

October 15, 2024

ODOT District 11
2201 Reiser Avenue
New Philadelphia, Ohio 44663

Attention: Ms. Adrienne N. Slanina
Consultant Contract Manager

Reference: Roadway Exploration – Final Submission
PID N. 119710
Agreement No. 39773
Task Order No. 11-C
BEL-70-9.35, PID 120547
Belmont County, Ohio
CTL Project No. 24050033MOR

Dear Ms. Slanina

CTL Engineering, Inc. has completed the field and laboratory testing for the above referenced project. We received the boring survey data and proposed subgrade elevations via email on September 30, 2024. Stations and offsets were received via email on October 3, 2024.

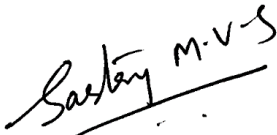
The following information is attached to this letter.

- Typed Boring Logs
- Pavement Core Photo Report
- Sulfate Content in Soils Report (All Roadway Borings)
- Rock Core Photos
- Subgrade Analysis (All Roadway Borings)
- DCP Results

We appreciate the opportunity to be of service to you on this project. If you have any questions, please contact us.

Respectfully submitted,

CTL Engineering, Inc.



Sastry Malladi, P.E.
Project Engineer



Joe Grani, P.E.
Project Engineer

cc: Mr. Cody Notz, P.E. (via email)

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT. - 10/14/24 12:01 - O:\PROJECT\2024\MOR-052405003\MOR_OHIO DEPARTMENT OF TRANSPORTATION BEL-70-9-35 PID 12054

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>106+33, 9' LT.</u>	EXPLORATION ID <u>B-001-0-24</u>
TYPE: <u>SUBGRADE</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1175.7 (MSL)</u> EOB: <u>7.0 ft.</u>	PAGE 1 OF 1
START: <u>6/25/24</u> END: <u>6/25/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.054237, -81.050177</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI				
ASPHALT (11.6")	1175.7																		
VERY DENSE, GRAY, GRAVEL AND/OR STONE FRAGMENTS, AND SAND, TRACE SILT AND CLAY, DAMP	1174.7	1	48																
		2	35	58	89	SS-1	-	53	28	16	-	3	-	NP	NP	NP	18	A-1-a (0)	3800
	1172.7	3	5	12	0	SS-2	-	-	-	-	-	-	-	-	-	-	-	A-6b (V)	-
STIFF, BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL, DAMP		4	2	8	83	SS-3	2.00	6	8	19	34	33	37	20	17	17	A-6b (9)	-	
		5	3	3															
@ 5.5'; MOIST		6	3	8	56	SS-4	1.75	-	-	-	-	-	-	-	-	-	29	A-6b (V)	-
	1168.7	7	3	8	56	SS-4	1.75	-	-	-	-	-	-	-	-	-	29	A-6b (V)	-
		EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>110+23, 9' RT.</u>	EXPLORATION ID <u>B-002-0-24</u>
TYPE: <u>SUBGRADE</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1173.0 (MSL)</u> EOB: <u>6.0 ft.</u>	PAGE 1 OF 1
START: <u>6/26/24</u> END: <u>6/26/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.055261, -81.050584</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
ASPHALT (9")	1173.0																	
VERY STIFF, BROWN, CLAY , AND SILT, SOME SAND, TRACE GRAVEL, DAMP	1172.2	1	4															
	1170.5	2	7	21	78	SS-1	4.00	1	4	20	37	38	42	22	20	15	A-7-6 (12)	<100
SANDSTONE , BROWN, HIGHLY WEATHERED.		3	50/2"	-	100	SS-2	-	-	-	-	-	-	-	-	-	5	Rock (V)	-
		4	50/3"	-	100	SS-3	-	-	-	-	-	-	-	-	-	7	Rock (V)	-
	1167.0	5	50/1"	-	100	SS-4	-	-	-	-	-	-	-	-	-	8	Rock (V)	-
		6																
		EOB																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 10/14/24 12:01 - C:\PROJECT\2024\MOR-052405003\MOR_OHIO DEPARTMENT OF TRANSPORTATION BEL-70-9-35 PID 12054

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>113+81, 8' LT.</u>	EXPLORATION ID <u>B-003-0-24</u>
TYPE: <u>RETAINING WALL</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA / NQ2</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1171.8 (MSL)</u> EOB: <u>26.0 ft.</u>	PAGE 1 OF 1
START: <u>6/26/24</u> END: <u>6/26/24</u>	SAMPLING METHOD: <u>SPT / NQ2</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.056172, -81.051069</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI				
ASPHALT (12")	1171.8																		
VERY STIFF, BROWN, SANDY SILT , SOME CLAY, LITTLE GRAVEL, FILL, DAMP	1170.8	1	3																
MEDIUM DENSE, BROWN, SANDY SILT , LITTLE CLAY, TRACE GRAVEL, DAMP	1169.3	2	4	10	67	SS-1	2.75	13	11	32	21	23	26	16	10	11	A-4a (2)	360	
		3	7	23	100	SS-2	4.00	6	8	48	18	20	NP	NP	NP	14	A-4a (1)	-	
		4	4	18	100	SS-3	3.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		5	6	18	100	SS-3	3.50	-	-	-	-	-	-	-	-	12	A-4a (V)	-	
		6	6	18	100	SS-4	3.75	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
	1164.8	7	7	18	100	SS-4	3.75	-	-	-	-	-	-	-	-	13	A-4a (V)	-	
MEDIUM DENSE, BROWN/GRAY, SANDY SILT , SOME CLAY, MOIST		8																	
		9	3	13	100	SS-5	2.75	-	-	-	-	-	-	-	-	24	A-4a (V)	-	
		10	5	13	100	SS-5	2.75	-	-	-	-	-	-	-	-	24	A-4a (V)	-	
@ 11.0'; LOOSE		11	2	9	100	SS-6	2.50	0	6	31	38	25	NP	NP	NP	31	A-4a (6)	-	
	1158.3	12	3	9	100	SS-6	2.50	0	6	31	38	25	NP	NP	NP	31	A-4a (6)	-	
		13	4	9	100	SS-6	2.50	0	6	31	38	25	NP	NP	NP	31	A-4a (6)	-	
HARD, BROWN/GRAY, SILTY CLAY , TRACE GRAVEL, DAMP	1156.3	14	3	18	100	SS-7	4.50	-	-	-	-	-	-	-	-	20	A-6b (V)	-	
	1155.8	15	5	18	100	SS-7	4.50	-	-	-	-	-	-	-	-	20	A-6b (V)	-	
CLAYSTONE , BROWN, SEVERELY WEATHERED.	1155.8	16	50/2"	-	100	SS-8	-	-	-	-	-	-	-	-	-	8	Rock (V)	-	
INTERBEDDED SHALE (60%) AND SANDSTONE (40%) , RQD 0%, REC. 100%; SHALE , GRAY, SEVERELY WEATHERED, WEAK TO SLIGHTLY STRONG; SANDSTONE , GRAY, SLIGHTLY WEATHERED, MODERATELY STRONG.	1151.6	17																	
		18	0	100		NQ2-1													CORE
	1150.8	19		100		NQ2-1													CORE
COAL , BLACK, MODERATELY WEATHERED, SLIGHTLY STRONG; RQD 0%, REC 100%.	1150.8	20																	
LIMESTONE , GRAY, SEVERELY WEATHERED, SLIGHTLY STRONG; RQD 14%, REC 100%.	1148.5	21																	
	1147.8	22																	
SHALE , GRAY, SLIGHTLY TO HIGHLY WEATHERED, MODERATELY STRONG; RQD 95%, REC 95%. @ 23.3' - 24.0'; Compressive Strength = 5,330 psi	1147.8	23																	
		24	38	96		NQ2-2													CORE
LIMESTONE , GRAY, SEVERELY WEATHERED, SLIGHTLY STRONG; RQD 46%, REC 92%.	1145.8	25																	
		26																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT - 10/14/24 12:01 - O:\PROJECT\2024\MOR-05246003\MOR_OHIO DEPARTMENT OF TRANSPORTATION BEL-70-9-35 PID 12054

