

# STATE OF OHIO DEPARTMENT OF TRANSPORTATION

## DEL-42-2.28

CITY OF DELAWARE  
CONCORD TOWNSHIP  
DELAWARE TOWNSHIP  
DELAWARE COUNTY

**FEDERAL PROJECT NUMBER**

E190(763)

**RAILROAD INVOLVEMENT**

NONE

**PROJECT DESCRIPTION**

THIS PROJECT CONSISTS OF THE REHABILITATION AND WIDENING OF 1.90 MILES OF PAVEMENT AND THE RESURFACING OF 2.37 MILES OF US 42 IN DELAWARE COUNTY AND THE CITY OF DELAWARE. WORK ALSO INCLUDES CULVERT REPAIRS OR REPLACEMENT.

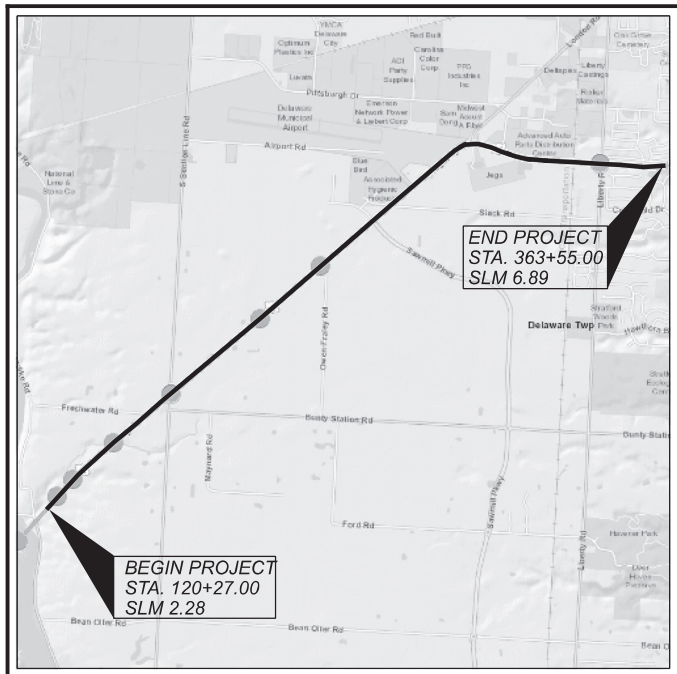
**EARTH DISTURBED AREAS**

PROJECT EARTH DISTURBED AREA: 9.04 ACRES  
ESTIMATED CONTRACTOR EARTH DISTURBED AREA: 0.25 ACRES  
NOTICE OF INTENT EARTH DISTURBED AREA: 9.29 ACRES

**2019 SPECIFICATIONS**

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PLANS AND CHANGES LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL REQUIRE THE CLOSING TO TRAFFIC IN THE NORTHBOUND DIRECTION OF THE HIGHWAY AND THAT A DETOUR WILL BE PROVIDED AS INDICATED ON SHEET 18.



**LOCATION MAP**

LATITUDE: N40°16'31" LONGITUDE: W83°06'07"



PORTION TO BE IMPROVED	=====	=====
INTERSTATE HIGHWAY	=====	=====
FEDERAL ROUTES	=====	=====
STATE ROUTES	=====	=====
COUNTY & TOWNSHIP ROADS	=====	=====
OTHER ROADS	-----	-----

**DESIGN DESIGNATION**

CURRENT ADT (2020)	-----	11,500
DESIGN YEAR ADT (2040)	-----	16,500
DESIGN HOURLY VOLUME (2040)	-----	1,600
DIRECTIONAL DISTRIBUTION	-----	58%
TRUCKS (24 HOUR B&C)	-----	15%
DESIGN SPEED	-----	55 MPH
LEGAL SPEED	-----	55 MPH
DESIGN FUNCTIONAL CLASSIFICATION:		
03 PRINCIPAL ARTERIAL (RURAL)		
NHS PROJECT	-----	YES

**DESIGN EXCEPTIONS**

DESIGN FEATURE:	APPROVAL DATES:	SHEET NUMBERS:
SHOULDER WIDTH	8/03/21	4, 5, 43 - 57

**ADA DESIGN WAIVERS**

**UNDERGROUND UTILITIES**  
Contact Two Working Days  
Before You Dig

**OHIO811.org**  
Before You Dig

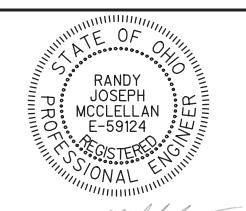
OHIO 811, 8-1-1, or 1-800-362-2764  
(Non members must be called directly)

**INDEX OF SHEETS:**

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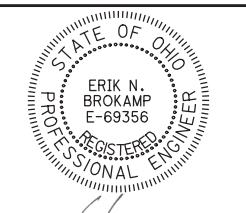
SOIL PROFILE - ROADWAY 152B - 152S, 153

**ENGINEER'S SEAL:**



SIGNED: *Randy McClellan*  
DATE: 9/30/21

**ENGINEER'S SEAL:**



SIGNED: *Erik N. Brokamp*  
DATE: 9/30/21

STANDARD CONSTRUCTION DRAWINGS						SUPPLEMENTAL SPECIFICATIONS		SPECIAL PROVISIONS	
BP-2.1	7/17/15	HW-2.1	7/20/18	MT-95.41	1/17/20		800-2020	10/15/21	
BP-2.2	1/15/21	HW-2.2	7/20/18	MT-97.10	4/19/19	TC-41.20	10/18/13	832	10/19/18
BP-2.3	7/18/14			MT-97.12	1/20/17	TC-41.30	10/18/13	861	1/15/21
BP-2.5	7/19/13			MT-99.20	4/19/19	TC-42.20	10/18/13		
BP-3.1	1/17/20	DM-1.1	7/17/20	MT-99.30	1/17/20	TC-52.10	10/18/13		
BP-3.2	1/18/19	DM-1.2	7/16/21	MT-101.60	1/17/20	TC-52.20	1/15/21		
BP-4.1	7/19/13	DM-4.4	1/15/16	MT-101.70	1/17/20	TC-64.10	7/16/21		
BP-5.1	7/16/21			MT-101.75	1/17/20	TC-65.10	1/17/14		
				MT-101.90	7/17/20	TC-65.11	7/21/17		
				MT-105.10	1/17/20	TC-71.10	7/16/21		
MGS-1.1	7/16/21	CB-2-2A	7/16/21						
MGS-2.1	1/19/18	CB-2-2B	7/16/21						
MGS-2.3	7/18/14	CB-2-2C	7/16/21						
MGS-4.2	7/19/13	CB-7	7/16/21						
MGS-5.3	7/15/16								
RM-4.1	7/21/17								
RM-4.2	4/17/20								

APPROVED: *[Signature]*  
DATE: 11/16/2021 DISTRICT DEPUTY DIRECTOR

APPROVED: \_\_\_\_\_  
DATE: \_\_\_\_\_ DIRECTOR, DEPARTMENT OF TRANSPORTATION

TITLE SHEET

DESIGN AGENCY	
DESIGNER	PJS
REVIEWER	RJM 09/27/21
PROJECT ID	109074
SHEET	TOTAL
1	153

DEL-42-2.28

MODEL: Sheet PAPER: 17x11 (in.) DATE: 11/11/2021 TIME: 7:48:12 AM USER: rmccllellan pwc\jmc-pw-bentley.com\jmc-pw-01\Documents\Projects\2019\19-03798-00\1109074-400-Engineering\Roadway\Sheets\109074\_GT001.dgn

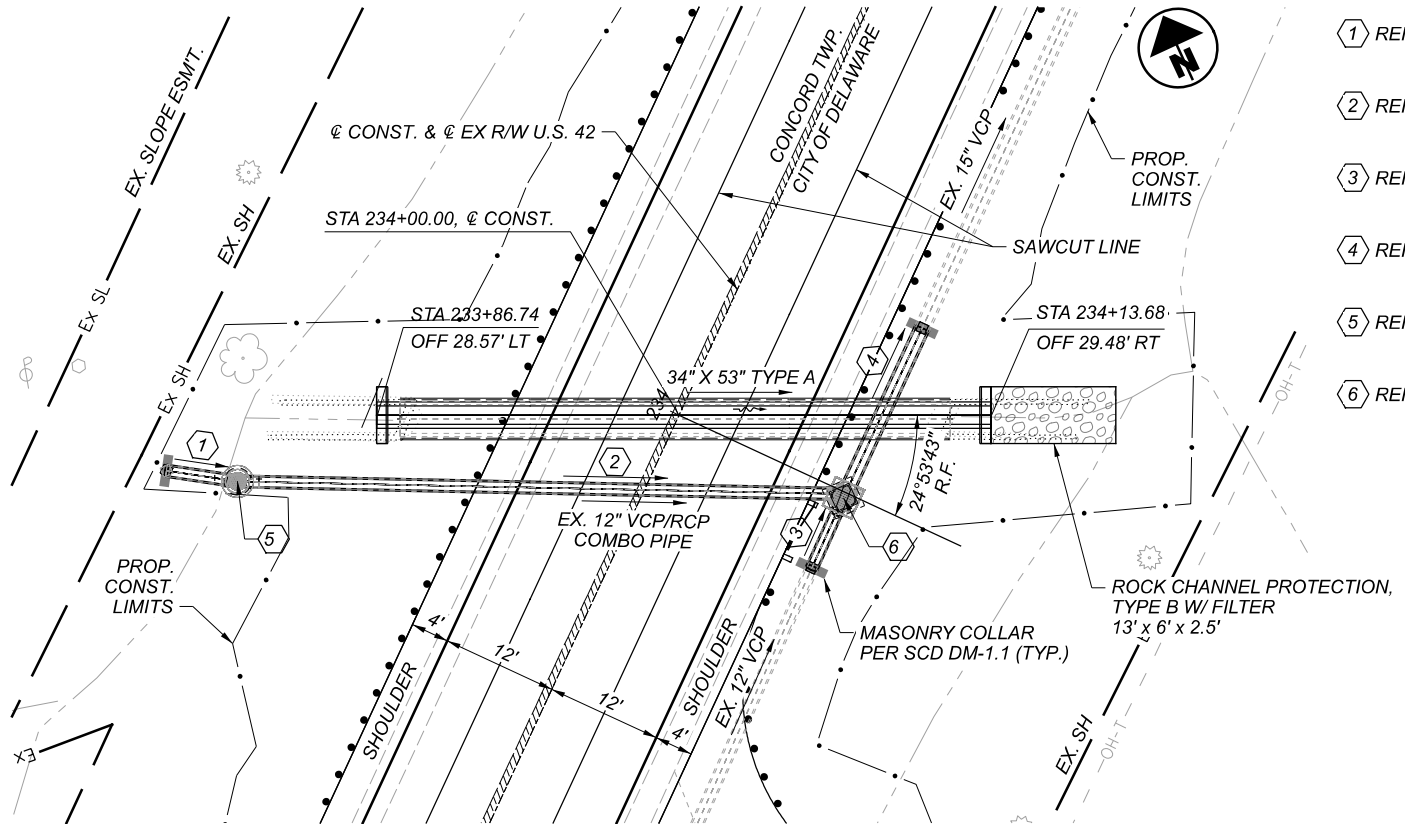
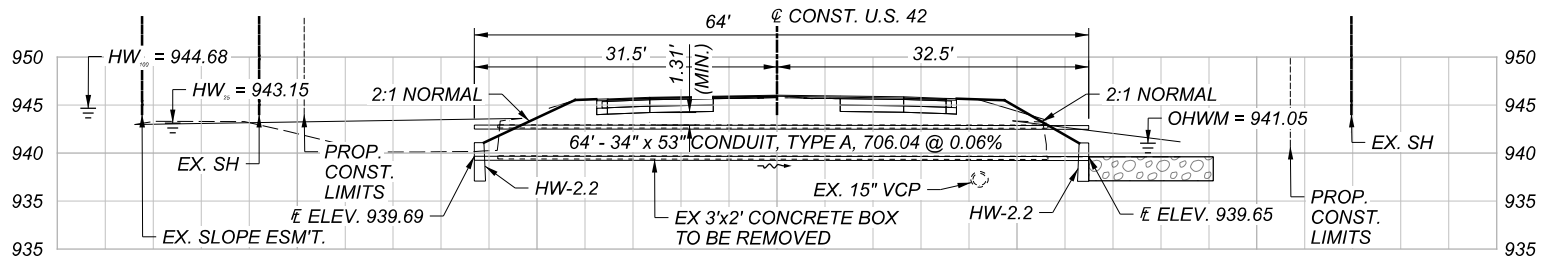
**HYDRAULIC DATA**

DRAINAGE AREA = 96.6 ACRES  
 Q(25) = 61 CFS - V(25) = 8 FPS - HW(25) = 943.15 FT  
 Q(100) = 90 CFS - V(100) = 10 FPS - HW(100) = 944.68 FT  
 ORDINARY HIGH WATER MARK: 941.05 FT  
 DESIGN SERVICE LIFE: 75 YRS  
 pH: 8  
 ABRASION LEVEL: 1  
 CFN:

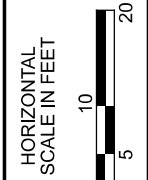
EXISTING STRUCTURE
TYPE: 3' x 3' CONCRETE BOX
SKEW: 24° 53' 43" R.F.
ALIGNMENT: TANGENT
CFN: 1832879

PROPOSED STRUCTURE
TYPE: 34" x 53" ELLIPTICAL CONCRETE PIPE
SKEW: 24° 53' 43" R.F.
ALIGNMENT: TANGENT
CFN:

ESTIMATED QUANTITIES				
ITEM	EXTENSION	UNIT	QUANTITY	DESCRIPTION
202	11000	LS	1	STRUCTURE REMOVED
202	35100	FT	98	PIPE REMOVED, 24" AND UNDER
202	58100	EACH	2	CATCH BASIN REMOVED
601	32100	CY	8	ROCK CHANNEL PROTECTION, TYPE B WITH FILTER
602	20000	CY	1.4	CONCRETE MASONRY
611	04400	FT	63	12" CONDUIT, TYPE B
611	04600	FT	16	12" CONDUIT, TYPE C, 706.08
611	06100	FT	19	15" CONDUIT, TYPE C, 706.08
611	52900	FT	64	34" x 53" CONDUIT, TYPE A, 706.04
611	98390	EACH	1	CATCH BASIN, No. 7
611	98470	EACH	1	CATCH BASIN, No. 2-2B



- ① REMOVE AND REPLACE 8' - 12" VCP @ EX. LOCATION AND ELEV.  
ITEM 202 - PIPE REMOVED, 24" AND UNDER  
ITEM 611 - 12" CONDUIT, TYPE C, 706.08
- ② REMOVE AND REPLACE 63' - 12" VCP @ EX. LOCATION AND ELEV.  
ITEM 202 - PIPE REMOVED, 24" AND UNDER  
ITEM 611 - 12" CONDUIT, TYPE B
- ③ REMOVE AND REPLACE 8' - 12" VCP @ EX. LOCATION AND ELEV.  
ITEM 202 - PIPE REMOVED, 24" AND UNDER  
ITEM 611 - 12" CONDUIT, TYPE C, 706.08
- ④ REMOVE AND REPLACE 19' - 15" VCP @ EX. LOCATION AND ELEV.  
ITEM 202 - PIPE REMOVED, 24" AND UNDER  
ITEM 611 - 15" CONDUIT, TYPE C, 706.08
- ⑤ REMOVE AND REPLACE EX. CB-7 @ EX. LOCATION AND ELEV.  
ITEM 202 - CATCH BASIN, REMOVED  
ITEM 611 - CATCH BASIN, No. 7
- ⑥ REMOVE AND REPLACE EX. CB2-2B @ EX. LOCATION AND ELEV.  
ITEM 202 - CATCH BASIN, REMOVED  
ITEM 611 - CATCH BASIN, No. 2-2B



CULVERT 6 DETAIL SHEET  
 U.S. 42 STATION 234+00.00

DESIGN AGENCY  
  
 DESIGNER: CTW  
 REVIEWER: ENB 07-15-21  
 PROJECT ID: 09074  
 SHEET: 152A TOTAL: 153

**PROJECT DESCRIPTION**

THIS PROJECT, DEL-42-2.29, CONSISTS OF THE REHABILITATION AND WIDENING OF 1.90 MILES OF US 42 AND THE RESURFACING OF 2.37 MILES OF US 42 IN DELAWARE COUNTY AND THE CITY OF DELAWARE. THE PROJECT ALSO INCLUDES CULVERT REPAIRS OR REPLACEMENT WITHIN THE PROJECT LIMITS.

**HISTORIC RECORDS**

SOIL PROFILES AND GEOTECHNICAL EXPLORATION FINDINGS FOR THE DEL- 42/257/745-0.95/7.55/6.59 PROJECT DATED SEPTEMBER 12, 1945 WERE REVIEWED FOR THIS PROJECT. THE RECORDS DID NOT PROVIDE ADEQUATE INFORMATION FOR USE ON THE DESIGN OF THIS PROJECT THEREFORE NO HISTORIC DATA FROM THESE PROJECTS HAVE BEEN PRESENTED ON THIS SOIL PROFILE.

