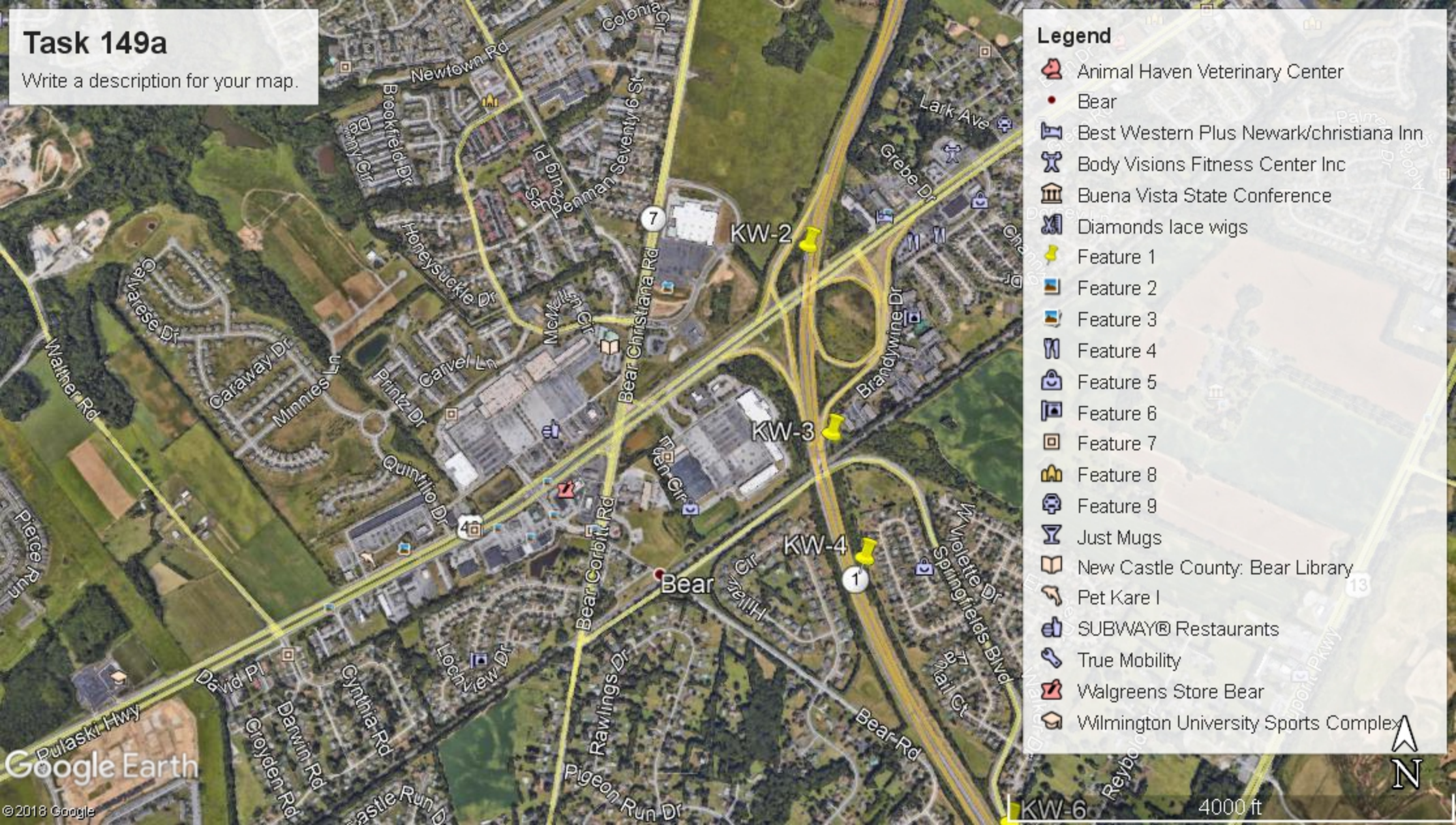
AGR 1693-2, Task 149
T201809201
SR 1 - Tybouts Left Exit Compliance

Reference	State Plane		Geographic	
	Northing	Easting	Latitude	Longitude
KW-2	596482.4078	589478.0906	39.6375009	-75.6534553
KW-3	594664.2926	589672.4706	39.6325111	-75.6527481
KW-4	593510.3953	589960.5843	39.6293454	-75.6517145
KW-6	591162.3864	591212.3395	39.6229084	-75.6472491
KW-8	590146.3904	591845.8294	39.6201237	-75.6449911
KW-9	590087.3474	591753.7042	39.6199609	-75.6453176

Task 149a

Write a description for your map.



Task 149b

Write a description for your map.

- **Table B-1 AASHTO SOIL CLASSIFICATION SYSTEM**

The American Association of State Highway and Transportation Officials developed the AASHTO Soil Classification System, and it is used as a guide for the classification of soils and soil-aggregate mixtures for highway construction purposes. AASHTO M-57-2, M-145-7											
General Classification	Granular Materials (35% or less passing the 0.075 mm sieve)							Silt-Clay Materials (>35% passing the 0.075 mm sieve)			
Group Classification	A-1		A-3	A-2				A-4	A-5	A-6	A-7
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6 Note 1
Sieve Analysis, % passing											
2.00 mm (No. 10)	50 max	…	…	…	…	…	…	…	…	…	…
0.425 (No. 40)	30 max	50 max	51 min	…	…	…	…	…	…	…	…
0.075 (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)											
Liquid Limit	…		…	40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min
Plasticity Index	6 max		N.P.	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11 min[1]
Usual types of significant constituent materials	stone fragments, gravel and sand		fine sand	silty or clayey gravel and sand				silty soils		clayey soils	
General rating as a subgrade	excellent to good							fair to poor			

Note (1): Plasticity index of A-7-5 subgroup is equal to or less than the LL - 30. Plasticity index of A-7-6 subgroup is greater than LL – 30

Note (2): The AASHTO classification include the Group Index (GI) need to be lees 20, more than 20 indicates

very poor subgrade.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING KW-2

Project Name: SR1 Tybouts Left Exit
Location: New Castle County, DE
State Contract #: T201809201
Federal Contract #:
Station/Offset:
Northing: 596482.407
Easting: 589478.090
Boring Surface Elev.:
Reference:
Date Started: 2/12/18
Date Completed: 2/12/18

Wt. of Sample Hammer: 140 **Lbs.**
Type of: **D-Sampler:** Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 50.0
From Depth of: **To:**

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
2/12/18	23.6	
2/12/18	Dry	10.0

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 Track
Driller: Jason Truver
Logged By: Randy Ferguson

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0' 2.0'	2 4 5 9	Moist stiff brown gray fine sandy fine gravelly silt w/some coarse sand and clay. 18" RECOVERY	A-4(0)	
2.5		2	2.0' 4.0'	8 29 30 16	Moist very dense gray clayey coarse sandy fine gravel w/some fine sand and silt. 16" RECOVERY	A-1-b	
5		3	4.0' 6.0'	16 16 11 11	Moist very stiff brown fine sandy silt w/some coarse sand and fine gravel. 20" RECOVERY	A-4(0)	
7.5		4	6.0' 8.0'	12 12 12 14	Wet very stiff brown clayey silt w/trace fine to coarse sand. 24" RECOVERY	A-4(5)	
10		5	8.0' 10.0'	5 7 10 13	Wet very stiff brown silt w/some clay, trace of fine to coarse sand. 24" RECOVERY	A-4(3)	
		6	10.0' 12.0'	18 18 18 16	Wet dense brown silty coarse to fine sand w/ trace fine gravel. 18" RECOVERY	A-1-b	
12.5		7	12.0'	11 12 10 10	Wet medium dense brown coarse sand w/ some fine sand and silt, trace of fine gravel.	A-1-b	

Remarks:

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-2
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			14.0'		20" RECOVERY		
15		8	14.0' 16.0'	7 10 11 12	Wet medium dense brown silty coarse to fine sand w/trace fine gravel. 20" RECOVERY	A-2-4(0)	
17.5		9	16.0' 18.0'	8 9 9 11	Wet medium dense brown silty fine sand w/ trace coarse sand. 20" RECOVERY	A-2-4(0)	
20, 22.5		10	18.0' 20.0'	8 8 9 16	Wet medium dense brown silty fine sand w/ trace coarse sand. 24" RECOVERY	A-2-4(0)	
25		11	24.0' 26.0'	8 8 9 11	Wet medium dense brown coarse to fine sandy fine gravel w/some silt. 14" RECOVERY	A-1-b	
27.5		U-1	27.0' 29.0'		24" RECOVERY		Shelby Tube - Press Sample
30, 32.5		12	29.0' 31.0'	8 7 7 9	Wet stiff brown clayey fine sandy silt w/some coarse sand. 18" RECOVERY	A-4(2)	
35		13	34.0'	3 6 10 12	Wet stiff brown clayey silt w/some fine sand, trace of coarse sand.	A-4(5)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-2
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
37.5			36.0'		24" RECOVERY		
40		14	39.0'	4 7 11 15	Wet very stiff brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	
			41.0'		24" RECOVERY		
42.5							
45		15	44.0'	4 5 8 11	Wet stiff brown fine sandy silt w/trace coarse sand and clay.	A-4(0)	
			46.0'		20" RECOVERY		
47.5							
50		16	48.0'	5 7 8 12	Wet stiff brown clayey fine sandy silt w/trace coarse sand.	A-4(2)	
			50.0'		18" RECOVERY		
52.5					End Boring		
55							
57.5							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty soils
	Well graded gravels and sands
	Poorly graded, silty or clayey sands and gravel

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

3. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING KW-3

Project Name: SR1 Tybouts Left Exit
Location: New Castle County, DE
State Contract #: T201809201
Federal Contract #:
Station/Offset:
Northing: 594664.292
Easting: 589672.470
Boring Surface Elev.:
Reference:
Date Started: 2/14/18
Date Completed: 2/14/18

Wt. of Sample Hammer: 140 **Lbs.**
Type of: **D-Sampler:** Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 50.0
From Depth of: **To:**

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
2/14/18	Dry	
2/14/18	Dry	35.0

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 45 Skid Rig
Driller: Billy Holden
Logged By: Randy Ferguson

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0' 2.0'	1 2 2 2	Wet soft gray fine sandy silt w/some coarse sand, trace of fine gravel. 12" RECOVERY	A-4(0)	
2.5		2	2.0' 4.0'	3 4 3 4	Wet loose brown fine gravel w/some fine to coarse sand and silt. 4" RECOVERY	A-1-b	
5		3	4.0' 6.0'	4 4 4 4	Wet loose brown silty fine to coarse sand w/ some fine gravel and clay. 16" RECOVERY	A-2-4(0)	
7.5		4	6.0' 8.0'	1 2 6 8	Wet firm brown fine sandy clay w/some coarse sand, fine gravel and silt. 14" RECOVERY	A-7-6(7)	
10		5	8.0' 10.0'	5 5 8 8	Wet stiff gray fine gravelly clay w/some fine sand and silt, trace of coarse sand. 18" RECOVERY	A-6(2)	
		6	10.0' 12.0'	7 9 13 19	Wet very stiff gray silt w/some fine to coarse sand, clay and silt. 14" RECOVERY	A-4(1)	
12.5		7	12.0'	2 2 3 4	Wet firm brown clayey fine sandy silt w/ some coarse sand and fine gravel.	A-4(1)	

Remarks:

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-3
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			14.0'		16" RECOVERY		
15		8	14.0' 16.0'	4 5 5 5	Wet stiff brown clayey fine to coarse sandy silt w/trace fine gravel. 20" RECOVERY	A-4(0)	
17.5		9	16.0' 18.0'	11 16 23 26	Wet hard brown clayey fine sandy silt w/ some coarse sand, trace of fine gravel. 16" RECOVERY	A-4(0)	
20 22.5		10	18.0' 20.0'	7 7 13 12	Wet very stiff brown clayey fine sandy silt w/ some coarse sand, trace of fine gravel. 20" RECOVERY	A-4(2)	
25 27.5		11	23.0' 25.0'	50/2	Wet very dense brown silty fine gravel w/ some fine to coarse sand. 4" RECOVERY	A-2-4(0)	
30 32.5		12	28.0' 30.0'	3 3 3 5	Wet firm brown clayey fine sandy silt w/ some coarse sand. 18" RECOVERY	A-4(3)	
35		13	33.0' 35.0'	8 7 7 9	Wet stiff brown fine sandy silt w/some coarse sand. 18" RECOVERY	A-4(0)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-3
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
37.5							
40		14	38.0' 40.0'	7 7 8 9	Wet stiff brown fine sandy silt w/some coarse sand, trace of fine gravel. 16" RECOVERY	A-4(0)	
42.5							
45		15	43.0' 45.0'	4 5 8 7	Wet medium dense brown silty fine to coarse sand. 14" RECOVERY	A-2-4(0)	
47.5							
50		16	48.0' 50.0'	4 5 9 14	Wet medium dense brown silty fine to coarse sand. 8" RECOVERY	A-2-4(0)	
52.5					End Boring		
55							
57.5							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty soils
	Well graded gravels and sands
	Poorly graded, silty or clayey sands and gravel
	Expansive plastic clays
	Plastic clays

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

3. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING KW-4

Project Name: SR1 Tybouts Left Exit
Location: New Castle County, DE
State Contract #: T201809201
Federal Contract #:
Station/Offset:
Northing: 593510.395
Easting: 589960.584
Boring Surface Elev.:
Reference:
Date Started: 2/5/18
Date Completed: 2/5/18

Wt. of Sample Hammer: 140 **Lbs.**
Type of: **D-Sampler:** Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 50.0
From Depth of: **To:**

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
2/5/18	43.0	
2/5/18	Dry	32.0

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 Skid Rig
Driller: Jason Truver
Logged By: Randy Ferguson

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0' 2.0'	2 2 2 5	Wet soft gray clayey silt w/some fine to coarse sand and fine gravel. 18" RECOVERY	A-4(1)	
2.5		2	2.0' 4.0'	6 6 5 7	Wet stiff brown clayey coarse sandy silt w/ some fine sand, trace of fine gravel. 18" RECOVERY	A-4(2)	
5		3	4.0' 6.0'	7 8 9 9	Wet very stiff brown clayey fine sandy silt w/ some coarse sand, trace of fine gravel. 24" RECOVERY	A-4(0)	
7.5		4	6.0' 8.0'	9 12 14 16	Wet very stiff brown fine sandy silt w/ some coarse sand, trace of fine gravel. 19" RECOVERY	A-4(0)	
10		5	8.0' 10.0'	7 16 18 19	Wet hard brown silt w/some coarse to fine sand, trace of fine gravel. 24" RECOVERY	A-4(0)	
		6	10.0' 12.0'	10 12 13 17	Wet very stiff brown fine clayey silt w/some coarse to fine sand and clay. 17" RECOVERY	A-4(0)	
12.5		7	12.0'	12 14 16 19	Wet hard brown clayey silt w/some coarse to fine sand and fine gravel.	A-4(3)	

Remarks:

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-4
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			14.0'		22" RECOVERY		
15		8	14.0' 16.0'	10 12 13 15	Wet medium dense brown coarse sand w/ some fine sand and fine gravel, trace of silt. 20" RECOVERY	A-1-b	
17.5		9	16.0' 18.0'	7 8 9 11	Wet medium dense brown coarse sand w/ some fine sand and silt, trace of fine gravel. 21" RECOVERY	A-1-b	
20		10	18.0' 20.0'	7 8 9 8	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 17" RECOVERY	A-1-b	
22.5							
25		11	24.0' 26.0'	9 9 10 12	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 17" RECOVERY	A-2-4(0)	
27.5							
30		12	29.0' 31.0'	12 12 12 16	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY	A-1-b	
32.5							
35		13	34.0'	12 12 14 17	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-4
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			36.0'		18" RECOVERY		
37.5							
		14	39.0'	8 12 14 19	Wet medium dense brown coarse sand w/ some fine sand, fine gravel and silt.	A-1-b	
40							
			41.0'		17" RECOVERY		
42.5							
		15	44.0'	6 6 12 14	Wet medium dense brown silty fine to coarse sand w/trace fine gravel.	A-2-4(0)	
45							
			46.0'		16" RECOVERY		
47.5							
		16	48.0'	17 19 20 21	Wet dense brown coarse to fine sand w/some fine gravel and silt.	A-1-b	
50			50.0'		13" RECOVERY		
					End Boring		
52.5							
55							
57.5							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty soils
	Well graded gravels and sands
	Poorly graded, silty or clayey sands and gravel

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

3. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING KW-6

Project Name: SR1 Tybouts Left Exit
Location: New Castle County, DE
State Contract #: T201809201
Federal Contract #:
Station/Offset:
Northing: 591162.386
Easting: 591212.339
Boring Surface Elev.:
Reference:
Date Started: 1/31/18
Date Completed: 1/31/18

Wt. of Sample Hammer: 140 **Lbs.**
Type of: **D-Sampler:** Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 50.0
From Depth of: **To:**

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
1/31/18	37.4	
1/31/18	Dry	24.0

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 ATV
Driller: Jason Truver
Logged By: Randy Ferguson

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0' 2.0'	13 12 11 7	Moist medium dense black fine gravel w/ some coarse sand and silt, trace of fine sand. 17" RECOVERY	A-1-b	
2.5		2	2.0' 4.0'	9 13 15 17	Moist loose brown silty fine to coarse sand w/trace fine gravel. 22" RECOVERY	A-2-4(0)	
5		3	4.0' 6.0'	7 11 11 12	Moist medium dense brown coarse to fine sand w/trace fine gravel and silt. 18" RECOVERY	A-1-b	
7.5		4	6.0' 8.0'	10 9 7 9	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 22" RECOVERY	A-1-b	
10		5	8.0' 10.0'	6 5 6 7	Moist medium dense brown coarse to fine sand w/some fine gravel and silt. 20" RECOVERY	A-1-b	
		6	10.0' 12.0'	5 7 6 6	Moist medium dense brown coarse to fine sand w/some fine gravel and silt. 20" RECOVERY	A-1-b	
12.5		7	12.0'	7 6 7 8	Moist medium dense brown coarse sand w/ some fine sand and silt, trace of fine gravel.	A-1-b	