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>113+87, 69' LT.</u>	EXPLORATION ID <u>B-003-2-24</u>
TYPE: <u>RETAINING WALL</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA / NQ2</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1159.6 (MSL)</u> EOB: <u>21.0 ft.</u>	PAGE 1 OF 1
START: <u>6/26/24</u> END: <u>6/26/24</u>	SAMPLING METHOD: <u>SPT / NQ2</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.056131, -81.051284</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (G)	SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI				
GRAVEL (10")	1159.6																		
VERY DENSE, GRAY, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, SILT, AND CLAY , DAMP	1158.7	1	27																
		2	19 21	51	56	SS-1	-	-	-	-	-	-	-	-	4	A-2-7 (V)	-		
	1156.6	3																	
HARD, GRAY/BROWN, SILT AND CLAY , SOME SAND, TRACE GRAVEL, DAMP		4	3																
		5	4	13	100	SS-2	4.25	2	6	20	39	33	32	19	13	9	A-6a (9)	-	
	1153.6	6																	
HARD, GRAY/BROWN, CLAY , SOME SILT, TRACE GRAVEL, MOIST		7	27																
		8	7	19	100	SS-3	4.50	2	10	5	33	50	48	23	25	24	A-7-6 (16)	-	
	1150.6	9	5																
@ 8.5'; VERY STIFF, DAMP		10	8	24	100	SS-4	4.00	-	-	-	-	-	-	-	-	15	A-7-6 (V)	-	
HARD, GRAY/BROWN, CLAY , POSSIBLE CLAYSTONE, DAMP	1149.6	11																	
LIMESTONE , GRAY, HIGHLY WEATHERED.	1148.6	12	50/1"	-	0		-	-	-	-	-	-	-	-	-	-	Rock (V)	-	
LIMESTONE , GRAY, SLIGHTLY TO MODERATELY WEATHERED, STRONG, WITH SHALE LAYERS; RQD 51%, REC 100%.		13																	
		14	47		100	NQ2-1													
		15																	
@ 15.1' - 16.0'; Compressive Strength = 10,940 psi		16																	
		17																	
		18																	
		19	55		100	NQ2-2													
		20																	
	1138.6	21																	
		EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>120+76, 12' LT.</u>	EXPLORATION ID <u>B-005-0-24</u>
TYPE: <u>SUBGRADE</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	PAGE 1 OF 1
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1191.2 (MSL)</u> EOB: <u>4.08 ft.</u>	
START: <u>6/24/24</u> END: <u>6/24/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.057965, -81.051917</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI				
ASPHALT (9.5")	1191.2																		
AGGREGATE BASE (4")	1190.5	1	11																
VERY DENSE, BROWN, COARSE AND FINE SAND, LITTLE SILT, LITTLE CLAY, DRY	1190.1	2	33 50/2"	-	100	SS-1	-	13	15	44	14	14	NP	NP	NP	4	A-3a (0)	<100	
SANDSTONE, BROWN, HIGHLY WEATHERED.	1188.7	TR	50/2"	-	100	SS-2	-	-	-	-	-	-	-	-	-	7	Rock (V)	-	
	1187.2	EOB	50/1"	-	100	SS-3	-	-	-	-	-	-	-	-	-	7	Rock (V)	-	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>124+61, 11' LT.</u>	EXPLORATION ID <u>B-006-0-24</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	PAGE 1 OF 1
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1193.4 (MSL)</u> EOB: <u>10.0 ft.</u>	
START: <u>6/24/24</u> END: <u>6/24/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.058961, -81.052376</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABAN- DONED	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			ODOT CLASS (GI)
ASPHALT (8")	1193.4																		
AGGREGATE BASE (4")	1192.7	1	6																
MEDIUM DENSE, BROWN, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, DAMP @ 2.5'; LOOSE	1192.4	2	7	15	56	SS-1	-	41	21	18	9	11	21	13	8	9	A-2-4 (0)	<100	
		3	4	3	10	0	SS-2	-	-	-	-	-	-	-	-	-	A-2-4 (V)	-	
	1189.4	4	3	3	15	100	SS-3	4.50	0	8	65	13	14	NP	NP	NP	13	A-3a (0)	-
MEDIUM DENSE, BROWN, COARSE AND FINE SAND, LITTLE CLAY, LITTLE SILT, DAMP	1187.9	5	3	9															
VERY STIFF, BROWN, SANDY SILT, CONTAINS STONE FRAGMENTS, DAMP		6	12	11	28	100	SS-4	4.00	-	-	-	-	-	-	-	-	9	A-4a (V)	-
		7	11	11															
	1184.9	8	12	9	24	100	SS-5	4.00	-	-	-	-	-	-	-	-	9	A-4a (V)	-
SANDSTONE, BROWN, SEVERELY WEATHERED.	1183.4	9	12	22	49	100	SS-6	-	-	-	-	-	-	-	-	-	8	Rock (V)	-
		10	16	16															
		TR																	
		EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT. - 10/14/24 12:01 - O:\PROJECT\2024\MOR-052405003\MOR_OHIO DEPARTMENT OF TRANSPORTATION BEL-70-9-35 PID 12054

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>125+39, 130' LT.</u>	EXPLORATION ID: <u>B-006-1-24</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1193.6 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE: <u>1 OF 1</u>
START: <u>6/27/24</u> END: <u>6/27/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.059054, -81.052870</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABANDONED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
CONCRETE (12")	1193.6																	
MEDIUM DENSE, BROWN, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, SILT, AND CLAY, DAMP	1192.6	1	7															
		2	4	12	72	SS-1	2.50	55	10	8	11	16	29	17	12	11	A-2-6 (0)	1600
	1190.1	3																
VERY STIFF, BROWN/GRAY, SILTY CLAY, SOME SAND, LITTLE GRAVEL, DAMP		4	7															
		5	4	10	56	SS-2	3.00	14	15	8	21	42	40	21	19	17	A-6b (9)	-
@ 6.0'; MOIST		6	4															
		7	5	13	100	SS-3	3.00	-	-	-	-	-	-	-	-	23	A-6b (V)	-
	1185.6	8																
VERY STIFF, GRAY/BROWN, SILTY CLAY, SOME GRAVEL, TRACE SAND, DAMP		9	3															
	1183.6	10	5	12	100	SS-4	2.50	-	-	-	-	-	-	-	-	12	A-6b (V)	-
		EOB	4															

