYPE "X" BITUMINOUS CONCRETE (BASE)	TONS	9.2		
502-11.08	CONCRETE PAVEMENT (8" NON-REINFORCED)	SY	6264.5		
603-10.99	ADJUST UTILITY COVER TO GRADE	EA	1		
604-14.01	AREA INLET, SINGLE, OPEN 1 SIDE, UNTRAPPED	EA	1		
604-20.26	ADJUST GRATE INLET TO GRADE	EA	3		
607-01.60	CHAIN LINK FENCE (60")	LF	474		
608-10.00	CONCRETE MEDIAN	SY	460.1		
609-10.41	CONCRETE GUTTER, TYPE "A"	LF	78		
609-10.55	CURB AND GUTTER, MOUNTABLE (3")	LF	384		
609-10.99	CONCRETE GUTTER, MODIFIED TYPE "A"	LF	474		
609-20.11	INTEGRAL CURB (6" HEIGHT AND UNDER)	LF	469		
609-60.98	FURNISHING TYPE 3 ROCK DITCH LINER	CY	296		
609-60.99	PLACING TYPE 3 ROCK DITCH LINER	CY	296		
609-70.00	BEDDING MATERIAL FOR ROCK DITCH LINER	CY	108		
612-10.20	MOVEABLE BARRICADES WITH MODEL "B" AMBER FLASHERS(2 EACH PER BARRICADE	EA	21		
612-70.20	CHANGEABLE MESSAGE BOARD (NOISELESS), RENTAL	EA	3		
616-10.05	CONSTRUCTION SIGNS	SF	392		
616-10.25	CHANNELIZER (TRIM LINE)	EA	95		
617-30.00	PERMANENT CONCRETE MEDIAN BARRIER, TYPE "D"	LF	55		
619-00.00	MOBILIZATION	LS	1		
627-40.99	CONTRACTOR FURNISHED SURVEYING AND STAKING	LS	1		
703-05.00	GRAFITTI PROTECTION SYSTEM	LS	1		
703-05.99	CONCRETE AND MASONRY PROTECTION SYSTEM	LS	1		
720-10.00	MECHANICALLY STABILIZED EARTH WALL SYSTEMS	SF	5894		
726-13.12	12" CLASS III REINFORCED CONCRETE PIPE CULVERT	LF	37		
731-00.48	PRECAST CONCRETE MANHOLE (48")	EA	1		
803-10.00	SODDING	SY	3114		
804-10.00	TOPSOIL	CY	346		

Item Number	Item Description	Unit	Quantity	Unit Price	Total
805-10.00	SEEDING	ACRE	0.4		
806-00.99	SEDIMENT REMOVAL	CY	28		
806-20.00	PERMANENT EROSION CONTROL BLANKET	SY	250		
806-30.01	ROCK DITCH CHECK	EA	26		
806-50.00	TEMPORARY SEEDING AND MULCHING	ACRE	1		
806-70.00	SILT FENCE	LF	193		
				SUBTOTAL	

Item Number	Item Description	Unit	Quantity	Unit Price	Total
	PEDESTRIAN FACILITIES:				
404-30.10	TYPE "C" ASPHALTIC CONCRETE	TONS	7		
608-60.07	CONCRETE SIDEWALK, CURB RAMP (7" THICK)	SY	25.5		
608-60.98	TRUNCATED DOMES FOR CURB RAMPS (NEW CONSTRUCTION)	SF	133		
				SUBTOTAL	
	STRIPING, SIGNING, AND LIGHTING:				
620-99.01	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 8 IN. YELLOW	LF	2339		
620-99.02	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 8 IN. WHITE	LF	2169		
620-99.03	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 12 IN. WHITE	LF	61		
620-99.04	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24 IN. WHITE	LF	260		
620-99.05	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24 IN. YELLOW	LF	180		
620-99.06	PREFORMED THERMOPLASTIC PAVEMENT MARKING, STRAIGHT ARROW	EA	1		
620-99.07	PREFORMED THERMOPLASTIC PAVEMENT MARKING, LEFT/RIGHT ARROW	EA	1		
620-99.08	PREFORMED THERMOPLASTIC PAVEMENT MARKING, COMBINATION STR/LT/RT	EA	5		
620-99.09	PREFORMED THERMOPLASTIC, PAVEMENT MARKING, BIKE LANE	EA	3		
620-99.10	PREFORMED THERMOPLASTIC PAVEMENT MARKING, WORD (YIELD)	EA	3		
628-00.10	ROADWAY SIGNS (FURNISH AND INSTALL, PERMANENT)	SF	111		
628-00.98	SH-FLAT SHEET	SF	50		
628-00.99	GROUND MOUNTED SIGN POST	EA	32		
901-10.30	LIGHTING POLE, 30 FT, TYPE AT (POWDER COATED BLACK)	EA	10		
901-13.12	LUMINAIRE, LED-B, TENON MOUNT (POWDER COATED BLACK)	EA	10		
901-30.02	CONDUIT, 2" RIGID, IN TRENCH	LF	1038		
901-30.03	CONDUIT, 3" RIGID, IN TRENCH	LF	207		
901-30.04	CONDUIT, 4" RIGID, IN TRENCH	LF	15		
901-40.03	CONDUIT, 3" RIGID, PUSHED	LF	188		
901-61.10	PULL BOX, PREFORMED CLASS 1	EA	6		
901-70.08	CABLE, #8 AWG, 1 CONDUCTOR	LF	3500		
901-71.10	POLE & BRACKET CABLE	LF	1020		
901-70.08	WIRE, #8 AWG, BARE NEUTRAL	LF	1750		

Item Number	Item Description	Unit	Quantity	Unit Price	Total
901-82.30	POLE FOUNDATION, 30 FT	EA	10		
901-86.12	POWER SUPPLY ASSEMBLY & CONTROLLER, 240 V LTG	EA	1		
901-99.01	REMOVAL OF EXIST. LIGHTING EQUIPMENT	LS	1		
901-99.02	BRACKET ARM, 2 FT, DECORATIVE (POWDER COATED BLACK)	EA	3		
901-99.03	PEDESTRIAN LIGHT POLE & FOUNDATION	EA	8		
901-99.04	PEDESTRIAN LUMINAIRE	EA	11		
				SUBTOTAL	
	LANDSCAPING/STREESCAPING:				
840-90.99	LANDSCAPING	LS	1		
				SUBTOTAL	
				PARTICIPATING COSTS TOTAL	

Non-Participating Construction Costs					
Item Number	**Item Description**	**Unit**	**Quantity**	**Unit Price**	**Total**
	ROADWAY:				
608-99.06	PIGMENTING AND TEXTURING CONCRETE PAVEMENT AND MEDIAN	SY	868.5		
720-10.99	WALL LETTERING AND MOUNTING ACCESSORIES	LS	1		
901-99.05	WALL MOUNTED SIGN LIGHTING SYSTEM	LS	1		
				SUBTOTAL	
	WATER MAIN:				
1	12" PVC C900 DR14 (OPEN CUT) (INCLUDING EXCAVATION AND BEDDING)	LF	2253		
2	12" DIP RESTRAINED JOINT (HORIZONTAL DIRECTIONAL DRILL) (INCLUDING EXCAVATIC	LF	120		
3	6" DIP RESTRAINED JOINT WATER MAIN (OPEN CUT) (INCLUDING EXCAVATION AND BE	LF	94		
4	6" PVC C900 DR14 (INCLUDING EXCAVATION AND BEDDING)	LF	100		
5	6" DIP WATER MAIN	LF	148		
6	6" DIP FITTINGS	EA	3		
7	12" DIP FITTINGS	EA	14		
8	12" GATE VALVE	EA	3		
9	6" GATE VALVE	EA	3		
10	HYDRANT ASSEMBLY (INCL. EXCAVATION, BEDDING, VALVE, TEE, PIPE SPOOL)	EA	5		
11	10" TAPPING SLEEVE & VALVE	EA	1		
12	CONNECTION TO EXISTING 12" MAIN	EA	1		
13	CONNECTION TO EXISTING 6" MAIN	EA	3		
14	GRANULAR BACKFILL	CY	609		