Remarks:

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-6
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			14.0'		23" RECOVERY		
15		8	14.0' 16.0'	8 5 5 5	Moist loose brown clayey coarse sand w/ some fine sand and silt, trace of fine gravel. 22" RECOVERY	A-2-6(0)	
17.5		9	16.0' 18.0'	8 8 8 9	Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel. 24" RECOVERY	A-1-b	
20		10	18.0' 20.0'	10 7 8 8	Moist medium dense brown coarse sand w/ some fine sand and silt, trace of fine gravel. 24" RECOVERY	A-1-b	
22.5							
25		11	24.0' 26.0'	10 8 9 8	Moist medium dense brown coarse sand w/ some fine sand and silt, trace of fine gravel. 23" RECOVERY	A-1-b	
27.5							
30		12	29.0' 31.0'	9 9 9 9	Moist medium dense brown coarse sand w/ some fine sand, fine gravel and silt. 19" RECOVERY	A-1-b	
32.5							
35		13	34.0'	13 13 12 7	Moist medium dense brown clayey coarse sand and fine gravel w/some fine sand and silt.	A-2-4(0)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-6
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			36.0'		18" RECOVERY		
37.5	■						
		14	39.0'	6 11 31 19	Wet very stiff brown silty clay w/trace fine to coarse sand.	A-7-6(23)	
40							
			41.0'		16" RECOVERY		
42.5							
		15	44.0'	5 10 13 17	Wet very stiff brown silty clay w/trace fine to coarse sand.	A-6(17)	
45							
			46.0'		24" RECOVERY		
47.5							
		16	48.0'	5 10 15 15	Wet very stiff brown silt w/trace fine to coarse sand.	A-4(0)	
50			50.0'		24" RECOVERY		
					End Boring		
52.5							
55							
57.5							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Well graded gravels and sands
	Poorly graded, silty or clayey sands and gravel
	Expansive plastic clays
	Plastic clays
	Silty soils

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

3. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING KW-8

Project Name: SR1 Tybouts Left Exit
Location: New Castle County, DE
State Contract #: T201809201
Federal Contract #:
Station/Offset:
Northing: 590146.390
Easting: 591845.829
Boring Surface Elev.:
Reference:
Date Started: 1/29/18
Date Completed: 1/29/18

Wt. of Sample Hammer: 140 **Lbs.**
Type of: **D-Sampler:** Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 50.0
From Depth of: **To:**

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
1/29/18	30.9	
1/29/18	20.8	34.3

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 ATV
Driller: Jason Truver
Logged By: Randy Ferguson

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0' 2.0'	2 3 8 12	Moist medium dense brown silty coarse sand and fine gravel w/some fine sand, trace of clay. 17" RECOVERY	A-2-4(0)	
2.5		2	2.0' 4.0'	10 8 9 14	Moist medium dense brown coarse to fine sand w/some fine gravel, clay and silt. 18" RECOVERY	A-2-4(0)	
5		3	4.0' 6.0'	3 9 10 10	Moist very stiff brown clayey fine to coarse sandy silt w/trace fine gravel. 20" RECOVERY	A-4(0)	
7.5		4	6.0' 8.0'	12 12 15 16	Moist very stiff brown clayey fine to coarse sandy silt w/trace fine gravel. 24" RECOVERY	A-4(0)	
10		5	8.0' 10.0'	4 9 9 18	Wet very stiff brown clayey silt w/some fine to coarse sand, trace of fine gravel. 24" RECOVERY	A-4(2)	
		6	10.0' 12.0'	13 15 16 13	Wet hard brown silt w/some fine sand, trace of coarse sand and fine gravel. 24" RECOVERY	A-4(0)	
12.5		7	12.0'	5 15 17 21	Wet hard brown fine to coarse sandy silt w/ some fine gravel.	A-4(0)	

Remarks:

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-8
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			14.0'		23" RECOVERY		
15		8	14.0' 16.0'	5 20 20 25	Wet medium dense brown silty coarse to fine sand w/trace fine gravel. 24" RECOVERY	A-2-4(0)	
17.5		9	16.0' 18.0'	13 18 14 16	Wet dense brown coarse sand w/some fine sand and silt, trace of fine gravel. 24" RECOVERY	A-1-b	
20		10	18.0' 20.0'	17 16 13 23	Wet medium dense brown coarse to fine sand and fine gravel w/some silt. 23" RECOVERY	A-1-b	
22.5							
25		11	24.0' 26.0'	3 5 9 18	Wet stiff brown clayey fine sandy silt w/some organic matter, trace of coarse sand. 24" RECOVERY	A-4(6)	
27.5		U-1	27.0' 29.0'		20" RECOVERY		Shelby Tube - Press Sample
30		12	29.0' 31.0'	10 12 15 13	Wet very stiff brown fine sandy silt w/ trace coarse sand. 24" RECOVERY	A-4(0)	
32.5							
35		13	34.0'	5 13 15 17	Wet very stiff brown fine sandy silt w/ trace coarse sand and fine gravel.	A-4(0)	

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-8
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			36.0'		22" RECOVERY		
37.5							
		14	39.0'	13 19 21 23	Wet dense brown fine sand w/trace coarse sand and silt.	A-3	
40							
			41.0'		17" RECOVERY		
42.5							
		15	44.0'	13 21 50	Wet very dense brown silty fine sand w/ trace coarse sand and fine gravel.	A-2-4(0)	
45							
			46.0'		16" RECOVERY		
47.5							
		16	48.0'	20 35 50/4	Wet very dense brown fine sand w/some silt, trace of fine gravel.	A-2-4(0)	
50			50.0'		17" RECOVERY		
					End Boring		
52.5							
55							
57.5							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Poorly graded, silty or clayey sands and gravel
	Silty soils
	Well graded gravels and sands
	Clean sand & gravelly sand
Misc. Symbols	
	Description not given for: "WATER2"

Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

3. All blow counts are uncorrected.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

BORING KW-9

Project Name: SR1 Tybouts Left Exit
Location: New Castle County, DE
State Contract #: T201809201
Federal Contract #:
Station/Offset:
Northing: 590087.347
Easting: 591753.704
Boring Surface Elev.:
Reference:
Date Started: 2/1/18
Date Completed: 2/1/18

Wt. of Sample Hammer: 140 **Lbs.**
Type of: **D-Sampler:** Split Barrel **O.D.**
S-Sampler: **O.D.**
U-Sampler: **O.D.**
Core Bit: **O.D.**

Average Fall: 30 **IN.**
O.D. of Sampler: 2 **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Samp. Tube: **IN.**
O.D. of Rock Core: **IN.**

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 50.0
From Depth of: **To:**

Water Level Readings

Date	Depth to Water (ft)	Caved Depth (ft)
2/1/18	17.4	
2/1/18	Dry	24.2

Boring Contractor: Walton Corporation
Equipment/Rig Type: CME 55 ATV
Driller: Jason Truver
Logged By: Randy Ferguson

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0' 2.0'	5 4 4 3	Moist firm gray silt w/some coarse to fine sand, fine gravel and clay. 21" RECOVERY	A-4(0)	
2.5		2	2.0' 4.0'	8 8 15 7	Wet very stiff gray silt w/some clay, trace of coarse to fine sand, fine gravel and clay. 18" RECOVERY	A-4(2)	
5		3	4.0' 6.0'	6 16 18 18	Wet hard gray silt w/some coarse to fine sand, trace of fine gravel. 23" RECOVERY	A-4(0)	
7.5		4	6.0' 8.0'	13 14 15 12	Wet medium dense gray silty fine to coarse sand w/some fine gravel. 24" RECOVERY	A-2-4(0)	
10		5	8.0' 10.0'	6 8 9 8	Wet medium dense brown coarse sand w/ some fine gravel, trace of fine sand and silt. 24" RECOVERY	A-1-b	
		6	10.0' 12.0'	12 18 22 17	Wet dense brown fine gravelly coarse sand w/some fine sand and silt. 6" RECOVERY	A-1-b	
12.5		7	12.0'	3 6 3 3	Wet stiff brown clayey silt w/some fine to coarse sand and fine gravel.	A-4(1)	

Remarks:

Reviewed By: Hany Fekry
Soils Supervisor: Aaron Wieczorek

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-9
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
			14.0'		6" RECOVERY		
		U-1	14.0'				Shelby Tube - Press Sample
15							
			16.0'		24" RECOVERY		
		8	16.0'	4 5 5 6	Wet stiff gray clayey fine sandy silt w/trace coarse sand.	A-4(4)	
17.5	■						
			18.0'		17" RECOVERY		
		9	18.0'	7 8 8 9	Wet stiff gray clayey fine sandy silt w/trace coarse sand and fine gravel.	A-4(4)	
20			20.0'		24" RECOVERY		
22.5							
		10	24.0'	7 7 6 5	Wet stiff gray clayey fine sandy silt w/trace coarse sand and fine gravel.	A-4(2)	
25							
			26.0'		9" RECOVERY		
27.5							
		11	29.0'	4 6 7 7	Wet stiff gray silt w/some fine sand and clay.	A-4(2)	
30							
			31.0'		24" RECOVERY		
32.5							
		12	34.0'	3 5 10 12	Wet stiff gray clayey fine sandy silt.	A-4(3)	
35							

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH

Project Name: SR1 Tybouts Left Exit **Boring No.:** KW-9
State Contract: T201809201

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
37.5			36.0'		24" RECOVERY		
40		13	39.0'	2 8 5 7	Wet stiff brown fine sandy silt w/trace coarse sand.	A-4(0)	
42.5			41.0'		22" RECOVERY		
45		14	44.0'	12 22 30 28	Wet very dense brown fine sand w/some silt.	A-2-4(0)	
47.5			46.0'		17" RECOVERY		
50		15	48.0'	16 20 30 30	Wet very dense brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			50.0'		18" RECOVERY		
52.5					End Boring		
55							
57.5							

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	Silty soils
	Poorly graded, silty or clayey sands and gravel
	Well graded gravels and sands

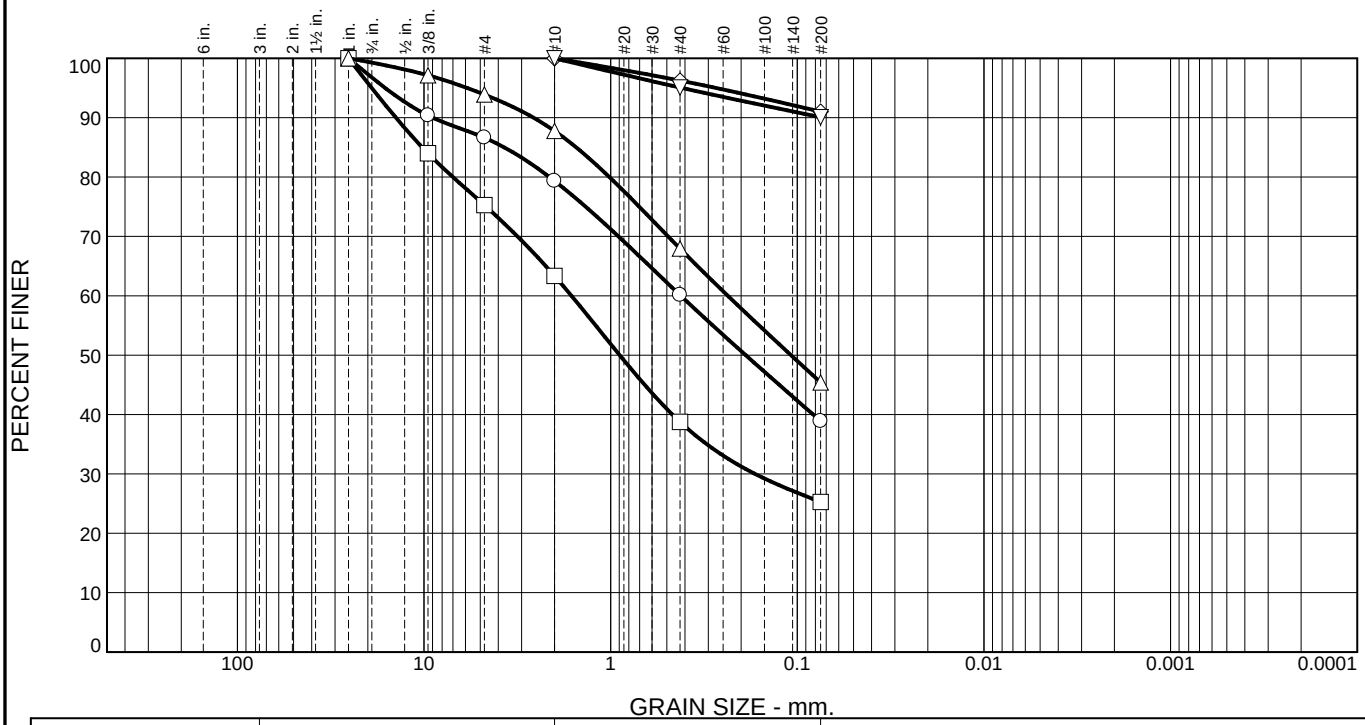
Notes:

1. Exploratory borings were drilled using a 3 1/4 - inch diameter hollow stem auger.

2. These logs are subject to the limitations, conclusions, and recommendations in this report.

3. All blow counts are uncorrected.

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	20.7	19.2	21.2	38.9	
□	0.0	36.6	24.6	13.5	25.3	
△	0.0	12.2	19.9	22.5	45.4	
◇	0.0	0.0	3.7	5.3	91.0	
▽	0.0	0.0	4.9	5.0	90.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	24.4	19.1	3.7180	0.4208	0.1890					
□	24.1	17.9	10.2176	1.6223	0.8946	0.1684				
△	22.0	NP	1.5304	0.2357	0.1081					
◇	29.1	22.8								
▽	26.9	22.6								

Material Description	USCS	AASHTO
○ Moist stiff brown gray fine sandy fine gravelly silt w/some coarse sand and clay.	SC-SM	A-4(0)
□ Moist very dense gray clayey coarse sandy fine gravel w/some fine sand and silt.	SC-SM	A-1-b
△ Moist very stiff brown fine sandy silt w/some coarse sand and fine gravel.	SM	A-4(0)
◇ Wet very stiff brown clayey silt w/trace fine to coarse sand.	ML	A-4(5)
▽ Wet very stiff brown silt w/some clay, trace of fine to coarse sand.	ML	A-4(3)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-2 **Depth:** 0.0 **Sample Number:** 1

□ **Source of Sample:** KW-2 **Depth:** 2.0 **Sample Number:** 2

△ **Source of Sample:** KW-2 **Depth:** 4.0 **Sample Number:** 3

◇ **Source of Sample:** KW-2 **Depth:** 6.0 **Sample Number:** 4

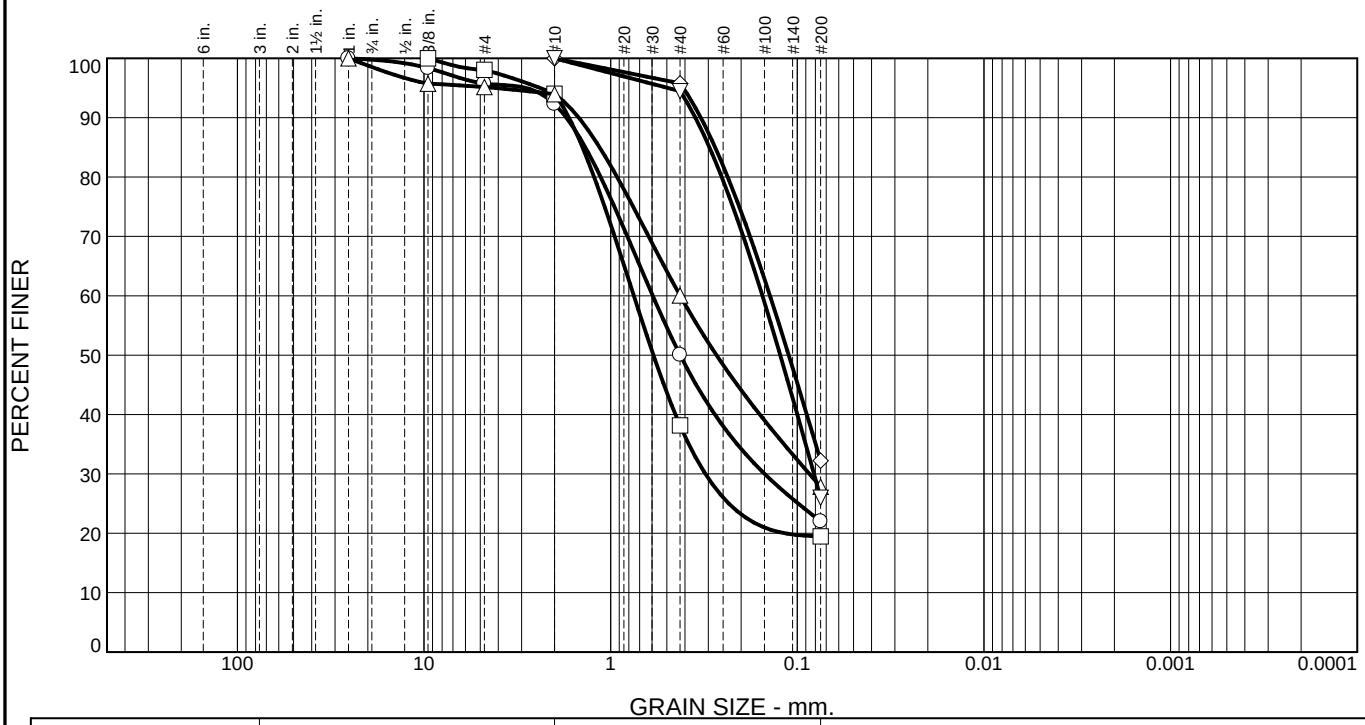
▽ **Source of Sample:** KW-2 **Depth:** 8.0 **Sample Number:** 5