**GEOLOGY**

THE PROJECT SITE IS LOCATED WITHIN THE CENTRAL OHIO CLAYEY TILL PLAIN PHYSIOGRAPHIC REGION WHICH IS CHARACTERIZED AS WELL-DEFINED MORAINES WITH INTERVENING FLAT-LYING GROUND MORAINE AND INTERMORAINAL LAKE BASINS. THE REGION CONSISTS OF CLAYEY TILL AT THE SURFACE AND CONTAINS FEW LARGE STREAMS AND LIMITED SAND AND GRAVEL OUTWASH. ELEVATIONS OF THE REGION RANGES FROM 700 TO 1,150 FT ABOVE MEAN SEA LEVEL (AMSL), WITH MODERATE RELIEF (100 FT). THE GEOLOGY WITHIN THIS REGION IS DESCRIBED AS CLAYEY, HIGH- LIME WISCONSINAN- AGE TILL AND LACUSTRINE MATERIALS OVER LOWER PALEOZOIC-AGE CARBONATE ROCKS AND, IN THE EAST, SHALES. LOESS IN THIS REGION IS THIN TO ABSENT.

THE GEOLOGY IN THE SOUTHWESTERN AND NORTHEASTERN PORTIONS OF THE PROJECT AREA IS MAPPED AS APPROXIMATELY 20 TO 30 FT OF TILL OVER DEVONIAN-AGE LIMESTONE. FROM ABOUT 1000 FT NORTH OF SOUTH SECTION LINE RD TO ABOUT 1000 FT NORTH OF SLACK RD, THE GEOLOGY IS MAPPED AS AN AVERAGE OF 10 FT OF TILL FOLLOWED BY DISCONTINUOUS LAYERS OF SAND AND GRAVEL WITH THICKNESSES TYPICALLY LESS THAN 10 FT, UNDERLAIN BY AN AVERAGE OF 40 FT OF TILL ALL OVER DEVONIAN-AGE LIMESTONE. THE WISCONSINAN-AGE TILL MAPPED THROUGHOUT THE PROJECT IS DESCRIBED AS CONSISTING OF AN UNSORTED MIX OF CLAY, SILT, GRAVEL AND BOULDERS WITH POSSIBLE SILT, SAND AND GRAVEL LENSES, WHILE THE DISCONTINUOUS LAYERS OF WISCONSINAN-AGE SAND AND GRAVEL SOILS MAPPED IN THE MIDDLE PORTION OF THE PROJECT ARE DESCRIBED AS CONSISTING OF WELL-SORTED, INTERBEDDED AND INTERMIXED SAND AND GRAVEL COMMONLY CONTAINING THIN, DISCONTINUOUS LAYERS OF SILT AND CLAY AND MAY LOCALLY CONTAIN ORGANICS. GRAIN SIZES OF THE SAND AND GRAVEL LAYERS ARE DESCRIBED AS MODERATELY SORTED, MODERATELY TO WELL ROUNDED, AND FINELY STRATIFIED TO MASSIVELY BEDDED.

BASED ON THE BEDROCK GEOLOGIC UNITS MAP OF OHIO, BEDROCK IS MAPPED AS ALTERNATING BETWEEN COLUMBUS LIMESTONE AND DELAWARE LIMESTONE THROUGHOUT THE PROJECT AREA. COLUMBUS LIMESTONE CONSISTS OF BOTH LIMESTONE AND DOLOMITE THAT CAN BE DESCRIBED AS GRAY TO BROWN IN COLOR WEATHERING TO BROWN, MASSIVELY BEDDED AND FOSSILIFEROUS IN THE UPPER TWO THIRDS. DELAWARE LIMESTONE CONSISTS OF PREDOMINANTLY LIMESTONE DESCRIBED AS GRAY TO BROWN IN COLOR, THIN TO MASSIVELY BEDDED, AND MAY CONTAIN ARGILLACEOUS PARTINGS, NODULES AND LAYERS. ACCORDING TO THE ODNR BEDROCK TOPOGRAPHY MAP OF OHIO, BEDROCK ELEVATIONS AT THE PROJECT SITE CAN BE EXPECTED TO RANGE FROM 860 FT AMSL TO 900 FT AMSL, PUTTING BEDROCK AT DEPTHS BETWEEN APPROXIMATELY 10 AND 45 FT BELOW GROUND SURFACE (BGS).

**RECONNAISSANCE**

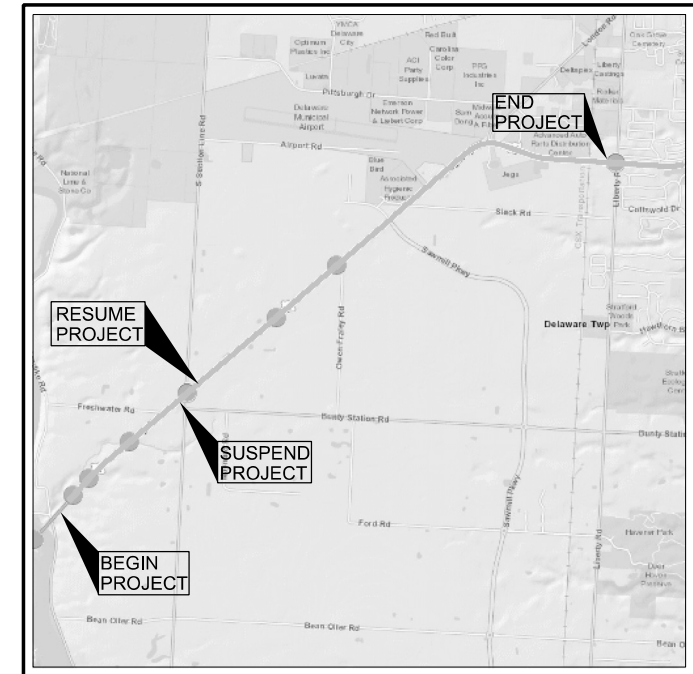
A FIELD RECONNAISSANCE WAS CONDUCTED ON SEPTEMBER 18, 2020 ALONG US42 WITHIN THE PROJECT LIMITS. SITE CONDITIONS, INCLUDING THE CONDITIONS OF EXISTING PAVEMENT, EMBANKMENTS AND STRUCTURES, WERE NOTED AND PHOTOGRAPHED. THE LAND USE OF MOST OF THE PROJECT AREA CONSISTS OF AGRICULTURAL PROPERTIES WITH OTHER LAND USES OF THE AREA INCLUDING INDUSTRIAL FACILITIES, COMMERCIAL PROPERTIES, AND RESIDENTIAL PROPERTIES.

THE PAVEMENT CONDITION ALONG US-42 WITHIN THE PROJECT LIMITS WAS OBSERVED TO BE FAIR TO GOOD WITH MINOR SIGNS OF WEATHERING AND SURFACE WEAR. FREQUENT LOW SEVERITY LONGITUDINAL AND TRANSVERSE CRACKING WAS OBSERVED ALONG THE PROJECT PORTION OF US-42, AS WELL AS EDGE CRACKING AND LOW SEVERITY RAVELING. THE SEGMENT OF US-42 WITHIN THE PROJECT AREA PLANNED WIDENING AND PARTIAL REPLACEMENT IS RAISED SLIGHTLY ABOVE THE SURROUNDING AREA WHICH IS RELATIVELY FLAT. THE ROADWAY SLOPES VERY GRADUALLY DOWNWARDS FROM NORTHEAST TO SOUTHWEST. THE ROADWAY DRAINS TO VEGETATED, OPEN DRAINAGE SWALES ON EITHER SIDE OF THE ROADWAY. NO SIGNIFICANT SIGNS OF INSTABILITY DUE TO GEOTECHNICAL RELATED ISSUES WERE OBSERVED ALONG THE PROJECT PORTION OF US-42 DURING THE FIELD VISIT.

FOUR (4) PROJECT CULVERTS WERE OBSERVED ALONG THE PROJECT PORTION OF US-42 DURING THE VISIT. THE FIRST PROJECT CULVERT ALONG THIS SEGMENT OF US-42, LOCATED ABOUT 1,000 FT NORTH OF KLONDIKE RD/RIVERSIDE DR, CONSISTS OF A 36 INCH DIAMETER REINFORCED CONCRETE PIPE. THIS CULVERT HAS A PARTIAL HEIGHT HEADWALL AT THE OUTLET (WEST SIDE) WHICH WAS OBSERVED TO BE IN GOOD CONDITION WHILE THE INLET OF THE CULVERT (EAST SIDE) WAS NOT VISIBLE. STANDING WATER WAS OBSERVED IN THE CULVERT DURING THE SITE VISIT. THE REMAINING THREE CULVERTS ALONG THIS SEGMENT OF US-42 WERE LOCATED: 1) ABOUT 1,800 FT NORTH OF KLONDIKE RD/RIVERSIDE DR; 2) ABOUT 1,500 FT SOUTH OF FRESHWATER RD; AND, 3) ABOUT 300 FT SOUTH OF OWEN FRALEY RD. EACH OF THESE CULVERTS CONSISTED OF A REINFORCED CONCRETE BOX CULVERT WITH FULL-HEIGHT HEADWALLS AT BOTH THE INLET AND OUTLET. EACH OF THE NOTED HEADWALLS APPEARED TO BE IN GOOD CONDITION WITH THE EXCEPTION OF THE CULVERTS ABOUT 300 FT SOUTH OF OWEN FRALEY RD WHICH APPEARED TO SHOW SOME SIGNS OF CONCRETE DETERIORATION.

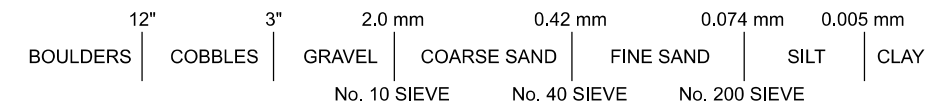
**LEGEND**

DESCRIPTION	ODOT CLASS	CLASSIFIED MECH./VISUAL
STONE FRAGMENTS	A-1-a	0 7
STONE FRAGMENTS WITH SAND	A-1-b	2 7
STONE FRAGMENTS WITH SAND AND SILT	A-2-4	0 1
COARSE AND FINE SAND	A-3a	0 6
SANDY SILT	A-4a	10 14
SILT	A-4b	2 1
SILT AND CLAY	A-6a	15 15
SILTY CLAY	A-6b	5 4
CLAY	A-7-6	10 9
<b>TOTAL</b>		<b>44 64</b>
PAVEMENT OR BASE = X = APPROXIMATE THICKNESS	VISUAL	
SOD AND TOPSOIL = X = APPROXIMATE THICKNESS	VISUAL	
EXPLORATION LOCATION - PLAN VIEW		
DRIVE SAMPLE AND/OR ROCK CORE BORING PLOTTED TO VERTICAL SCALE ONLY. HORIZONTAL BAR INDICATES A CHANGE IN STRATIGRAPHY.		
WC INDICATES WATER CONTENT IN PERCENT.		
W— INDICATES FREE WATER ELEVATION.		
N <sub>60</sub> INDICATES STANDARD PENETRATION RESISTANCE NORMALIZED TO 60% DRILL ROD ENERGY RATIO.		
NUMBER OF BLOWS FOR STANDARD PENETRATION TEST (SPT): X= NUMBER OF BLOWS FOR 6 INCHES (UNCORRECTED). Y/D"= NUMBER OF BLOWS (UNCORRECTED) FOR D" OF PENETRATION AT REFUSAL.		
INDICATES A PLASTIC MATERIAL WITH A MOISTURE CONTENT EQUAL TO OR GREATER THAN THE LIQUID LIMIT MINUS 3.		
SS INDICATES A SPLIT-SPOON SAMPLE.		
ST INDICATES A SHELBY TUBE SAMPLE.		
NP INDICATES A NON-PLASTIC SAMPLE.		



LOCATION MAP  
SCALE IN MILES

**PARTICLE SIZE DEFINITIONS**



INDEX OF SHEETS						
SUMMARY OF SOIL TEST DATA, SHEET 3						
LOCATION		PLAN	PROFILE	CROSS SECTION	CUT MAX.	FILL MAX.
FROM STA.	TO STA.					
SR 42						
115+00.00	127+50.00	6	6	-	< 1 ft	< 1 ft
127+50.00	140+00.00	7	7	-	< 1 ft	< 1 ft
140+00.00	152+50.00	8	8	-	< 1 ft	< 1 ft
152+50.00	165+00.00	9	9	-	< 1 ft	< 1 ft
165+00.00	177+50.00	-	-	-	< 1 ft	< 1 ft
177+50.00	190+00.00	11	11	-	< 1 ft	< 1 ft
190+00.00	202+50.00	12	12	-	< 1 ft	< 1 ft
202+50.00	215+00.00	13	13	-	< 1 ft	< 1 ft
215+00.00	227+50.00	-	-	-	< 1 ft	< 1 ft
227+50.00	240+00.00	15	15	-	< 1 ft	< 1 ft
BORING LOGS, SHEETS 16-19						

DEL-42-2.29		
BORING ID	PLAN VIEW SHEETS	PROFILE SHEET
B-027-0-20	6	6
B-028-0-20	6	6
B-029-0-20	7	7
B-030-0-20	7	7
B-031-0-20	7	7
B-032-0-20	8	8
B-033-0-20	8	8
B-034-0-20	9	9
B-035-0-20	11	11
B-036-0-20	12	12
B-037-0-20	13	13
B-038-0-20	15	15
B-039-0-20	15	15
B-040-0-20	15	15

RECON. - EB 09/18/20  
 DRILLING - RW 10/28/20 - 11/06/20  
 DRAWN - AI 02/11/21  
 REVIEWED - BPA 02/11/21

DESIGN AGENCY  
**NEAS**  
 2800 CORPORATE EXCHANGE DR, SUITE 240 COLUMBUS, OH, 43231  
 TEL: 614.714.0299 WWW.NEASINC.COM  
 DESIGNER AI  
 REVIEWER BPA 02-11-21  
 PROJECT ID 109074  
 SUBSET TOTAL 1 19  
 SHEET TOTAL 152B 153

DEL-42-2.29

MODEL: Sheet PAPER SIZE: 17x11 (in.) DATE: 2/12/2021 TIME: 12:46:25 PM USER: akhail P:\OHDOT\Work\Seas\109074\4040-Engineering\Geotechnical\Sheets\109074\_IC001.dgn

SOIL PROFILE

## SUBSURFACE EXPLORATION

THE SUBSURFACE EXPLORATION WAS CONDUCTED BY NEAS BETWEEN OCTOBER 28, 2020 AND NOVEMBER 6, 2020 AND INCLUDED 14 BORINGS DRILLED TO DEPTHS BETWEEN 7.5 AND 28.8 FT BGS. BORINGS WERE DRILLED BY NEAS USING A CME 55 OR CME 45B TRUCK MOUNTED DRILLING RIG UTILIZING 3.25-INCH DIAMETER HOLLOW STEM AUGERS. STANDARD PENETRATION TESTS (SPT) WERE CONDUCTED USING CME AUTO HAMMERS CALIBRATED ON DECEMBER 5, 2019 TO BE 81.7% AND 68.4% AS INDICATED ON THE BORING LOGS.

DISTURBED SOIL SAMPLES WERE OBTAINED IN ACCORDANCE WITH THE STANDARD PENETRATION TEST (SPT) (AASHTO T206). SPT SAMPLES WERE GENERALLY COLLECTED CONTINUOUSLY TO A DEPTH OF 7.5 BGS FOR ROADWAY BORINGS, WHILE SAMPLES FOR SUBGRADE/CULVERT BORINGS WERE TYPICALLY RECOVERED CONTINUOUSLY TO A DEPTH OF 7.5 FT BGS AND AT 2.5-FT INTERVALS THEREAFTER.

SPLIT SPOON SAMPLES COLLECTED AS PART OF THE SPT WERE PLACED IN SEALED GLASS CONTAINERS AND TRANSPORTED TO NEAS'S GEOTECHNICAL LABORATORY IN COLUMBUS, OH. THE BORINGS WERE BACKFILLED OR SEALED ACCORDING TO ODOT REQUIREMENTS. FIELD BORING LOGS WERE PREPARED BY DRILLING PERSONNEL, AND INCLUDED LITHOLOGICAL DESCRIPTION, SPT RESULTS RECORDED AS BLOWS PER 6-INCH INCREMENT OF PENETRATION AND ESTIMATED UNCONFINED SHEAR STRENGTH VALUES ON SPECIMENS EXHIBITING COHESION (USING A HAND-PENETROMETER. GROUNDWATER RELATED OBSERVATIONS WERE RECORDED AS APPROPRIATE.