Item Number	Item Description	Unit	Quantity	Unit Price	Total
15	ASPHALT PAVEMENT REMOVAL & REPLACEMENT	SY	84		
16	CONCRETE REMOVAL & REPLACEMENT	SY	154		
17	CONCRETE REMOVAL & REPLACE WITH TEMPORARY ASPHALT	SY	38		
18	ASPHALT PAVEMENT REMOVAL ONLY	SY	190		
19	TREE CLEARING	LS	1		
20	TRAFFIC CONTROL	LS	1		
				SUBTOTAL	
				NON-PARTICIPATING COSTS TOTAL	
				PARTICIPATING COSTS TOTAL	
				NON-PARTICIPATING COSTS TOTAL	
				PROJECT COSTS TOTAL	

4140 Lindell Blvd
St. Louis, MO 63108
Phone: (314) 454-0222
Fax: (314) 454-1235
http://www.abnacorp.com

October 28, 2021

Mr. Jonathan R. Loos, P.E.
Horner & Shifrin, Inc.
401 S. 18th Street, Suite 400
St. Louis, MO 63103

SUBJECT: **Report of Subsurface Exploration and Geotechnical Engineering Evaluation for Little Hills Expressway, St. Charles, Missouri rev 1**

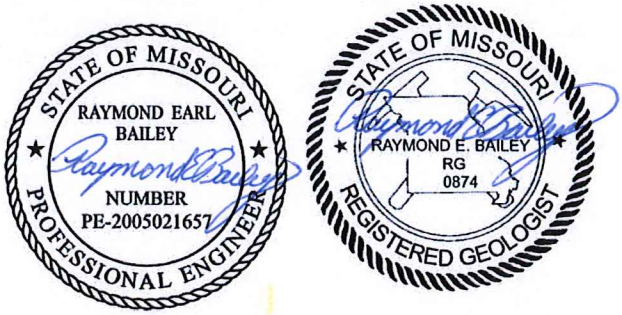
Dear Mr. Loos:

ABNA Engineering, Inc., has completed the authorized Subsurface Exploration and Geotechnical Engineering Evaluation of the subject project. Our work was done in general accordance with the Professional Service Agreement dated July 15, 2019.

The purpose of our work was to determine the general subsurface conditions at specific soil test boring locations and to gather data on which to base comments relative to the selection of foundation types for the proposed structure at the site and assess the existing pavement at roughly third points within the project. This report outlines the exploration procedures used, exhibits the data obtained, and presents our evaluation and recommendations relative to the outlined geotechnical engineering aspects of the project.

We appreciate the opportunity to work with you on this project. Please contact our office if we can be of further assistance.

Respectfully submitted,
ABNA Engineering, Inc.



Geotechnical Manager

TABLE OF CONTENTS

1 SCOPE OF WORK

Our work was performed in general accordance with the Professional Service Agreement dated July 15, 2019. Authorization to proceed was issued by Horner & Shifrin, Inc. Our scope of work consisted of the following:

1. Site reconnaissance and boring layout by a staff engineer/surveyor.
2. Obtain existing utility information through coordination with utility companies and utility locate service.
3. Provide maintenance of traffic per MUTCD guidelines.
4. Subsurface Exploration consisting of four (4) soil test borings at the proposed retaining wall location and three (3) test borings along the alignment of the new water main with samples and penetration tests at regular intervals.
5. Laboratory soil classification testing on selected soil samples obtained from the soil borings and preparation of the borehole logs.
6. Prepare a letter report addressing the findings of the subsurface investigation and geotechnical recommendations as it relates to construction of the proposed gravity block or Mechanically Stabilized Earth (MSE) retaining wall.

2 SITE AND PROJECT DESCRIPTION

The subject site is located within the City of St. Charles, Saint Charles County, Missouri. The subject site lies north east of Route 370 consists of Little Hills Expressway and the Mel Wetter Parkway Roundabout.

The topography of the subject site was observed to be generally sloping from an elevation of 556 ft in the west to 458 ft at the east end of the site with 15 to 20 foot high slopes from street level north of the Little Hills Expressway to the base of the proposed retaining wall. The exposed surfaces were generally covered with wooded vegetation. Figures 1 through 2 show the site in visual detail.

It is our understanding that the proposed project will involve the design of a roundabout capable of accommodating future Route 370 ramps at the intersection of Mel Wetter Parkway and Little Hills Expressway. In the interim, the roundabout will optimize traffic currently experiencing significant traffic delays and experiencing an increase in traffic volumes due to new developments. The project will also consist of a new retaining wall, ADA compliant changes to Boschert Greenway, and a new water main along Little Hills Expressway.

3 SITE GEOLOGY

Published geologic literature (USDA Web Soil Survey and Geologic Map of Missouri) indicates that the site is underlain by silty clay and the bedrock unit is the Mississippian age St. Louis limestone formation. Estimated depth to bedrock at the east end of the project site is approximately 41.5 feet. The soil overburden within the general site vicinity consists of the Menfro silt loam present on 20 to 45 percent slopes. These soil deposits can form on slopes and are well drained silt loams to silty clay loams.

4 SEISMIC

The New Madrid fault zone, which is the primary region of seismic activity for the mid-continental region, is located approximately 150 miles south of the St. Louis area in the southeast corner of Missouri. The strongest recorded earthquakes resulting from this fault zone occurred in December, 1811 through February, 1812, with three principal earthquakes of estimated Intensity XI on the Modified Mercalli Scale.

A secondary source of seismic activity is the St. Genevieve fault zone, which extends northwest/southeast from southwestern Illinois towards St. Genevieve County, Missouri. This fault zone's northern terminus is located within 50 miles of the St. Louis area. Several seismic events of body wave magnitude (mb) 4.5 to 5.8 have been recorded near this fault zone.

5 FIELD EXPLORATION AND LABORATORY TESTING

On August 14 and 17, 2020, ABNA Engineering, Inc. conducted a subsurface exploration consisting of seven (7) soil borings: four (4) at the proposed retaining wall location and three (3) at the proposed new water main. The soil borings are designated as B-01 through B-04. Borings B-01 to B-04 were completed up slope of the roadway along the proposed retaining wall and borings B-05 to B07 were completed at the roadway level along the proposed new water main. Borings B-01 through B-04 were completed to a depth of approximately the existing road elevation. This configuration was utilized to obtain soil samples to provide data for global stability analysis. Borings B-05 was drilled to establish the depth to bedrock and collect a rock sample. Borings B-06 to B-07 were drilled to obtain soil samples and data in the footprint of the proposed new water main. The field investigation was directed by a geotechnical engineer/geologist from ABNA who also classified and collected the soil and rock samples.

In addition to the field exploration, a geotechnical laboratory testing program was conducted to determine additional engineering characteristics of selected soil samples obtained from the soil borings and to test the compressive strength of the rock sample. The results of the individual tests are indicated on the Logs of Boring in Appendix B.

6 SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered by the borings are shown on the Logs of Boring located in Appendix B. The general subsurface conditions encountered on the slopes consisted primarily of brown and gray lean silty clays and loess. Auger refusal was only encountered during boring B-05. Groundwater was not observed during the exploration. The presence or absence of groundwater during drilling does not necessarily mean that groundwater will be present or absent at that location at other times. The results of the Atterberg Limits laboratory tests confirmed the designation of low plasticity lean clay (CL) for 3 samples tested and silt (ML) for one sample.

Conditions represented by the borings should be considered applicable only at the boring locations on the dates shown. It should be assumed that the reported conditions might be different at other locations or at other times.

7 FOUNDATION DESIGN AND CONSTRUCTION RECOMMENDATIONS

7.1 Geotechnical Consideration

Based on our analysis, the new ***MSE wall*** structure can be supported on a footing foundation system bearing within the soil. Recommendations regarding the design and construction of the foundation are provided below.

7.2 Foundation – Retaining Wall

Below-grade walls required at this site are assumed to include a retaining wall designed to accommodate surface grade changes on the north side of Little Hills Expressway. The maximum toe pressure for below-grade walls should not exceed the bearing pressure of 1,500 pounds per square foot (psf). ***Retaining walls designed with a bearing pressure exceeding 1,500 pounds per square foot will need to incorporate some form of ground bearing modification system and/or foundation improvement***. Retaining walls may be designed with an allowable coefficient of friction between the base of the ***wall*** and the soil subgrade of 0.3 ***and between the base of the wall and the porous granular (figure 3) of 0.45.***

Below-grade walls should also be designed to withstand lateral earth pressures caused by the weight of the backfill, including slopes behind the walls; and any surcharge, such as adjacent loads. We recommend the equivalent fluid unit weights tabulated below for lateral earth pressures be used in the design of below-grade walls. The indicated values assume that positive drainage is provided to prevent buildup of hydrostatic pressure. Expansive clay soils should not be used to backfill the wall excavations. Values for granular material should only be used if the granular backfill extends upwards and outwards the full height of the wall at a slope of 45 degrees or flatter from its base. In this case, exterior granular backfill should be capped with approximately 2 feet

of cohesive soil to reduce the potential for surface water infiltration into the granular backfill. With clean granular backfill, filter fabric, such as Mirafi 140N, should be placed along the interface between the soil and granular backfill to reduce the potential for infiltration of the soil into the granular material.