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	7.7	42.2	28.1	22.0	
□	0.0	6.0	55.8	18.7	19.5	
△	0.0	6.1	33.8	32.3	27.8	
◇	0.0	0.0	4.2	63.6	32.2	
▽	0.0	0.0	5.5	68.5	26.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	1.3670	0.5948	0.4242	0.1496				
□	NV	NP	1.4146	0.7512	0.5899	0.3107				
△	21.0	NP	1.1461	0.4241	0.2709	0.0861				
◇	18.7	NP	0.2755	0.1401	0.1112					
▽	NV	NP	0.2955	0.1539	0.1235	0.0814				

Material Description	USCS	AASHTO
○ Wet dense brown silty coarse to fine sand w/trace fine gravel.	SM	A-1-b
□ Wet medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel.	SM	A-1-b
△ Wet medium dense brown silty coarse to fine sand w/trace fine gravel.	SM	A-2-4(0)
◇ Wet medium dense brown silty fine sand w/trace coarse sand.	SM	A-2-4(0)
▽ Wet medium dense brown silty fine sand w/trace coarse sand.	SM	A-2-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-2 **Depth:** 10.0 **Sample Number:** 6

□ **Source of Sample:** KW-2 **Depth:** 12.0 **Sample Number:** 7

△ **Source of Sample:** KW-2 **Depth:** 14.0 **Sample Number:** 8

◇ **Source of Sample:** KW-2 **Depth:** 16.0 **Sample Number:** 9

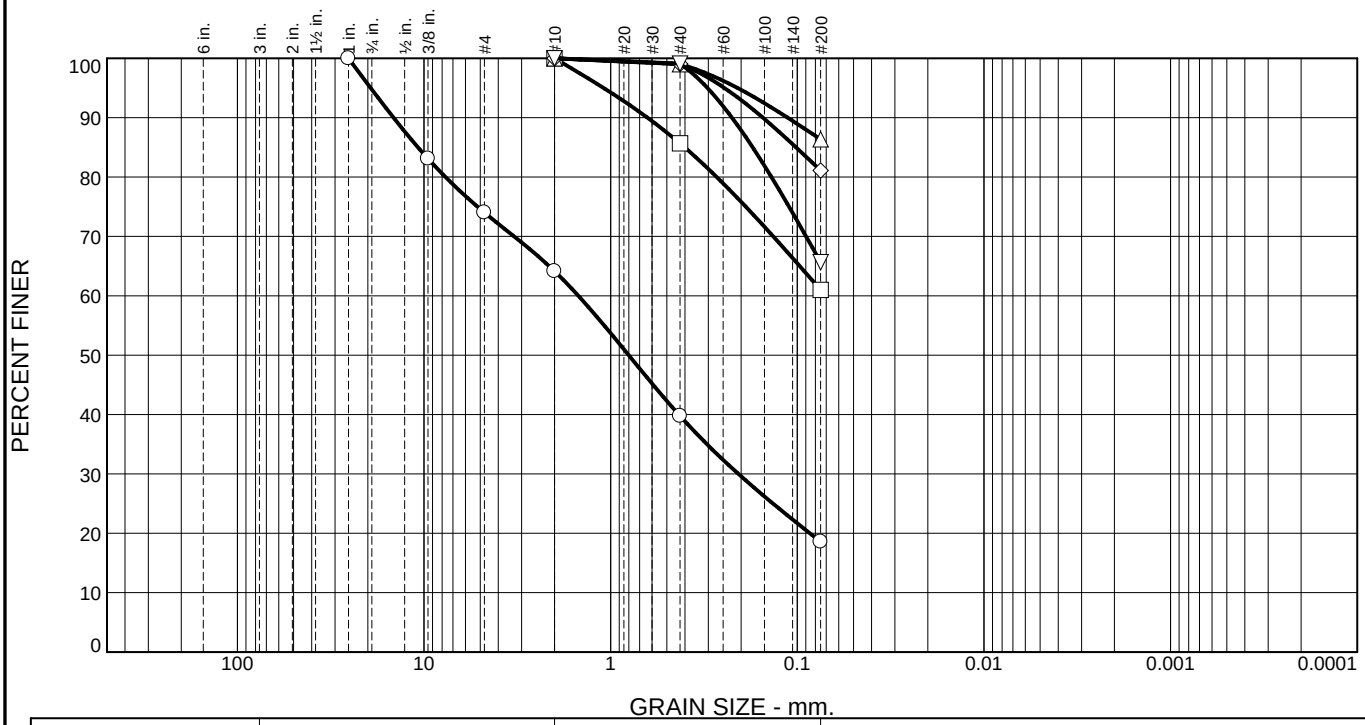
▽ **Source of Sample:** KW-2 **Depth:** 18.0 **Sample Number:** 10

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	35.9	24.3	21.2	18.6	
□	0.0	0.0	14.3	24.7	61.0	
△	0.0	0.0	1.0	12.6	86.4	
◇	0.0	0.0	1.0	17.9	81.1	
▽	0.0	0.0	0.9	33.4	65.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	10.7736	1.4902	0.8005	0.2069				
□	26.8	20.4	0.4012							
△	25.0	17.1								
◇	27.0	18.1	0.1016							
▽	21.2	17.9	0.1735							

Material Description	USCS	AASHTO
○ Wet medium dense brown coarse to fine sandy fine gravel w/some silt.	SM	A-1-b
□ Wet stiff brown clayey fine sandy silt w/some coarse sand.	CL-ML	A-4(2)
△ Wet stiff brown clayey silt w/some fine sand, trace of coarse sand.	CL	A-4(5)
◇ Wet very stiff brown clayey silt w/some fine sand, trace of coarse sand.	CL	A-4(6)
▽ Wet stiff brown fine sandy silt w/trace coarse sand and clay.	ML	A-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-2 **Depth:** 24.0 **Sample Number:** 11

□ **Source of Sample:** KW-2 **Depth:** 29.0 **Sample Number:** 12

△ **Source of Sample:** KW-2 **Depth:** 34.0 **Sample Number:** 13

◇ **Source of Sample:** KW-2 **Depth:** 39.0 **Sample Number:** 14

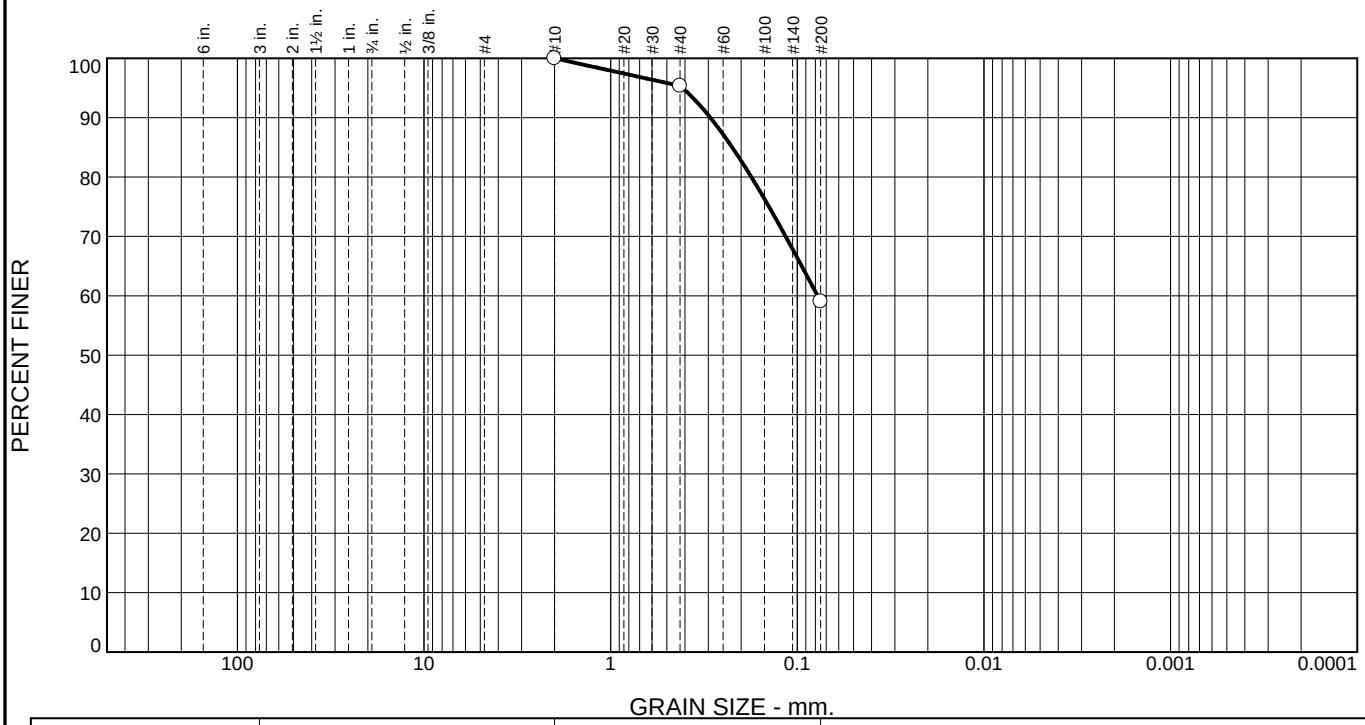
▽ **Source of Sample:** KW-2 **Depth:** 44.0 **Sample Number:** 15

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	0.0	4.6	36.4	59.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	23.5	17.2	0.2232	0.0779						

Material Description	USCS	AASHTO
○ Wet stiff brown clayey fine sandy silt w/trace coarse sand.	CL-ML	A-4(2)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

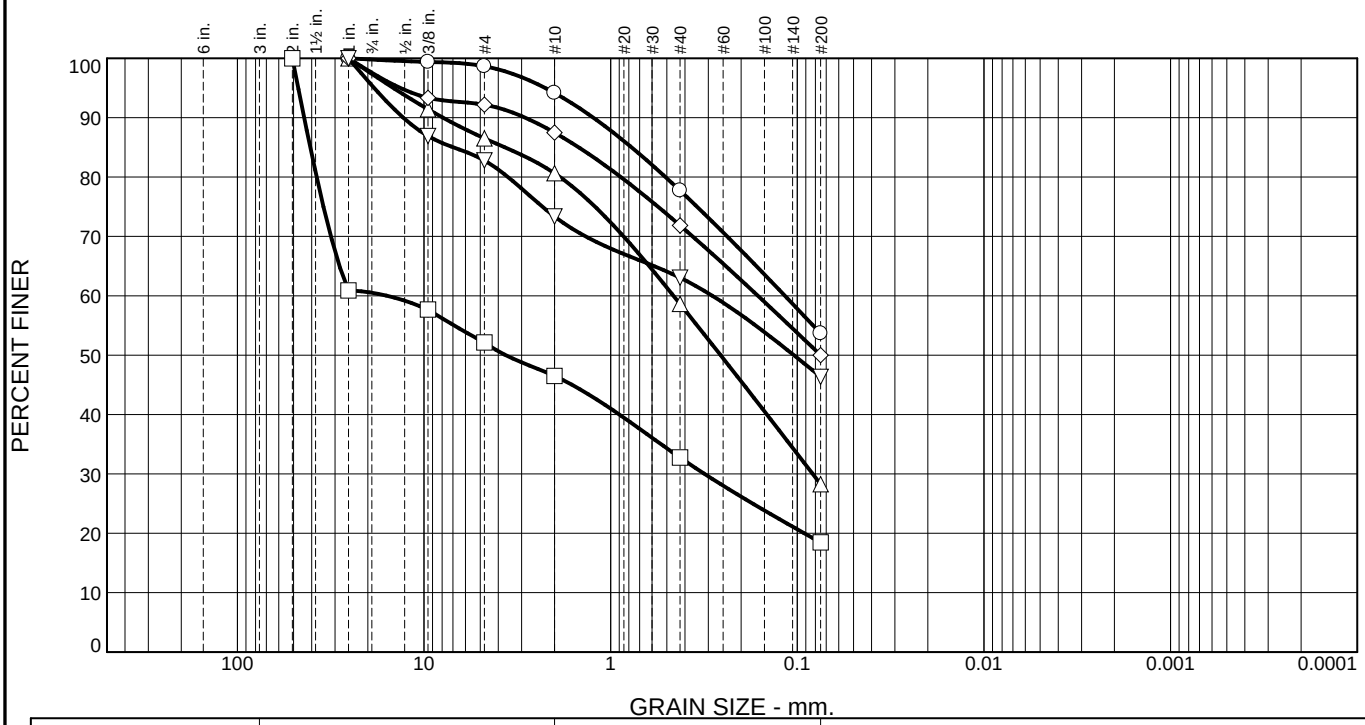
○ **Source of Sample:** KW-2 **Depth:** 48.0 **Sample Number:** 16

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	5.8	16.5	24.0	53.7	
□	0.0	53.5	13.7	14.3	18.5	
△	0.0	19.4	22.0	30.3	28.3	
◇	0.0	12.5	15.6	21.9	50.0	
▽	0.0	26.6	10.3	16.7	46.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	25.8	NP	0.7727	0.1166						
□	NV	NP	40.6857	15.7307	3.6457	0.3138				
△	22.2	17.9	3.6888	0.4607	0.2576	0.0827				
◇	43.4	22.2	1.4835	0.1626						
▽	33.7	22.2	6.9561	0.2850	0.1044					

Material Description	USCS	AASHTO
○ Wet soft gray fine sandy silt w/some coarse sand, trace of fine gravel.	ML	A-4(0)
□ Wet loose brown fine gravel w/some fine to coarse sand and silt.	GM	A-1-b
△ Wet loose brown silty fine to coarse sand w/some fine gravel and clay.	SC-SM	A-2-4(0)
◇ Wet firm brown fine sandy clay w/some coarse sand, fine gravel and silt.	CL	A-7-6(7)
▽ Wet stiff gray fine gravelly clay w/some fine sand and silt, trace of coarse sand.	SC	A-6(2)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-3 **Depth:** 0.0 **Sample Number:** 1

□ **Source of Sample:** KW-3 **Depth:** 2.0 **Sample Number:** 2

△ **Source of Sample:** KW-3 **Depth:** 4.0 **Sample Number:** 3

◇ **Source of Sample:** KW-3 **Depth:** 6.0 **Sample Number:** 4

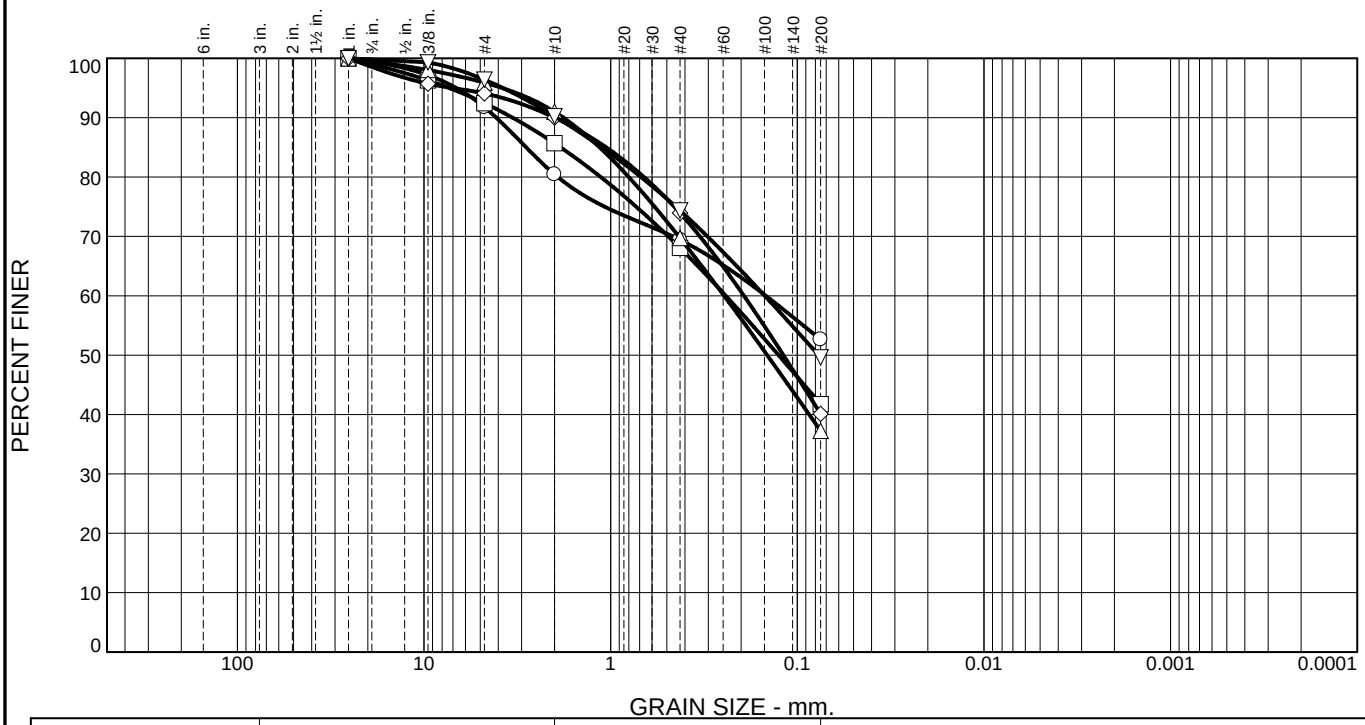
▽ **Source of Sample:** KW-3 **Depth:** 8.0 **Sample Number:** 5