## EXPLORATION FINDINGS

THE SUBSURFACE PROFILE AT THE SITE CONSISTS OF SURFICIAL MATERIALS COMPRISED OF EITHER TOPSOIL OR AN EXISTING PAVEMENT SECTION (ASPHALT, CONCRETE AND/OR GRANULAR BASE) RANGING FROM 12 TO 18 INCHES IN THICKNESS WHICH WAS GENERALLY UNDERLAIN BY NATURAL SOILS CONSISTING OF MODERATELY PLASTIC SANDY SILT AND SILT/CLAY COMBINATIONS. THE SUBGRADE SOILS ENCOUNTERED WITHIN THE PROJECT LIMITS CLASSIFIED AS EITHER A-1-B, A-2-4, A-3A, A-4A, A 6A, A-6B, OR A 7-6 TYPE SOILS.

WITHIN THE PROJECT PORTION OF US-42, EIGHTY-SEVEN PERCENT (87%) OF THE SAMPLES TAKEN ALONG THE ROADWAY WERE CLASSIFIED AS FINE- GRAINED COHESIVE SOILS AND WERE COMPRISED OF COHESIVE SANDY SILT, SILT AND CLAY, SILTY CLAY, AND CLAY. WITH RESPECT TO THE CONSISTENCY OF THE FINE GRAINED SOILS, THE DESCRIPTIONS VARIED FROM SOFT TO HARD CORRELATING TO CONVERTED SPT-N VALUES (N60) BETWEEN 4 AND 30 BLOWS PER FOOT (BPF), AND UNCONFINED COMPRESSIVE STRENGTHS (ESTIMATED BY MEANS OF HAND PENETROMETER) BETWEEN APPROXIMATELY 1.5 AND IN EXCESS OF 4.5 TONS PER SQUARE FOOT (TSF). NATURAL MOISTURE CONTENTS RANGED FROM 10 TO 29 PERCENT. BASED ON ATTERBERG LIMIT TESTS PERFORMED ON REPRESENTATIVE SAMPLES OF THE FINE-GRAINED SUBGRADE SOILS OBTAINED ALONG THE PROJECT PORTIONS OF US-42, THE LIQUID AND PLASTIC LIMITS RANGED FROM 26 TO 57 PERCENT AND FROM 14 TO 26 PERCENT, RESPECTIVELY. THE REMAINING THIRTEEN PERCENT (13%) OF THE SAMPLES TAKEN ALONG THE ROADWAY WERE IDENTIFIED AS COARSE GRAINED, NON-COHESIVE SOILS AND WERE COMPRISED OF GRAVEL WITH SAND, STONE FRAGMENTS WITH SAND AND SILT, COARSE AND FINE SAND, AND NON-COHESIVE SANDY SILT. WITH RESPECT TO THE RELATIVE DENSITY OF THE COARSE GRAINED SOILS, THE DESCRIPTIONS VARIED FROM LOOSE TO MEDIUM DENSE CORRELATING TO N60 VALUES BETWEEN 8 AND 19 BPF. NATURAL MOISTURE CONTENTS RANGED FROM 7 TO 11 PERCENT.

## SPECIFICATIONS

THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED JULY 2020.

## AVAILABLE INFORMATION

ALL AVAILABLE SOIL AND BEDROCK INFORMATION THAT CAN BE CONVENIENTLY SHOWN ON THE GEOTECHNICAL EXPLORATION SHEETS HAS BEEN SO REPORTED. ADDITIONAL EXPLORATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR'S OFFICE OR THE OFFICE OF GEOTECHNICAL ENGINEERING AT 1980 WEST BROAD STREET, COLUMBUS, OHIO 43223.

DEL-42-2.29

MODEL: Sheet PAPER: 17x11 (in.) DATE: 2/12/2021 TIME: 12:46:29 PM USER: akhail  
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SOIL PROFILE

DESIGN AGENCY



2800 CORPORATE  
EXCHANGE DR.  
SUITE 240  
COLUMBUS, OH,  
43231  
TEL: 614.714.0299  
WWW.NEASINC.COM

DESIGNER

AI

REVIEWER

BPA 02-11-21

PROJECT ID

109074

SUBSET TOTAL

2 19

SHEET TOTAL


152C 153

**DEL-42-2.29**

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**SUMMARY OF SOIL TEST DATA**  
109074 DEL-42-2.92

EXPLORATION NO., STATION & OFFSET	FROM	TO	SAMPLE ID	% REC	HP Isf	% GR	% CS	% FS	% SILT	% CLAY	LL	PL	PI	WC	ODOT CLASS (GI)	ppm SO4
B-027-0-20	01.50	03.00	SS-1	11	-	MEDIUM DENSE, BROWN, STONE FRAGMENTS WITH SAND AND SILT						11		A-2-4 (VISUAL)	-	
STA. 120+77, 15' RT	03.00	04.50	SS-2	17	2.50	VERY STIFF, BROWN, SANDY SILT						14		A-4a (VISUAL)	-	
LATITUDE = 40.247274	04.50	06.00	SS-3	56	3.00	4	24	20	26	26	34	18	16	18	A-6a (6)	-
LONGITUDE = -83.143475	06.00	07.50	SS-4	56	2.00	6	20	22	26	26	32	17	15	19	A-6a (5)	-
B-028-0-20	01.50	03.00	SS-1	72	4.50	17	13	14	34	22	29	17	12	14	A-6a (5)	-
STA. 121+84, 16' LT	03.00	04.50	SS-2	61	4.50	18	14	15	33	20	30	19	11	13	A-6a (4)	-
LATITUDE = 40.247549	04.50	06.00	SS-3	89	1.75	SAME AS SS-2						25		A-6a (VISUAL)	-	
LONGITUDE = -83.143301	06.00	07.50	SS-4	39	2.25	12	13	12	32	31	40	20	20	21	A-6b (10)	-
B-029-0-20	01.00	02.50	SS-1	33	4.25	SAME AS SS-2						13		A-6a (VISUAL)	-	
STA. 129+02, 51' LT	03.50	05.00	SS-2	67	4.50	2	5	16	49	28	29	18	11	11	A-6a (8)	-
LATITUDE = 40.249082	06.00	07.50	SS-3	44	4.50	-	-	-	-	-	-	-	-	16	A-6a (VISUAL)	-
LONGITUDE = -83.141677	08.50	10.00	SS-4	67	4.50	3	4	9	41	43	32	19	13	16	A-6a (9)	-
B-030-0-20	01.50	03.00	SS-1	8	3.50	35	14	11	24	16	27	14	13	12	A-6a (2)	-
STA. 130+72, 13' RT	03.00	04.50	SS-2	44	3.50	VERY STIFF, BROWN AND GRAY, SILTY CLAY						16		A-6b (7)	-	
LATITUDE = 40.249291	04.50	06.00	SS-3	67	3.25	SAME AS SS-2						19		A-6b (VISUAL)	-	
LONGITUDE = -83.141082	06.00	07.50	SS-4	67	2.75	SAME AS SS-2						21		A-6b (VISUAL)	-	
B-031-0-20	01.50	03.00	SS-1	56	-	18	29	17	27	9	NP	NP	NP	10	A-4a (0)	-
STA. 138+15, 14' LT	03.00	04.50	SS-2	61	4.50	9	13	19	36	23	26	16	10	13	A-4a (5)	-
LATITUDE = 40.250766	04.50	06.00	SS-3	72	4.50	2	6	14	42	36	31	18	13	16	A-6a (9)	-
LONGITUDE = -83.139233	06.00	07.50	SS-4	83	4.50	SAME AS SS-3						17		A-6a (VISUAL)	-	
B-032-0-20	01.00	02.50	SS-1	33	-	MEDIUM DENSE, BROWN, COARSE AND FINE SAND						7		A-3a (VISUAL)	-	
STA. 147+36, 15' LT	03.50	05.00	SS-2	44	3.00	5	8	12	37	38	42	17	25	21	A-7-6 (14)	-
LATITUDE = 40.252354	06.00	07.50	SS-3	17	2.75	SAME AS SS-2						17		A-7-6 (VISUAL)	-	
LONGITUDE = -83.137010	08.50	10.00	SS-4	44	3.50	VERY STIFF, BROWN, SILT AND CLAY						19		A-6a (VISUAL)	-	
B-033-0-20	01.50	02.25	SS-1A	8	-	LOOSE, BROWN, GRAVEL WITH SAND						10		A-1-b (VISUAL)	-	
STA. 146+80, 30' RT	02.25	03.00	SS-1B	-	2.75	SAME AS SS-2						18		A-6a (VISUAL)	-	
LATITUDE = 40.252231	03.00	04.50	SS-2	7	2.75	9	12	17	35	27	28	17	11	15	A-6a (6)	-
LONGITUDE = -83.136789	04.50	06.00	SS-3	44	2.25	SAME AS SS-2						13		A-6a (VISUAL)	-	
B-034-0-20	01.50	03.00	SS-1	67	4.25	2	7	17	46	28	28	17	11	17	A-6a (8)	-
STA. 162+66, 14' LT	03.00	04.50	SS-2	44	2.75	SAME AS SS-1						18		A-6a (VISUAL)	-	
LATITUDE = 40.255109	04.50	06.00	SS-3	72	2.25	3	6	13	34	44	44	18	26	22	A-7-6 (15)	-
LONGITUDE = -83.132529	06.00	07.50	SS-4	78	3.00	SAME AS SS-3						21		A-7-6 (VISUAL)	-	
B-035-0-20	01.50	03.00	SS-1	44	4.50	10	14	15	41	20	27	17	10	13	A-4a (5)	-
STA. 179+07, 14' RT	03.00	04.50	SS-2	56	3.50	SAME AS SS-1						20		A-4a (VISUAL)	-	
LATITUDE = 40.257913	04.50	06.00	SS-3	78	2.50	3	5	11	39	42	44	21	23	10	A-7-6 (14)	-
LONGITUDE = -83.128061	06.00	07.50	SS-4	78	2.75	SAME AS SS-3						29		A-7-6 (VISUAL)	-	
B-036-0-20	01.50	03.00	SS-1	67	-	17	18	16	37	12	NP	NP	NP	10	A-4a (3)	-
STA. 195+00, 14' RT	03.00	04.50	SS-2	67	4.25	SAME AS SS-1						18		A-4a (VISUAL)	-	
LATITUDE = 40.780686	04.50	05.30	SS-3A	78	4.25	SAME AS SS-1						17		A-4a (VISUAL)	-	
LONGITUDE = -82.373915	05.30	06.00	SS-3B	-	2.75	SAME AS SS-4						23		A-6b (VISUAL)	-	
B-037-0-20	01.50	03.00	SS-1	67	4.25	2	4	9	45	40	40	20	20	23	A-6b (12)	-
STA. 210+66, 12' LT	03.00	04.50	SS-2	44	3.75	12	17	17	35	19	28	16	12	13	A-6a (5)	-
LATITUDE = 40.263668	04.50	06.00	SS-3	56	2.75	5	9	10	39	37	46	23	23	24	A-7-6 (14)	-
LONGITUDE = -83.119419	06.00	07.50	SS-4	67	2.25	3	4	5	39	49	52	22	30	26	A-7-6 (18)	-
B-038-0-20	01.50	03.00	SS-1	56	4.25	3	12	13	45	27	31	21	10	18	A-4a (7)	-
STA. 227+74, 14' LT	03.00	04.50	SS-2	44	3.00	SAME AS SS-1						19		A-4a (VISUAL)	-	
LATITUDE = 40.266485	04.50	06.00	SS-3	67	2.50	2	6	8	41	43	48	20	28	24	A-7-6 (17)	-
LONGITUDE = -83.115107	06.00	07.50	SS-4	56	3.25	SAME AS SS-3						18		A-7-6 (VISUAL)	-	
B-039-0-20	01.50	03.00	SS-1	39	2.50	2	6	8	44	40	49	24	25	25	A-7-6 (16)	-
STA. 233+71, 13' LT	03.00	04.50	SS-2	56	2.75	SAME AS SS-1						24		A-7-6 (VISUAL)	-	
LATITUDE = 40.267759	04.50	06.00	SS-3	44	1.50	1	2	6	38	53	57	26	31	28	A-7-6 (19)	-
LONGITUDE = -83.113152	06.00	07.50	SS-4	78	3.50	SAME AS SS-3						28		A-7-6 (VISUAL)	-	
B-040-0-20	01.50	03.00	SS-1	56	-	23	21	15	32	9	NP	NP	NP	10	A-4a (1)	-
STA. 234+26, 14' RT	03.00	04.50	SS-2	44	2.75	0	4	9	44	43	48	22	26	25	A-7-6 (16)	-
LATITUDE = 40.267800	04.50	06.00	SS-3	28	3	SAME AS SS-2						26		A-7-6 (VISUAL)	-	
LONGITUDE = -83.112939	06.00	07.50	SS-4	33	3.5	SAME AS SS-2						25		A-7-6 (VISUAL)	-	

DESIGN AGENCY  
  
2800 CORPORATE EXCHANGE DR., SUITE 240 COLUMBUS, OH, 43231  
TEL: 614.714.0299 WWW.NEASINC.COM

DESIGNER: AI  
REVIEWER: BPA 02-11-21  
PROJECT ID: 109074  
SUBSET: 3 / 19  
SHEET: 152D / 153

**SOIL PROFILE**  
**SUMMARY OF SOIL TEST DATA**



5710 Westbourne Avenue  
 Columbus, OH 43213  
 614-892-0162

**Unconfined Compressive Strength of Cohesive Soil (ASTM D2166)**

(Project: DEL-42-2.29, Boring Location: B-033-0-20, ST-1, Depth: 9.3 - 9.8ft)

Tested Date: 12/1/2020

**Specimen Properties**

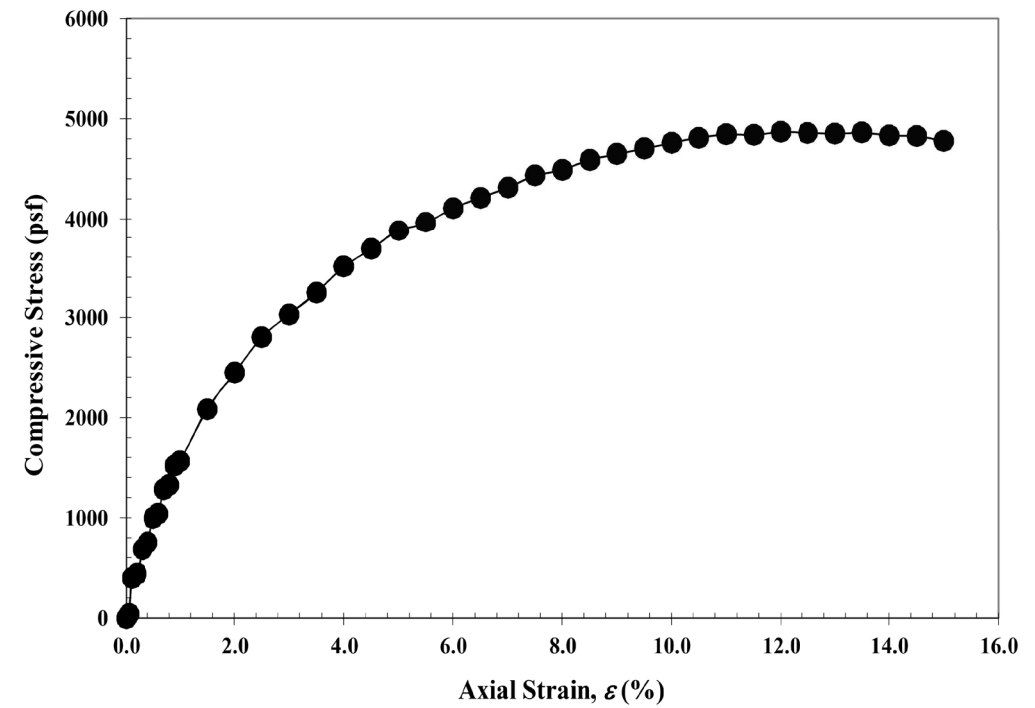
Average Dia., $D_{avg}$ (in):	2.87
Average Height $H_{avg}$ (in):	5.73
Area, $A$ (in <sup>2</sup> ):	6.46
Volume, $V$ (in <sup>3</sup> ):	36.99
Wet Mass of Specimen (lb):	2.9
Moisture Content (%):	16.8
Dry Mass of Specimen (lb):	2.5
Wet Unit Weight, $\gamma$ (lb/ft <sup>3</sup> ):	137.7
Dry Unit Weight, $\gamma_d$ (lb/ft <sup>3</sup> ):	117.9

**Final Specimen Figure**



**Results**

Unconfined Compressive Strength (psf):	<b>4868</b>
Strain (%):	<b>12.0</b>



**Notes:** Very stiff, brown, SILT AND CLAY, some sand, trace gravel, damp.



2800 CORPORATE EXCHANGE DR. SUITE 240 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
 WWW.NEASINC.COM

DESIGNER	AI
REVIEWER	BPA 02-11-21
PROJECT ID	109074
SUBSET	TOTAL
4	19
SHEET	TOTAL
152E	153

**Unconsolidated-Undrained  
Triaxial Compression Test on Cohesive Soils  
(Quick Undrained)**



<b>Client</b>	JMT Inc	<b>Lab Ref</b>	ST-1 A 111620165147 2.ini
<b>Project</b>	UNI-DEL-42-2.29	<b>Job</b>	UNI-DEL-42_109074
<b>Borehole</b>	B-039-0-20	<b>Sample</b>	ST-1