Lateral Earth Pressure Parameters

BACKFILL MATERIAL	ON-SITE SOIL	CRUSHED STONE
At-Rest Equivalent Fluid Pressure	80 pcf	50 pcf
Active Equivalent Fluid Pressure	60 pcf	30 pcf
Soil Unit Weight	120 pcf	110 pcf (Crushed Stone)
Soil Angle of Internal Friction	20 ^{o}	35 ^{o}
Assumed Surcharge Condition	None	None
Slope Profile	Horizontal	Horizontal
Drainage Condition	Fully Drained (No hydrostatic Pressure	Fully Drained (No hydrostatic Pressure)

We recommend that all below-grade walls be provided with a drainage system. A minimum 4-inch diameter, perforated drainpipe should be used, and placed at foundation level. Granular drainage material, consisting of 1-inch clean crushed rock, classified as GP by ASTM D 2487, with less than 5 percent of the rock passing the No. 200 sieve, should be placed a minimum of 6 inches in all directions around the drainage pipe. Synthetic filter fabric, such as Mirafi 140N or equivalent, should encapsulate the drainpipe and granular drainage material. The pipe should be sloped to drain by gravity or through weepholes located on approximately 10-foot centers for above-grade retaining walls. Alternately, drainage can be provided directly through the weepholes without a drain pipe, provided that filter fabric is used or other measures are taken to prevent the granular backfill from migrating out through the weepholes.

7.3 Footing Foundation Construction Considerations

Footing excavations should be free of water, loose soil, and debris if and when concrete is placed. Concrete should be placed soon after excavating to reduce bearing material disturbance.

7.4 Design Recommendation for Retaining Wall Footing Bearing on Soil

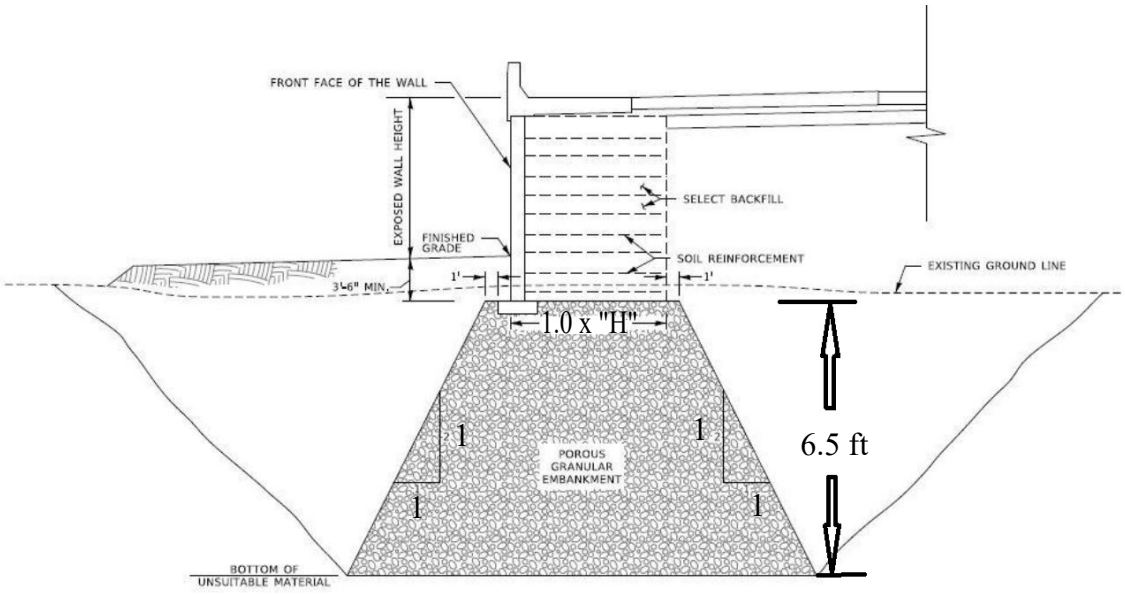
DESCRIPTION	*Design Value*
Net allowable bearing pressure[1]	*1,500 pounds/ft*^{2}
Minimum embedment (below lowest exterior grade)[2]	*30 inches*

1. *The net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation for footings founded in soil. Footing excavation should be free of loose and disturbed material, debris, and water when concrete is placed. 1st two feet shall be omitted for passive pressure.*
2. *Minimum depth will help provide frost protection.*

7.5 Spread Footings Bearing on Controlled Engineering Fill Construction Considerations

This approach involves over-excavating the existing soil and replacing the over-excavated areas with controlled engineered fill as a way of increasing the allowable maximum bearing capacity. Engineered fill should be free of organic and other deleterious material. The fill should consist of ***crushed stone***. The fill should be placed in lifts not exceeding eight inches of loose measure and compacted to 95% of the soil's maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D698).

The retaining wall structure can be supported on a system of footings, ***that includes the entire length of the select backfill soil mass for MSE walls, and*** derives their support from newly placed controlled engineered fill ***(figure 3)***. Footings bearing on controlled engineered fill should be dimensioned for an allowable maximum bearing capacity (bearing capacity in excess of adjacent overburden) of 2,500 pounds per square foot (PSF).



NOT TO SCALE (See plans for actual wall configuration.)

**** Depth of porous granular is only at the 16 ft wall maximum height provided in the updated wall sheet plan profiles.***

Figure 3 - Controlled Engineered Fill

The footing bearing surfaces should be observed by a geotechnical engineer from ABNA to confirm that the exposed bearing surface complies with the design bearing pressure. Based on the field observation, if localized soft zones are identified, they should be undercut and replaced with controlled engineered fill, crushed stone, or lean concrete. If clean stone is used as backfill material, the clean stone should be enclosed in geotextile fabric to prevent adjacent fine-grained material from migrating into the clean stone.

Soil exposed in the base of all satisfactory foundation excavations should be protected against any detrimental change in conditions such as disturbance from rain, frost or groundwater seepage. Surface runoff should be diverted away from the footing trench excavations and not be allowed to pond. Water encountered within the footing trench excavation should be pumped out prior to backfilling or concrete placement.

7.6 Seismic Considerations

The project location is determined to be Site Class D as per AASHTO (2012), Section 3.10.3.1. The maximum considered earthquake spectral response acceleration at short period, S_s (0.2 seconds) is 0.320 g and S1 (1.0 second) is 0.092 g. The values of site factor coefficients F_a, and F_v for Site Class D is approximately 1.54 and 2.41 respectively. Peak ground acceleration, PGA, for this site is 0.186.

7.7 Lateral Earth Pressures

Earth pressures will be influenced by the structural design of the walls, methods of construction and compaction, the strength of the materials being restrained, and the conditions of wall restraint. The lateral earth pressure design parameters for retaining wall work should be designed to withstand lateral earth pressures caused by adjacent soil and surcharge load. If low plasticity cohesive soil is used as backfill, the earth pressure against the walls may be computed using the following equation:

$P_h = 45H + 0.6Q$

Where: P_h = lateral earth pressure at any depth h, psf

H = depth below adjacent grade, feet

Q = surcharge loads, psf

8 GLOBAL STABILITY OF RETAINING WALL SLOPE

For global stability of a slope, the following information should be considered: Geometry (cross section and loading conditions); Location of the water table; soil / rock stratigraphy; soil/rock properties (unit weight, Atterberg Limits, undrained and drained shear strength); Additional

loading conditions (traffic surcharge, railroad live load, etc.). For the soils in this location (classified as CL) a reference value of 300 psf for cohesion and a phi angle of 20 degrees are acceptable for global stability analysis. If using the NAVFAC DM-7.2 (1982) graphical reference, use curve 3 for the active components for retaining walls (k_v and k_h).

For global stability of a slope, a minimum factor of safety FS ≥ 1.3 is recommended for both the long-term drained condition and the short term undrained condition, except recommend making the factor of safety 1.5 for slope or walls that support buildings, critical utilities, or other installations with a low tolerance for failure.