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	19.5	11.1	16.8	52.6	
□	0.0	14.3	17.6	26.4	41.7	
△	0.0	9.0	21.3	32.4	37.3	
◇	0.0	10.0	16.1	33.8	40.1	
▽	0.0	9.8	15.8	24.8	49.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	26.6	22.0	2.8372	0.1475						
□	33.8	23.5	1.8554	0.2416	0.1261					
△	25.2	16.6	1.1467	0.2467	0.1450					
◇	24.5	16.9	1.0569	0.1932	0.1188					
▽	26.3	17.1	1.1166	0.1495	0.0768					

Material Description	USCS	AASHTO
○ Wet very stiff gray silt w/some fine to coarse sand, clay and silt.	CL-ML	A-4(1)
□ Wet firm brown clayey fine sandy silt w/some coarse sand and fine gravel.	SC	A-4(1)
△ Wet stiff brown clayey fine to coarse sandy silt w/trace fine gravel.	SC	A-4(0)
◇ Wet hard brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	SC-SM	A-4(0)
▽ Wet very stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	SC	A-4(2)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-3 **Depth:** 10.0 **Sample Number:** 6

□ **Source of Sample:** KW-3 **Depth:** 12.0 **Sample Number:** 7

△ **Source of Sample:** KW-3 **Depth:** 14.0 **Sample Number:** 8

◇ **Source of Sample:** KW-3 **Depth:** 16.0 **Sample Number:** 9

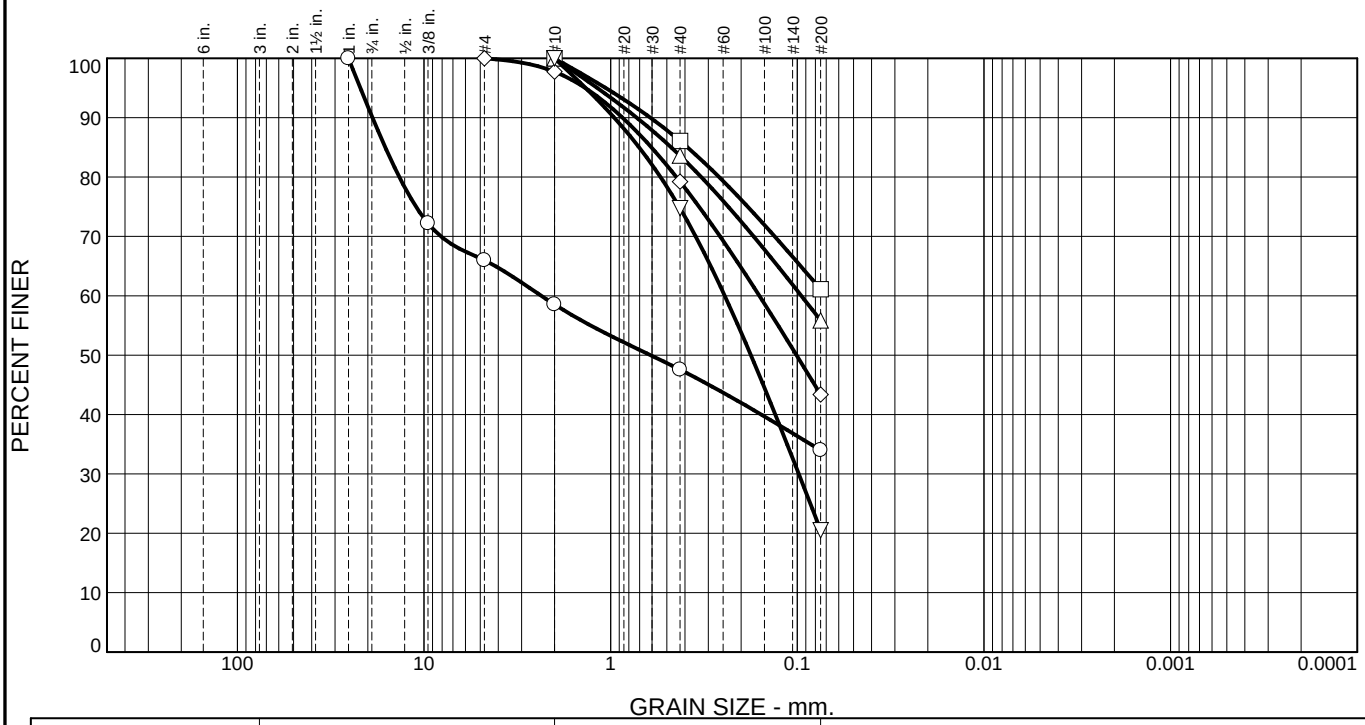
▽ **Source of Sample:** KW-3 **Depth:** 18.0 **Sample Number:** 10

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	41.5	10.9	13.6	34.0	
□	0.0	0.0	13.9	25.0	61.1	
△	0.0	0.0	16.4	27.7	55.9	
◇	0.0	2.3	18.5	35.8	43.4	
▽	0.0	0.0	25.2	54.3	20.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	16.1295	2.3528	0.6116					
□	27.0	19.1	0.3875							
△	18.8	NP	0.4737	0.0952						
◇	24.0	NP	0.6049	0.1597	0.1010					
▽	NV	NP	0.7043	0.2447	0.1774	0.0982				

Material Description	USCS	AASHTO
○ Wet very dense brown silty fine gravel w/some fine to coarse sand.	GM	A-2-4(0)
□ Wet firm brown clayey fine sandy silt w/some coarse sand.	CL	A-4(3)
△ Wet stiff brown fine sandy silt w/some coarse sand.	ML	A-4(0)
◇ Wet stiff brown fine sandy silt w/some coarse sand, trace of fine gravel.	SM	A-4(0)
▽ Wet medium dense brown silty fine to coarse sand.	SM	A-2-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-3 **Depth:** 23.0 **Sample Number:** 11

□ **Source of Sample:** KW-3 **Depth:** 28.0 **Sample Number:** 12

△ **Source of Sample:** KW-3 **Depth:** 33.0 **Sample Number:** 13

◇ **Source of Sample:** KW-3 **Depth:** 38.0 **Sample Number:** 14

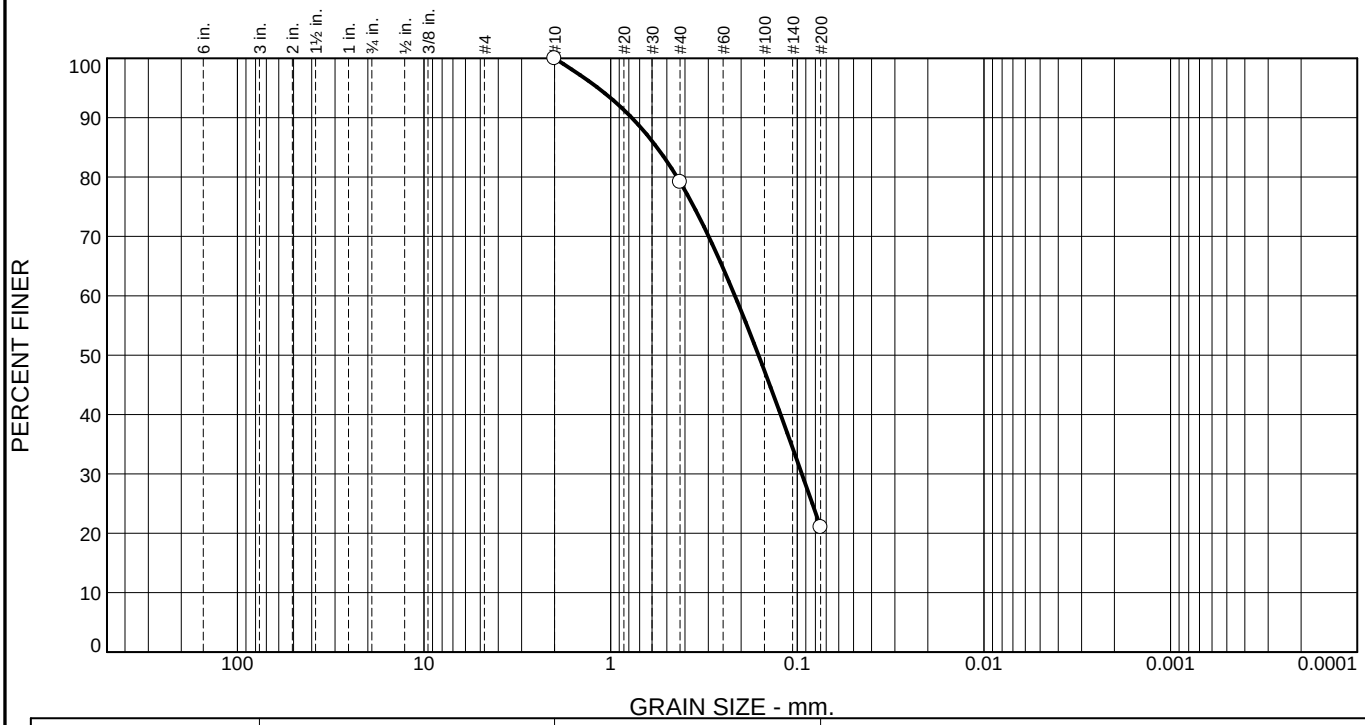
▽ **Source of Sample:** KW-3 **Depth:** 43.0 **Sample Number:** 15

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	0.0	20.8	58.2	21.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.5651	0.2160	0.1615	0.0946				

Material Description	USCS	AASHTO
○ Wet medium dense brown silty fine to coarse sand.	SM	A-2-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

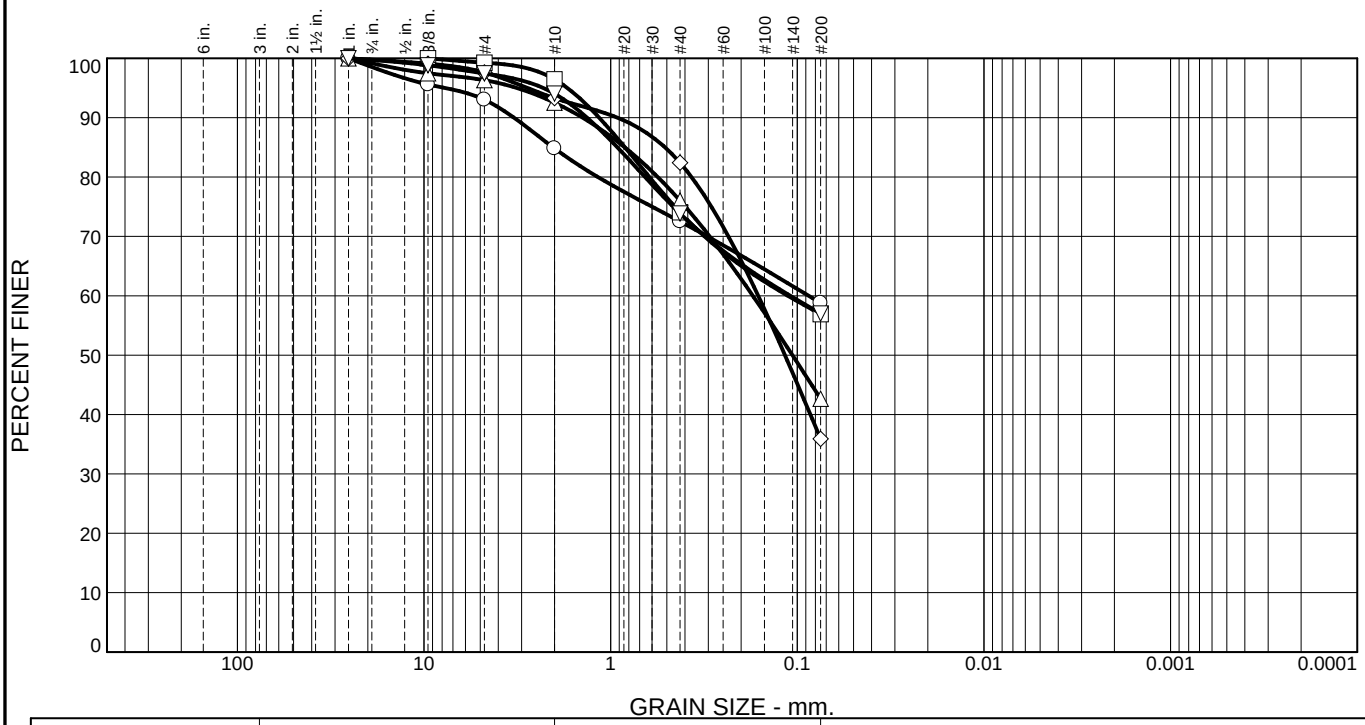
○ **Source of Sample:** KW-3 **Depth:** 48.0 **Sample Number:** 16

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	15.2	12.3	13.7	58.8	
□	0.0	3.5	22.4	17.2	56.9	
△	0.0	7.5	16.5	33.3	42.7	
◇	0.0	6.7	10.9	46.5	35.9	
▽	0.0	5.9	20.2	16.9	57.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	24.7	19.2	2.0357	0.0869						
□	30.0	21.8	0.8382	0.1123						
△	24.4	17.8	0.8396	0.1731	0.1062					
◇	22.5	17.6	0.5112	0.1621	0.1165					
▽	24.6	21.2	0.9201	0.1090						

Material Description	USCS	AASHTO
○ Wet soft gray clayey silt w/some fine to coarse sand and fine gravel.	CL-ML	A-4(1)
□ Wet stiff brown clayey coarse sandy silt w/some fine sand, trace of fine gravel.	CL	A-4(2)
△ Wet very stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	SC-SM	A-4(0)
◇ Wet very stiff brown fine sandy silt w/ some coarse sand, trace of fine gravel.	SC-SM	A-4(0)
▽ Wet hard brown silt w/some coarse to fine sand, trace of fine gravel.	CL-ML	A-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-4 **Depth:** 0.0 **Sample Number:** 1

□ **Source of Sample:** KW-4 **Depth:** 2.0 **Sample Number:** 2

△ **Source of Sample:** KW-4 **Depth:** 4.0 **Sample Number:** 3

◇ **Source of Sample:** KW-4 **Depth:** 6.0 **Sample Number:** 4

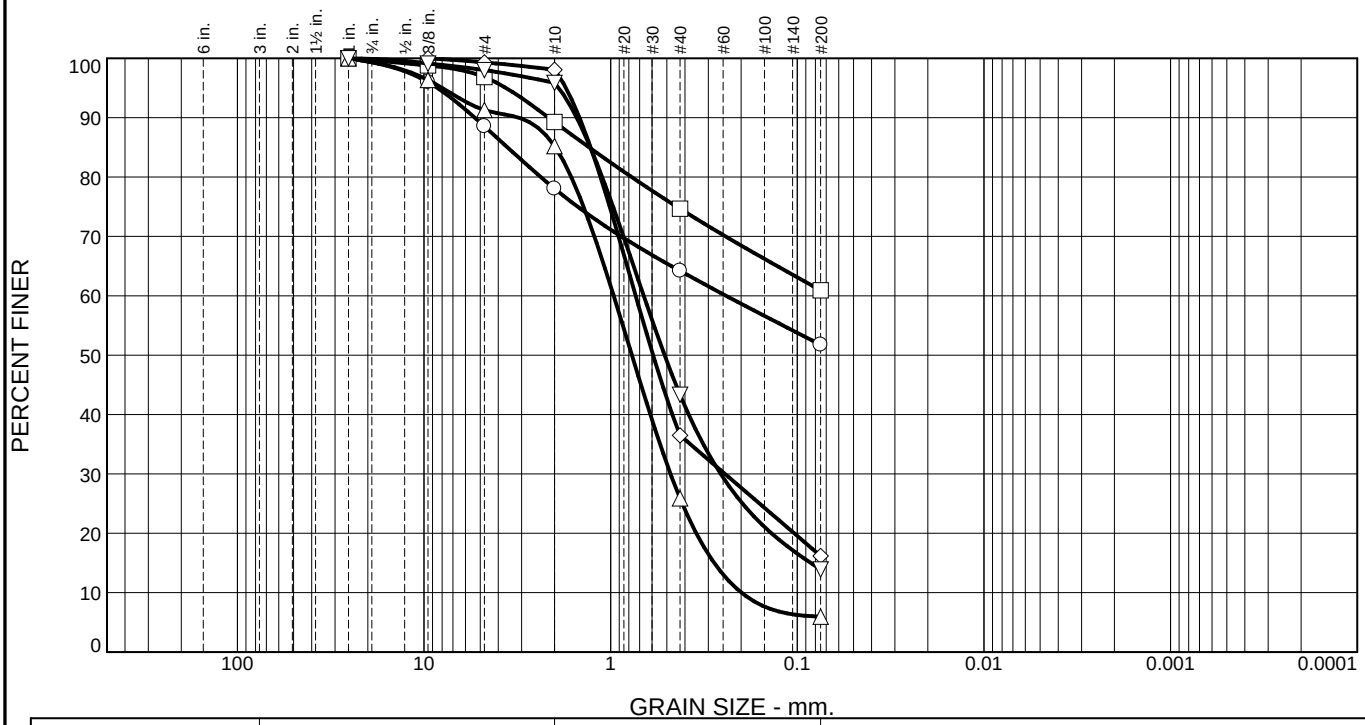
▽ **Source of Sample:** KW-4 **Depth:** 8.0 **Sample Number:** 5

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	22.0	13.8	12.4	51.8	
□	0.0	10.7	14.6	13.8	60.9	
△	0.0	14.8	59.3	20.0	5.9	
◇	0.0	1.9	61.6	20.3	16.2	
▽	0.0	4.1	52.6	29.4	13.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	24.9	20.0	3.5703	0.2407						
□	28.2	20.4	1.3043							
△	NV	NP	1.9786	0.9634	0.7695	0.4779	0.2787	0.1993	1.19	4.83
◇	NV	NP	1.2810	0.7345	0.5922	0.2441				
▽	NV	NP	1.2849	0.6652	0.5140	0.2573	0.0846			