**Test & Sample Details**

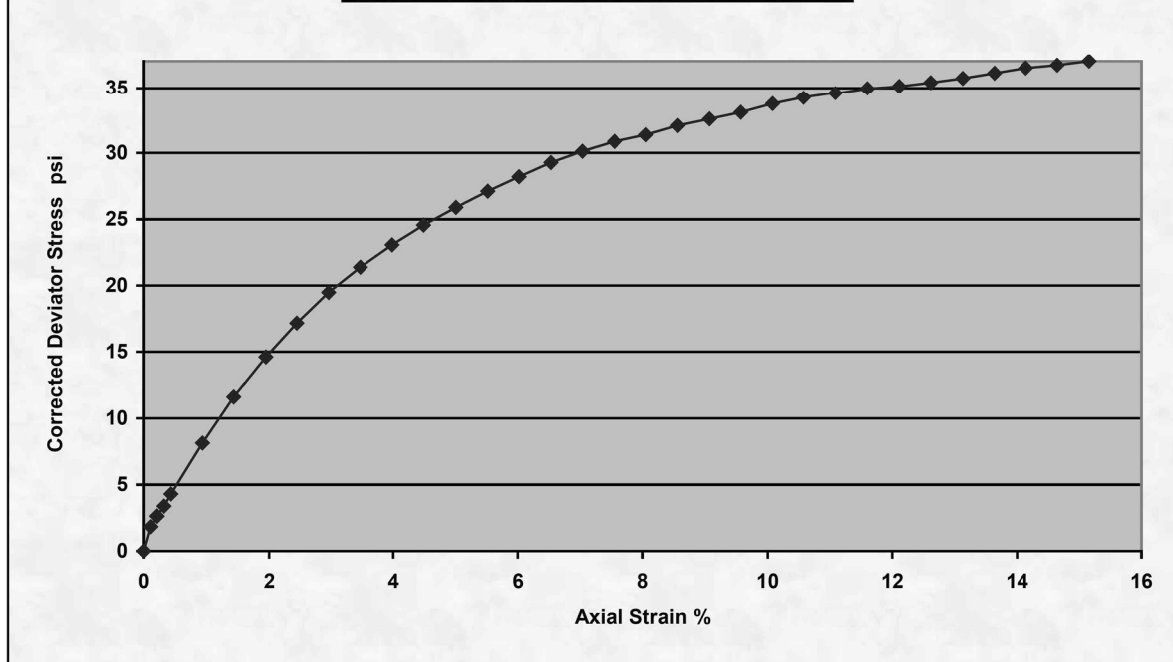
<b>Standard</b>	ASTM D2850 / AASHTO T296	<b>Sample Depth</b>	8.50 ft
<b>Sample Type</b>	Thin walled push in sample (undisturbed)	<b>Sp. Gravity of Solids</b>	2.67
<b>Sample Description</b>	VERY STIFF, BROWN MOTTLED WITH DARK BROWN AND GRAY, <b>SILTY CLAY</b> , LITTLE SAND, TRACE GRAVEL, CONTAINS TRACE IRON STAINING, MOIST	<b>Lab. Temperature</b>	71.1 °F
<b>Variations from Procedure</b>	None		

**Specimen Details**

<b>Specimen Reference</b>	A	<b>Description</b>	A-6b (consistent with sample description)
<b>Initial Height</b>	5.7480 in	<b>Depth within Sample</b>	11.9000 in
<b>Initial Diameter</b>	2.8676 in	<b>Depth of Specimen</b>	9.4-9.9 ft
<b>Initial Dry Unit Weight</b>	108.90 lbf/ft3	<b>Preparation</b>	Intact
<b>Initial Moisture Content*</b>	20.35 % (trimmings: 20.31 %)	<b>Degree of Saturation</b>	102.28%
<b>Void Ratio</b>	0.53		
<b>Comments</b>	LL=36; PL=18; PI=18; Observation after compression: contains trace gravel exceeding 1/6 of specimen diameter (see photo).		

\* Calculated from initial and dry weights of whole specimen

**Shearing Stage (Stress Vs Axial Strain %)**



**Unconsolidated-Undrained  
Triaxial Compression Test on Cohesive Soils  
(Quick Undrained)**



<b>Client</b>	JMT Inc	<b>Lab Ref</b>	ST-1 A 111620165147 2.ini
<b>Project</b>	UNI-DEL-42-2.29	<b>Job</b>	UNI-DEL-42_109074
<b>Borehole</b>	B-039-0-20	<b>Sample</b>	ST-1

**Shear Conditions**

<b>Rate of Axial Strain</b>	1.00%/min	<b>Cell Pressure</b>	8.60psi
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**Conditions at Failure**

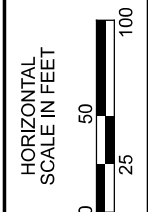
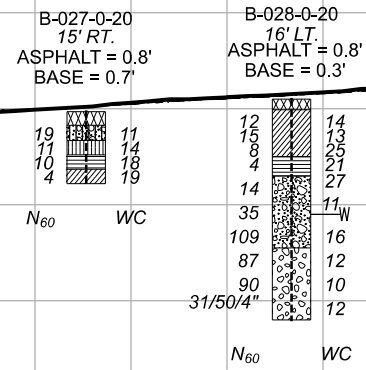
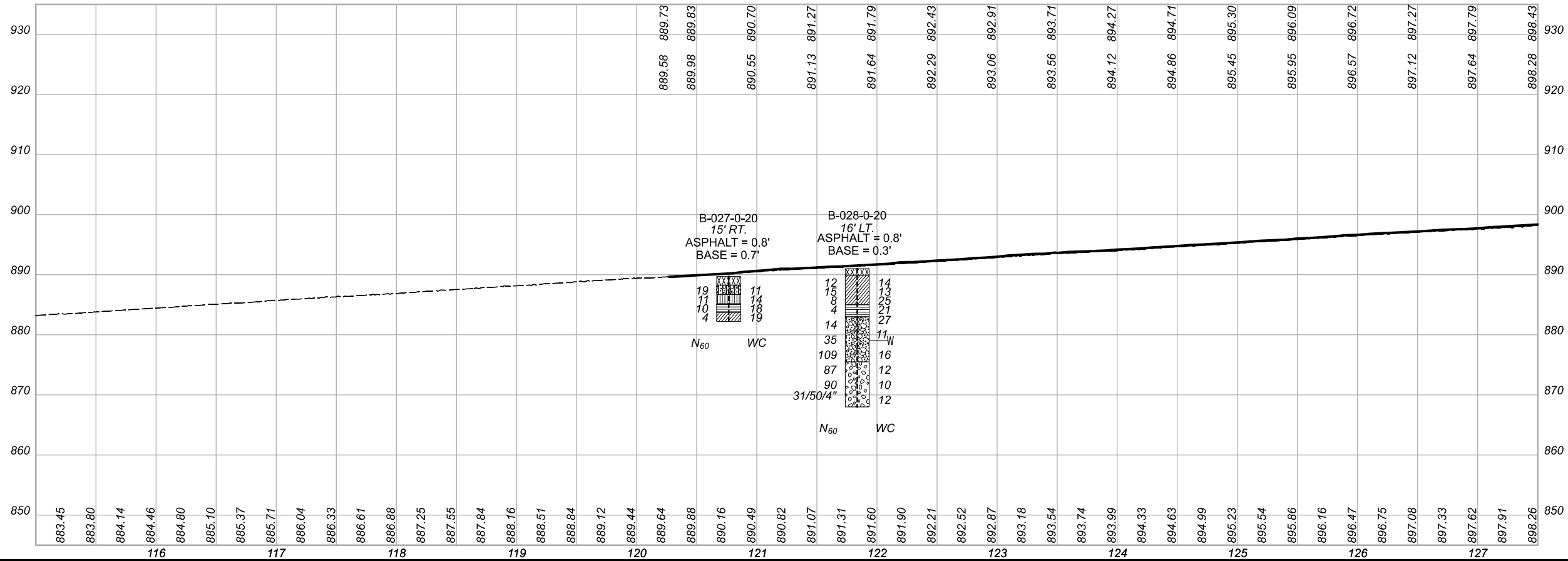
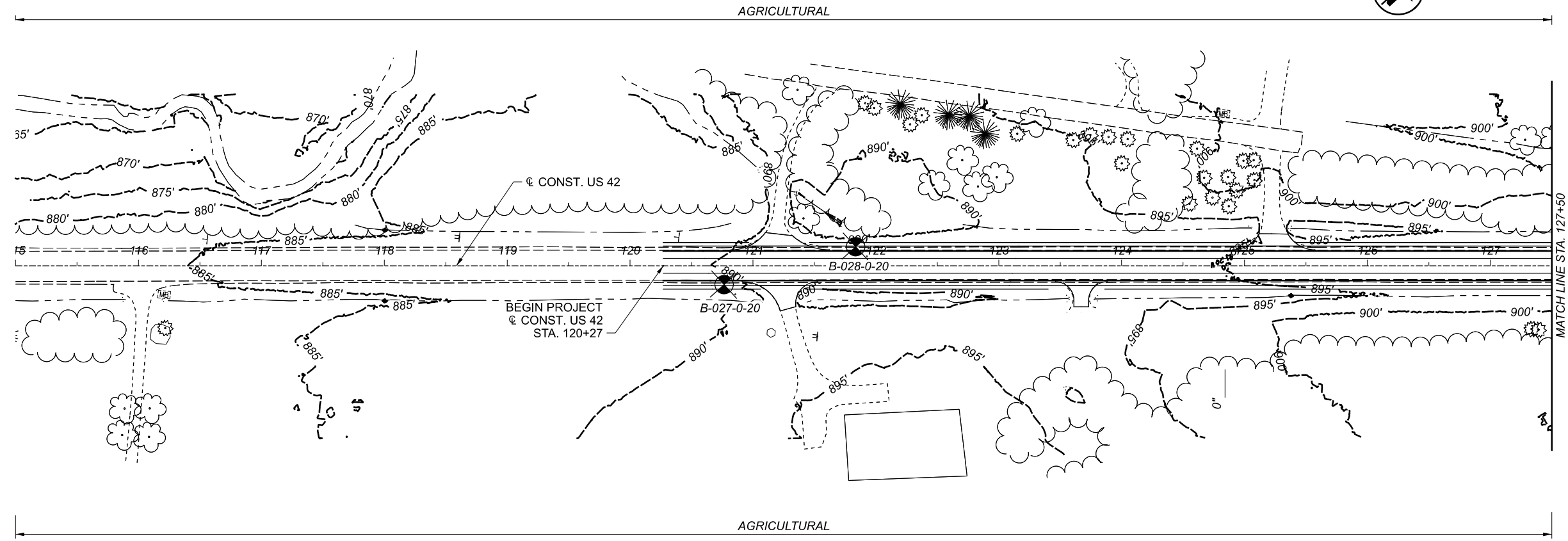
<b>Failure Criterion</b>	Maximum Deviator Stress		
<b>Compressive Strength</b>	37.05 psi	<b>Major Principal Stress</b>	45.65 psi
<b>Axial Strain</b>	15.16%	<b>Minor Principal Stress</b>	8.60 psi
<b>Deviator Stress Correction Applied</b>	0.515psi	<b>Final Moisture Content</b>	20.31 %
<b>Final Unit Weight</b>	131.02 lbf/ft3		

**Mode of Failure**



Note presence of trace gravel exceeding 1/6 of specimen diameter

Tested By and Date: P. Johnson 11/16/2020



**SOIL PROFILE**  
 STA. 115+00 TO 127+50.01 US 42

DESIGN AGENCY  
**NEAS**  
 2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
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DESIGNER  
 AI

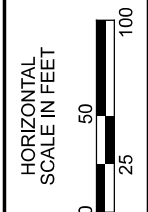
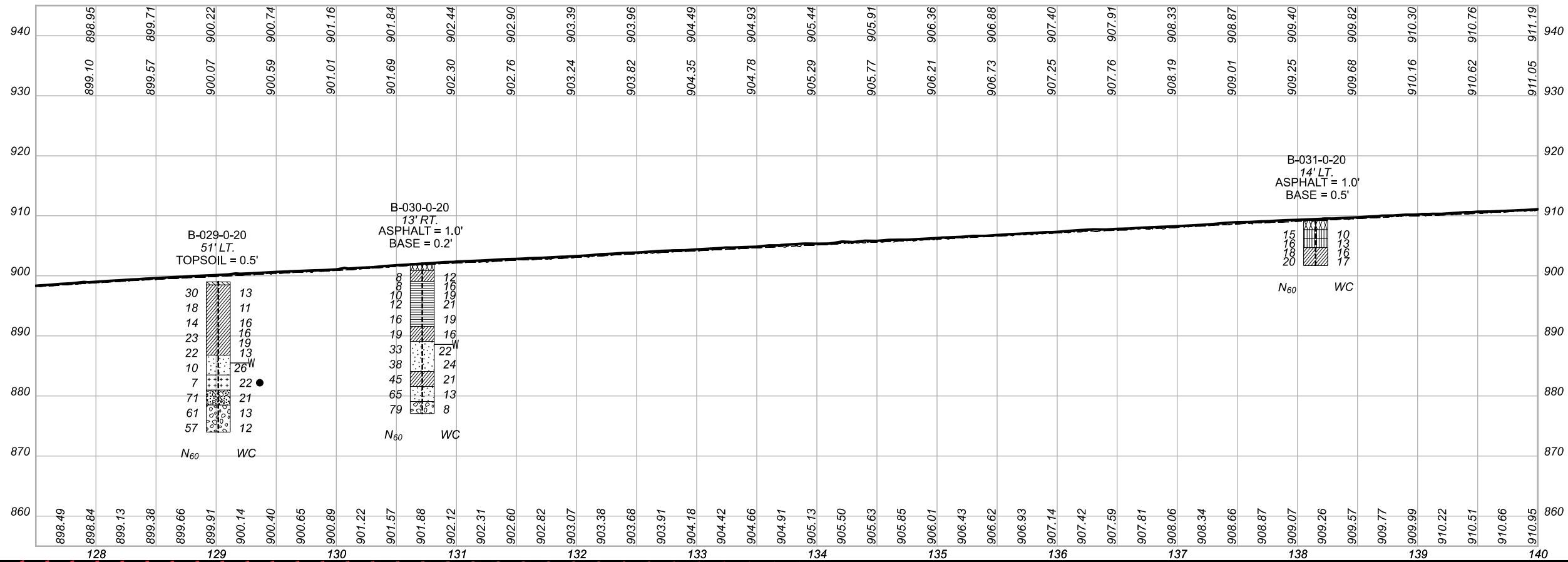
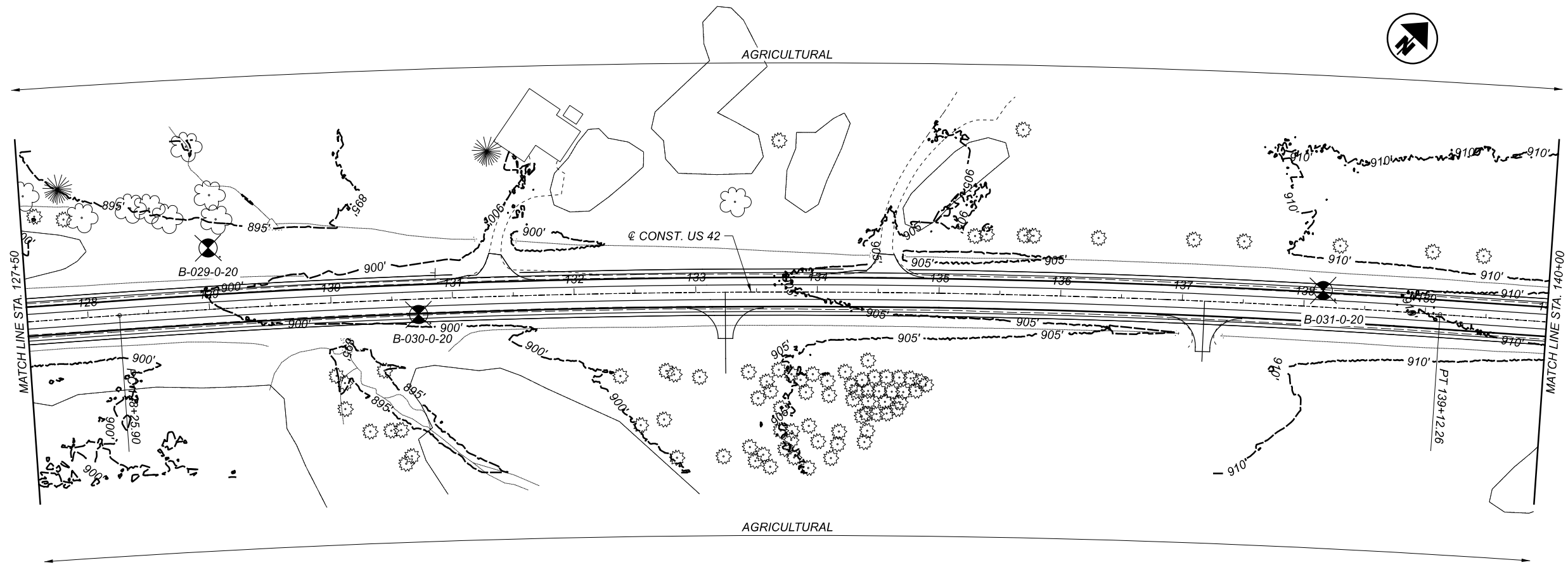
REVIEWER  
 BPA 02-11-21