With a minimum soil reinforcement length behind the ***MSE* retaining wall of 1.0 x Height of *wall,*** slope stability analysis ***for the preliminary wall plans (see Appendix D)*** yielded a factor of safety of 2.146 for non-earthquake loaded condition and 1.477 for earthquake loaded condition (see Appendix C) ***and for the updated wall plans (see Appendix D) yielded a factor of safety of 3.236 for non-earthquake loaded condition and 1.995 for earthquake loaded condition (see Appendix C).***

9 ROAD CONDITION ASSESSMENT

On September 14, 2020, ABNA obtained 3 pavement cores roughly at the third points within the project. Cores were extended through the aggregate base and into the sub base. The following are observations of the core samples:

		PAVEMENT	AGGREGATE	TOTAL	BEARING
CORE	LOCATION	THCIKNESS	THICKNESS	DEPTH	STRENGTH
1	CL 17+60	8.5 inches	6.5 inches	17 inches	25,800 psf
2	PCC 302+50	8.5 inches	4.0 inches	13 inches *	24,800 psf
3	PCC 200+30	8.5 inches	5.5 inches	21 inches	29,800 psf

* hand auger encountered rock and resulted in auger refusal.

10 GENERAL REMARKS/REPORT LIMITATIONS

This report has been prepared for the exclusive use of **Horner & Shifrin, Inc.**, for the specific application to the subject project. All recommendations contained in this report have been made in accordance with generally accepted soil and foundation engineering practices. No other warranties are implied or expressed.

The analysis and recommendations submitted in this report are based in part upon the data obtained from the test borings. The nature and extent of variations between the borings may not become evident until construction. If variations appear to be evident, it may be necessary to re-evaluate the recommendations of this report.

We emphasize that this report is for design purposes only and may not be sufficient to prepare an accurate bid. Contractors reviewing this report should acknowledge that the discussions and recommendations contained herein are for design purposes.

When the plans and specifications are more complete, or if significant changes are made in the nature of the proposed project, a consultation should be arranged to review them with respect to prevailing soil conditions. At that time, it may be necessary to submit supplementary recommendations.

We also suggest that the geotechnical engineer be granted the opportunity to review the plans and specifications to verify that the recommendations in this report are properly interpreted and incorporated in the design. If the geotechnical engineer is not granted the privilege of making this recommended review, the geotechnical engineer can assume no responsibility for misinterpretation of his recommendations.

FIGURES

Figure 1: Google Maps image of Little Hills Expressway – Plan View

Site Overview and Borehole Locations

Figure 2: Web Soil Survey image of site.

Site Overview and Borehole Location

APPENDIX A

APPENDIX A1 - SUMMARY OF LABORATORY TESTING

Laboratory testing was performed on selected representative samples to evaluate pertinent engineering properties of the soils. To supplement the visual classification of the soil samples, the following tests were performed. These laboratory tests were performed in accordance with applicable ASTM standards.

A1.1 Natural Moisture Contents

Natural moisture contents were evaluated on selected samples. The natural moisture content is the ratio, expressed as a percentage, of the weight of water in a given amount of soil to the weight of soil particles. The results are indicated on the Logs of Boring and Summary of Laboratory Results in Appendix B.

A1.2 Atterberg Limits

Atterberg limits tests were performed to evaluate the soil's plasticity characteristics. The soil's Plasticity Index (P.I.) is representative of this characteristic and is bracketed by the Liquid Limit (L.L.) and the Plastic Limit (P.L.). The Liquid Limit is the moisture content at which the soil will flow as a heavy viscous fluid. The Plastic Limit is the moisture content at which the soil is between the "plastic" and the semi-soil stage. The results of these tests are presented on Logs of Boring and Summary of Laboratory Results in Appendix B. The Plasticity Index (P.I. = L.L. - P.L.) is a frequently used indicator for the soil's potential for volume change. Typically, volume change potential increases with higher plasticity indices.

A1.3 Pocket Penetrometer

Pocket Penetrometer (P.P.) tests were performed on cohesive soil samples. The Pocket Penetrometer provides a consistency classification and an indication of the soil's unconfined compressive strength. Due to the sampling method described below, the upper sample was tested in the boring wall. The lower sample was tested on the largest pieces available and averaged. This method results in values that can only be classified as an estimate.

APPENDIX A2 - DRILLING AND SAMPLING PROCEDURES

Soil drilling and sampling operations were conducted in general accordance with ASTM D1586-11. The borings were advanced by mechanically twisting continuous hollow stem auger flights into the ground. Samples were obtained with a standard 2 inch O.D. split-barrel sampler. The sampler was driven a typical total of 18 inches by means of a 140 pound C.M.E. auto-hammer with a free fall of 30 inches. The number of hammer blows required to drive the sampler the final 12 inches of penetration was recorded and designated as the standard Penetration Test "N-Value".

The penetration resistance, when properly evaluated, is an index to the in-situ relative density of cohesionless soils, the consistency of cohesive soils, the behavior under applied loads, and the relative hardness of bedrock.

Rock drilling and sampling operations were conducted in general accordance with ASTM D2113-14. Drilling is accomplished by circulating a drilling medium through the drill bit while rotating and lowering or advancing the string of drill rods as downward force is applied to a cutting bit. The bit cuts and breaks up the material as it penetrates the formation, and the drilling medium picks up the cuttings generated by the cutting action of the bit. The drilling medium, with cuttings, then flows outward through the annular space between the drill rods and drill hole, and carries the cuttings to the ground surface, thus cleaning the hole. The string of drill rods and bit is advanced downward, deepening the hole as the operation proceeds. Coring is the process of recovering cylindrical cores of rock by means of rotating a hollow steel tube (core barrel) equipped with a coring bit. The drilled core is carefully collected in the core barrel as the drilling progresses. Once the core has been cut and the core barrel is full, the drill rods or overshot assembly are pulled and the core retrieved. The core samples recovered were measured in the field for percent recovery and Rock Quality Designation value (RQD). Each core sample was placed in a cardboard box for transport to the laboratory. The sampling sequence for each coring is summarized on the appropriate Log of Boring in Appendix C1 as well as shown on an annotated core log in Appendix C2. The boreholes were completed with cuttings or grout at depth and grouted or chipped near the surface with spider plugs supporting asphalt patches when needed until the grout fully cured.

APPENDIX B

APPENDIX B1

Log of Borings

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 1 OF 1
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-1

PROJECT: Little Hills Expressway		LOCATION:	
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3 ¼"	HOLE SIZE: 7"
ELEVATION: 543.36	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 20'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20 DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	0										
	1	1-2.5	SS-1	18"	1-1-2 / 1.00		28.20				Soft, Brown Clayey Silt
	2										
	3										
	4	3.5-5	SS-2	14"	1-2-2 / 1.50		28.56				Soft, Brown Clayey Silt (ML)
	5										
	6										
	7										
	8										
	9	8.5-10	SS3	18"	1-2-2 / 0.25		31.13				Soft, Gray Silty Clay
	10										
	11										
	12										
	13										
	14	13.5-15	SS4	18"	0-1-2 / 0.50		30.18				Soft, Gray Silty Clay
	15										
	16										
	17										
	18										
	19	18.5-20	SS5	18"	1-1-3 / 0.75		27.29				Soft, Gray Clayet Silt Boring terminated at 20'

REMARKS: Boring started approximately 1.5' lower than original elevation due to leveling of the slope for rig placement.