Material Description	USCS	AASHTO
○ Wet very stiff brown fine clayey silt w/some coarse to fine sand and clay.	CL-ML	A-4(0)
□ Wet hard brown clayey silt w/some coarse to fine sand and fine gravel.	CL	A-4(3)
△ Wet medium dense brown coarse sand w/some fine sand and fine gravel, trace of silt.	SP-SM	A-1-b
◇ Wet medium dense brown coarse sand w/some fine sand and silt, trace of fine gravel.	SM	A-1-b
▽ Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	SM	A-1-b

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-4 **Depth:** 10.0 **Sample Number:** 6

□ **Source of Sample:** KW-4 **Depth:** 12.0 **Sample Number:** 7

△ **Source of Sample:** KW-4 **Depth:** 14.0 **Sample Number:** 8

◇ **Source of Sample:** KW-4 **Depth:** 16.0 **Sample Number:** 9

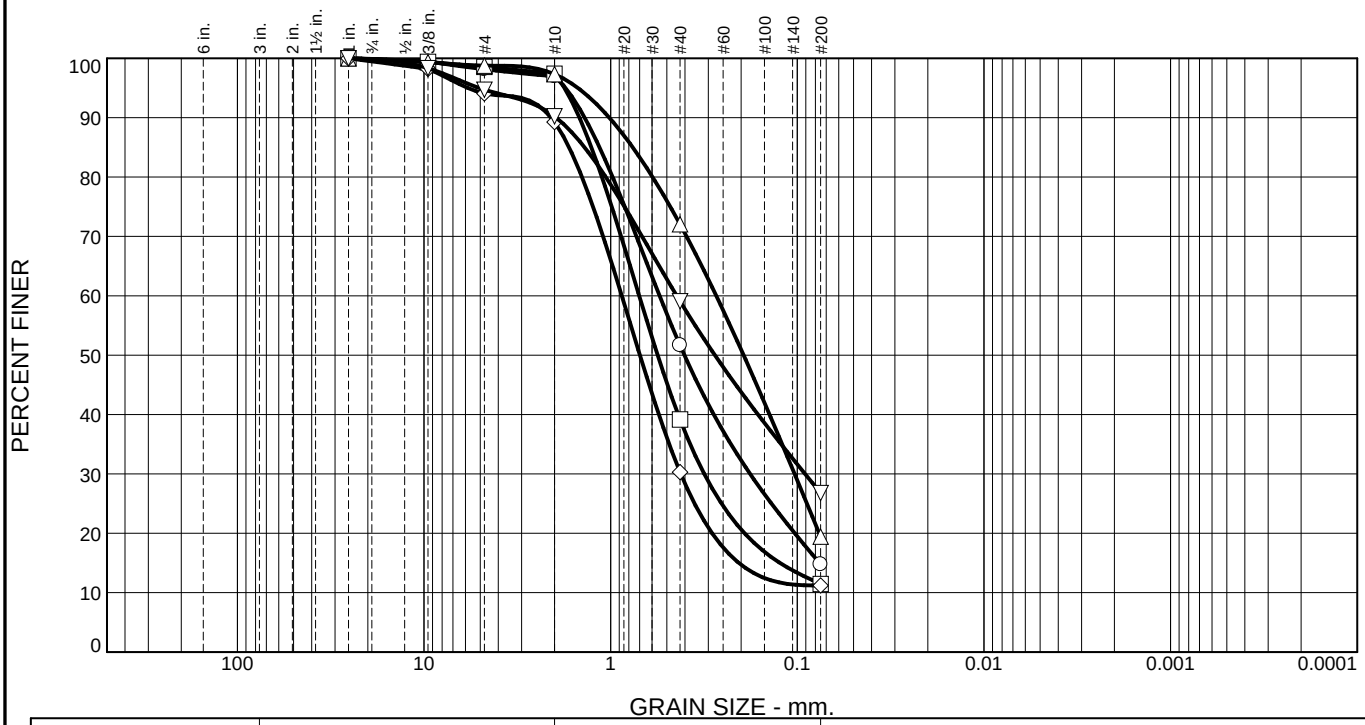
▽ **Source of Sample:** KW-4 **Depth:** 18.0 **Sample Number:** 10

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	3.0	45.3	36.9	14.8	
□	0.0	2.6	58.2	27.7	11.5	
△	0.0	2.7	25.3	52.6	19.4	
◇	0.0	10.7	59.0	19.1	11.2	
▽	0.0	9.8	31.1	32.3	26.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	1.1474	0.5468	0.4027	0.1790	0.0761			
□	NV	NP	1.2684	0.7032	0.5598	0.3152	0.1238			
△	NV	NP	0.7618	0.2718	0.1940	0.1035				
◇	NV	NP	1.6709	0.8718	0.6968	0.4211	0.2057			
▽	NV	NP	1.3798	0.4426	0.2764	0.0909				

Material Description	USCS	AASHTO
○ Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	SM	A-2-4(0)
□ Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	SP-SM	A-1-b
△ Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	SM	A-2-4(0)
◇ Wet medium dense brown coarse sand w/some fine sand, fine gravel and silt.	SP-SM	A-1-b
▽ Wet medium dense brown silty fine to coarse sand w/trace fine gravel.	SM	A-2-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-4 **Depth:** 24.0 **Sample Number:** 11

□ **Source of Sample:** KW-4 **Depth:** 29.0 **Sample Number:** 12

△ **Source of Sample:** KW-4 **Depth:** 34.0 **Sample Number:** 13

◇ **Source of Sample:** KW-4 **Depth:** 39.0 **Sample Number:** 14

▽ **Source of Sample:** KW-4 **Depth:** 44.0 **Sample Number:** 15

Remarks:

Delaware Department of Transportation
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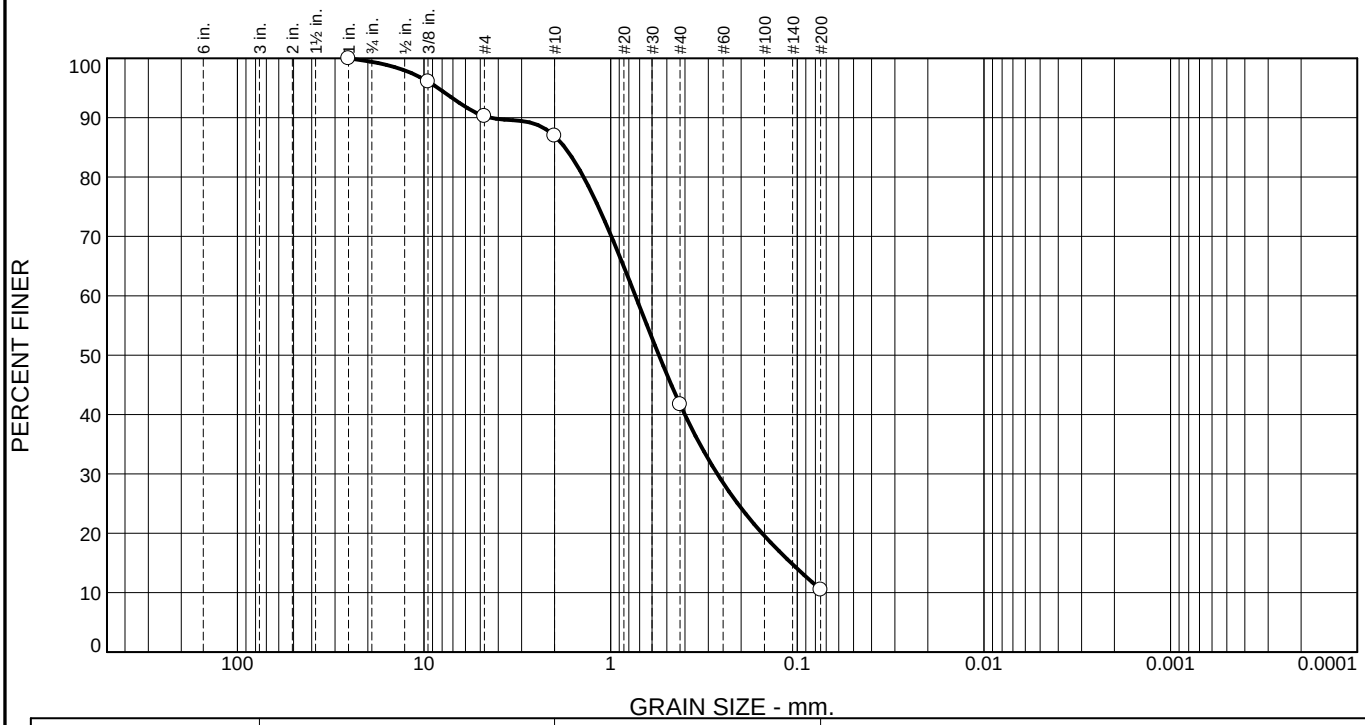
Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	13.1	45.2	31.2	10.5	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	1.7601	0.7373	0.5513	0.2682	0.1079			

Material Description	USCS	AASHTO
○ Wet dense brown coarse to fine sand w/some fine gravel and silt.	SP-SM	A-1-b

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

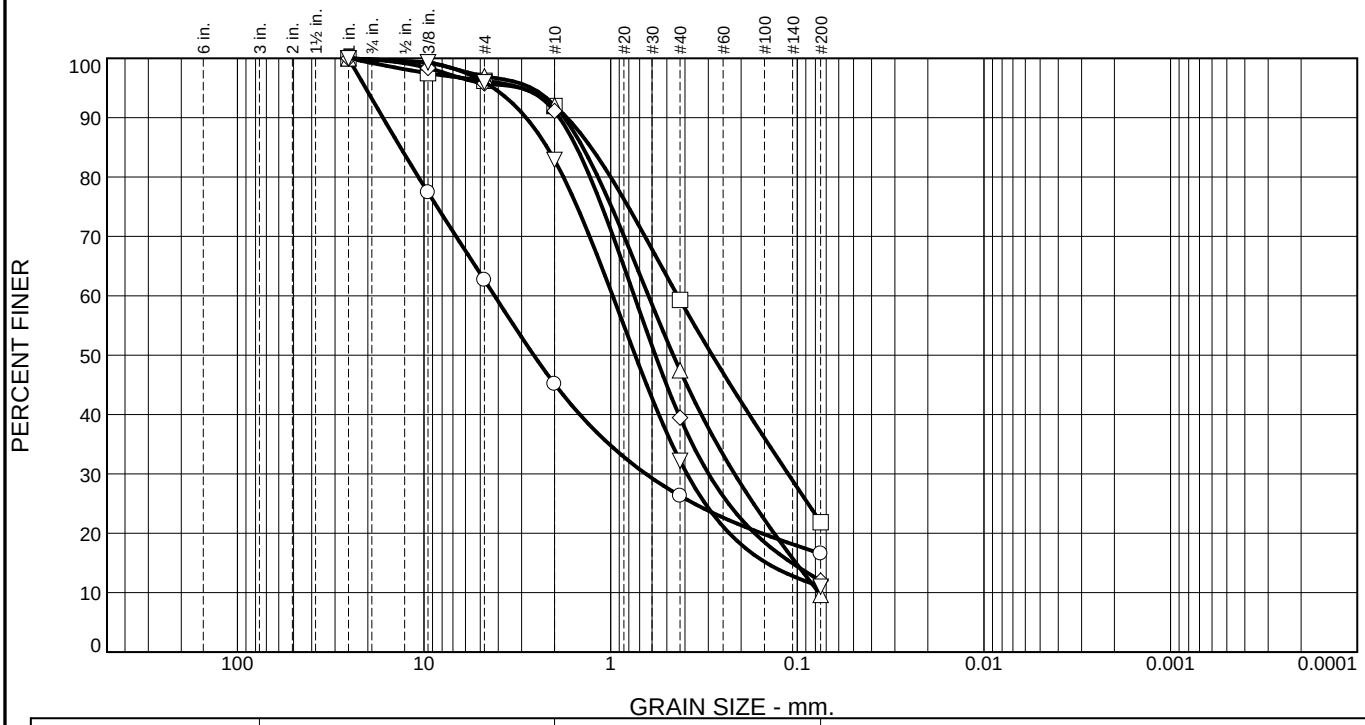
○ **Source of Sample:** KW-4 **Depth:** 48.0 **Sample Number:** 16

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	54.8	18.9	9.7	16.6	
□	0.0	8.0	32.7	37.4	21.9	
△	0.0	8.0	44.5	37.9	9.6	
◇	0.0	8.9	51.6	27.5	12.0	
▽	0.0	17.1	50.7	21.2	11.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	20.5	NP	13.3692	4.1848	2.5841	0.6476				
□	NV	NP	1.2747	0.4374	0.2856	0.1120				
△	NV	NP	1.4100	0.6273	0.4616	0.2169	0.1016	0.0767	0.98	8.18
◇	NV	NP	1.5227	0.7478	0.5761	0.2987	0.1068			
▽	NV	NP	2.1873	0.9757	0.7393	0.3901	0.1462			

Material Description	USCS	AASHTO
○ Moist medium dense black fine gravel w/ some coarse sand and silt, trace of fine sand.	SM	A-1-b
□ Moist loose brown silty fine to coarse sand w/trace fine gravel.	SM	A-2-4(0)
△ Moist medium dense brown coarse to fine sand w/trace fine gravel and silt.	SP-SM	A-1-b
◇ Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	SP-SM	A-1-b
▽ Moist medium dense brown coarse to fine sand w/some fine gravel and silt.	SP-SM	A-1-b

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-6 **Depth:** 0.0 **Sample Number:** 1

□ **Source of Sample:** KW-6 **Depth:** 2.0 **Sample Number:** 2

△ **Source of Sample:** KW-6 **Depth:** 4.0 **Sample Number:** 3

◇ **Source of Sample:** KW-6 **Depth:** 6.0 **Sample Number:** 4

▽ **Source of Sample:** KW-6 **Depth:** 8.0 **Sample Number:** 5

Remarks:

Delaware Department of Transportation
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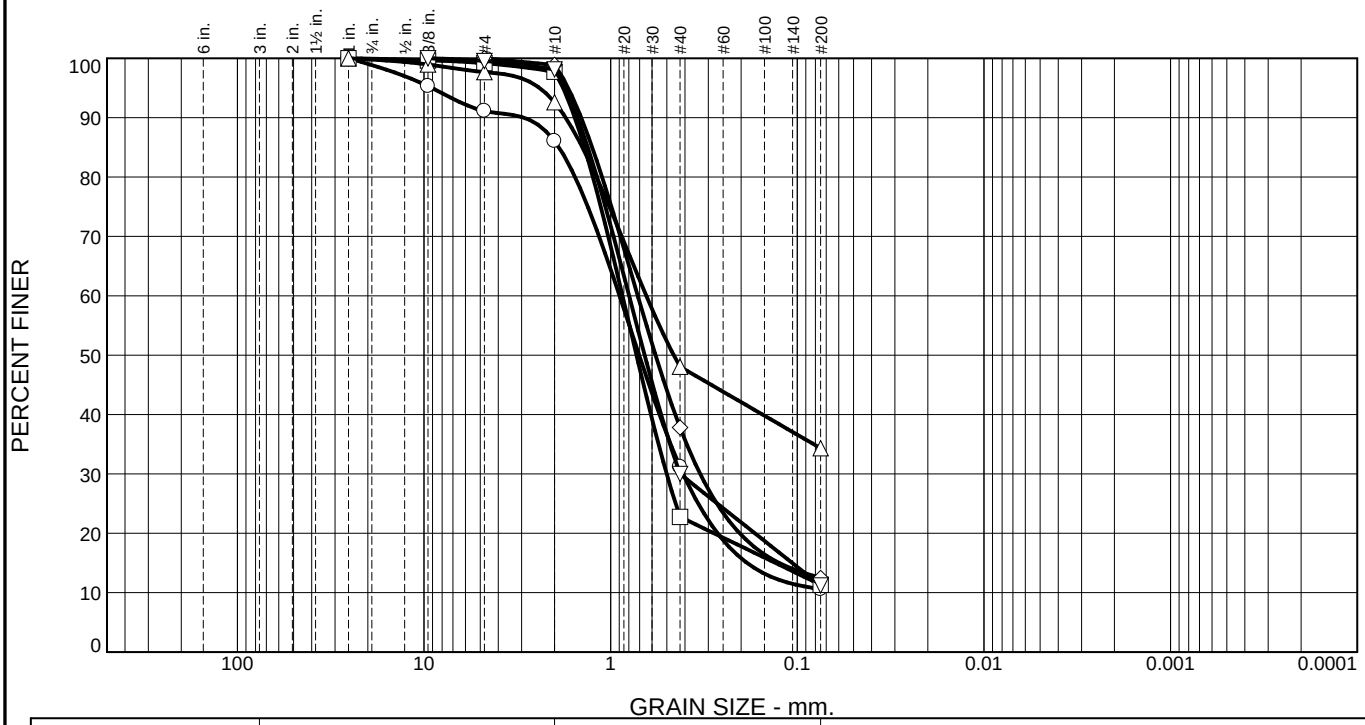
Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	13.9	54.9	20.6	10.6	
□	0.0	2.3	74.9	11.5	11.3	
△	0.0	7.4	44.5	13.8	34.3	
◇	0.0	1.1	61.1	25.3	12.5	
▽	0.0	1.9	68.1	18.8	11.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	1.8933	0.8963	0.7038	0.4088	0.1859			
□	NV	NP	1.3826	0.8642	0.7272	0.5011	0.1308			
△	30.9	20.5	1.4177	0.6443	0.4592					
◇	NV	NP	1.2563	0.7159	0.5747	0.3315	0.1250			
▽	NV	NP	1.3265	0.7966	0.6576	0.4251	0.1064			