PROJECT ID  
 109074

SUBSET	TOTAL
6	19

SHEET	TOTAL
152G	153





**SOIL PROFILE**  
 STA. 127+50 TO STA. 140+00 US 42

DESIGN AGENCY  
**NEAS**  
 NEAS Engineering & Architectural Services, Inc.  
 2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
 WWW.NEASINC.COM

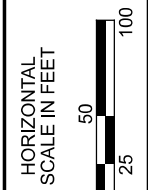
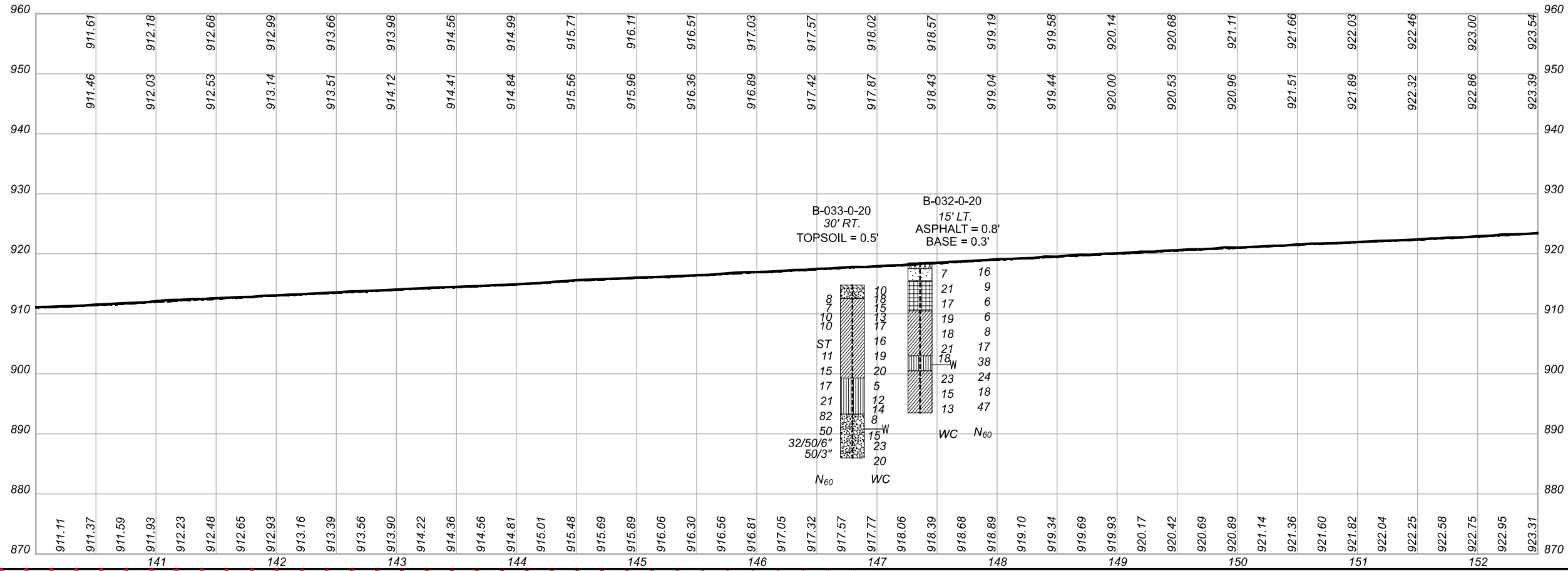
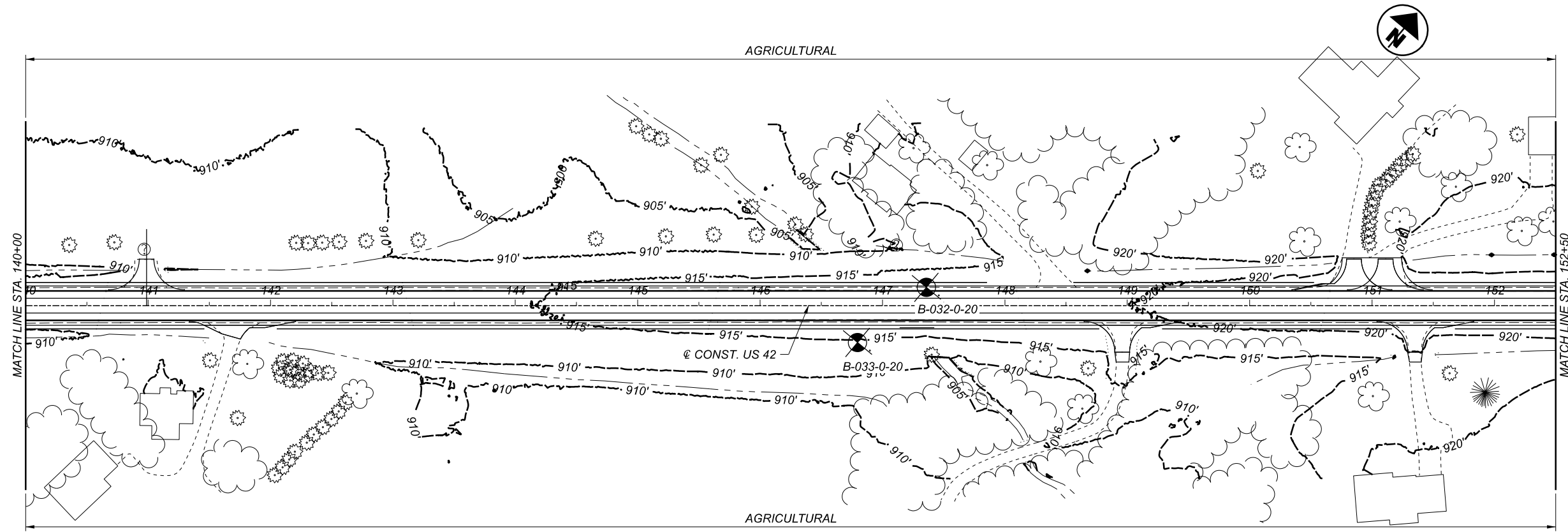
DESIGNER  
**AI**

REVIEWER  
**BPA 02-11-21**

PROJECT ID  
**109074**

SUBSET	TOTAL
7	19

SHEET	TOTAL
152H	153



SOIL PROFILE  
 STA. 140+00 TO STA. 152+50 US 42

DESIGN AGENCY  
**NEAS**  
 NEAS Engineering & Architectural Services Inc.  
 2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
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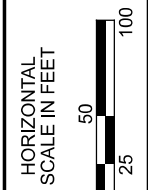
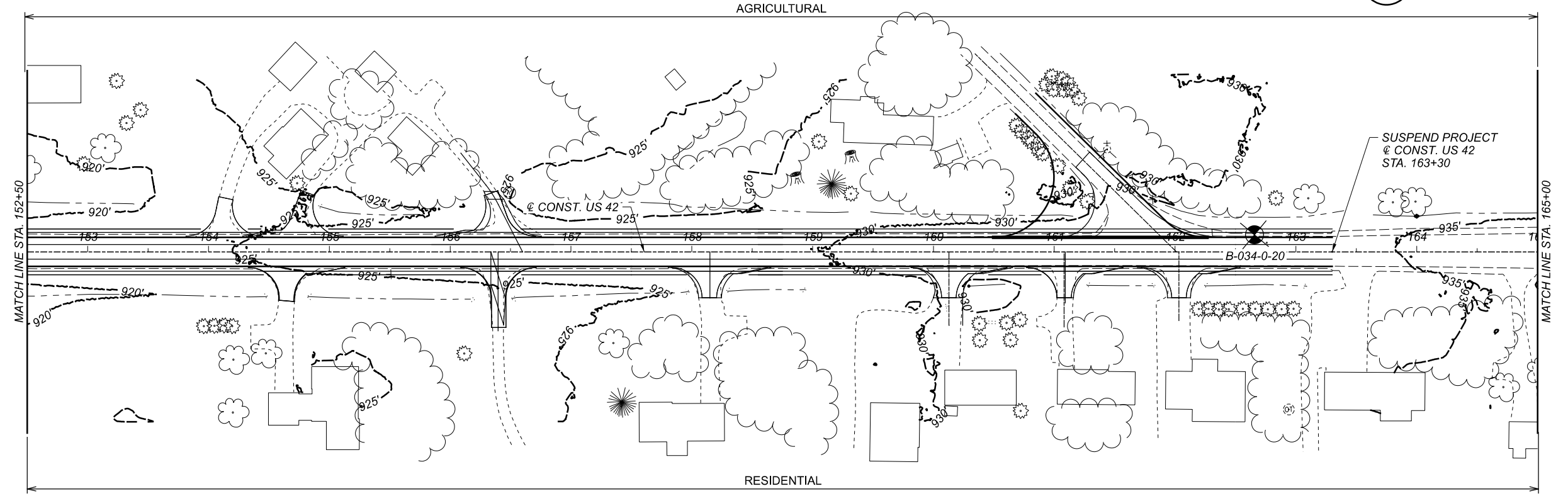
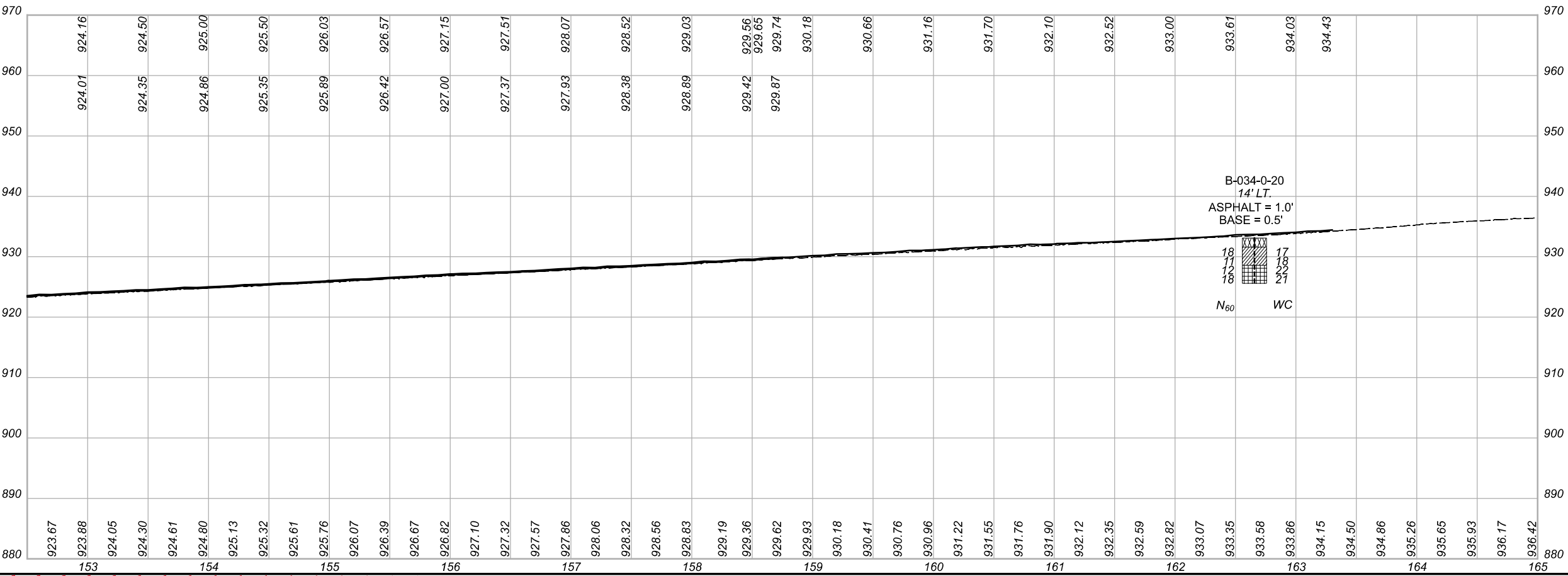
DESIGNER  
 AI

REVIEWER  
 BPA 02-11-21

PROJECT ID  
 109074

SUBSET	TOTAL
8	19

SHEET	TOTAL
1521	153



SOIL PROFILE  
 STA. 152+50 TO STA. 165+00 US 42

DESIGN AGENCY  
**NEAS**  
 NEAS Engineering & Architectural Services, Inc.  
 2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
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DESIGNER  
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REVIEWER  
 BPA 02-11-21

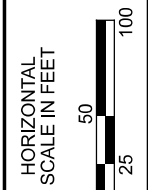
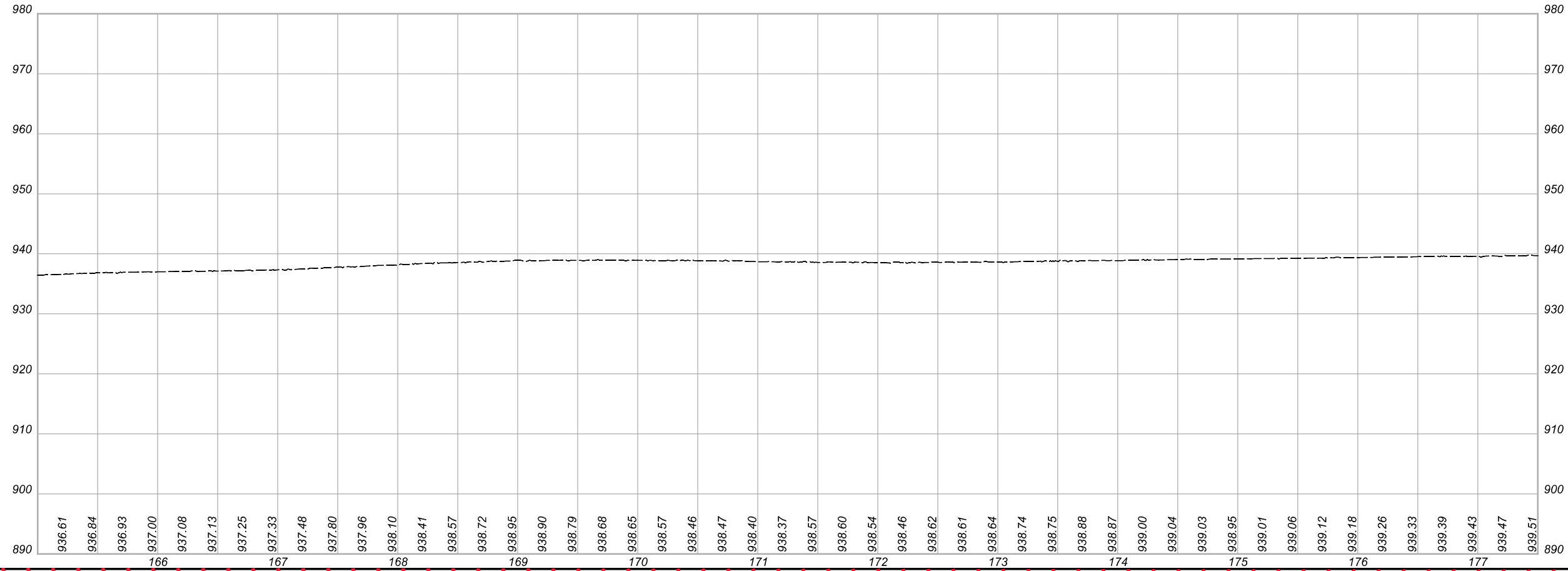
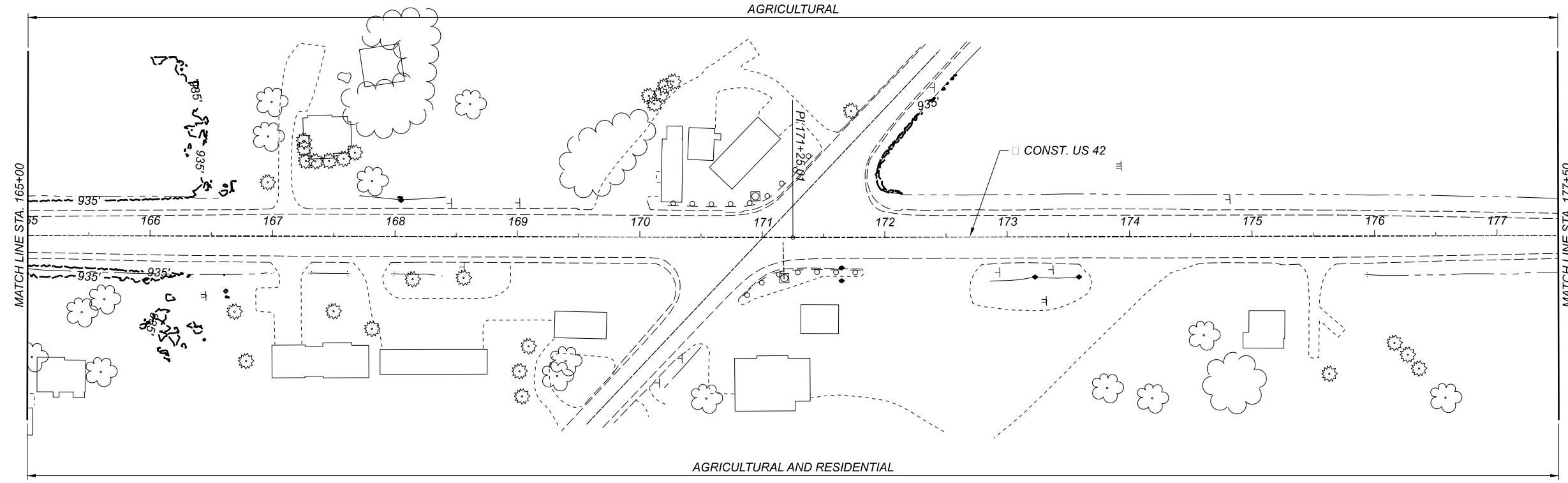
PROJECT ID  
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SUBSET	TOTAL
9	19