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 1 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-2

PROJECT: Little Hills Expressway			LOCATION:	
COORDINATES:			DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A		DEPTH CASING & SIZE: 3¼ HAS	HOLE SIZE: 7"
ELEVATION: 554.58'	ANGLE FROM VERT. AND BEARING: N/A		DEPTH BOTTOM OF HOLE: 60'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/14/20	DATE FINISH: 8/14/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	0										
	1										
	2										
	3										
	4	3.5-5	SS-1	13"	8-4-4 / max		16.90				Medium Stiff, Brown Silty Clay trace roots
	5										
	6										
	7										
	8										
	9	8.5-10	SS2	18"	4-5-5 / 1.75		24.04				Stiff, Brown Silty Clay
	10										
	11										
	12										
	13										
	14	13.5-15	SS3	18"	4-4-4 / 2.0		27.79				Medium Stiff, Orange Brown Silty Clay 14.5' to 14.8 - 3" band of Clayey Silt
	15										
	16										
	17										
	18										
	19	18.5-20	SS4	18"	1-2-3 / 0.50		34.87				Soft, Clayey Silt, transition from Brown to Gray

REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 2 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-2

PROJECT: Little Hills Expressway		LOCATION:	
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¾ HAS	HOLE SIZE: 7"
ELEVATION: 554.58'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 60'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/14/20 / DATE FINISH: 8/14/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	20										
	21										
	22										
	23										
	24	23.5-25	SS5	18"	0-0-0 / 0.25		32.97	34	24	10	Very Soft, Gray Silty Clay (CL)
	25										
	26										
	27										
	28										
	29	28.5-30	SS6	18"	0-1-2 / 1.0		27.94				Soft, Gray Silty Clay
	30										
	31										
	32										
	33										
	34	33.5-35	SS7	18"	1-3-3 / 1.5		26.48				Medium Stiff, Gray Silty Clay
	35										
	36										
	37										
	38										
	39	38.5-40	SS8	18"	2-3-4 / 2.25		25.31				Medium Stiff, Gray Silty Clay

REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 3 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-2

PROJECT: Little Hills Expressway		LOCATION:	
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¾ HAS	HOLE SIZE: 7"
ELEVATION: 554.58'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 60'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/14/20 / DATE FINISH: 8/14/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	40										
	41										
	42										
	43										
	44	43.5-45	SS9	18"	1-3-4 / 2.0		27.65				Medium Stiff, Gray Silty Clay
	45										
	46										
	47										
	48										
	49	48.5-50	SS10	18"	2-4-4 / 3.5		25.98				Very Stiff, Brown with Gray Clay
	50										
	51										
	52										
	53										
	54	53.5-55	SS11	18"	2-4-4 / 2.25		26.50				Very Stiff, Brown Clay
	55										
	56										
	57										
	58										
	59	58.5-60	SS12	18"	3-5-7 / 3.50		23.12				Very Stiff, Mottled light and dark Brown Silty Clay Boring Terminated at 60'

REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 1 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-3

PROJECT: Little Hills Expressway		LOCATION:		
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling		
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¾ HAS		HOLE SIZE: 7"
ELEVATION: 556.27'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 45'		
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20	DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	0										
	1										
	2										
	3										
	4	3.5-5	SS-1	16"	2-2-3 / 1.25		25.82				Soft, Brown Silty Clay
	5										
	6										
	7										
	8										
	9	8.5-10	SS2	15"	7-7-9 / MAX		10.49				Dry, Brown Loess
	10										
	11										
	12										
	13										
	14	13.5-15	SS3	16"	7-7-7 / 3.75		10.38				Dry, Brown Loess
	15										
	16										
	17										
	18										
	19	18.5-20	SS4	16"	3-3-5		17.04				Dry, Brown Loess

REMARKS: The boring was drilled approximately 5' behind the face of wall, North, due to the slope of the hill

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 2 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-3

PROJECT: Little Hills Expressway		LOCATION:		
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling		
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¾ HAS		HOLE SIZE: 7"
ELEVATION: 556.27	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 45'		
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20	DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	20										
	21										
	22										
	23										
	24	23.5-25	SS5	18"	3-2-3 / 1.25		23.36				Siff, Brown Clayey Silt
	25										
	26										
	27										
	28										
	29	28.5-30	SS6	18"	0-1-3 / 1.0		26.30				Soft, Gray Silty Clay
	30										
	31										
	32										
	33										
	34	33.5-35	SS7	18"	1-2-3 / 1.75		26.14	33	21	12	Soft, Gray Silty Clay (CL)
	35										
	36										
	37										
	38										
	39	38.5-40	SS8	18"	2-3-4 / 3.0		25.99				Medium Stiff, Gray Silty Clay

REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 3 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-3

PROJECT: Little Hills Expressway		LOCATION:	
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¾ HAS	HOLE SIZE: 7"
ELEVATION: 556.27'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 45'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20	DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION
	40										*NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL*
	41										
	42										
	43										
	44	43.5-45	SS9	18"	3-3-5 / 2.0		25.66				Medium Stiff, Dark Gray Silty Clay Boring terminated at 45'
	45										
	46										
	47										
	48										
	49										
	50										
	51										
	52										
	53										
	54										
	55										
	56										
	57										
	58										
	59										

REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 1 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-4

PROJECT: Little Hills Expressway		LOCATION:	
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¼ HAS	HOLE SIZE: 7"
ELEVATION: 556.89'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 45'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20 / DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	0										
	1										
	2										
	3										
	4	3.5-5	SS-1	15"	4-5-5 / 0.5		27.74				Brown Loess
	5										
	6										
	7										
	8										
	9	8.5-10	SS2	16"	5-3-6 / 1.25		23.94				Brown Loess
	10										
	11										
	12										
	13										
	14	13.5-15	SS3	17"	4-3-4 / 1.75		23.62				Brown Loess
	15										
	16										
	17										
	18										
	19	18.5-20	SS4	18"	2-3-3 / 1.50		25.43	36	22	14	Gray Silty Clay (CL)

REMARKS: Boring started approximately 1' lower than original elevation due to leveling of the slope for rig placement.

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 2 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-4

PROJECT: Little Hills Expressway		LOCATION:	
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¼ HAS	HOLE SIZE: 7"
ELEVATION: 556.89'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 45'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20 / DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	20										
	21										
	22										
	23										
	24	23.5-25	SS5	18"	2-3-4 / 1.5		23.45				Medium Stiff, Gray Silty Clay
	25										
	26										
	27										
	28										
	29	28.5-30	SS6	18"	4-4-5 / 2.0		26.73				Stiff Gray Silty Clay
	30										
	31										
	32										
	33										
	34	33.5-35	SS7	18"	1-2-3 / 0.5		28.45				Medium Stiff, Gray Silty Clay
	35										
	36										
	37										
	38										
	39	38.5-40	SS8	18"	1-2-3 / 1.25		28.47				Medium Stiff, Stiff Brown Silty Clay

REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 3 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-4

PROJECT: Little Hills Expressway			LOCATION:	
COORDINATES:			DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A		DEPTH CASING & SIZE: 3¾ HAS	HOLE SIZE: 7"
ELEVATION: 556.89'	ANGLE FROM VERT. AND BEARING: N/A		DEPTH BOTTOM OF HOLE: 45'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20	DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION
	40										*NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL*
	41										
	42										
	43										
	44	43.5-45	SS9	18"	2-2-3 / 2.0		25.39				Medium Stiff, Orange Brown Silty Clay
											Boring terminated at 45'
	45										
	46										
	47										
	48										
	49										
	50										
	51										
	52										
	53										
	54										
	55										
	56										
	57										
	58										
	59										

REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 1 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-5

PROJECT: Little Hills Expressway		LOCATION:		
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling		
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: 41'	DEPTH CASING & SIZE: 3¾ HAS		HOLE SIZE: 7"
ELEVATION: 458.22'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 45'		
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20	DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	0										
	1										
	2										
	3										
	4	3.5-5	SS-1	9"	4-3-4 / N/A		18.02				FILL: Brown Silty Clay with limestone gravel
	5										
	6										
	7										
	8										
	9	8.5-10	SS2	16"	3-3-3 / 1.50		34.39				Stiff, Dark Gray Silty Clay
	10										
	11										
	12										
	13										
	14	13.5-15	SS3	18"	2-2-1 / 0.75		33.59				Soft, Brown and Gray Clayey Silt
	15										
	16										
	17										
	18										
	19	18.5-20	SS4	18"	0-1-1 / 0.25		50.00				Very Soft, Gray Silty Clay

REMARKS: Boring started approximately 1' lower than original elevation due to leveling of the slope for rig placement.