Material Description	USCS	AASHTO
○ Moist medium dense brown coarse to fine sand w/some fine gravel and silt.	SP-SM	A-1-b
□ Moist medium dense brown coarse sand w/ some fine sand and silt, trace of fine gravel.	SP-SM	A-1-b
△ Moist loose brown clayey coarse sand w/ some fine sand and silt, trace of fine gravel.	SC	A-2-6(0)
◇ Moist medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	SM	A-1-b
▽ Moist medium dense brown coarse sand w/ some fine sand and silt, trace of fine gravel.	SP-SM	A-1-b

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-6 **Depth:** 10.0 **Sample Number:** 6

□ **Source of Sample:** KW-6 **Depth:** 12.0 **Sample Number:** 7

△ **Source of Sample:** KW-6 **Depth:** 14.0 **Sample Number:** 8

◇ **Source of Sample:** KW-6 **Depth:** 16.0 **Sample Number:** 9

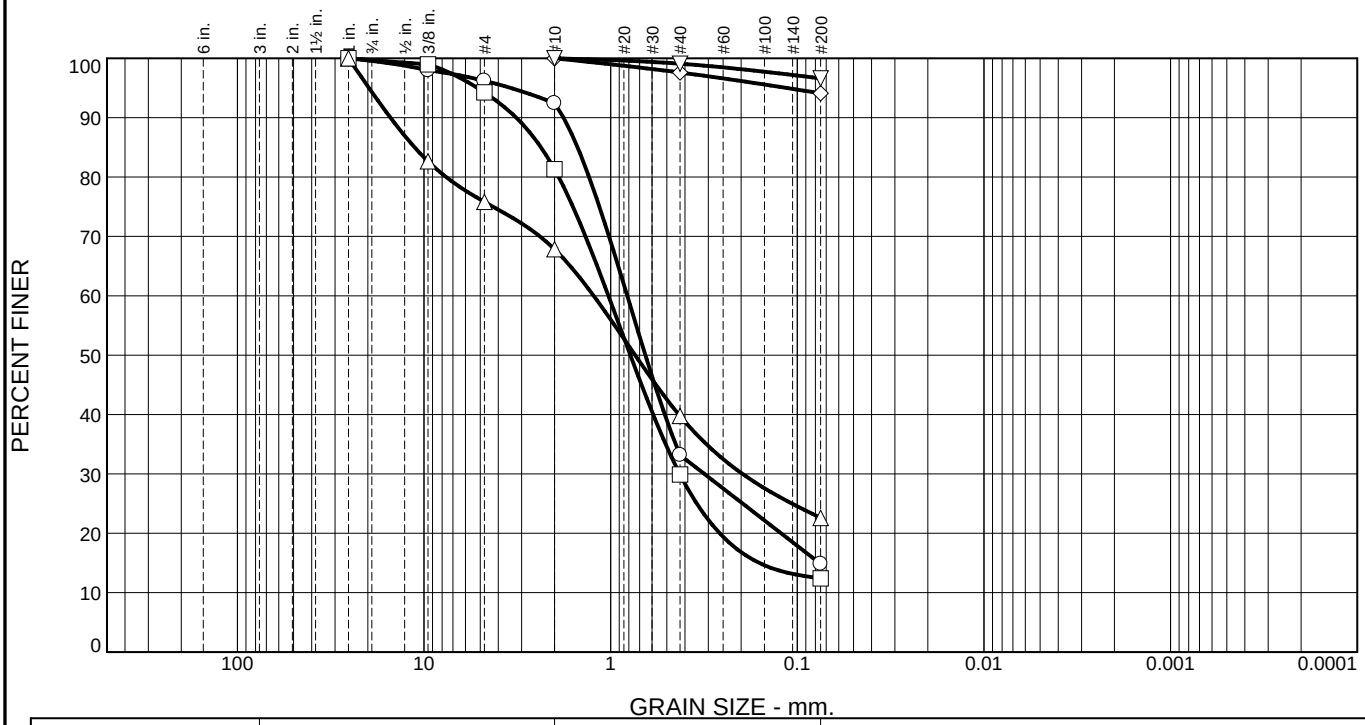
▽ **Source of Sample:** KW-6 **Depth:** 18.0 **Sample Number:** 10

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	7.6	59.2	18.4	14.8	
□	0.0	18.7	51.4	17.5	12.4	
△	0.0	32.2	28.0	17.2	22.6	
◇	0.0	0.0	2.4	3.5	94.1	
▽	0.0	0.0	0.9	2.5	96.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	1.5043	0.8149	0.6517	0.3148	0.0761			
□	NV	NP	2.3617	1.0284	0.7844	0.4267	0.1598			
△	24.6	17.8	11.2276	1.2331	0.7393	0.1967				
◇	43.2	19.8								
▽	35.8	19.0								

Material Description	USCS	AASHTO
○ Moist medium dense brown coarse sand w/ some fine sand and silt, trace of fine gravel.	SM	A-1-b
□ Moist medium dense brown coarse sand w/ some fine sand, fine gravel and silt.	SM	A-1-b
△ Moist medium dense brown clayey coarse sand and fine gravel w/some fine sand and silt.	SC-SM	A-2-4(0)
◇ Wet very stiff brown silty clay w/trace fine to coarse sand.	CL	A-7-6(23)
▽ Wet very stiff brown silty clay w/trace fine to coarse sand.	CL	A-6(17)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-6 **Depth:** 24.0 **Sample Number:** 11

□ **Source of Sample:** KW-6 **Depth:** 29.0 **Sample Number:** 12

△ **Source of Sample:** KW-6 **Depth:** 34.0 **Sample Number:** 13

◇ **Source of Sample:** KW-6 **Depth:** 39.0 **Sample Number:** 14

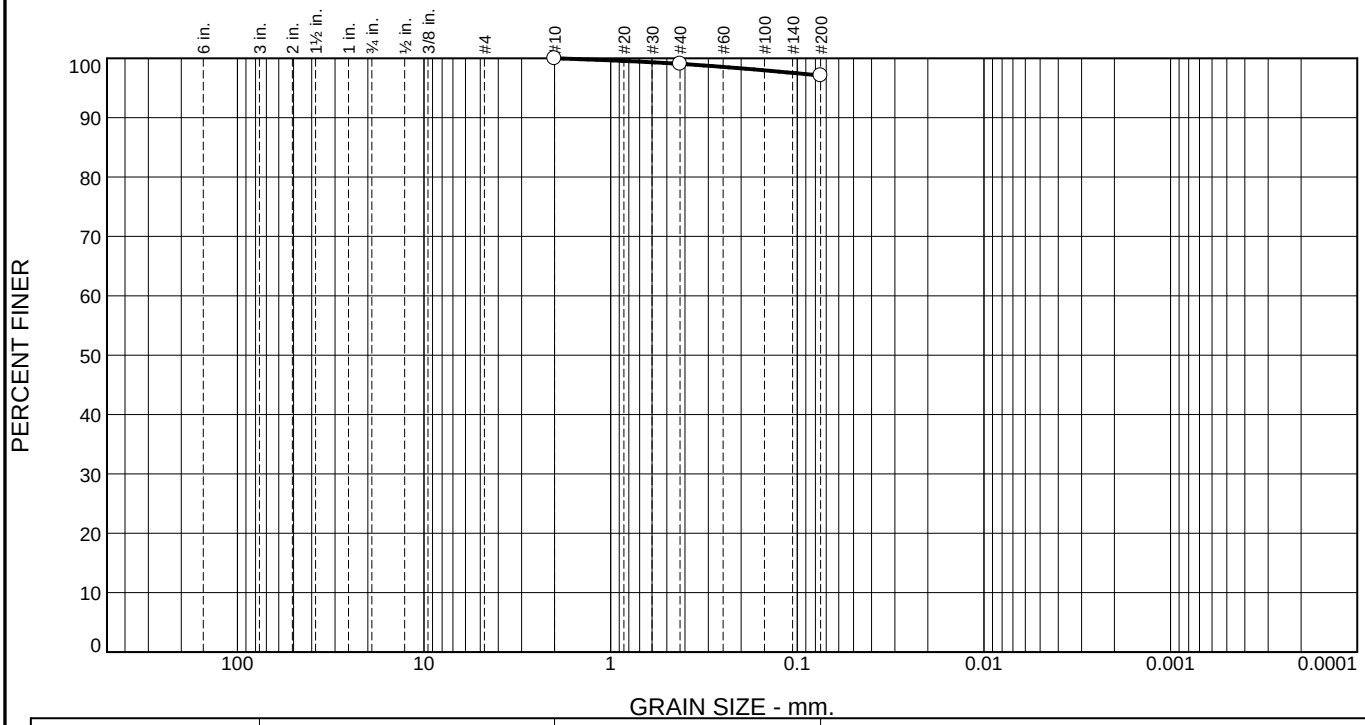
▽ **Source of Sample:** KW-6 **Depth:** 44.0 **Sample Number:** 15

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	0.0	0.9	2.0	97.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP								

Material Description	USCS	AASHTO
○ Wet very stiff brown silt w/trace fine to coarse sand.	ML	A-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

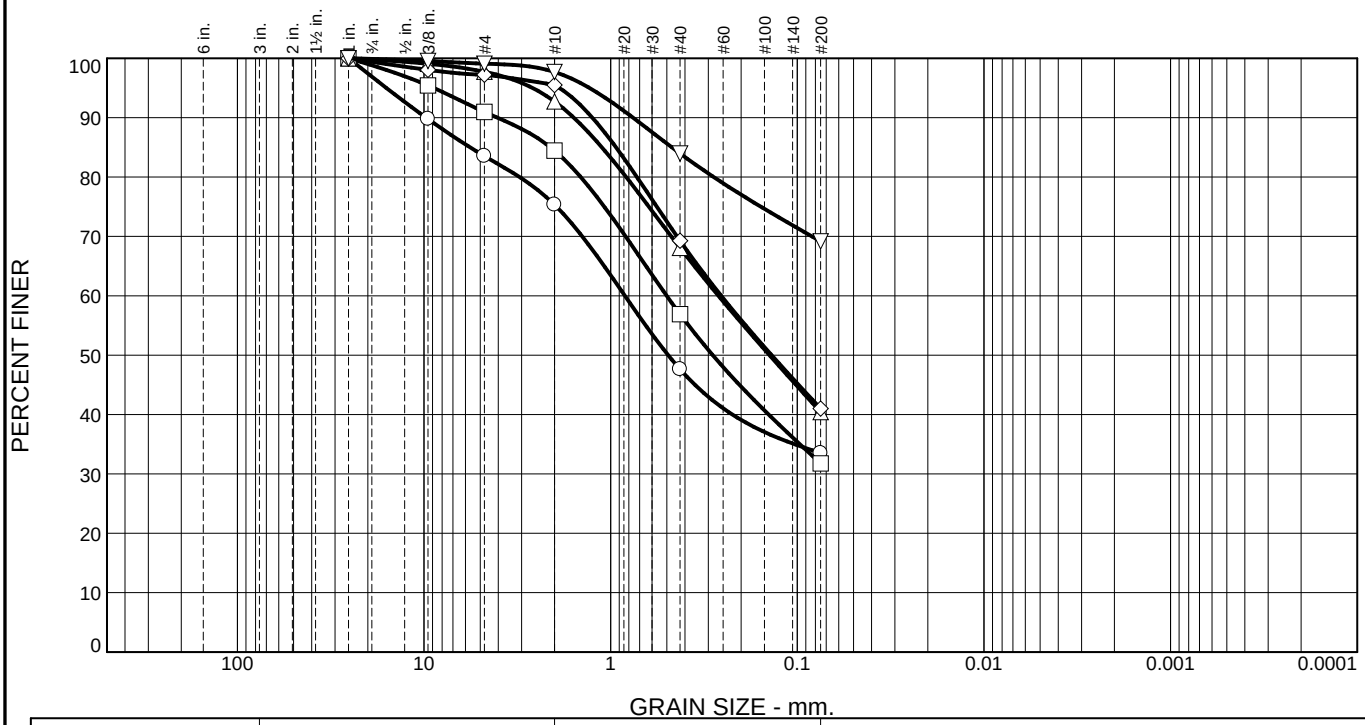
○ **Source of Sample:** KW-6 **Depth:** 48.0 **Sample Number:** 16

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	24.7	27.7	14.1	33.5	
□	0.0	15.5	27.6	25.1	31.8	
△	0.0	7.3	24.6	27.7	40.4	
◇	0.0	4.5	26.2	28.3	41.0	
▽	0.0	2.3	13.7	14.8	69.2	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	25.5	22.6	5.6587	0.8389	0.4920					
□	21.5	17.4	2.1002	0.5008	0.2837					
△	25.3	18.9	1.1142	0.2646	0.1410					
◇	23.9	18.2	0.9363	0.2556	0.1373					
▽	26.1	20.1	0.4698							

Material Description	USCS	AASHTO
○ Moist medium dense brown silty coarse sand and fine gravel w/some fine sand, trace of clay.	SM	A-2-4(0)
□ Moist medium dense brown coarse to fine sand w/some fine gravel, clay and silt.	SC-SM	A-2-4(0)
△ Moist very stiff brown clayey fine to coarse sandy silt w/trace fine gravel.	SC-SM	A-4(0)
◇ Moist very stiff brown clayey fine to coarse sandy silt w/trace fine gravel.	SC-SM	A-4(0)
▽ Wet very stiff brown clayey silt w/some fine to coarse sand, trace of fine gravel.	CL-ML	A-4(2)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-8 **Depth:** 0.0 **Sample Number:** 1

□ **Source of Sample:** KW-8 **Depth:** 2.0 **Sample Number:** 2

△ **Source of Sample:** KW-8 **Depth:** 4.0 **Sample Number:** 3

◇ **Source of Sample:** KW-8 **Depth:** 6.0 **Sample Number:** 4

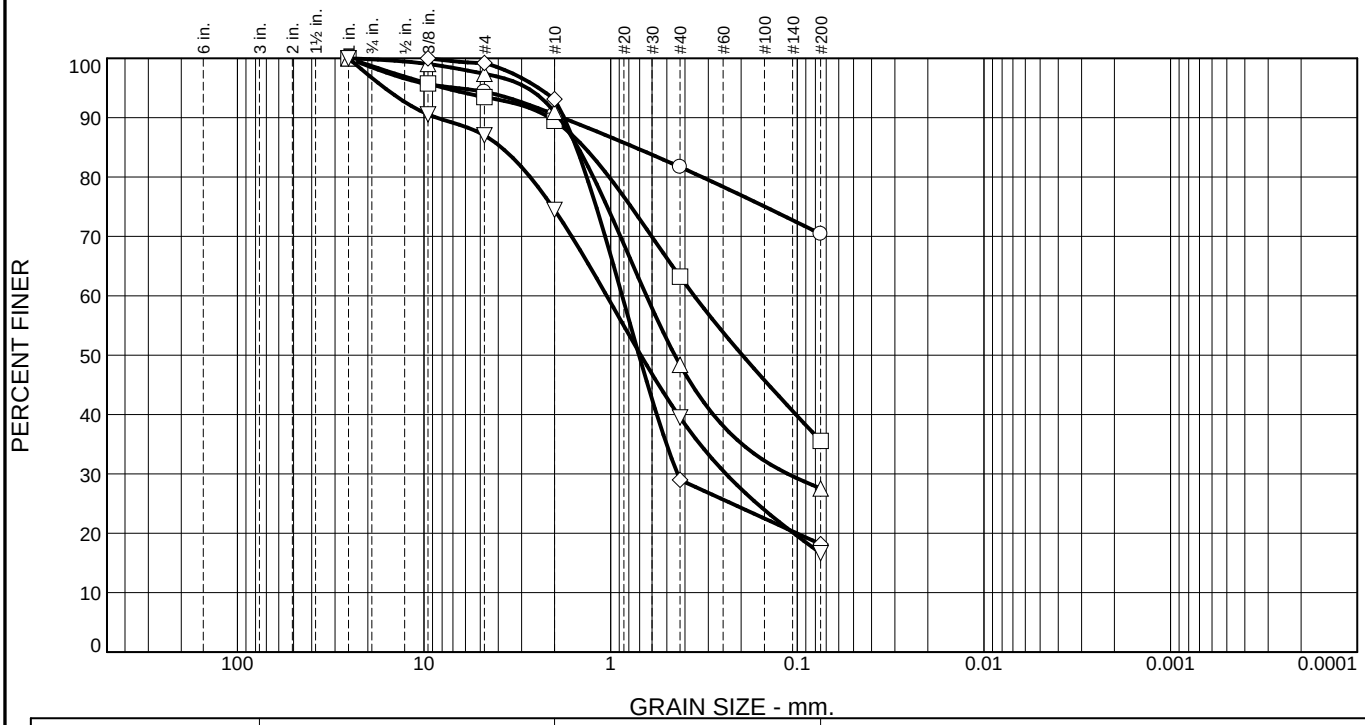
▽ **Source of Sample:** KW-8 **Depth:** 8.0 **Sample Number:** 5

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	9.5	8.8	11.3	70.4	
□	0.0	10.5	26.3	27.6	35.6	
△	0.0	9.0	42.6	20.9	27.5	
◇	0.0	6.9	64.1	10.8	18.2	
▽	0.0	25.5	35.0	22.9	16.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	27.8	NP	0.7414							
□	20.0	NP	1.3842	0.3567	0.1970					
△	NV	NP	1.4986	0.6431	0.4532	0.1123				
◇	NV	NP	1.5281	0.8678	0.7050	0.4380				
▽	NV	NP	3.8529	1.0498	0.6893	0.2410				

Material Description	USCS	AASHTO
○ Wet hard brown silt w/some fine sand, trace of coarse sand and fine gravel.	ML	A-4(0)
□ Wet hard brown fine to coarse sandy silt w/some fine gravel.	SM	A-4(0)
△ Wet medium dense brown silty coarse to fine sand w/trace fine gravel.	SM	A-2-4(0)
◇ Wet dense brown coarse sand w/some fine sand and silt, trace of fine gravel.	SM	A-1-b
▽ Wet medium dense brown coarse to fine sand and fine gravel w/some silt.	SM	A-1-b