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>125+62, 159' RT.</u>	EXPLORATION ID <u>B-006-2-24</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	
PID: <u>120547</u> SFN: <u></u>	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1193.9 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE <u>1 OF 1</u>
START: <u>6/27/24</u> END: <u>6/27/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.059380, -81.051924</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABAN- DONED	
								GR	CS	FS	SI	CL	LL	PL	PI	WC			ODOT CLASS (G)
GRAVEL (1") VERY STIFF, BROWN, CLAY , SOME SAND, SOME SILT, LITTLE GRAVEL, MOIST	1193.8	1	3																
	1190.9	2	3	9	72	SS-1	2.75	20	14	10	21	35	43	21	22	23	A-7-6 (9)	<100	
VERY STIFF, BROWN/GRAY, CLAY , LITTLE SILTY, LITTLE GRAVEL, TRACE CLAY, DAMP	1187.9	3																	
		4	4	10	100	SS-2	3.25	13	1	3	17	66	63	28	35	27	A-7-6 (20)	-	
		5	4																
SHALE, BROWN/GRAY, SEVERELY WEATHERED.	1185.4	6	7																
		7	12 30	54	100	SS-3	4.50	-	-	-	-	-	-	-	-	12	Rock (V)	-	
SHALE, BROWN, HIGHLY WEATHERED.	1183.9	8																	
		9	60/2"	-	100	SS-4	3.50	-	-	-	-	-	-	-	-	6	Rock (V)	-	
		10																	
		EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>128+67, 8' LT.</u>	EXPLORATION ID <u>B-008-0-24</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1200.1 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>6/24/24</u> END: <u>6/24/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.060009, -81.052866</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI				
ASPHALT (9")	1200.1																	X	
AGGREGATE BASE (3")	1199.3	1	5															X	
HARD, BROWN, SILTY CLAY , LITTLE SAND, LITTLE GRAVEL, CONTAINS ASPHALT, DAMP @ 2.5'; VERY STIFF	1199.1	2	5	15	67	SS-1	4.50	16	8	10	33	33	38	19	19	17	A-6b (10)	<100	V
	1196.1	3	7	19	100	SS-2	4.00	-	-	-	-	-	-	-	-	18	A-6b (V)	-	V
MEDIUM DENSE, BROWN, SANDY SILT , LITTLE CLAY, DAMP	1196.1	4	4	18	100	SS-3	3.25	0	16	48	18	18	NP	NP	NP	13	A-4a (0)	-	V
		5	6	18	100	SS-3	3.25	0	16	48	18	18	NP	NP	NP	13	A-4a (0)	-	V
		6	5	8	21	100	SS-4	2.50	-	-	-	-	-	-	-	16	A-4a (V)	-	V
		7	6	8	21	100	SS-4	2.50	-	-	-	-	-	-	-	16	A-4a (V)	-	V
	1190.1	8	7	18	100	SS-5	2.50	-	-	-	-	-	-	-	13	A-4a (V)	-	V	
	1190.1	9	8	24	100	SS-6	4.25	-	-	-	-	-	-	-	16	A-4a (V)	-	V	
	1190.1	10	10	24	100	SS-6	4.25	-	-	-	-	-	-	-	16	A-4a (V)	-	V	
		EOB	10															V	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PID: 120547	SFN: _____	PROJECT: BEL-70-9.35	STATION / OFFSET: 128+56, 149' LT.	START: 6/27/24	END: 7/1/24	PG 2 OF 2	B-008-1-24												
MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	SO4 ppm	ABANDONED
								GR	CS	FS	SI	CL	LL	PL	PI				
	1191.3																		
HARD, BROWN, SANDY SILT, TRACE GRAVEL, DAMP	1190.8	TR	31	6															
			32	10	33	100	SS-13	4.50	-	-	-	-	-	-	-	-	14	A-4a (V)	-
	1188.3		33																
SANDSTONE, BROWN, SEVERELY WEATHERED.			34	14	86	100	SS-14	-	-	-	-	-	-	-	-	-	13	Rock (V)	-
			35	21	46														
			36	30															
	1183.3		37	34	90	100	SS-15	-	-	-	-	-	-	-	-	8	Rock (V)	-	
			38	36															
SANDSTONE, BROWN, MODERATELY WEATHERED, MODERATELY STRONG; RQD 54%, REC 100%. @ 38.8' - 39.7'; Compressive Strength = 4,330 psi @ 39.0'; LOST WATER	1181.6		39																
SHALE, BROWN, HIGHLY WEATHERED, WEAK; RQD 71%, REC 100%.			40																
			41																
	1178.3		42	65		100	NQ2-1												
	1178.0		43																
COAL, BLACK, SEVERELY WEATHERED, VERY WEAK; RQD 0%, REC 100%.			44																
SHALE, GRAY, SLIGHTLY TO MODERATELY WEATHERED, SLIGHTLY TO MODERATELY STRONG; RQD 54%, REC 100%.			45																
			46																
			47																
	1173.3		48																
		EOB																	

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PID: 120547		SFN: _____		PROJECT: BEL-70-9.35		STATION / OFFSET: 128+83, 148' RT.			START: 7/2/24		END: 7/2/24		PG 2 OF 2		B-008-2-24								
MATERIAL DESCRIPTION AND NOTES		ELEV.	DEPTHS		SPT/RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	SO ₄ ppm	ABANDONED		
										GR	CS	FS	SI	CL	LL	PL	PI						
SANDSTONE , BROWN, HIGHLY WEATHERED. <i>(continued)</i>		1187.5	31		30																		
		1185.5	32		50/4"	-	100	SS-13	-	-	-	-	-	-	-	-	-	-	8	Rock (V)	-		
SANDSTONE , BROWN, MODERATELY WEATHERED, SLIGHTLY STRONG; RQD 27%, REC 100%.		1180.5	33																				
			34		27		100	NQ2-1															
			35																				
			36																				
			37																				
SANDSTONE , BROWN TO GRAY, MODERATELY TO SEVERELY WEATHERED, SLIGHTLY STRONG; RQD 23%, REC 100%.		1175.5	38																				
			39		23		100	NQ2-2															
			40																				
			41																				
@ 41.0' - 41.5'; Compressive Strength = 1,880 psi			42																				
			EOB																				

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>130+74, 21' RT.</u>	EXPLORATION ID <u>B-009-0-24</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1205.7 (MSL)</u> EOB: <u>10.0 ft.</u>	PAGE 1 OF 1
START: <u>6/24/24</u> END: <u>6/24/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.060563, -81.053061</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
CONCRETE (12.5")	1205.7																	
VERY STIFF, BROWN, SANDY SILT, SOME CLAY, TRACE GRAVEL, DAMP	1204.5	1	3															
VERY STIFF, BROWN, SILTY CLAY, LITTLE SAND, TRACE GRAVEL, DAMP	1203.2	2	3	10	100	SS-1	3.25	10	11	23	25	31	29	16	13	9	A-6a (5)	380
@ 4.0'; HARD		3	3	13	100	SS-2	3.25	-	-	-	-	-	-	-	-	17	A-6b (V)	-
		4	4	15	100	SS-3	4.50	2	7	8	41	42	37	19	18	15	A-6b (11)	-
	1200.2	5	5	24	100	SS-4	3.50	-	-	-	-	-	-	-	-	18	A-6b (V)	-
VERY STIFF, GRAY, SILTY CLAY, SOME GRAVEL, DAMP		6	6	21	100	SS-5	2.25	-	-	-	-	-	-	-	-	19	A-6b (V)	-
		7	6	18	100	SS-6	3.50	-	-	-	-	-	-	-	-	19	A-6b (V)	-
	1195.7	8	3															
		9	6															
		10	8															
		EOB																