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 2 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-5

PROJECT: Little Hills Expressway		LOCATION:		
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling		
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: 41'	DEPTH CASING & SIZE: 3¾ HAS		HOLE SIZE: 7"
ELEVATION: 458.22'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 45'		
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20	DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	20										
	21										
	22										
	23										
	24	23.5-25	SS5	18"	0-1-1		71.79				Soft, Gray Silty Clay with Black Organics
					0.50						
	25										
	26										
	27										
	28										
	29	28.5-30	SS6	18"	0-0-0		61.55				Very Soft, Gray Silty Clay
					0.25						
	30										
	31										
	32										
	33										Very Soft, Gray Silty Clay
	34	33.5-35	SS7	18"	0-0-1		48.56				
					0.25						Soft Gray Silty Clay with Sand starting at 34.5'
	35										Rottery Drilling from 35'
	36										
	37										
	38										
	39	38.5-40	SS8	13"	4-16-15						Fine to Medium Grained Sand and Limestone gravel

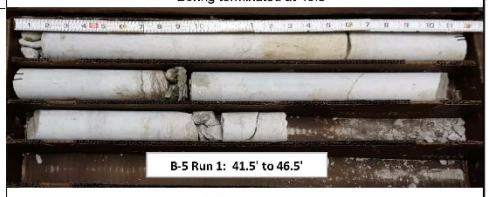
REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

DAILY FIELD REPORT BOREHOLE LOG

SHEET 3 OF 3
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-5

PROJECT: Little Hills Expressway		LOCATION:	
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¾ HAS	HOLE SIZE: 7"
ELEVATION: 458.22'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 45'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/17/20	DATE FINISH: 8/17/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY		SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION
	40										Green Shale fragments in drilling return
	41										
	42	41.5' to 46.5'	Run 1	60/60	RQD 45/60 75% Fair to Good						Top of core barrel Contained Coarse Grained, Rounded Gravel Limestone: Moderately Hard, Finely Crystaline, Thick Bedded, Sligthly Weathered, Dense, Good Quality Gray Shale: 44' to 44.2'
	43										
	44										
	45										
	46										Boring terminated at 46.5'
	47										 B-5 Run 1: 41.5' to 46.5'
	48										
	49										
	50										
	51										
	52										
	53										
	54										
	55										
	56										
	57										
	58										
	59										

REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 1 OF 1
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-6

PROJECT: Little Hills Expressway		LOCATION:	
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¾ HAS	HOLE SIZE: 7"
ELEVATION: 518.60'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 10'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/14/20	DATE FINISH: 8/14/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	0										Grass, approximately 1' Top Soil
	1	1-2.5	SS-1	12"	2-2-3 / 1.25		23.98				Medium Stiff, Brown Silty Clay
	2										
	3										
	4	3.5-5	SS-2	16"	3-3-4 / 1.75		20.52				Medium Stiff, Brown Silty Clay
	5										
	6	6.5-8	SS3	18"	2-3-4 / 1.5		29.48				Medium Stiff, Brown Silty Cl
	7										
	8										
	9	8.5-10	SS4	18"	2-3-4 / 2.25		23.14				Medium Stiff, Brown Silty Clay Boring terminated at 10'
	10										
	11										
	12										
	13										
	14										
	15										
	16										
	17										
	18										
	19										

REMARKS:

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

ABNA

DAILY FIELD REPORT BOREHOLE LOG

SHEET 1 OF 1
PROJECT NUMBER: 19-6023
HOLE NUMBER: B-7

PROJECT: Little Hills Expressway		LOCATION:	
COORDINATES:		DRILLING CONTRACTOR: Bulldog Drilling	
DRILL MAKE AND MODEL: CME 55LC	DEPTH TOP OF ROCK: N/A	DEPTH CASING & SIZE: 3¾ HAS	HOLE SIZE: 7"
ELEVATION: 546.69'	ANGLE FROM VERT. AND BEARING: N/A	DEPTH BOTTOM OF HOLE: 15'	
WATER LEVEL: N/A	FLUIDS AND ADDITIVES: N/A	DATE START: 8/14/20 / DATE FINISH: 8/14/20	LOGGER: AJS

ELEVATION	DEPTH BELOW SURFACE (Feet)	SAMPLE INTERVAL	SAMPLE TYPE & NUMBER	SAMPLE RECOVERY	STANDARD PENETRATION TEST RESULT / Pocket Penetrometer tons/ft²	SYMBOLIC LOG	MOISTURE %	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL DESCRIPTION (NAME, GRADATION OR PLASTICITY, PARTICLE SIZE DISTRIBUTION, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL)
	0										6 " Asphalt 4" aggregate base
	1	1-2.5	SS-1	16"	0-2-1 / 0.50		29.83				Soft, Brown Silty Clay
	2										
	3										
	4	3.5-5	SS-2	18"	2-2-3 / 0.75		28.82				Medium Stiff, Brown Silty Clay
	5										
	6	6.5-8	SS3	18"	1-2-3 / 0.50		22.82				Medium Stiff, Brown Cleyey
	7										
	8										
	9	8.5-10	SS4	18"	1-2-3 / 0.50		30.61				Medium Stiff, Brown Silty Clay
	10										
	11										
	12										
	13										
	14	13.5-15	SS5	186	3-2-2 / 0.75		30.04				Medium Stiff, Brown Clayey Silt Boring Terminated at 15'
	15										
	16										
	17										
	18										
	19										

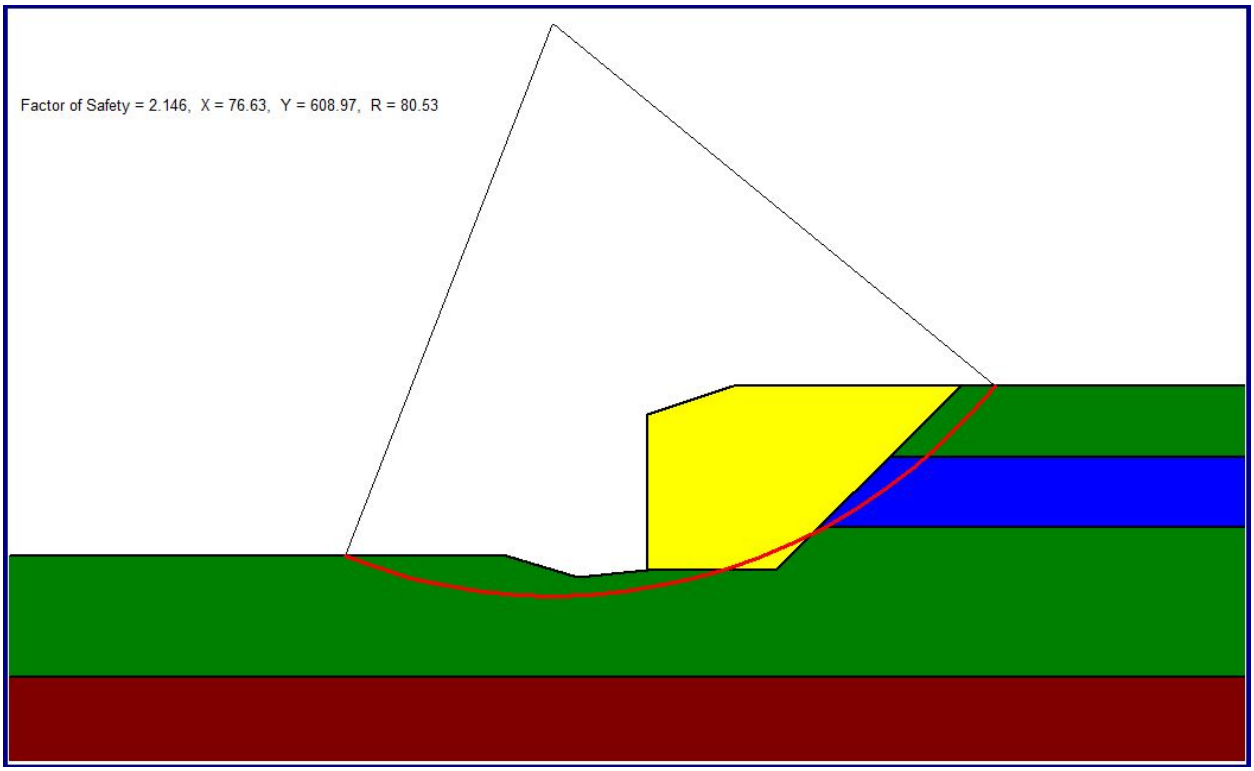
REMARKS: Boring was moved approximately 7.5' South, onto the shoulder, due to conflicts with utilities

The stratifications lines represent approximate strata boundaries .
In situations the transition may be gradual.