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-8 **Depth:** 10.0 **Sample Number:** 6

□ **Source of Sample:** KW-8 **Depth:** 12.0 **Sample Number:** 7

△ **Source of Sample:** KW-8 **Depth:** 14.0 **Sample Number:** 8

◇ **Source of Sample:** KW-8 **Depth:** 16.0 **Sample Number:** 9

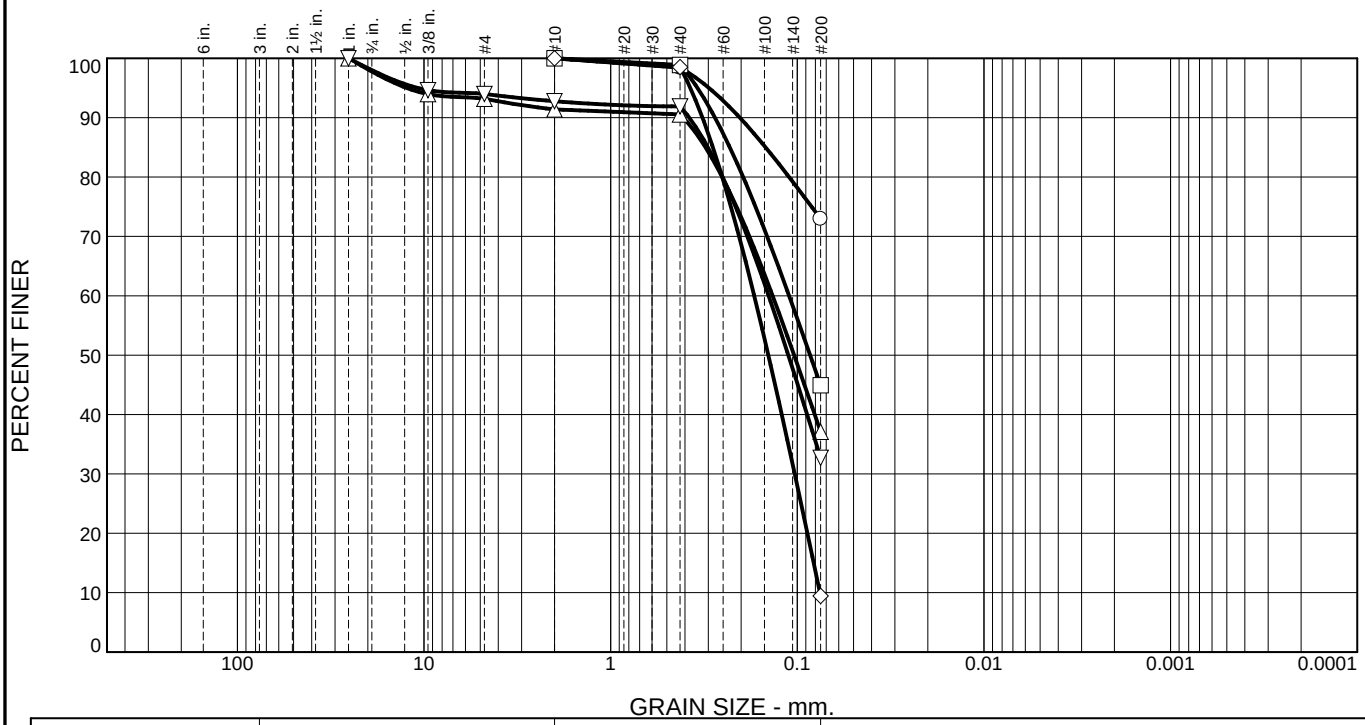
▽ **Source of Sample:** KW-8 **Depth:** 18.0 **Sample Number:** 10

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	0.0	1.6	25.4	73.0	
□	0.0	0.0	1.1	54.0	44.9	
△	0.0	8.6	0.9	53.4	37.1	
◇	0.0	0.0	1.5	89.1	9.4	
▽	0.0	7.2	0.9	59.2	32.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	31.5	22.8	0.1479							
□	15.6	NP	0.2299	0.1107	0.0854					
△	17.9	NP	0.3101	0.1356	0.1041					
◇	NV	NP	0.2833	0.1702	0.1430	0.1033	0.0817	0.0756	0.83	2.25
▽	20.6	NP	0.3012	0.1425	0.1118					

Material Description	USCS	AASHTO
○ Wet stiff brown clayey fine sandy silt w/some organic matter, trace of coarse sand.	CL	A-4(6)
□ Wet very stiff brown fine sandy silt w/ trace coarse sand.	SM	A-4(0)
△ Wet very stiff brown fine sandy silt w/ trace coarse sand and fine gravel.	SM	A-4(0)
◇ Wet dense brown fine sand w/trace coarse sand and silt.	SP-SM	A-3
▽ Wet very dense brown silty fine sand w/ trace coarse sand and fine gravel.	SM	A-2-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-8 **Depth:** 24.0 **Sample Number:** 11

□ **Source of Sample:** KW-8 **Depth:** 29.0 **Sample Number:** 12

△ **Source of Sample:** KW-8 **Depth:** 34.0 **Sample Number:** 13

◇ **Source of Sample:** KW-8 **Depth:** 39.0 **Sample Number:** 14

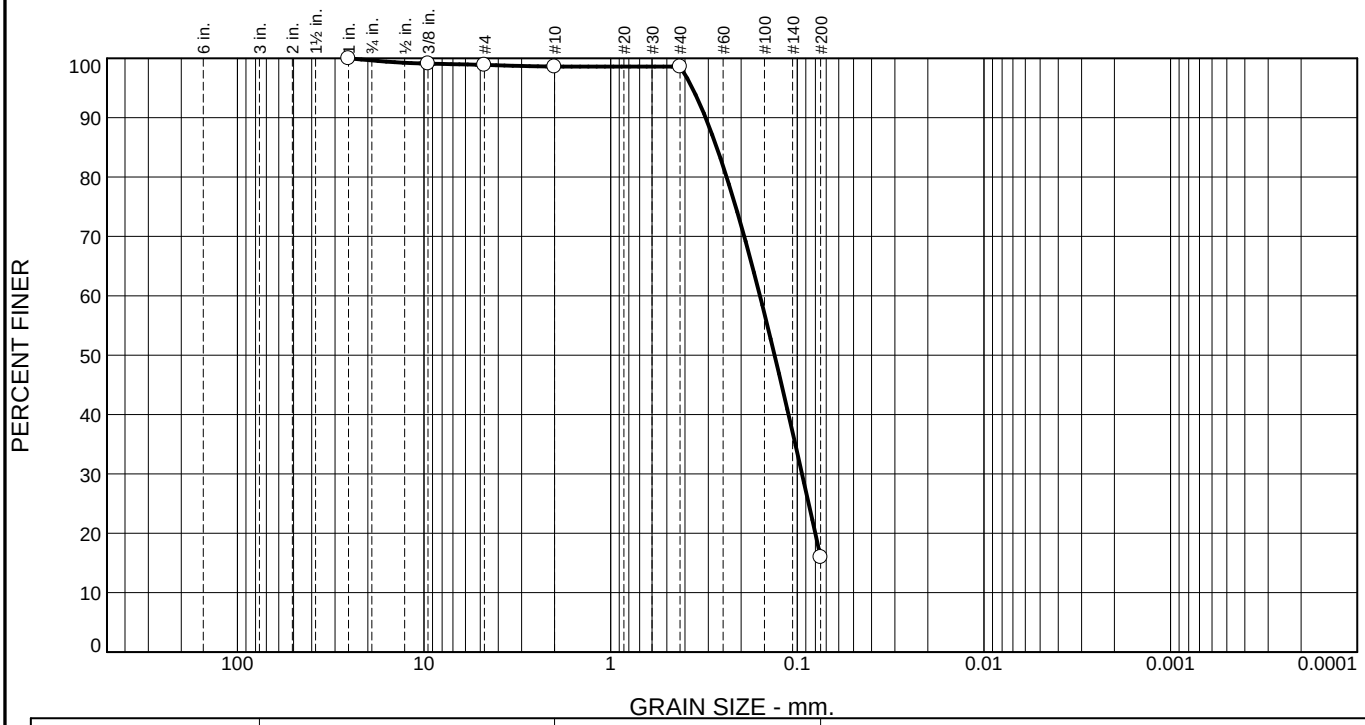
▽ **Source of Sample:** KW-8 **Depth:** 44.0 **Sample Number:** 15

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	1.4	0.0	82.6	16.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	0.2702	0.1586	0.1324	0.0944				

Material Description	USCS	AASHTO
○ Wet very dense brown fine sand w/some silt, trace of fine gravel.	SM	A-2-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

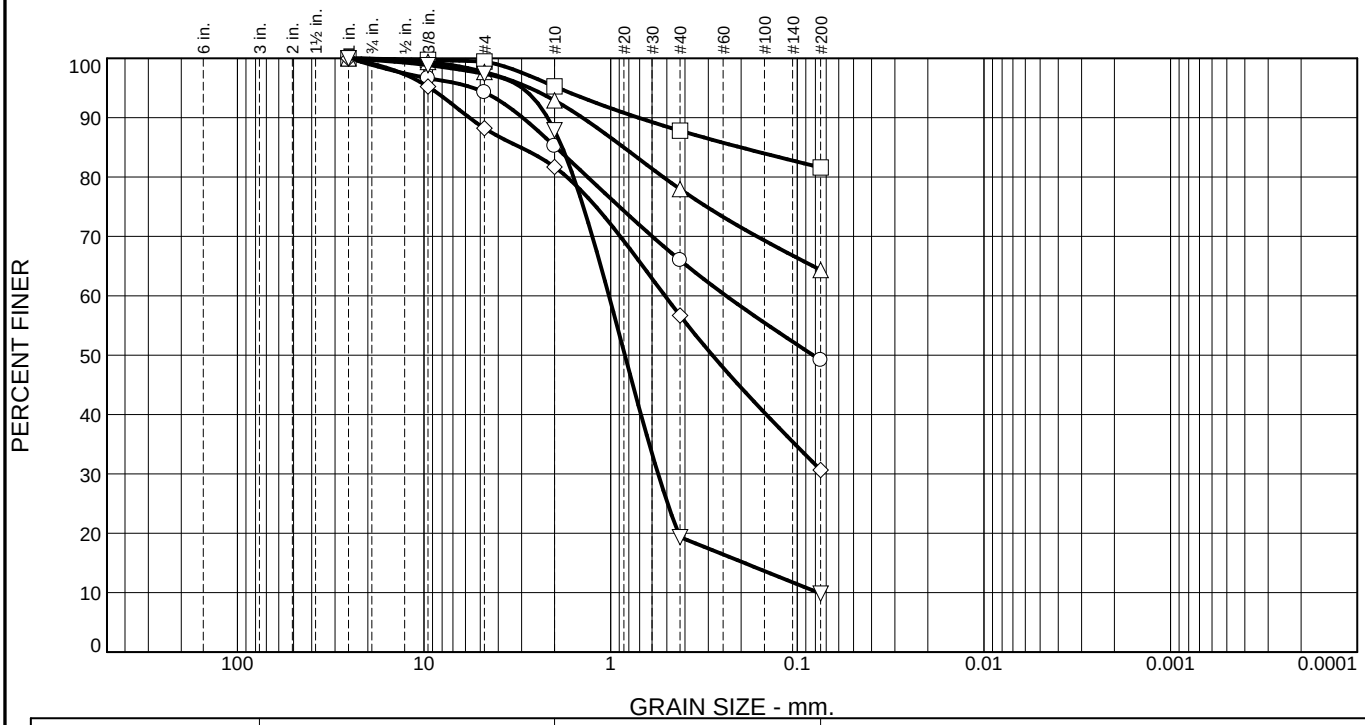
○ **Source of Sample:** KW-8 **Depth:** 48.0 **Sample Number:** 16

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	14.8	19.2	16.8	49.2	
□	0.0	4.7	7.5	6.2	81.6	
△	0.0	7.1	14.9	13.7	64.3	
◇	0.0	18.3	25.0	26.0	30.7	
▽	0.0	12.1	68.6	9.5	9.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	22.2	18.3	1.9642	0.2407	0.0823					
□	23.9	19.9	0.2014							
△	22.4	NP	0.8516							
◇	18.6	NP	3.0432	0.5117	0.2851					
▽	NV	NP	1.8180	1.0213	0.8392	0.5567	0.1921	0.0771	3.94	13.25

Material Description	USCS	AASHTO
○ Moist firm gray silt w/some coarse to fine sand, fine gravel and clay.	SC-SM	A-4(0)
□ Wet very stiff gray silt w/some clay, trace of coarse to fine sand, fine gravel and clay.	CL-ML	A-4(2)
△ Wet hard gray silt w/some coarse to fine sand, trace of fine gravel.	ML	A-4(0)
◇ Wet medium dense gray silty fine to coarse sand w/some fine gravel.	SM	A-2-4(0)
▽ Wet medium dense brown coarse sand w/some fine gravel, trace of fine sand and silt.	SP-SM	A-1-b

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-9 **Depth:** 0.0 **Sample Number:** 1

□ **Source of Sample:** KW-9 **Depth:** 2.0 **Sample Number:** 2

△ **Source of Sample:** KW-9 **Depth:** 4.0 **Sample Number:** 3

◇ **Source of Sample:** KW-9 **Depth:** 6.0 **Sample Number:** 4

▽ **Source of Sample:** KW-9 **Depth:** 8.0 **Sample Number:** 5

Remarks:

Delaware Department of Transportation
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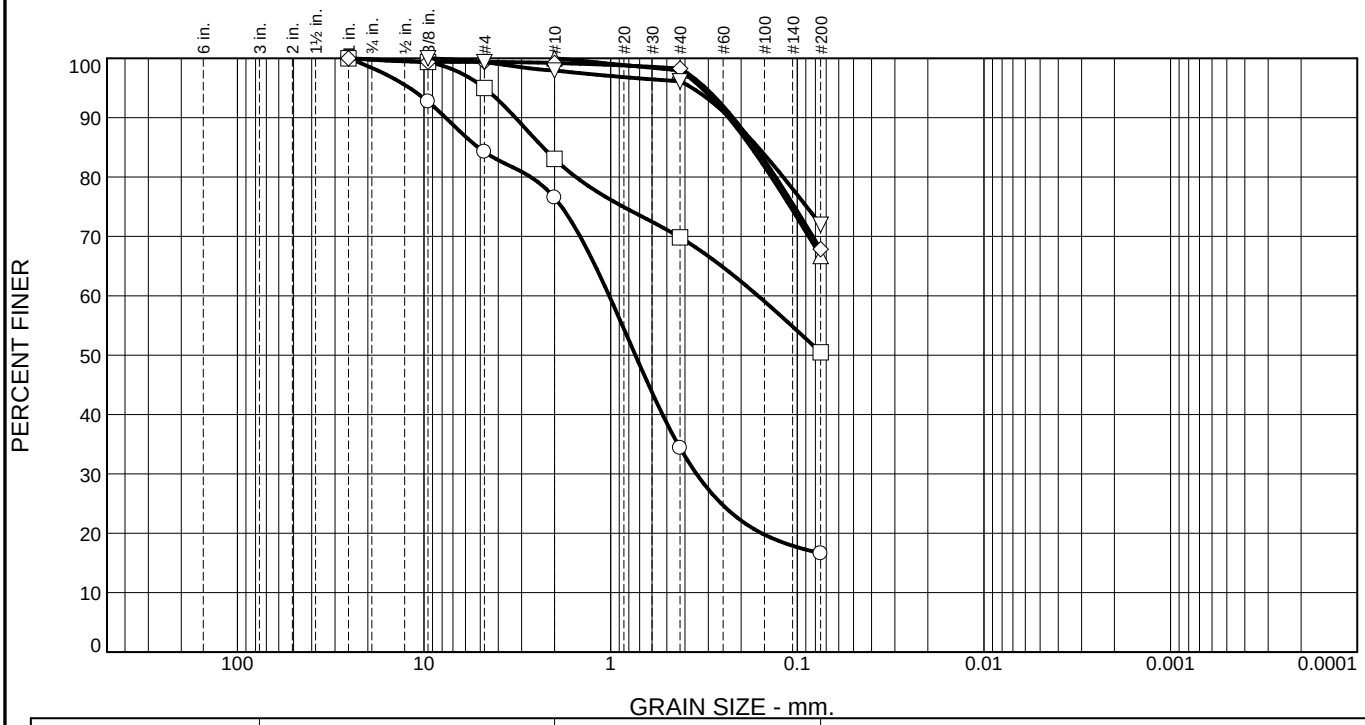
Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	23.5	42.1	17.8	16.6	
□	0.0	16.9	13.3	19.3	50.5	
△	0.0	0.0	2.0	31.3	66.7	
◇	0.0	0.8	0.9	30.4	67.9	
▽	0.0	2.1	1.8	24.1	72.0	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NV	NP	5.1284	1.0181	0.7372	0.3468				
□	29.8	23.7	2.3059	0.1625						
△	30.0	21.4	0.1767							
◇	29.9	21.8	0.1675							
▽	25.3	18.9	0.1621							

Material Description	USCS	AASHTO
○ Wet dense brown fine gravelly coarse sand w/some fine sand and silt.	SM	A-1-b
□ Wet stiff brown clayey silt w/some fine to coarse sand and fine gravel.	ML	A-4(1)
△ Wet stiff gray clayey fine sandy silt w/trace coarse sand.	CL	A-4(4)
◇ Wet stiff gray clayey fine sandy silt w/trace coarse sand and fine gravel.	CL	A-4(4)
▽ Wet stiff gray clayey fine sandy silt w/trace coarse sand and fine gravel.	CL-ML	A-4(2)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-9 **Depth:** 10.0 **Sample Number:** 6

