APPENDIX A

Geotechnical Data

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N

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Scale: 1" = 400'

SOURCE: AERIAL IMAGERY FLOWN 2018 BY GOOGLE.

Legend

- Completed Boring and Well
- Completed Boring
- PDR Boring
- Phase I
- General Subsurface Profile Section

PHASE I BORINGS

Ardaman & Associates, Inc.
Geotechnical, Environmental, and Materials Consultants
A Tetra Tech Company

WEST LYNN SEWER SEPARATION
LYNN, MASSACHUSETTS

DRAWN BY: TJC	CHECKED BY: RR	DATE: 04-10-19
PROJECT: 18-13-0095	APPROVED BY:	FIGURE: 3

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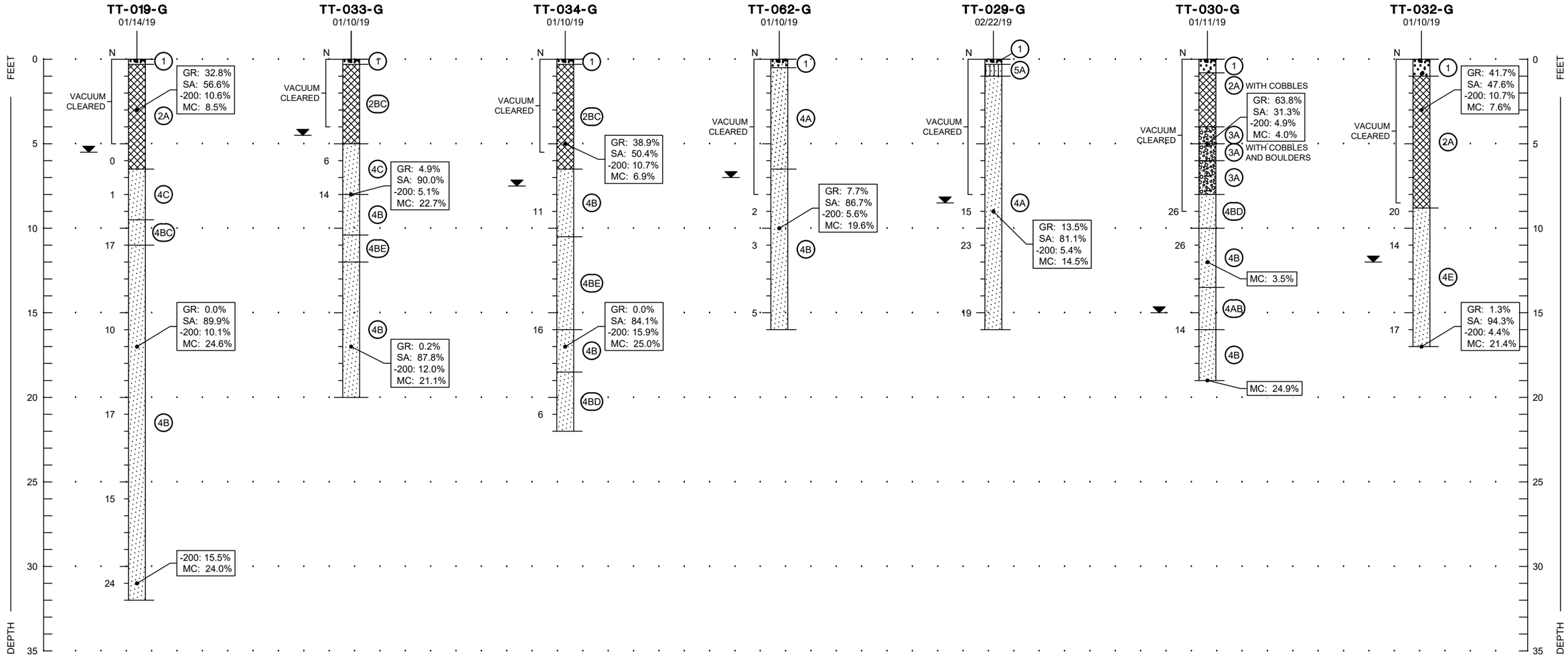

LEGEND

MATERIAL TYPE

1. ASPHALT AND BASE MATERIALS
2. URBAN FILL
3. SANDY GRAVEL TO GRAVELLY SAND
4. SAND TO SILTY SAND (FINE TO MEDIUM)
5. SANDY SILT