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

STANDARD ODOT LOG W/ SULFATES (8.5 X 11) - OH DOT.GDT. - 10/14/24 12:01 - O:\PROJECT\2024\MOR-052405003\MOR_OHIO DEPARTMENT OF TRANSPORTATION BEL-70-9-35 PID 12054

PROJECT: <u>BEL-70-9.35</u>	DRILLING FIRM / OPERATOR: <u>CTL / A. WILDER</u>	DRILL RIG: <u>CME 45 TRACK</u>	STATION / OFFSET: <u>130+76, 223' LT.</u>	EXPLORATION ID <u>B-009-1-24</u>
TYPE: <u>ROADWAY</u>	SAMPLING FIRM / LOGGER: <u>CTL / CTL</u>	HAMMER: <u>CME AUTOMATIC</u>	ALIGNMENT: <u>SR 149</u>	PAGE 1 OF 1
PID: <u>120547</u> SFN: _____	DRILLING METHOD: <u>3.25" HSA</u>	CALIBRATION DATE: <u>3/27/24</u>	ELEVATION: <u>1207.3 (MSL)</u> EOB: <u>10.0 ft.</u>	
START: <u>6/27/24</u> END: <u>6/27/24</u>	SAMPLING METHOD: <u>SPT</u>	ENERGY RATIO (%): <u>77</u>	LAT / LONG: <u>40.060295, -81.053862</u>	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG				SO4 ppm	ABAN- DONED
								GR	CS	FS	SI	CL	LL	PL	PI	WC		
CONCRETE (12")	1207.3																	
VERY STIFF, BROWN, SILTY CLAY , AND SAND, TRACE GRAVEL, DAMP	1206.3	1	3															
		2	4	13	83	SS-1	3.00	6	24	22	21	27	32	15	17	9	A-6b (5)	<100
	1204.3	3	6															
MEDIUM DENSE, BROWN, COARSE AND FINE SAND , DAMP		4	10															
		5	7	18	100	SS-2	-	-	-	-	-	-	-	-	-	6	A-3a (V)	-
	1201.8	6	3															
VERY STIFF, BROWN, SILT AND CLAY , SOME SAND, TRACE GRAVEL, MOIST		7	5	14	100	SS-3	2.75	1	16	12	46	25	31	17	14	18	A-6a (9)	-
		8	6															
@ 8.5'; DAMP		9	13															
	1197.3	10	6	15	100	SS-4	2.50	-	-	-	-	-	-	-	-	16	A-6a (V)	-
		EOB	6															

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PROJECT: BEL-70-9.35	DRILLING FIRM / OPERATOR: CTL / A. WILDER	DRILL RIG: CME 45 TRACK	STATION / OFFSET: 130+89, 158' RT.	EXPLORATION ID: B-009-2-24
TYPE: ROADWAY	SAMPLING FIRM / LOGGER: CTL / CTL	HAMMER: CME AUTOMATIC	ALIGNMENT: SR 149	PAGE: 1 OF 1
PID: 120547 SFN: _____	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 3/27/24	ELEVATION: 1208.9 (MSL) EOB: 10.0 ft.	
START: 6/27/24 END: 6/27/24	SAMPLING METHOD: SPT	ENERGY RATIO (%): 77	LAT / LONG: 40.060757, -81.052638	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTH	SPT/ RQD	N ₆₀	REC (%)	SAMPLE ID	HP (tsf)	GRADATION (%)					ATTERBERG			WC	ODOT CLASS (GI)	SO4 ppm	ABAN- DONED	
								GR	CS	FS	SI	CL	LL	PL	PI					
CONCRETE (12") MEDIUM DENSE, GRAY, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, TRACE SILT, TRACE CLAY, DAMP (FILL)	1208.9 1207.9	1																		
		2	12 11 10	27	100	SS-1	-	46	25	11	9	9	NP	NP	NP	6	A-1-b (0)	560		
		3																		
		4	8 5	17	72	SS-2	-	-	-	-	-	-	-	-	-	8	A-1-b (V)	-		
	1203.4	5																		
VERY STIFF, BROWN, SILTY CLAY, LITTLE SAND, LITTLE GRAVEL, CONTAINS BRICK PIECES, DAMP (FILL)		6	4																	
		7	6 5	14	56	SS-3	3.50	12	13	7	38	30	37	19	18	11	A-6b (10)	-		
		8																		
@ 8.5'; NO BRICK		9	5 5	15	100	SS-4	3.25	-	-	-	-	-	-	-	-	18	A-6b (V)	-		
	1198.9	10																		
		EOB																		

NOTES: NONE

ABANDONMENT METHODS, MATERIALS, QUANTITIES: BACKFILLED WITH AUGER CUTTINGS

PAVEMENT CORE REPORT

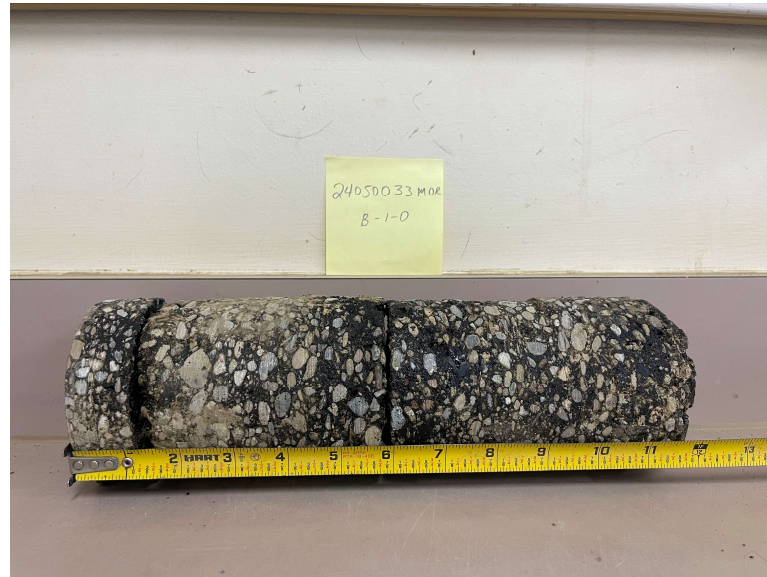
Ohio Department of Transportation

BEL-70-9-35 PID 120547

Belmont Co., Ohio

CTL Project No.: 24050033MOR

Core No.	Date Cored	Core Diameter	Latitude (Degrees)	Longitude (Degrees)	Elevation (feet)
B-001-0-24	6/25/24	4.0"	40.054237	-81.050177	1175.7