SHEET	TOTAL
152J	153

DEL-42-2.29

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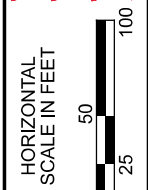
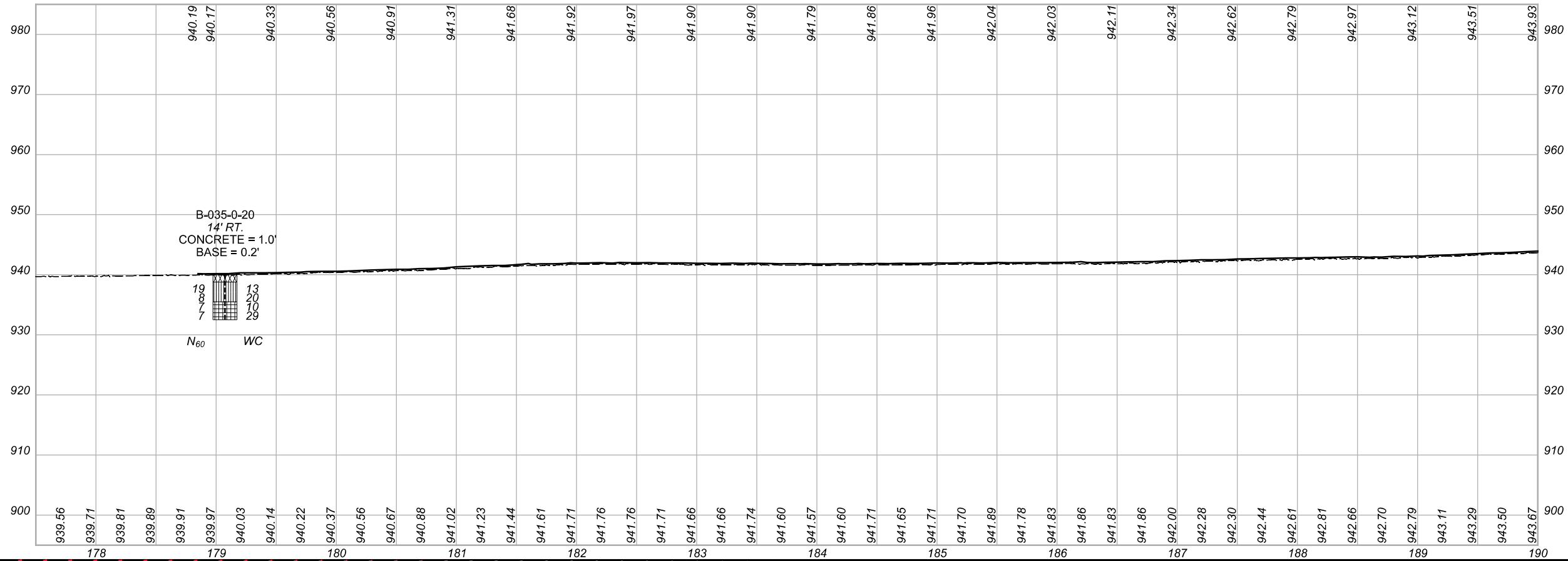
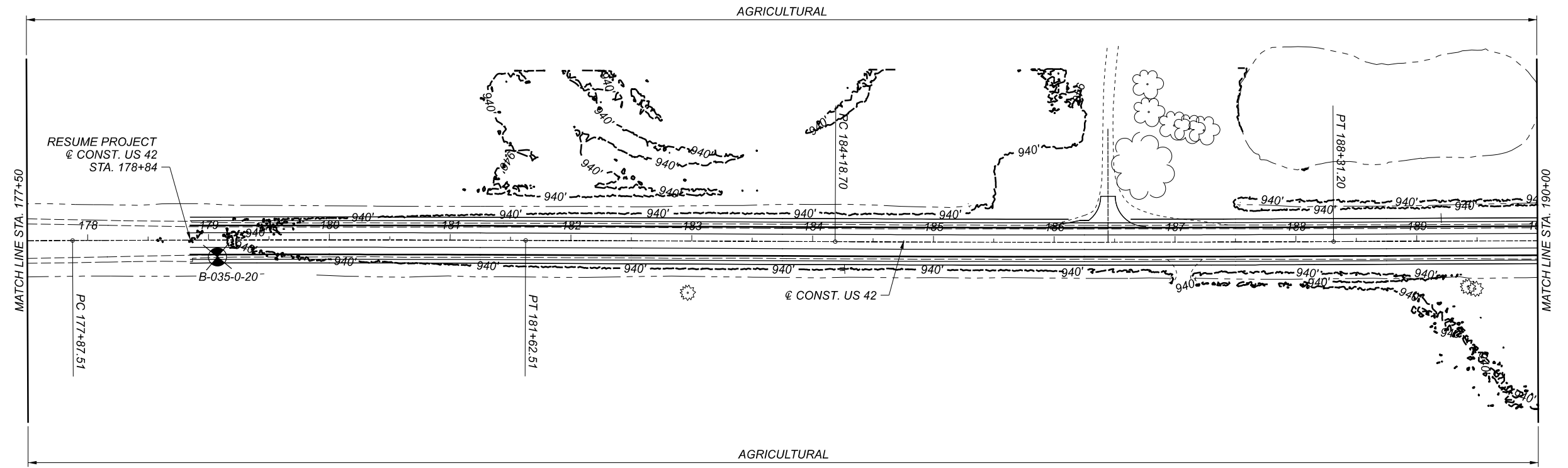


**SOIL PROFILE**  
**STA. 165+00 TO STA. 177+50 US 42**

DESIGN AGENCY  
**NEAS**  
 NEAS Engineering & Architectural Services, Inc.

2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
 WWW.NEASINC.COM

DESIGNER	AI
REVIEWER	BPA 02-11-21
PROJECT ID	109074
SUBSET	TOTAL
10	19
SHEET	TOTAL
152K	153

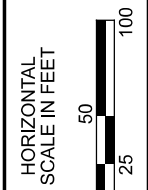
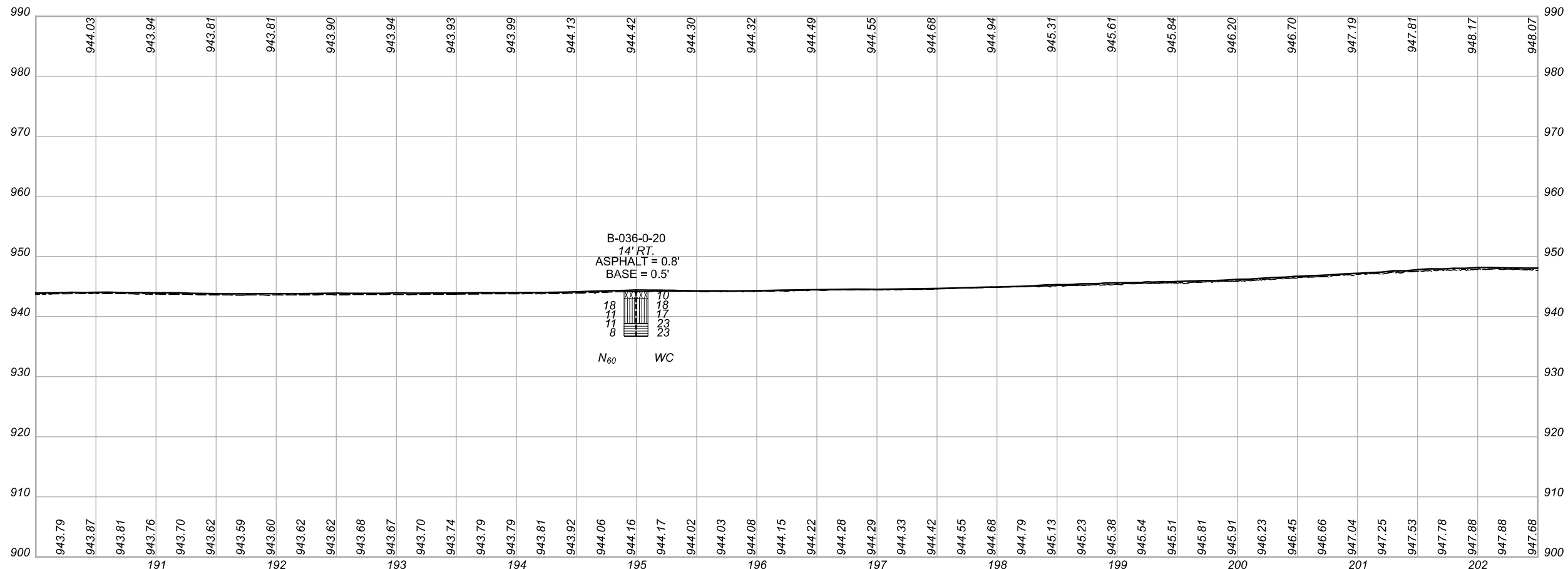
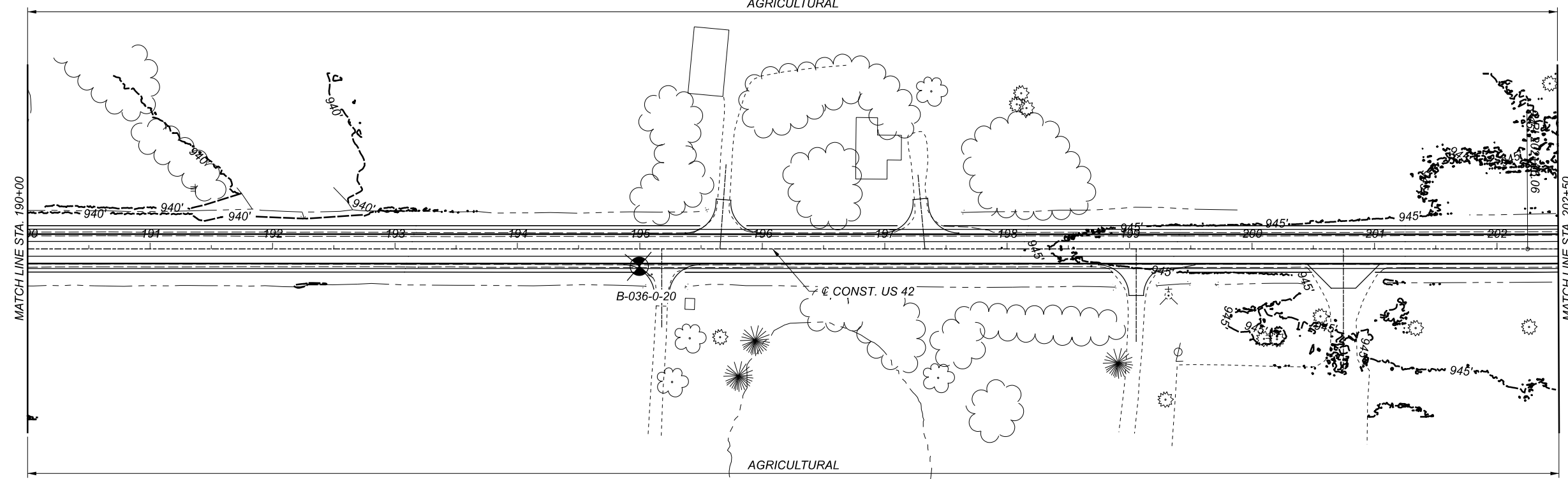


SOIL PROFILE  
 STA. 177+50 TO STA. 190+00 US 42



DESIGN AGENCY  
 2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
 WWW.NEASINC.COM

DESIGNER	AI
REVIEWER	BPA 02-11-21
PROJECT ID	109074
SUBSET	TOTAL
11	19
SHEET	TOTAL
152L	153



SOIL PROFILE  
 STA. 190+00 TO STA. 202+50 US 42

DESIGN AGENCY  
**NEAS**  
 NEAS Engineering & Architectural Services Inc.  
 2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
 WWW.NEASINC.COM

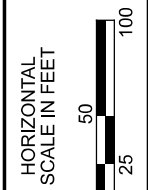
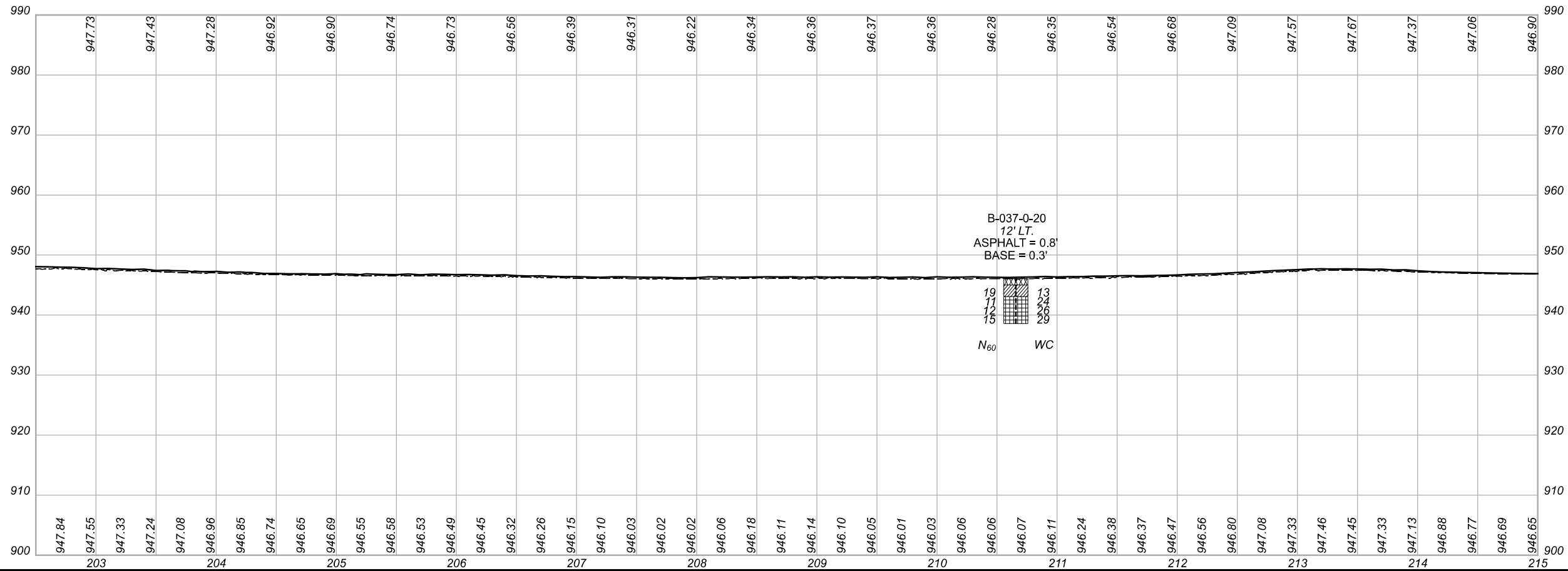
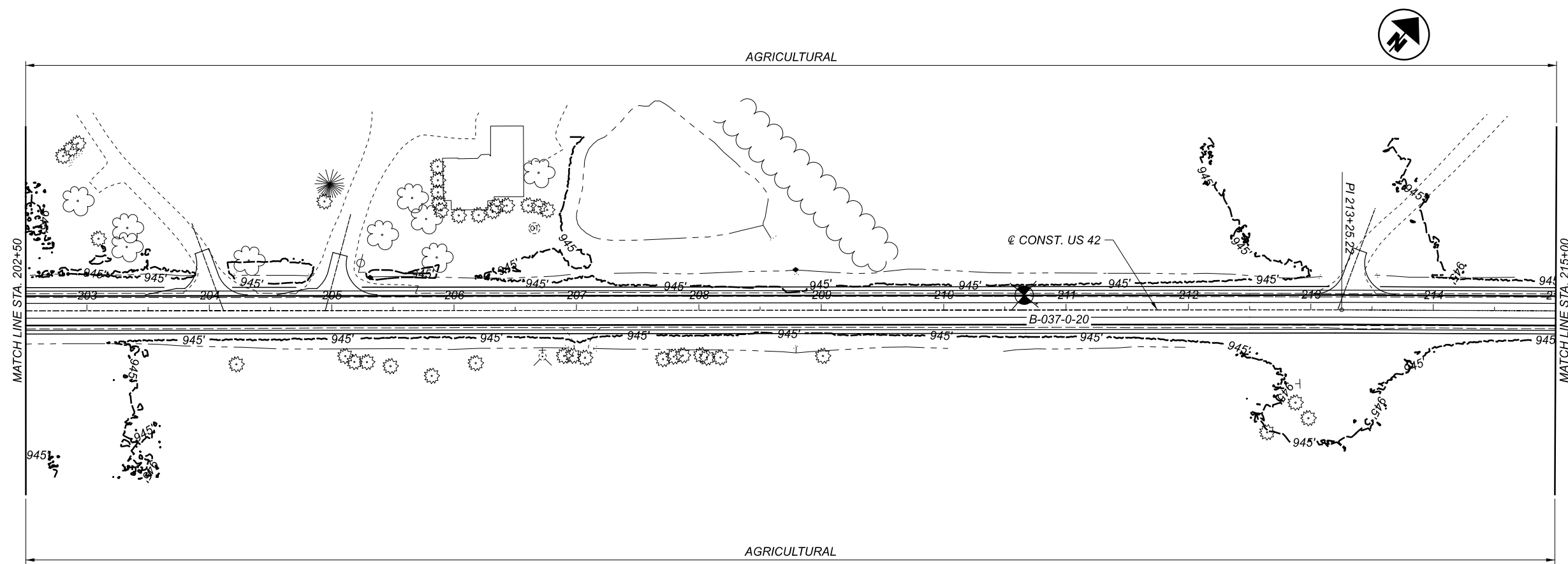
DESIGNER  
 AI