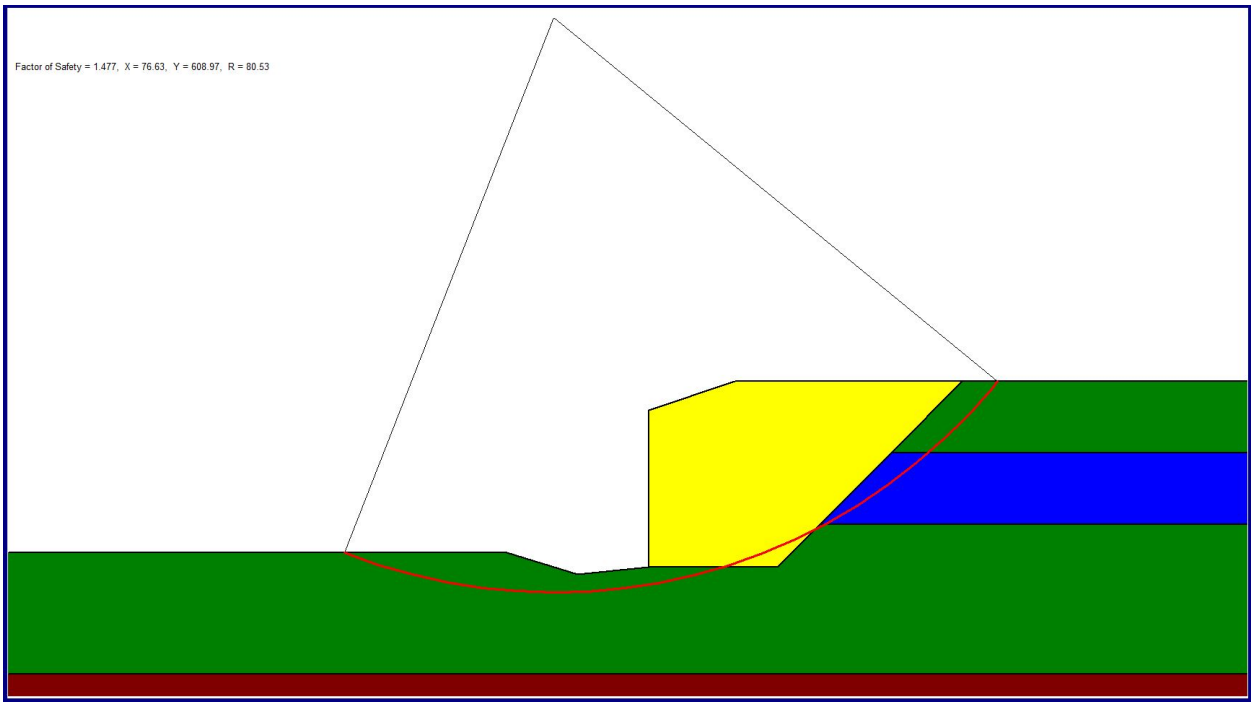
APPENDIX C

APPENDIX C1

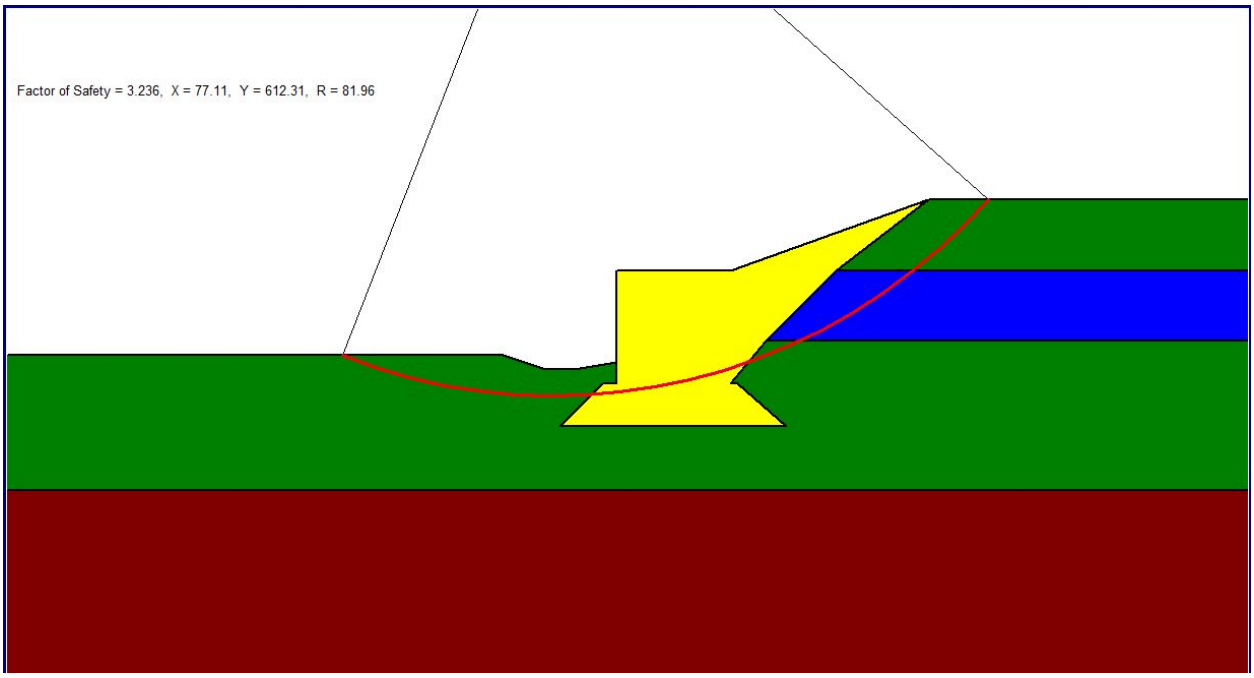
Slope Stability Analysis



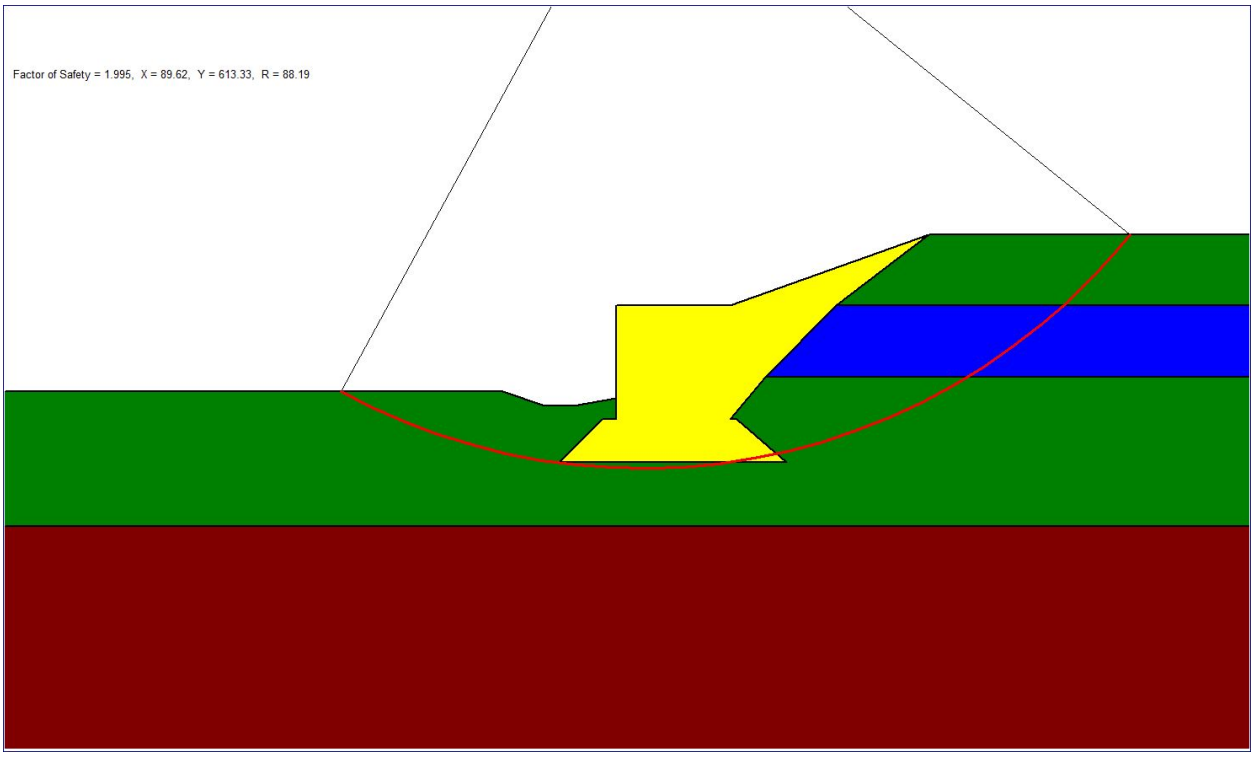
Slope Stability Analysis ***of Preliminary Plan Profiles (Appendix D1).***



Slope Stability Analysis with earthquake loading ***of Preliminary Plan Profiles (Appendix D1).***



Slope Stability Analysis of Updated Plan Profiles (Appendix D1).