Depth (inches)	Pavement Type	Notes
0 – 1.25	Asphalt Concrete	Surface Course
1.25 - 11.6	Asphalt Concrete	Intermediate Course

Recovered Core Length (inches)	In-hole Depth (inches)	Recovery (%)
11.6	11.6	100

PAVEMENT CORE REPORT

Ohio Department of Transportation

BEL-70-9-35 PID 120547

Belmont Co., Ohio

CTL Project No.: 24050033MOR

Core No.	Date Cored	Core Diameter	Latitude (Degrees)	Longitude (Degrees)	Elevation (feet)
B-002-0-24	6/26/24	4.0"	40.055261	-81.050584	1173.0



Depth (inches)	Pavement Type	Notes
0 - 1.0	Asphalt Concrete	Surface Course
1.0 - 7.5	Asphalt Concrete	Intermediate Course

Recovered Core Length (inches)	In-hole Depth (inches)	Recovery (%)
7.5	9.0	83

PAVEMENT CORE REPORT

Ohio Department of Transportation

BEL-70-9-35 PID 120547

Belmont Co., Ohio

CTL Project No.: 24050033MOR

Core No.	Date Cored	Core Diameter	Latitude (Degrees)	Longitude (Degrees)	Elevation (feet)
B-003-0-24	6/26/24	4.0"	40.056172	-81.051069	1171.8



Depth (inches)	Pavement Type	Notes
0 – 1.75	Asphalt Concrete	Surface Course
1.75 – 10.25	Asphalt Concrete	Intermediate Course

Recovered Core Length (inches)	In-hole Depth (inches)	Recovery (%)
10.25	12	85

PAVEMENT CORE REPORT

Ohio Department of Transportation

BEL-70-9-35 PID 120547

Belmont Co., Ohio

CTL Project No.: 24050033MOR

Core No.	Date Cored	Core Diameter	Latitude (Degrees)	Longitude (Degrees)	Elevation (feet)
B-004-0-24	6/24/24	4.0"	40.056921	-81.051443	1179.2



Depth (inches)	Pavement Type	Notes
0 – 5.0	Asphalt Concrete	Surface Course
5.0 - 9.625	Asphalt Concrete	Intermediate Course

Recovered Core Length (inches)	In-hole Depth (inches)	Recovery (%)
9.6	9.6	100

PAVEMENT CORE REPORT

Ohio Department of Transportation

BEL-70-9-35 PID 120547

Belmont Co., Ohio

CTL Project No.: 24050033MOR

Core No.	Date Cored	Core Diameter	Latitude (Degrees)	Longitude (Degrees)	Elevation (feet)
B-005-0-24	6/24/24	4.0"	40.057965	-81.051917	1191.2



Depth (inches)	Pavement Type	Notes
0 – 1.5	Asphalt Concrete	Surface Course
1.5 - 9.5	Asphalt Concrete	Intermediate Course

Recovered Core Length (inches)	In-hole Depth (inches)	Recovery (%)
9.5	9.5	100

PAVEMENT CORE REPORT

Ohio Department of Transportation

BEL-70-9-35 PID 120547

Belmont Co., Ohio

CTL Project No.: 24050033MOR

Core No.	Date Cored	Core Diameter	Latitude (Degrees)	Longitude (Degrees)	Elevation (feet)
B-006-0-24	6/24/24	4.0"	40.058961	-81.052376	1193.4



Depth (inches)	Pavement Type	Notes
0 – 4.1	Asphalt Concrete	Surface Course
0	Asphalt Concrete	Intermediate Course

Recovered Core Length (inches)	In-hole Depth (inches)	Recovery (%)
4.1	8.0	51

PAVEMENT CORE REPORT

Ohio Department of Transportation

BEL-70-9-35 PID 120547

Belmont Co., Ohio

CTL Project No.: 24050033MOR

Core No.	Date Cored	Core Diameter	Latitude (Degrees)	Longitude (Degrees)	Elevation (feet)
B-008-0-24	6/24/24	4.0"	40.060009	-81.052866	1200.1



Depth (inches)	Pavement Type	Notes
0 – 2.25	Asphalt Concrete	Surface Course
2.25 - 6.5	Asphalt Concrete	Intermediate Course

Recovered Core Length (inches)	In-hole Depth (inches)	Recovery (%)
6.5	9.0	72

PAVEMENT CORE REPORT

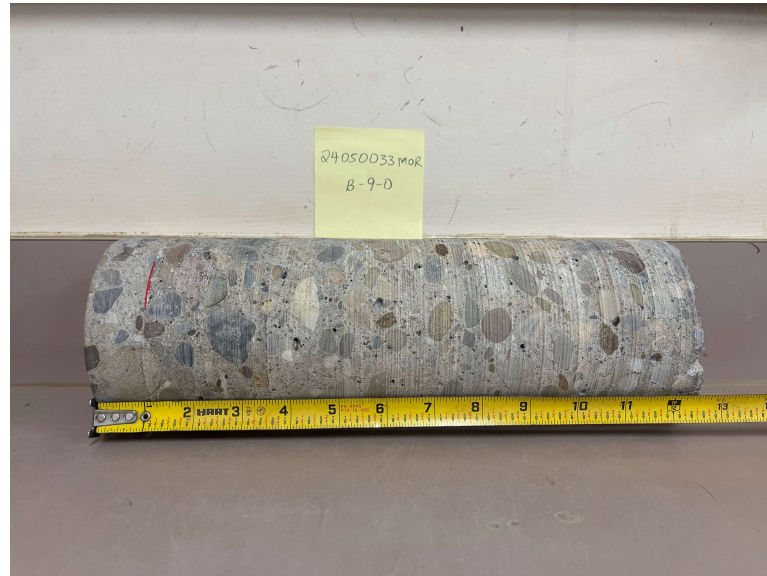
Ohio Department of Transportation

BEL-70-9-35 PID 120547

Belmont Co., Ohio

CTL Project No.: 24050033MOR

Core No.	Date Cored	Core Diameter	Latitude (Degrees)	Longitude (Degrees)	Elevation (feet)
B-009-0-24	6/24/24	4.0"	40.060563	-81.053061	1205.7



Depth (inches)	Pavement Type	Notes
0 – 12.5	Portland Cement	Concrete Pavement

Recovered Core Length (inches)	In-hole Depth (inches)	Recovery (%)
12.5	12.5	100



OHIO DEPARTMENT OF TRANSPORTATION
DETERMINING SULFATE CONTENT IN SOILS
SUPPLEMENT 1122

Project C-R-S: BEL-70-9.35

PID No: 120547

Report Date: 7/26/2024

Consultant: CTL Engineering, Inc.