REVIEWER  
 BPA 02-11-21

PROJECT ID  
 109074

SUBSET	TOTAL
12	19

SHEET	TOTAL
152M	153



SOIL PROFILE  
 STA. 202+50 TO 215+00 US 42

DESIGN AGENCY  
**NEAS**  
 NEAS Engineering & Architectural Services Inc.  
 2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
 WWW.NEASINC.COM

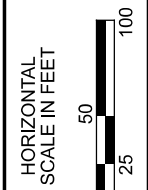
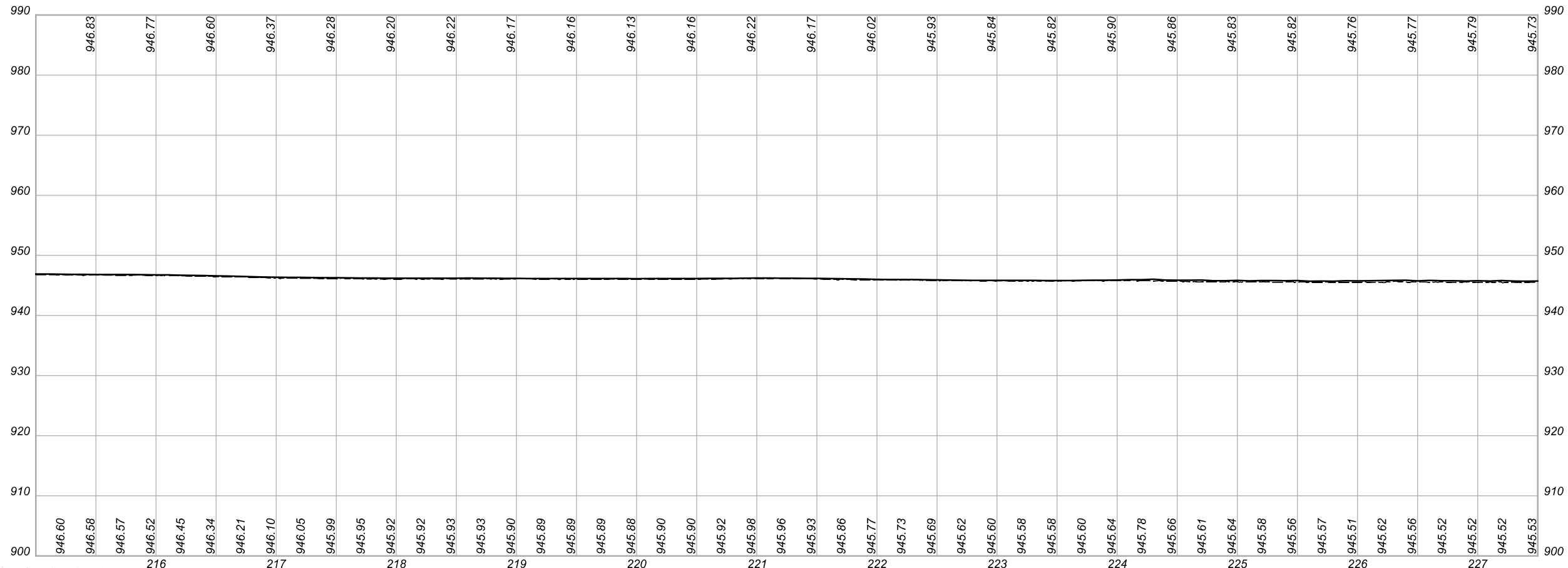
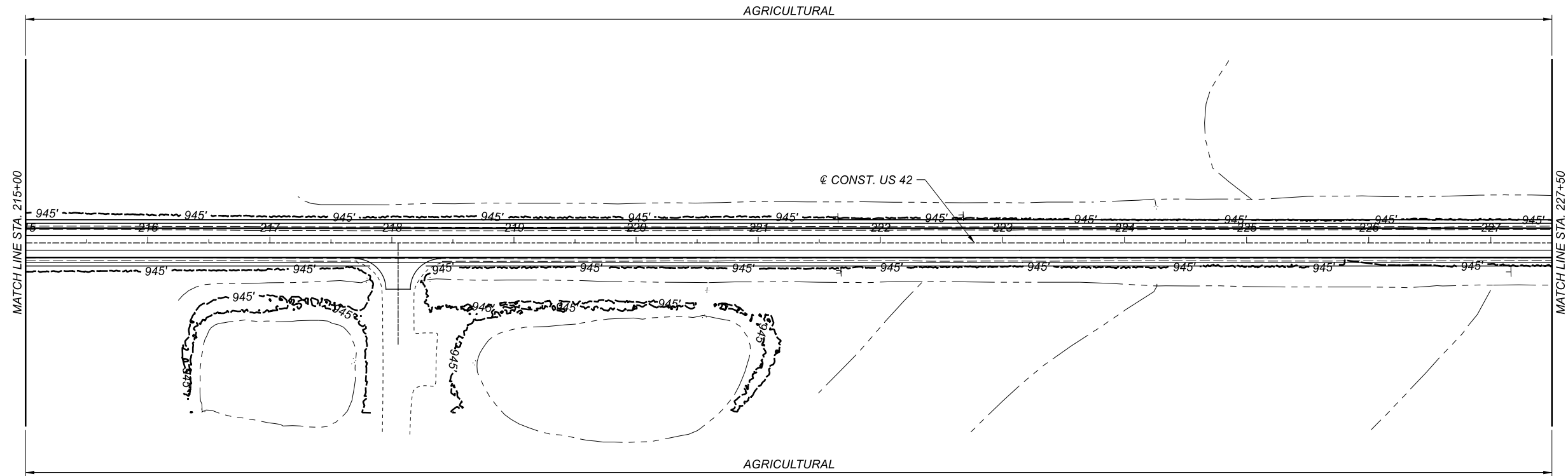
DESIGNER  
 AI

REVIEWER  
 BPA 02-11-21

PROJECT ID  
 109074

SUBSET	TOTAL
13	19

SHEET	TOTAL
152N	153



SOIL PROFILE  
 STA. 215+00 TO STA. 227+50 US 42

DESIGN AGENCY  
**NEAS**  
 NEAS Engineering & Architectural Services Inc.  
 2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
 WWW.NEASINC.COM

DESIGNER  
 AI

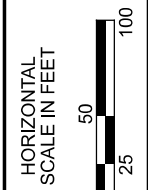
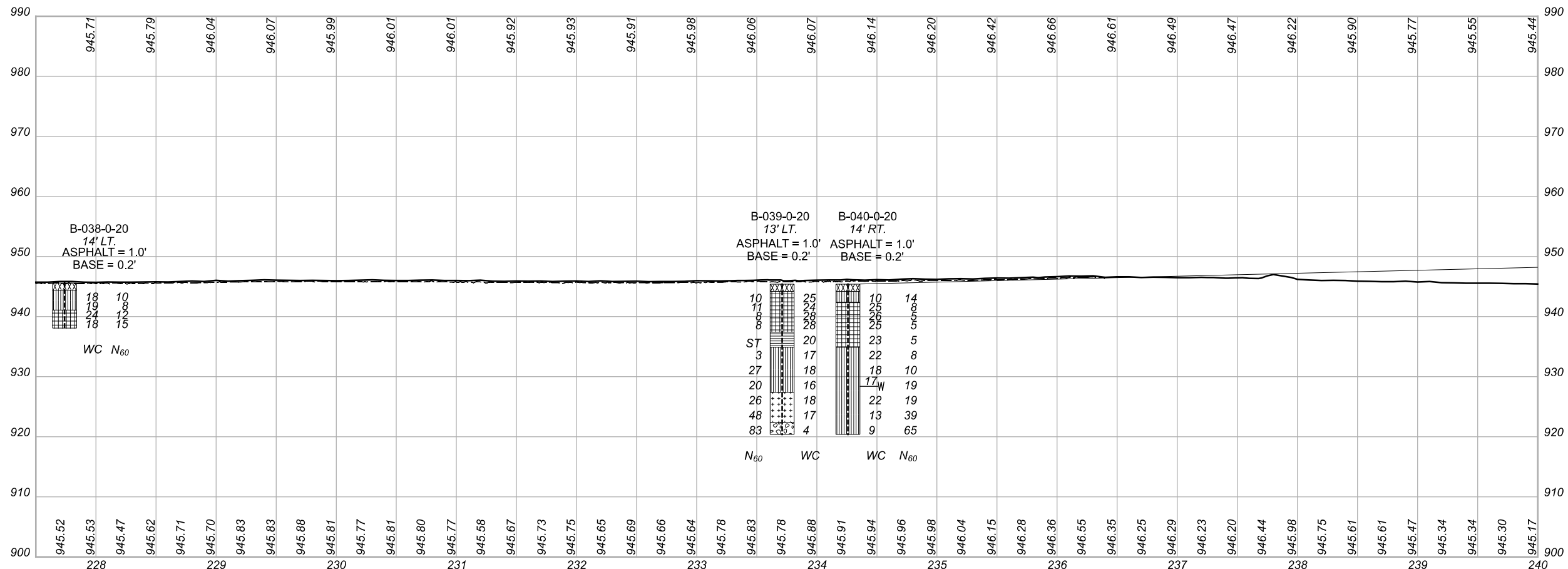
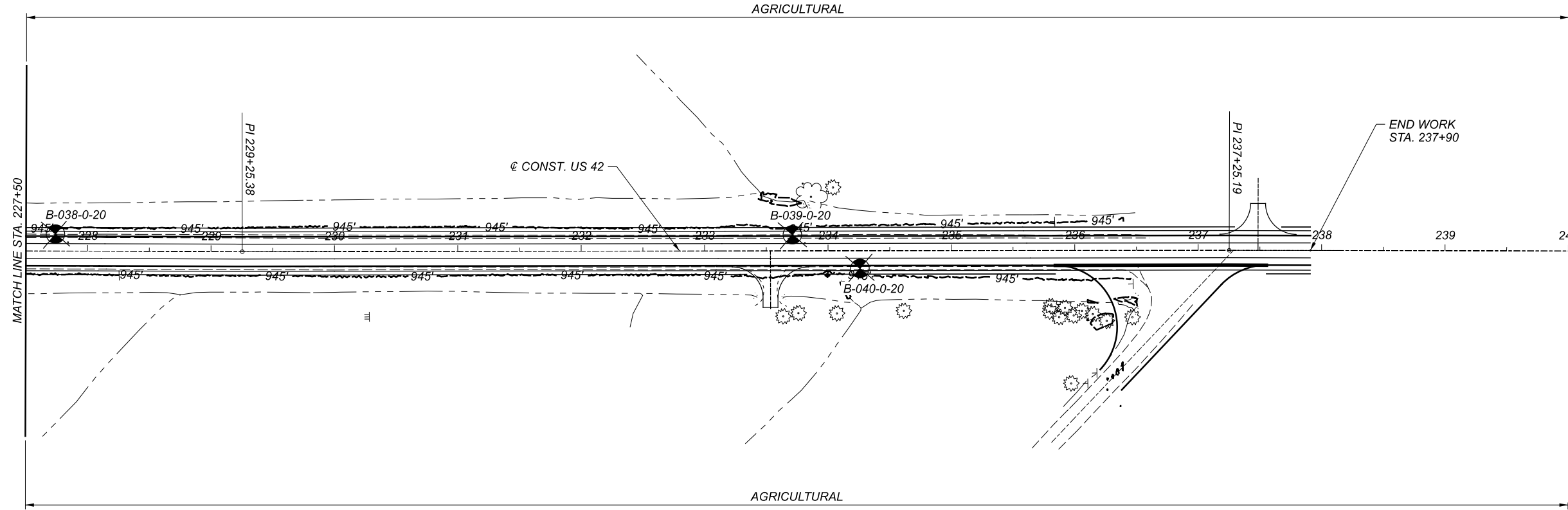
REVIEWER  
 BPA 02-11-21

PROJECT ID  
 109074

SUBSET	TOTAL
14	19

SHEET	TOTAL
1520	153





SOIL PROFILE  
 STA. 227+50 TO STA. 231+00 US 42

DESIGN AGENCY  
**NEAS**  
 NEAS Engineering & Architectural Services Inc.  
 2800 CORPORATE EXCHANGE DR.  
 SUITE 240  
 COLUMBUS, OH, 43231  
 TEL: 614.714.0299  
 WWW.NEASINC.COM

DESIGNER  
 AI

REVIEWER  
 BPA 02-11-21

PROJECT ID  
 109074

SUBSET	TOTAL
15	19

SHEET	TOTAL
152P	153

PROJECT: DEL-42-2-29 TYPE: CULVERT	DRILLING FIRM / OPERATOR: NEAS / R. WEBB	STATION / OFFSET: 121+84, 16' L.T.	EXPLOSION ID: B-028-0-20
PID: 109074	NEAS / R. WEBB	ELEVATION: 891.0 (MSL)	23.0 ft.
START: 11/3/20	LOGGERS: 3.25" HSA	LAT / LONG: 40.247549, -83.143301	1 OF 1
END: 11/3/20	SPT	GRADATION (%)	ODOT CLASS (GI)
MATERIAL DESCRIPTION AND NOTES	DEPTHS	GR CS FS SI CL LL PL WC	BACK FILL
10.0" ASPHALT AND 3.0" BASE (DRILLERS DESCRIPTION)	1		
STIFF TO HARD, BROWN AND BROWNISH GRAY, SILT AND CLAY, SOME SAND, LITTLE GRAVEL, DAMP TO MOIST	2		
	3		
	4		
VERY STIFF, BROWN MOTTLED WITH GRAY AND ORANGISH BROWN, SILTY CLAY, SOME SAND, LITTLE GRAVEL, CONTAINS TRACE IRON STAINING, MOIST	5		
	6		
	7		
MEDIUM DENSE TO VERY DENSE, ORANGISH BROWN, STONE FRAGMENTS WITH SAND, LITTLE SILT, TRACE CLAY, CONTAINS IRON STAINING, MOIST TO WET	8		
	9		
	10		
VERY DENSE, ORANGISH BROWN AND GRAY, STONE FRAGMENTS, SOME SAND, TRACE SILT, TRACE CLAY, CONTAINS IRON STAINING, MOIST TO WET	11		
	12		
	13		
VERY DENSE, ORANGISH BROWN AND GRAY, STONE FRAGMENTS, SOME SAND, TRACE SILT, TRACE CLAY, CONTAINS IRON STAINING, MOIST TO WET	14		
	15		
	16		
VERY DENSE, ORANGISH BROWN AND GRAY, STONE FRAGMENTS, SOME SAND, TRACE SILT, TRACE CLAY, CONTAINS IRON STAINING, MOIST TO WET	17		
	18		
	19		
VERY DENSE, ORANGISH BROWN AND GRAY, STONE FRAGMENTS, SOME SAND, TRACE SILT, TRACE CLAY, CONTAINS IRON STAINING, MOIST TO WET	20		
	21		
	22		
VERY DENSE, ORANGISH BROWN AND GRAY, STONE FRAGMENTS, SOME SAND, TRACE SILT, TRACE CLAY, CONTAINS IRON STAINING, MOIST TO WET	23		
	24		
	25		