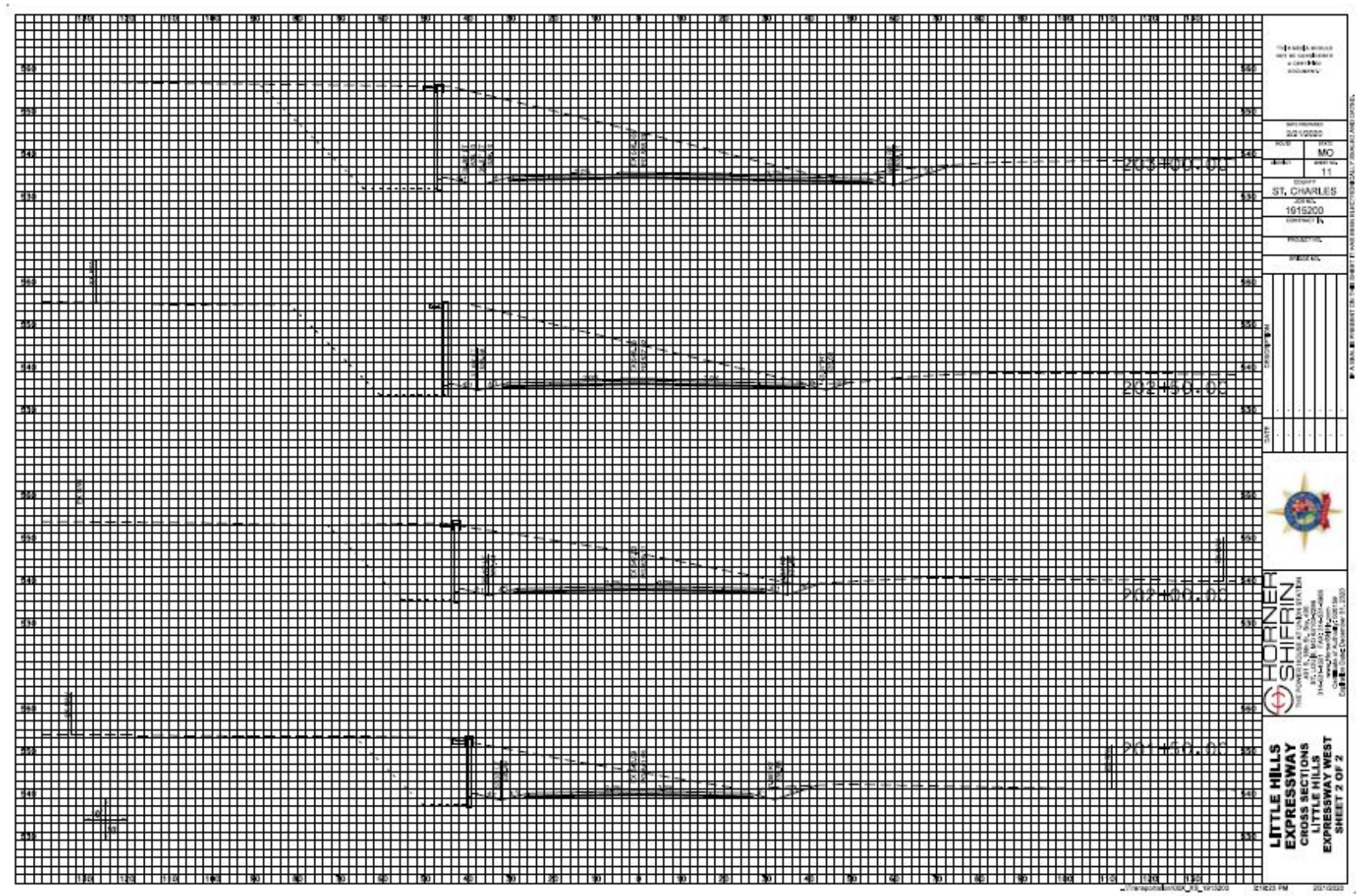


Slope Stability Analysis with earthquake loading of Updated Plan Profiles (Appendix D1).

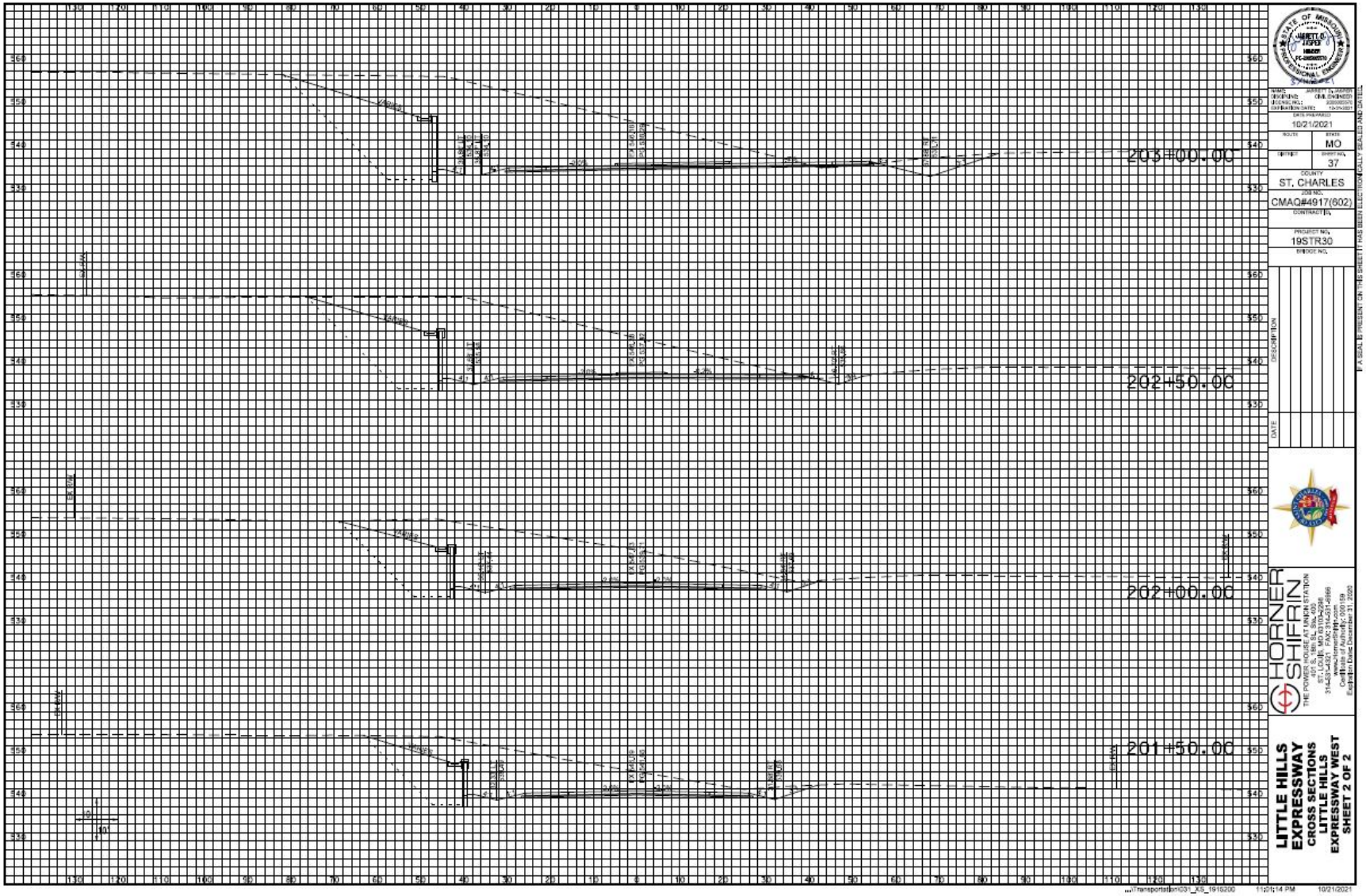
APPENDIX D

APPENDIX D1

Wall Sheet Plan Profiles



Preliminary Plan Wall Sheet – 2/21/2020



Updated Plan Wall Sheet – 10/21/2021