Technician: RV

Sample or Boring ID	Station	Offset	Latitude & Longitude or State Plane Coordinates		Elevation	Soaking Time (hr)	Replicate Sample Readings						Sulfate Content (ppm)
							1		2		3		
							Dilution	Reading	Dilution	Reading	Dilution	Reading	
B-001-0-24	106+32.87	-8.827	40.054237	-81.050177	1175.71	20	20	190	20	190	20	190	3800
B-002-0-24	110+22.62	8.924	40.055261	-81.050584	1172.99	20	20	<5	20	<5	20	<5	< 100
B-003-0-24	113+80.66	-7.707	40.056172	-81.051069	1171.83	20	20	18	20	18	20	18	360
B-004-0-24	116+72.96	-14.79	40.056921	-81.051443	1179.17	20	20	<5	20	<5	20	<5	< 100
B-005-0-24	120+75.91	-12.17	40.057965	-81.051917	1191.24	20	20	<5	20	<5	20	<5	< 100
B-006-0-24	124+60.85	-11.39	40.058961	-81.052376	1193.39	20	20	<5	20	<5	20	<5	< 100
B-006-1-24	125+38.94	-130.3	40.059054	-81.052870	1193.55	20	20	78	20	78	20	78	1560
B-006-2-24	125+62.04	158.8	40.059380	-81.051924	1193.87	20	20	<5	20	<5	20	<5	< 100
B-008-0-24	128+66.69	-7.697	40.060009	-81.052866	1200.06	20	20	<5	20	<5	20	<5	< 100
B-009-0-24	130+73.74	21.18	40.060563	-81.053061	1205.67	20	20	19	20	19	20	19	380
B-009-1-24	130+76.11	-223.2	40.060295	-81.053862	1207.32	20	20	<5	20	<5	20	<5	< 100
B-009-2-24	130+89.33	158	40.060757	-81.052638	1208.92	20	20	28	20	28	20	28	560

B-003-0-24 Box 1 of 1



Run #:	Depth:		Recovery		RQD	
1	16.0'	21.0'	5.0/5.0	97%	0.0/5.0	0%
2	21.0'	26.0'	4.8/5.0	96%	1.9/5.0	38%

24050033MOR – BEL-70-9.35

B-003-2-24 Box 1 of 1



Run #:	Depth:		Recovery		RQD	
1	11.0'	16.0'	5.0/5.0	100%	2.35/5.0	47%
2	16.0'	21.0'	5.0/5.0	100%	2.75/5.0	55%

24050033MOR – BEL-70-9.35

B-008-1-24 Box 1 of 1



Run #:	Depth:		Recovery		RQD	
1	38.0'	43.0'	5.0/5.0	100%	3.25/5.0	65%
2	43.0'	48.0'	5.0/5.0	100%	2.6/5.0	52%

24050033MOR – BEL-70-9.35

B-008-2-24 Box 1 of 1



Run #:	Depth:		Recovery		RQD	
1	32.0'	37.0'	5.0/5.0	100%	1.35/5.0	27%
2	37.0'	42.0'	5.0/5.0	100%	1.15/5.0	23%

24050033MOR – BEL-70-9.35

OHIO DEPARTMENT OF TRANSPORTATION**OFFICE OF GEOTECHNICAL ENGINEERING****PLAN SUBGRADES****Geotechnical Design Manual Section 600**

Instructions: Enter data in the shaded cells only.

(Enter state route number, project description, county, consultant's name, prepared by name, and date prepared. This information will be transferred to all other sheets. The date prepared must be entered in the appropriate cell on this sheet to remove these instructions prior to printing.)

BEL-70-9.35**120547****Major Design-Build interchange Project Involving Widening of SR 149 and Replacement of the IR 70 Bridges over SR 149, 8 Roadway borings along SR 149****CTL Engineering, Inc.**

Prepared By: Joe Grani, P.E.
Date prepared: Monday, October 14, 2024

CTL Engineering, Inc.
2860 Fisher Road
Columbus, OH 43204

(614) 276-8123
jgrani@ctleng.com

NO. OF BORINGS: 12



#	Boring ID	Alignment	Station	Offset	Dir	Drill Rig	ER	Boring EL.	Proposed Subgrade EL.	Cut Fill
1	B-001-0-24	SR 149	106+33	8.827	Lt.	CME 45 Track	77	1175.71	1174.42	1.3 C
2	B-002-0-24	SR 149	11023	8.924	Rt.	CME 45 Track	77	1172.99	1171.7	1.3 C
3	B-003-0-24	SR 149	11381	7.707	Lt.	CME 45 Track	77	1171.83	1170.54	1.3 C
4	B-004-0-24	SR 149	11673	14.787	Lt.	CME 45 Track	77	1179.17	1177.84	1.3 C
5	B-005-0-24	SR 149	12076	12.173	Lt.	CME 45 Track	77	1191.24	1189.91	1.3 C
6	B-006-0-24	SR 149	12461	11.387	Lt.	CME 45 Track	77	1193.39	1192.06	1.3 C
7	B-006-1-24	SR 149	12539	130.3	Lt.	CME 45 Track	77	1193.55	1191.97	1.6 C
8	B-006-2-24	SR 149	12562	158.81	Rt.	CME 45 Track	77	1193.87	1191.79	2.1 C
9	B-008-0-24	SR 149	12867	7.697	Lt.	CME 45 Track	77	1200.06	1197.59	2.5 C
10	B-009-0-24	SR 149	13074	21.178	Rt.	CME 45 Track	77	1205.67	1203.33	2.3 C
11	B-009-1-24	SR 149	13076	223.22	Lt.	CME 45 Track	77	1207.32	1205.24	2.1 C
12	B-009-2-24	SR 149	13089	157.99	Rt.	CME 45 Track	77	1208.92	1206.84	2.1 C