STANDARD ODOT SOIL BORING LOG (8.5 X 11) - OH DOT GDT - 2/11/21 12:00 - C:\USERS\KARENS\DESKTOP\UN-DEL-42-4-92 (DEL-42-2-29).GP1

PROJECT: DEL-42-2-29 TYPE: CULVERT	DRILLING FIRM / OPERATOR: NEAS / R. WEBB	STATION / OFFSET: 129+02, 51' L.T.	EXPLOSION ID: B-029-0-20
PID: 109074	NEAS / R. WEBB	ELEVATION: 899.0 (MSL)	25.0 ft.
START: 11/3/20	LOGGERS: 3.25" HSA	LAT / LONG: 40.249082, -83.141677	1 OF 1
END: 11/3/20	SPT	GRADATION (%)	ODOT CLASS (GI)
MATERIAL DESCRIPTION AND NOTES	DEPTHS	GR CS FS SI CL LL PL WC	BACK FILL
6.0" TOPSOIL (DRILLERS DESCRIPTION)	1		
VERY STIFF TO HARD, BROWN BECOMING GRAY, SILT AND CLAY, LITTLE TO SOME SAND, TRACE GRAVEL, SS-3 CONTAINS IRON STAINING, DAMP	2		
	3		
	4		
LOOSE TO MEDIUM DENSE, GRAY, COARSE AND FINE SAND, TRACE GRAVEL, TRACE SILT, TRACE CLAY, MOIST TO WET	5		
	6		
	7		
SOFT, GRAY, SILT, SOME CLAY, TRACE SAND, TRACE GRAVEL, MOIST	8		
	9		
	10		
VERY DENSE, GRAY, GRAVEL WITH SAND, LITTLE SILT, TRACE CLAY, WET	11		
	12		
	13		
VERY DENSE, GRAY AND BROWN, STONE FRAGMENTS, SOME SAND, TRACE SILT, TRACE CLAY, MOIST	14		
	15		
	16		
VERY DENSE, GRAY, GRAVEL WITH SAND, LITTLE SILT, TRACE CLAY, WET	17		
	18		
	19		
VERY DENSE, GRAY AND BROWN, STONE FRAGMENTS, SOME SAND, TRACE SILT, TRACE CLAY, MOIST	20		
	21		
	22		
VERY DENSE, GRAY AND BROWN, STONE FRAGMENTS, SOME SAND, TRACE SILT, TRACE CLAY, MOIST	23		
	24		
	25		

NOTES: GROUNDWATER ENCOUNTERED AT 13.5' DURING DRILLING. HOLE CAVE-IN AT 15.0'.  
ABANDONMENT METHODS, MATERIALS, QUANTITIES: SHOVELED SOIL CUTTINGS

DESIGN AGENCY  
**NEAS**  
 2800 CORPORATE EXCHANGE DR., SUITE 240  
 COLUMBUS, 43231  
 TEL: 614.714.0299  
 WWW.NEASINC.COM

DESIGNER: AI  
 REVIEWER: BPA 02-11-21  
 PROJECT ID: 109074  
 SUBSET TOTAL: 16 19  
 SHEET TOTAL: 152Q 153

CULVERT  
BORING LOGS B-028-0-20 AND B-029-0-20

PROJECT:	DEL-42-2.29	DRILLING FIRM / OPERATOR:	NEAS / R. WEBB	STATION / OFFSET:	130+72, 13' RT.	EXPLORATION ID	B-030-0-20						
TYPE:	CULVERT	SAMPLING FIRM / LOGGER:	NEAS / R. WEBB	ALIGNMENT:	US-42	HAMMER:	CME 45B						
PID:	109074	DRILLING METHOD:	3.25" HSA	ELEVATION:	902.1 (MSL)	ENERGY RATIO (%)	81.7						
START:	11/3/20	SAMPLING METHOD:	SPT	LAT / LONG:	40.249305, -83.141095	RECALIBRATION DATE:	12/5/19						
END:	11/3/20	ELEV.	902.1	DEPTH:		REC SAMPLE ID							
MATERIAL DESCRIPTION AND NOTES		SPT/ROD	N <sub>60</sub>	GRADATION (%)	GR	CS	FS	SI	CL	LL	PL	WC	BACK FILL
<b>12.0" ASPHALT AND 2.0" BASE (DRILLERS DESCRIPTION)</b>		1											
VERY STIFF, BROWN, SILT AND CLAY, SOME GRAVEL AND STONE FRAGMENTS, SOME SAND, DAMP		2	5										
VERY STIFF, BROWN AND GRAY, SILTY CLAY, SOME SAND, TRACE TO LITTLE GRAVEL, CONTAINS TRACE IRON STAINING, DAMP TO MOIST		3	3										
		4	2										
		5	4										
		6	3										
		7	4										
		8	5										
HARD, BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, MOIST		9	7										
		10	16										
		11	4										
		12	7										
		13	7										
DENSE GRAY, COARSE AND FINE SAND, TRACE GRAVEL, TRACE SILT, TRACE CLAY, WET		14	8										
		15	12										
		16	10										
		17	14										
		18	14										
STIFF, GRAY, SILT AND CLAY, TRACE SAND, TRACE GRAVEL, MOIST		19	15										
		20	18										
		21	45										
VERY DENSE, GRAY, COARSE AND FINE SAND, LITTLE GRAVEL, TRACE SILT, TRACE CLAY, MOIST		22	20										
		23	26										
		24	21										
		25	28										
		30	79										

NOTES: GROUNDWATER ENCOUNTERED AT 13.5 DURING DRILLING. HOLE CAVE-IN AT 15.0'

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH, SHOVELED SOIL CUTTINGS

PROJECT:	DEL-42-2.29	DRILLING FIRM / OPERATOR:	NEAS / R. WEBB	STATION / OFFSET:	147+36, 15' LT.	EXPLORATION ID	B-032-0-20						
TYPE:	CULVERT	SAMPLING FIRM / LOGGER:	NEAS / R. WEBB	ALIGNMENT:	US-42	HAMMER:	CME 55T						
PID:	109074	DRILLING METHOD:	3.25" HSA	ELEVATION:	918.5 (MSL)	ENERGY RATIO (%)	25.0						
START:	11/6/20	SAMPLING METHOD:	SPT	LAT / LONG:	40.252401, -83.136717	RECALIBRATION DATE:	12/5/19						
END:	11/6/20	ELEV.	918.5	DEPTH:		REC SAMPLE ID							
MATERIAL DESCRIPTION AND NOTES		SPT/ROD	N <sub>60</sub>	GRADATION (%)	GR	CS	FS	SI	CL	LL	PL	WC	BACK FILL
<b>8" ASPHALT AND 4" BASE (DRILLERS DESCRIPTION)</b>		1	8										
MEDIUM DENSE, BROWN, COARSE AND FINE SAND, SOME GRAVEL, SOME SILT, TRACE CLAY, CONTAINS TRACE IRON STAINING, DAMP		2	6										
VERY STIFF, BROWNISH GRAY, CLAY, "AND" SILT, LITTLE TO SOME SAND, TRACE GRAVEL, CONTAINS TRACE IRON STAINING, MOIST TO DAMP		3	9										
		4	3										
		5	5										
		6	2										
		7	3										
		8	6										
VERY STIFF, BROWN, SILT AND CLAY, SOME SAND, TRACE GRAVEL, CONTAINS TRACE IRON STAINING, DAMP TO MOIST		9	2										
		10	3										
		11	4										
		12	3										
		13	4										
		14	6										
		15	9										
		16	10										
		17	13										
		18	38										
SOFT TO VERY STIFF, BROWNISH GRAY BECOMING BROWN, SILT AND CLAY, LITTLE SAND, TRACE GRAVEL, CONTAINS TRACE IRON STAINING, MOIST TO DAMP		19	10										
		20	11										
		21	5										
		22	7										
		23	9										
		24	17										
		25	47										

NOTES: GROUNDWATER ENCOUNTERED AT 17.0' DURING DRILLING. HOLE DID NOT CAVE.

ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH, SHOVELED SOIL CUTTINGS

DESIGN AGENCY  
**NEAS**  
 Neas Engineering & Structural Services Inc.  
 2800 CORPORATE EXCHANGE DR., SUITE 240 COLUMBUS, 43231  
 TEL: 614.714.0299 WWW.NEASINC.COM

DESIGNER  
 AI

REVIEWER  
 BPA 02-11-21

PROJECT ID  
 109074

SUBSET	TOTAL
17	19

SHEET	TOTAL
152R	153

CULVERT  
 BORING LOGS B-030-0-20 AND B-032-0-20

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT GDT - 2/5/21 08-09 - X:\ACTIVE PROJECTS\ACTIVE SOIL PROJECTS\UN-DEL-42-4-92-00 (B-027 - R-040)\GINT FILES\UN-DEL-42-4-92 (1)

PROJECT: TYPE: PID: START:	DEL-42-2.29 CULVERT 109074 11/6/20	DRILLING FIRM / OPERATOR: SAMPLING FIRM / LOGGER: DRILLING METHOD: SAMPLING METHOD:	NEAS / R. WEBB NEAS / R. WEBB 3.25" HSA SPT	ELEV. 914.8 914.3 912.6	DEPTHS	DRILL RIG:		STATION / OFFSET:		EXPLOSION ID											
						CME 55T HAMMER: CALIBRATION DATE: ENERGY RATIO (%):	CME AUTOMATIC 12/5/19 68.4	146+80.30' RT. ALIGNMENT: ELEVATION: LAT / LONG:	US-42 914.8 (MSL) EOB: 40.252207, -83.136767	B-033-0-20 28.8 ft. 1 OF 1											
MATERIAL DESCRIPTION AND NOTES					SPT/ RQD	REC SAMPLE ID	HP (tsf)	GRADATION (%)				ODOT CLASS (GI)	BACK FILL								
					N <sub>60</sub>	(%)		GR	CS	FS	SI	CL	LL	PL	PI	WC					
6.0" TOPSOIL (DRILLERS DESCRIPTION) LOOSE, BROWN, GRAVEL WITH SAND, LITTLE SILT, TRACE CLAY, DAMP STIFF TO VERY STIFF, BROWN AND GRAY, SILT AND CLAY, SOME SAND, TRACE GRAVEL, DAMP TO MOIST  @9.3' TO 9.8'; Qu = 4868 PSF @ 12.0%  HARD, GRAY, SANDY SILT, LITTLE CLAY, LITTLE GRAVEL, DRY TO DAMP  DENSE TO VERY DENSE, BROWN, STONE FRAGMENTS WITH SAND, TRACE TO LITTLE SILT, TRACE CLAY, DAMP TO WET					1																
					2	4	8	33													
					3	2	7	44	2.75												
					4	2	4	44	2.75												
					5	2	4	44	2.25												
					6	3	4	67	2.00												
					7	4	5														
					8																
					9			63	4.00												
					10																
					11			72	3.75												
					12			4	11	72	3.75										
					13																
					14			4	15	50	4.00										
					15			6	7												
					16			4	17	78	4.50										
					17			5	7	28	4.25										
					18			7	21												
					19			11													
					20																
					21			30	82	56	4.25										
					22			33	39												
					23																
					24			17	21	50	89	58	17	7	14	4	NP	NP	NP	15	A-1-b(0)
					25			23													
					26			32	50												
					27																
					28			50/3"													
							100									20	A-1-b(V)				

NOTES: GROUNDWATER ENCOUNTERED AT 24.0' DURING DRILLING. HOLE DID NOT CAVE. BORING OFFSET 10.0' WEST.  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: SHOVELED SOIL CUTTINGS



2800 CORPORATE EXCHANGE DR, SUITE 240 COLUMBUS, 43231 TEL:614.714.0299 WWW.NEASINC.COM

DESIGNER	AI
REVIEWER	BPA 02-11-21
PROJECT ID	109074
SUBSET	TOTAL
18	19
SHEET	TOTAL
152S	153

CULVERT BORING LOGS B-033-0-20

**DEL-42-2.29**

MODEL: Sheet PAPER: 2/12/2021 12:00 - C:\Users\KARENS\Desktop\DEL-42-2.29\GP1  
 P:\VHDDT\Work\Sets\109074\_400-Engineering\Geotechnical\Sheets\109074\_ZL004.dgn USER: kchcjl

PROJECT: TYPE: PID: START:	DEL-42-2.29 CULVERT 109074 11/2/20	END: 11/2/20	DRILLING FIRM / OPERATOR: SAMPLING FIRM / LOGGER: DRILLING METHOD: SAMPLING METHOD:	NEAS / R. WEBB		DRILL RIG: HAMMER: CALIBRATION DATE: ENERGY RATIO (%):	CME 45B CME AUTOMATIC 12/5/19 81.7		STATION / OFFSET: ALIGNMENT: ELEVATION: LAT / LONG:		233+71, 13' LT. US-42 945.4 (MSL) EOB: 25.0 ft. 40.267759, -83.113152		EXPLORATION ID B-039-0-20 PAGE 1 OF 1	
				ELEV.	DEPTHS		SPT/ RQD	N <sub>60</sub>	REC SAMPLE (%)	HP ID	GR	CS		FS
<b>MATERIAL DESCRIPTION AND NOTES</b>														
<b>12.0" ASPHALT AND 2.0" BASE (DRILLERS DESCRIPTION)</b>														
STIFF TO VERY STIFF, DARK BROWN AND BLACK, CLAY, "AND" SILT, TRACE TO LITTLE SAND, TRACE GRAVEL, SLIGHTLY ORGANIC, DAMP TO MOIST														
VERY STIFF, BROWN MOTTLED WITH DARK BROWN AND GRAY, SILTY CLAY, LITTLE SAND, TRACE GRAVEL, CONTAINS TRACE IRON STAINING, MOIST														
MEDIUM STIFF TO STIFF, GRAY, SANDY SILT, SOME CLAY, TRACE TO LITTLE GRAVEL, MOIST TO DAMP														
STIFF TO VERY STIFF, GRAY, SILT, SOME CLAY, LITTLE SAND, TRACE GRAVEL, MOIST TO DAMP														
VERY DENSE, GRAY, STONE FRAGMENTS, LITTLE SAND, TRACE SILT, TRACE CLAY, DAMP														

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT.GDT - 2/11/21 12:00 - C:\Users\KARENS\Desktop\DEL-42-2.29\GP1

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. HOLE CAVE-IN AT 12.5'.  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; SHOVELED SOIL CUTTINGS

PROJECT: TYPE: PID: START:	DEL-42-2.29 CULVERT 109074 11/2/20	END: 11/2/20	DRILLING FIRM / OPERATOR: SAMPLING FIRM / LOGGER: DRILLING METHOD: SAMPLING METHOD:	NEAS / R. WEBB		DRILL RIG: HAMMER: CALIBRATION DATE: ENERGY RATIO (%):	CME 45B CME AUTOMATIC 12/5/19 81.7		STATION / OFFSET: ALIGNMENT: ELEVATION: LAT / LONG:		234+26, 14' RT. US-42 945.4 (MSL) EOB: 25.0 ft. 40.267800, -83.112939		EXPLORATION ID B-040-0-20 PAGE 1 OF 1	
				ELEV.	DEPTHS		SPT/ RQD	N <sub>60</sub>	REC SAMPLE (%)	HP ID	GR	CS		FS
<b>MATERIAL DESCRIPTION AND NOTES</b>														
<b>12.0" ASPHALT AND 2.0" BASE (DRILLERS DESCRIPTION)</b>														
MEDIUM DENSE, BROWN, SANDY SILT, SOME GRAVEL, TRACE CLAY, DAMP														
VERY STIFF, DARK GRAY WITH BROWN MOTTLES, CLAY, "AND" SILT, LITTLE SAND, TRACE GRAVEL, SLIGHTLY ORGANIC, MOIST														
STIFF TO HARD, GRAY AND BROWN, SANDY SILT, SOME CLAY, TRACE GRAVEL, MOIST TO DAMP														

STANDARD ODOT SOIL BORING LOG (6.5 X 11) - OH DOT.GDT - 2/11/21 12:00 - C:\Users\KARENS\Desktop\DEL-42-2.29\GP1

NOTES: GROUNDWATER ENCOUNTERED AT 17.0' DURING DRILLING. HOLE CAVE-IN AT 20.0'.  
 ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED 0.5 BAG ASPHALT PATCH; POURED 1 BAG HOLE PLUG; SHOVELED SOIL CUTTINGS

DESIGN AGENCY  
**NEAS**  
 Neas Engineering & Architectural Services Inc.  
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DESIGNER: AI  
 REVIEWER: BPA 02-11-21  
 PROJECT ID: 109074  
 SUBSET: 19 TOTAL: 19  
 SHEET: 153 TOTAL: 153

**CULVERT**  
**BORING LOGS B-039-0-20 AND B-040-0-20**