□ **Source of Sample:** KW-9 **Depth:** 12.0 **Sample Number:** 7

△ **Source of Sample:** KW-9 **Depth:** 16.0 **Sample Number:** 8

◇ **Source of Sample:** KW-9 **Depth:** 18.0 **Sample Number:** 9

▽ **Source of Sample:** KW-9 **Depth:** 24.0 **Sample Number:** 10

Remarks:

Delaware Department of Transportation
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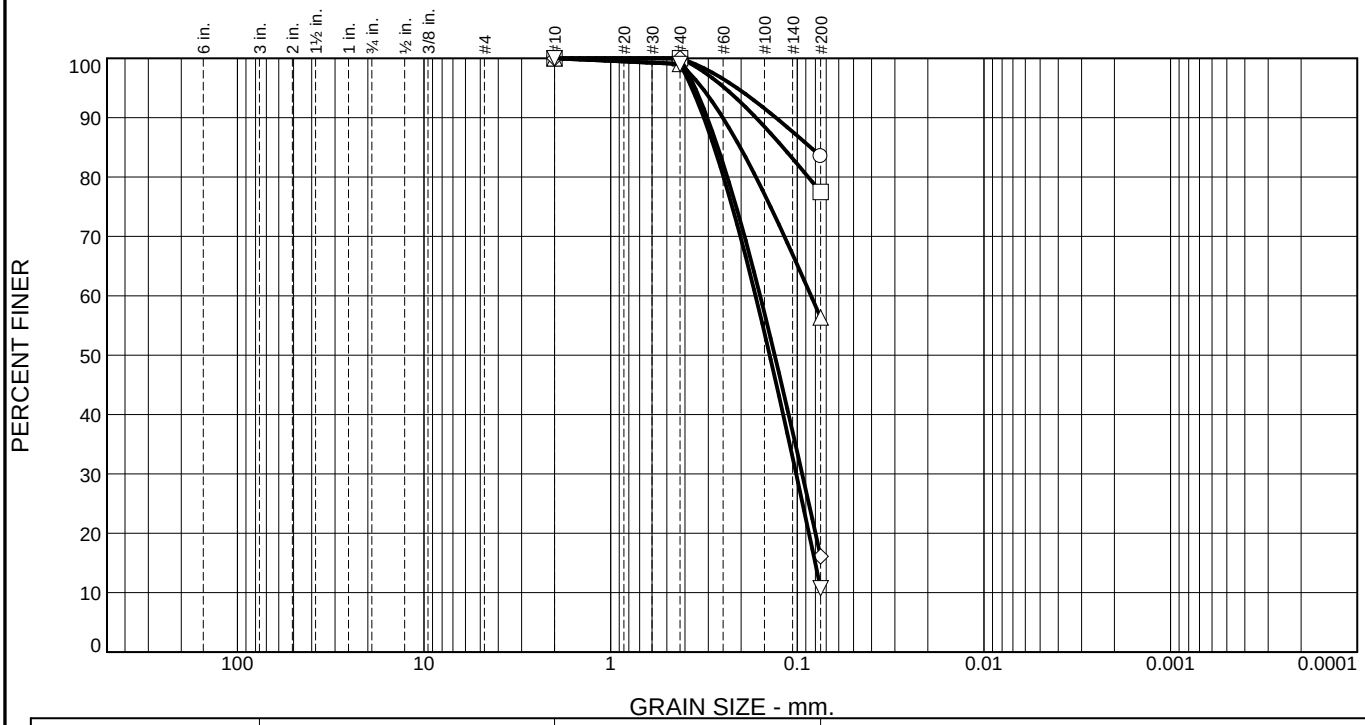
Figure

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	0.0	0.0	16.5	83.5	
□	0.0	0.0	0.0	22.5	77.5	
△	0.0	0.0	0.9	42.8	56.3	
◇	0.0	0.0	0.0	83.9	16.1	
▽	0.0	0.0	1.0	88.3	10.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21.6	16.9	0.0849							
□	22.9	16.3	0.1194							
△	16.7	NP	0.2022	0.0844						
◇	NV	NP	0.2667	0.1583	0.1322	0.0942				
▽	NV	NP	0.2787	0.1674	0.1406	0.1014	0.0801			

Material Description	USCS	AASHTO
○ Wet stiff gray silt w/some fine sand and clay.	CL-ML	A-4(2)
□ Wet stiff gray clayey fine sandy silt.	CL-ML	A-4(3)
△ Wet stiff brown fine sandy silt w/trace coarse sand.	ML	A-4(0)
◇ Wet very dense brown fine sand w/some silt.	SM	A-2-4(0)
▽ Wet very dense brown fine sand w/some silt, trace of coarse sand.	SP-SM	A-2-4(0)

Project No. T201809201 **Client:**

Project: SR1 Tybouts Left Exit

○ **Source of Sample:** KW-9 **Depth:** 29.0 **Sample Number:** 11

□ **Source of Sample:** KW-9 **Depth:** 34.0 **Sample Number:** 12

△ **Source of Sample:** KW-9 **Depth:** 39.0 **Sample Number:** 13

◇ **Source of Sample:** KW-9 **Depth:** 44.0 **Sample Number:** 14

▽ **Source of Sample:** KW-9 **Depth:** 48.0 **Sample Number:** 15

Remarks:

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Figure

BORING	SAMP_NU	DEPTH	DESCRIPT	LL	PI	NM	USCS	AASHTO
KW-2								
	1	0.0	Moist stiff b	24.4	5.3	14.3	SC-SM	A-4(0)
	2	2.0	Moist very	24.1	6.2	8.0	SC-SM	A-1-b
	3	4.0	Moist very	22.0	NP	14.1	SM	A-4(0)
	4	6.0	Wet very sl	29.1	6.3	22.6	ML	A-4(5)
	5	8.0	Wet very sl	26.9	4.3	20.4	ML	A-4(3)
	6	10.0	Wet dense	NV	NP	9.6	SM	A-1-b
	7	12.0	Wet mediu	NV	NP	11.1	SM	A-1-b
	8	14.0	Wet mediu	21.0	NP	12.9	SM	A-2-4(0)
	9	16.0	Wet mediu	18.7	NP	16.6	SM	A-2-4(0)
	10	18.0	Wet mediu	NV	NP	16.0	SM	A-2-4(0)
	11	24.0	Wet mediu	NV	NP	14.6	SM	A-1-b
	U-1	27.0						
	12	29.0	Wet stiff br	26.8	6.4	24.5	CL-ML	A-4(2)
	13	34.0	Wet stiff br	25.0	7.9	21.4	CL	A-4(5)
	14	39.0	Wet very sl	27.0	8.9	23.2	CL	A-4(6)
	15	44.0	Wet stiff br	21.2	3.3	20.6	ML	A-4(0)
	16	48.0	Wet stiff br	23.5	6.3	23.5	CL-ML	A-4(2)
		50.0	End Boring					
KW-3								
	1	0.0	Wet soft gr	25.8	NP	18.4	ML	A-4(0)
	2	2.0	Wet loose l	NV	NP	2.2	GM	A-1-b
	3	4.0	Wet loose l	22.2	4.3	15.7	SC-SM	A-2-4(0)
	4	6.0	Wet firm br	43.4	21.2	21.0	CL	A-7-6(7)
	5	8.0	Wet stiff gr	33.7	11.5	15.2	SC	A-6(2)
	6	10.0	Wet very sl	26.6	4.6	14.0	CL-ML	A-4(1)
	7	12.0	Wet firm br	33.8	10.3	20.8	SC	A-4(1)
	8	14.0	Wet stiff br	25.2	8.6	11.5	SC	A-4(0)
	9	16.0	Wet hard b	24.5	7.6	9.9	SC-SM	A-4(0)
	10	18.0	Wet very sl	26.3	9.2	12.1	SC	A-4(2)
	11	23.0	Wet very d	NV	NP	4.5	GM	A-2-4(0)
	12	28.0	Wet firm br	27.0	7.9	13.6	CL	A-4(3)
	13	33.0	Wet stiff br	18.8	NP	10.8	ML	A-4(0)
	14	38.0	Wet stiff br	24.0	NP	11.7	SM	A-4(0)
	15	43.0	Wet mediu	NV	NP	7.4	SM	A-2-4(0)
	16	48.0	Wet mediu	NV	NP	6.5	SM	A-2-4(0)
		50.0	End Boring					
KW-4								
	1	0.0	Wet soft gr	24.7	5.5	17.8	CL-ML	A-4(1)
	2	2.0	Wet stiff br	30.0	8.2	14.3	CL	A-4(2)
	3	4.0	Wet very sl	24.4	6.6	12.1	SC-SM	A-4(0)
	4	6.0	Wet very sl	22.5	4.9	10.5	SC-SM	A-4(0)
	5	8.0	Wet hard b	24.6	3.4	10.6	CL-ML	A-4(0)
	6	10.0	Wet very sl	24.9	4.9	13.7	CL-ML	A-4(0)
	7	12.0	Wet hard b	28.2	7.8	12.7	CL	A-4(3)
	8	14.0	Wet mediu	NV	NP	3.4	SP-SM	A-1-b
	9	16.0	Wet mediu	NV	NP	7.0	SM	A-1-b
	10	18.0	Wet mediu	NV	NP	5.9	SM	A-1-b
	11	24.0	Wet mediu	NV	NP	7.1	SM	A-2-4(0)
	12	29.0	Wet mediu	NV	NP	6.5	SP-SM	A-1-b

	13	34.0	Wet mediu	NV	NP	9.3	SM	A-2-4(0)
	14	39.0	Wet mediu	NV	NP	8.8	SP-SM	A-1-b
	15	44.0	Wet mediu	NV	NP	21.8	SM	A-2-4(0)
	16	48.0	Wet dense	NV	NP	18.7	SP-SM	A-1-b
		50.0	End Boring					
KW-6								
	1	0.0	Moist medi	20.5	NP	7.2	SM	A-1-b
	2	2.0	Moist loose	NV	NP	9.3	SM	A-2-4(0)
	3	4.0	Moist medi	NV	NP	5.3	SP-SM	A-1-b
	4	6.0	Moist medi	NV	NP	6.2	SP-SM	A-1-b
	5	8.0	Moist medi	NV	NP	7.8	SP-SM	A-1-b
	6	10.0	Moist medi	NV	NP	6.4	SP-SM	A-1-b
	7	12.0	Moist medi	NV	NP	4.4	SP-SM	A-1-b
	8	14.0	Moist loose	30.9	10.4	13.0	SC	A-2-6(0)
	9	16.0	Moist medi	NV	NP	6.4	SM	A-1-b
	10	18.0	Moist medi	NV	NP	6.3	SP-SM	A-1-b
	11	24.0	Moist medi	NV	NP	7.1	SM	A-1-b
	12	29.0	Moist medi	NV	NP	13.3	SM	A-1-b
	13	34.0	Moist medi	24.6	6.8	13.1	SC-SM	A-2-4(0)
	14	39.0	Wet very s	43.2	23.4	19.1	CL	A-7-6(23)
	15	44.0	Wet very s	35.8	16.8	17.5	CL	A-6(17)
	16	48.0	Wet very s	NV	NP	19.7	ML	A-4(0)
		50.0	End Boring					
KW-8								
	1	0.0	Moist medi	25.5	2.9	11.8	SM	A-2-4(0)
	2	2.0	Moist medi	21.5	4.1	9.4	SC-SM	A-2-4(0)
	3	4.0	Moist very	25.3	6.4	10.4	SC-SM	A-4(0)
	4	6.0	Moist very	23.9	5.7	13.3	SC-SM	A-4(0)
	5	8.0	Wet very s	26.1	6.0	15.0	CL-ML	A-4(2)
	6	10.0	Wet hard b	27.8	NP	18.3	ML	A-4(0)
	7	12.0	Wet hard b	20.0	NP	11.7	SM	A-4(0)
	8	14.0	Wet mediu	NV	NP	10.3	SM	A-2-4(0)
	9	16.0	Wet dense	NV	NP	9.8	SM	A-1-b
	10	18.0	Wet mediu	NV	NP	12.3	SM	A-1-b
	11	24.0	Wet stiff br	31.5	8.7	25.4	CL	A-4(6)
	U-1	27.0						
	12	29.0	Wet very s	15.6	NP	18.9	SM	A-4(0)
	13	34.0	Wet very s	17.9	NP	21.6	SM	A-4(0)
	14	39.0	Wet dense	NV	NP	23.6	SP-SM	A-3
	15	44.0	Wet very d	20.6	NP	20.2	SM	A-2-4(0)
	16	48.0	Wet very d	NV	NP	22.7	SM	A-2-4(0)
		50.0	End Boring					
KW-9								
	1	0.0	Moist firm g	22.2	3.9	13.1	SC-SM	A-4(0)
	2	2.0	Wet very s	23.9	4.0	15.5	CL-ML	A-4(2)
	3	4.0	Wet hard g	22.4	NP	12.8	ML	A-4(0)
	4	6.0	Wet mediu	18.6	NP	12.2	SM	A-2-4(0)
	5	8.0	Wet mediu	NV	NP	11.7	SP-SM	A-1-b
	6	10.0	Wet dense	NV	NP	12.0	SM	A-1-b
	7	12.0	Wet stiff br	29.8	6.1	23.0	ML	A-4(1)
	U-1	14.0						

8	16.0	Wet stiff gr	30.0	8.6	23.9	CL	A-4(4)
9	18.0	Wet stiff gr	29.9	8.1	24.3	CL	A-4(4)
10	24.0	Wet stiff gr	25.3	6.4	21.3	CL-ML	A-4(2)
11	29.0	Wet stiff gr	21.6	4.7	17.8	CL-ML	A-4(2)
12	34.0	Wet stiff gr	22.9	6.6	16.0	CL-ML	A-4(3)
13	39.0	Wet stiff br	16.7	NP	22.9	ML	A-4(0)
14	44.0	Wet very d	NV	NP	24.7	SM	A-2-4(0)
15	48.0	Wet very d	NV	NP	22.6	SP-SM	A-2-4(0)
	50.0	End Boring					

PER10	PER200	BLOWS1	BLOWS2	BLOWS3	BLOWS4
79.3	38.9	2	4	5	9
63.4	25.3	8	29	30	16
87.8	45.4	16	16	11	11
100.0	91.0	12	12	12	14
100.0	90.1	5	7	10	13
92.3	22.0	18	18	18	16
94.0	19.5	11	12	10	10
93.9	27.8	7	10	11	12
100.0	32.2	8	9	9	11
100.0	26.0	8	8	9	16
64.1	18.6	8	8	9	11
100.0	61.0	8	7	7	9
100.0	86.4	3	6	10	12
100.0	81.1	4	7	11	15
100.0	65.7	4	5	8	11
100.0	59.0	5	7	8	12
94.2	53.7	1	2	2	2
46.5	18.5	3	4	3	4
80.6	28.3	4	4	4	4
87.5	50.0	1	2	6	8
73.4	46.4	5	5	8	8
80.5	52.6	7	9	13	19
85.7	41.7	2	2	3	4
91.0	37.3	4	5	5	5
90.0	40.1	11	16	23	26
90.2	49.6	7	7	13	12
58.5	34.0	50/2			
100.0	61.1	3	3	3	5
100.0	55.9	8	7	7	9
97.7	43.4	7	7	8	9
100.0	20.5	4	5	8	7
100.0	21.0	4	5	9	14
84.8	58.8	2	2	2	5
96.5	56.9	6	6	5	7
92.5	42.7	7	8	9	9
93.3	35.9	9	12	14	16
94.1	57.0	7	16	18	19
78.0	51.8	10	12	13	17
89.3	60.9	12	14	16	19
85.2	5.9	10	12	13	15
98.1	16.2	7	8	9	11
95.9	13.9	7	8	9	8
97.0	14.8	9	9	10	12
97.4	11.5	12	12	12	16

97.3	19.4	12	12	14	17
89.3	11.2	8	12	14	19
90.2	26.8	6	6	12	14
86.9	10.5	17	19	20	21
45.2	16.6	13	12	11	7
92.0	21.9	9	13	15	17
92.0	9.6	7	11	11	12
91.1	12.0	10	9	7	9
82.9	11.0	6	5	6	7
86.1	10.6	5	7	6	6
97.7	11.3	7	6	7	8
92.6	34.3	8	5	5	5
98.9	12.5	8	8	8	9
98.1	11.2	10	7	8	8
92.4	14.8	10	8	9	8
81.3	12.4	9	9	9	9
67.8	22.6	13	13	12	7
100.0	94.1	6	11	31	19
100.0	96.6	5	10	13	17
100.0	97.1	5	10	15	15
75.3	33.5	2	3	8	12
84.5	31.8	10	8	9	14
92.7	40.4	3	9	10	10
95.5	41.0	12	12	15	16
97.7	69.2	4	9	9	18
90.5	70.4	13	15	16	13
89.5	35.6	5	15	17	21
91.0	27.5	5	20	20	25
93.1	18.2	13	18	14	16
74.5	16.6	17	16	13	23
100.0	73.0	3	5	9	18
100.0	44.9	10	12	15	13
91.4	37.1	5	13	15	17
100.0	9.4	13	19	21	23
92.8	32.7	13	21	50	
98.6	16.0	20	35	50/4	
85.2	49.2	5	4	4	3
95.3	81.6	8	8	15	7
92.9	64.3	6	16	18	18
81.7	30.7	13	14	15	12
87.9	9.8	6	8	9	8
76.5	16.6	12	18	22	17
83.1	50.5	3	6	3	3

100.0	66.7	4	5	5	6
99.2	67.9	7	8	8	9
97.9	72.0	7	7	6	5
100.0	83.5	4	6	7	7
100.0	77.5	3	5	10	12
100.0	56.3	2	8	5	7
100.0	16.1	12	22	30	28
100.0	10.7	16	20	30	30