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics					Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)		
			From	To	From	To	N ₆₀	N _{60L}		LL	PL	PI	% Silt	% Clay	P200	M _C	M _{OPT}	Class		GI	Unsuitable	Unstable	Unsuitable		Unstable	
1	B 001-0 24	SS-1	1.0	2.5	-0.3	1.2	30			NP	NP	NP	3		3	18	6	A-1-a	0	3800						
		SS-2	2.5	4.0	1.2	2.7	12									16		A-6b	16							
		SS-3	4.0	5.5	2.7	4.2	8		2	37	20	17	34	33	67	17	16	A-6b	9							
		SS-4	5.5	7.0	4.2	5.7	8	8	1.75							29	16	A-6b	16							
2	B 002-0 24	SS-1	1.0	2.5	-0.3	1.2	21		4	42	22	20	37	38	75	15	19	A-7-6	12	99						
		SS-2	2.5	4.0	1.2	2.7										5	0	Rock	0							
		SS-3	4.0	5.5	2.7	4.2										7	0	Rock	0							
		SS-4	5.5	7.0	4.2	5.7		21								8	0	Rock	0							
3	B 003-0 24	SS-1	1.0	2.5	-0.3	1.2	10		2.75	26	16	10	21	23	44	11	11	A-4a	2	360		N ₆₀		12"	12" 204 Geotextile	
		SS-2	2.5	4.0	1.2	2.7	23		4	NP	NP	NP	18	20	38	14	11	A-4a	1			Mc				
		SS-3	4.0	5.5	2.7	4.2	18		3.5							12	10	A-4a	8							
		SS-4	5.5	7.0	4.2	5.7	18	10	3.75							13	10	A-4a	8							
4	B 004-0 24	SS-1	1.0	2.5	-0.3	1.2	10		3.5	27	17	10	23	19	42	15	12	A-4a	1	99		N ₆₀ & Mc		12"	12" 204 Geotextile	
		SS-2	2.5	4.0	1.2	2.7	14		2.5							19	10	A-4a	8			N ₆₀ & Mc				
		SS-3	4.0	5.5	2.7	4.2	12		4.25	26	16	10	30	22	52	16	11	A-4a	3							
		SS-4	5.5	7.0	4.2	5.7	12	10	3							14	10	A-4a	8							
5	B 005-0 24	SS-1	1.0	2.5	-0.3	1.2	30			NP	NP	NP	14	14	28	4	8	A-3a	0	99						
		SS-2	2.5	4.0	1.2	2.7										7	0	Rock	0							
		SS-3	4.0	5.5	2.7	4.2										7	0	Rock	0							
								30																		
6	B 006-0 24	SS-1	1.0	2.5	-0.3	1.2	15			21	13	8	9	11	20	9	10	A-2-4	0	99						
		SS-2	2.5	4.0	1.2	2.7	10										10		A-2-4	0			N ₆₀			
		SS-3	4.0	5.5	2.7	4.2	15		4.5	NP	NP	NP	13	14	27	13	8	A-3a	0							
		SS-4	5.5	7.0	4.2	5.7	28	10	4							9	10	A-4a	8							
7	B 006-1 24	SS-1	1.0	2.5	-0.6	0.9	12		2.5	29	17	12	11	16	27	11	10	A-2-6	0	1600						
		SS-2	3.5	5.0	1.9	3.4	10		3	40	21	19	21	42	63	17	16	A-6b	9				N ₆₀			
		SS-3	6.0	7.5	4.4	5.9	13		3							23	16	A-6b	16							
		SS-4	8.5	10.0	6.9	8.4	12	10	2.5							12	16	A-6b								
8	B 006-2 24	SS-1	1.0	2.5	-1.1	0.4	9		2.75	43	21	22	21	35	56	23	18	A-7-6	9	99		N ₆₀ & Mc		12"	12" 204 Geotextile	
		SS-2	3.5	5.0	1.4	2.9	10		3.25	63	28	35	17	66	83	27	25	A-7-6	20			N ₆₀				
		SS-3	6.0	7.5	3.9	5.4			4.5							12	0	Rock	0							
		SS-4	8.5	10.0	6.4	7.9		9	3.5							6	0	Rock								
9	B 008-0 24	SS-1	1.0	2.5	-1.5	0.0	15		4.5	38	19	19	33	33	66	17	16	A-6b	10	99						
		SS-2	2.5	4.0	0.0	1.5	19		4							18	16	A-6b	16							
		SS-3	4.0	5.5	1.5	3.0	18		3.25	NP	NP	NP	18	18	36	13	11	A-4a	0							

#	Boring	Sample	Sample Depth		Subgrade Depth		Standard Penetration		HP (tsf)	Physical Characteristics					Moisture		Ohio DOT		Sulfate Content (ppm)	Problem		Excavate and Replace (Item 204)		Recommendation (Enter depth in inches)	
			From	To	From	To	N ₆₀	N _{60L}		LL	PL	PI	% Silt	% Clay	P200	M _C	M _{OPT}	Class		GI	Unsuitable	Unstable	Unsuitable		Unstable
		SS-4	5.5	7.0	3.0	4.5	21	15	2.5							16	10	A-4a	8						
10	B 009-0 24	SS-1	1.0	2.5	-1.3	0.2	10	10	3.25	29	16	13	25	31	56	9	14	A-6a	5	380		N ₆₀		12"	12" 204 Geotextile
		SS-2	2.5	4.0	0.2	1.7	13		3.25								17	16	A-6b	16					
		SS-3	4.0	5.5	1.7	3.2	15		4.5	37	19	18	41	42	83	15	16	A-6b	11						
		SS-4	5.5	7.0	3.2	4.7	24		3.5								18	16	A-6b	16					
11	B 009-1 24	SS-1	1.0	2.5	-1.1	0.4	13	13	3	32	15	17	21	27	48	9	16	A-6b	5	99					
		SS-2	3.5	5.0	1.4	2.9	18										6	8	A-3a	0					
		SS-3	6.0	7.5	3.9	5.4	14		2.75	31	17	14	46	25	71	18	14	A-6a	9						
		SS-4	8.5	10.0	6.4	7.9	15		2.5								16	14	A-6a						
12	B 009-2 24	SS-1	1.0	2.5	-1.1	0.4	27	14		NP	NP	NP	9	9	18	6	6	A-1-b	0	560					
		SS-2	3.5	5.0	1.4	2.9	17										8	6	A-1-b	0					
		SS-3	6.0	7.5	3.9	5.4	14		3.5	37	19	18	38	30	68	11	16	A-6b	10						
		SS-4	8.5	10.0	6.4	7.9	15		3.25								18	16	A-6b						

PID: 120547

County-Route-Section: BEL-70-9.35

No. of Borings: 12

Geotechnical Consultant: CTL Engineering, Inc.

Prepared By: Joe Grani, P.E.

Date prepared: 10/14/2024

Chemical Stabilization Options		
320	Rubblize & Roll	Option
206	Cement Stabilization	Option
	Lime Stabilization	Option
206	Depth	12"

Excavate and Replace Stabilization Options	
Global Geotextile Average(N60L): Average(HP):	12" 0"
Global Geogrid Average(N60L): Average(HP):	0" 0"

<p>Design CBR</p>	<p>7</p>
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% Samples within 3 feet of subgrade			
N ₆₀ ≤ 5	0%	HP ≤ 0.5	0%
N ₆₀ < 12	19%	0.5 < HP ≤ 1	0%
12 ≤ N ₆₀ < 15	14%	1 < HP ≤ 2	2%
N ₆₀ ≥ 20	14%	HP > 2	47%
M+	9%		
Rock	13%		
Unsuitable Soil	0%		

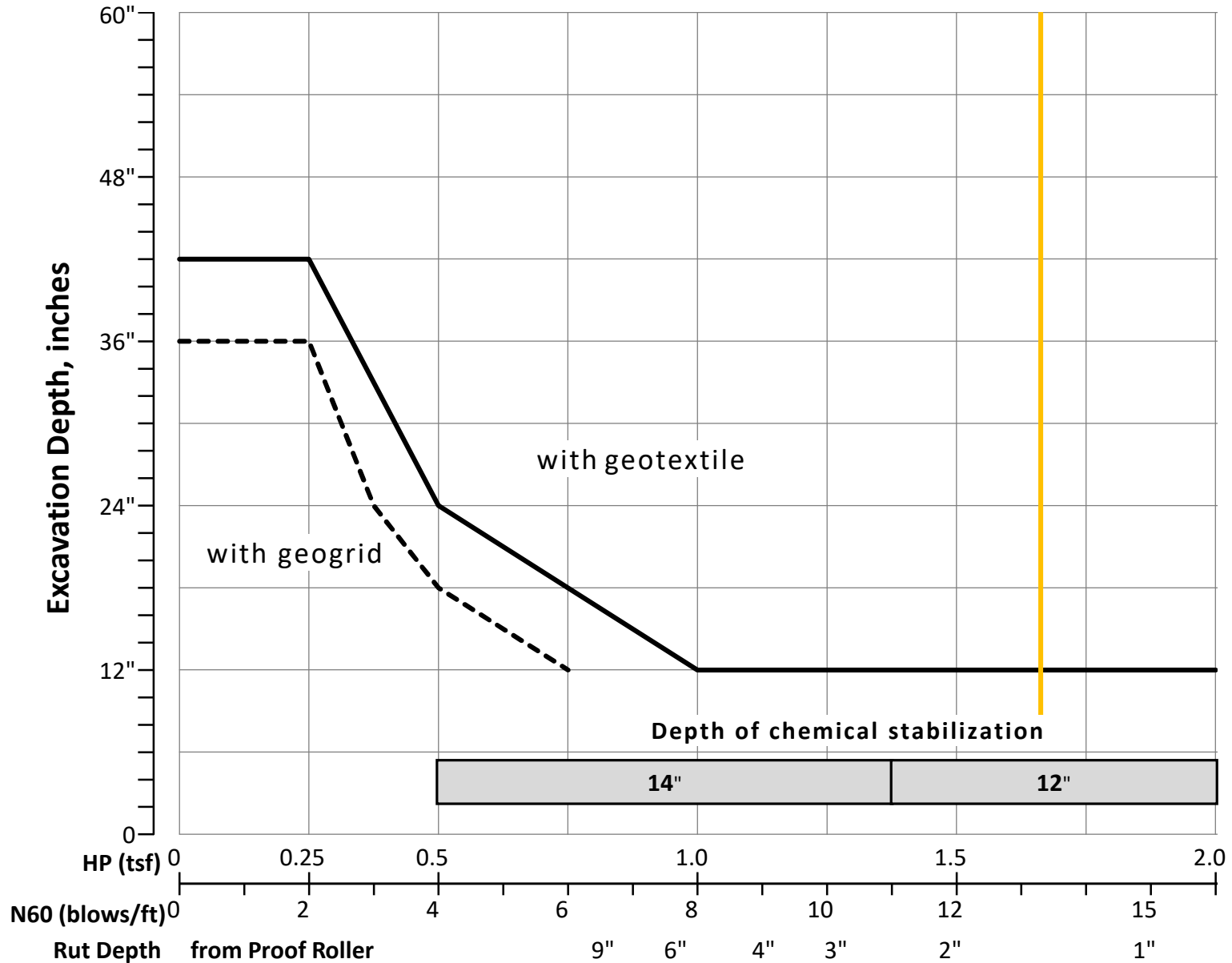
Excavate and Replace at Surface	
Average	4"
Maximum	12"
Minimum	0"

% Proposed Subgrade Surface	
Unstable & Unsuitable	28%
Unstable	28%
Unsuitable (Soil & Rock)	0%

	N ₆₀	N _{60L}	HP	LL	PL	PI	Silt	Clay	P 200	M _c	M _{OPT}	GI
Average	16	13	3.30	35	19	16	23	27	49	14	11	6
Maximum	30	30	4.50	63	28	35	46	66	83	29	25	20
Minimum	8	8	1.75	21	13	8	3	9	3	4	0	0

Classification Counts by Sample																					
ODOT Class	UCF	Rock	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-3	A-3a	A-4a	A-4b	A-5	A-6a	A-6b	A-7-5	A-7-6	A-8a	A-8b	Totals	
Count	0	7	1	2	2	0	1	0	0	3	11	0	0	3	14	0	3	0	0	47	
Percent	0%	15%	2%	4%	4%	0%	2%	0%	0%	6%	23%	0%	0%	6%	30%	0%	6%	0%	0%	100%	
% Rock Granular Cohesive	0%	15%	43%									43%									100%
Surface Class Count	0	4	1	2	2	0	1	0	0	3	7	0	0	1	8	0	3	0	0	32	
Surface Class Percent	0%	13%	3%	6%	6%	0%	3%	0%	0%	9%	22%	0%	0%	3%	25%	0%	9%	0%	0%	100%	

Fig. 600-1 – Subgrade Stabilization



OVERRIDE TABLE

Calculated Average	New Values	Check to Override
3.30	0.50	<input type="checkbox"/> HP
13.33	6.00	<input type="checkbox"/> N60L

Average HP —
 Average N_{60L} —

DCP Test Data

Project : BEL-70-9.35
Exploration ID: D-003-1-24
Surface Elev: 1158.2
Lat/Long: 40.055791, -81.051068
Consultant: CTL Engineering, Inc.

PID: 120547
Date: 6/27/2024
Surface Materials: N/A
Test Starting Depth (ft): 0
Hammer Wt. (lbs): 17.6

No. of Blows	Accumulative Penetration (mm)	Accumulative Penetration (in)	SPT N-Value (bpf)
0	0	0	0
1	152	6	1
3	305	12	3
3	457	18	3
5	610	24	7
3	762	30	3
2	914	36	2
3	1067	42	3
6	1219	48	9
60	1372	54	51

DCP Test Data

Project : BEL-70-9.35
Exploration ID: D-004-1-24
Surface Elev: 1160.4
Lat/Long: 40.056919, -81.051664
Consultant: CTL Engineering, Inc.

PID: 120547
Date: 6/27/2024
Surface Materials: N/A
Test Starting Depth (ft): 0
Hammer Wt. (lbs): 17.6

No. of Blows	Accumulative Penetration (mm)	Accumulative Penetration (in)	SPT N-Value (bpf)
0	0	0	0
7	152	6	11
7	305	12	11
3	457	18	3
3	610	24	3
7	762	30	11
6	914	36	9
5	1067	42	7
9	1219	48	15
4	1372	54	5
4	1524	60	5
7	1676	66	11
11	1829	72	17
30	1981	78	33
14	2134	84	20
17	2286	90	23
25	2438	96	29

DCP Test Data

Project : BEL-70-9.35
Exploration ID: D-006-3-24
Surface Elev: 1176.5
Lat/Long: 40.058926, -81.052652
Consultant: CTL Engineering, Inc.

PID: 120547
Date: 6/28/2024
Surface Materials: N/A
Test Starting Depth (ft): 0
Hammer Wt. (lbs): 17.6

No. of Blows	Accumulative Penetration (mm)	Accumulative Penetration (in)	SPT N-Value (bpf)
0	0	0	0
1	152	6	1
4	305	12	5
2	457	18	2
2	610	24	2
2	762	30	2
8	914	36	13
6	1067	42	9
11	1219	48	17
12	1372	54	18
13	1524	60	19
18	1676	66	24
29	1829	72	32
34	1981	78	36

DCP Test Data

Project : BEL-70-9.35
Exploration ID: D-007-0-24
Surface Elev: 1180.0
Lat/Long: 40.059451, -81.052774
Consultant: CTL Engineering, Inc.

PID: 120547
Date: 6/27/2024
Surface Materials: N/A
Test Starting Depth (ft): 0
Hammer Wt. (lbs): 17.6

No. of Blows	Accumulative Penetration (mm)	Accumulative Penetration (in)	SPT N-Value (bpf)
0	0	0	0
9	152	6	15
10	305	12	16
9	457	18	15
6	610	24	9
7	762	30	10
11	914	36	17
12	1067	42	18
13	1219	48	19
26	1372	54	30
30	1524	60	33