COLORS

A. BROWN
B. TAN
C. GRAY
D. OLIVE
E. ORANGE

N — STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
MC — NATURAL MOISTURE CONTENT IN PERCENT
-200 — PERCENT PASSING NO. 200 SIEVE SIZE (PERCENT FINES)
GR — GRAVEL CONTENT IN PERCENT
SA — SAND CONTENT IN PERCENT
▼ — GROUNDWATER LEVEL MEASURED AT TIME OF DRILLING

NOTES:
1. ALL SPT BORINGS WERE PERFORMED USING AN AUTOMATIC HAMMER TO THE BORING TERMINATION DEPTH.
2. UPON COMPLETION OF EACH SPT BORING, THE BOREHOLE WAS BACKFILLED WITH SOIL CUTTINGS.

ENGINEERING CLASSIFICATION

COHESIONLESS SOILS

DESCRIPTION	BLOW COUNT "N"
VERY LOOSE	<4
LOOSE	4 TO 10
MEDIUM DENSE	10 TO 30
DENSE	30 TO 50
VERY DENSE	>50

WHILE THE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOGS AND RELATED INFORMATION ARE BASED ON THE DRILLER'S LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELINEATION BETWEEN SOIL TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED.

GROUNDWATER ELEVATIONS SHOWN ON THE BORING LOGS REPRESENT GROUNDWATER SURFACES ENCOUNTERED ON THE DATES SHOWN. FLUCTUATIONS IN WATER TABLE LEVELS SHOULD BE ANTICIPATED THROUGHOUT THE YEAR.

GENERALIZED
SOIL BORING PROFILE

Ardaman & Associates, Inc.
Geotechnical, Environmental, and Materials Consultants
A Tetra Tech Company

WEST LYNN SEWER SEPARATION
LYNN, MASSACHUSETTS

DRAWN BY: CD	CHECKED BY:	DATE: 04/25/19
FILE NO. 18-13-0095	APPROVED BY:	FIGURE: 4

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ATTACHMENT 1

BORING LOGS

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BORING NUMBER B-01

TETRA TECH

CLIENT Stantec Consulting Services, Inc.
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18001
PROJECT LOCATION Lynn, Massachusetts
DATE STARTED 5/8/18 **COMPLETED** 5/8/18
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 9.0 ft
LOGGED BY A. Ranieri **CHECKED BY** C. Nitchie
AT END OF DRILLING NM
NOTES 0-7' vac truck
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL	0.8	ASPHALT	
	GB SS-1			FILL	2.5	Brown fine-to-coarse SAND, little gravel, coal, moist, no odor, fill.	
5	GB SS-2			SW	9.0	Brown fine-to-coarse SAND, little gravel, moist, no odor.	0.0
10	AU SS-3	63	5-8-9-8 (17)	SW	14.0	Brown fine-to-coarse SAND, trace gravel, wet, no odor.	0.0
15	AU SS-4	75	4-6-8-8 (14)	SP	16.0	Brown fine-to-coarse SAND, trace gravel and silt, wet, no odor.	0.0
						Bottom of hole at 16.0 feet.	

GENERAL BH / TP / WELL 2018-05-14_BORING LOGS.GPJ GINT STD US LAB.GDT 4/25/19

BORING NUMBER B-03

TETRA TECH

CLIENT Stantec Consulting Services, Inc.
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18001
PROJECT LOCATION Lynn, Massachusetts
DATE STARTED 5/8/18 **COMPLETED** 5/8/18
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 9.0 ft
LOGGED BY A. Ranieri **CHECKED BY** C. Nitchie
AT END OF DRILLING NM
NOTES 0-7' vac truck
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL		0.5 ASPHALT	
	GB SS-1			FILL		Dark brown fine-to-coarse SAND, little gravel, trace silt, brick fragments, moist, no odor, fill. 2.5	0.0
5	GB SS-2			SP		Brown fine-to-coarse SAND, little gravel, moist, no odor. 9.0	0.0
10	AU SS-3	63	4-6-7-9 (13)	SP-SM		Light brown fine-to-coarse SAND, some gravel, wet, no odor. 14.0	0.0
15	AU SS-4	83	8-9-11-13 (20)	SP-SM		Brown to gray fine-to-coarse SAND, little gravel and trace silt, wet, no odor. 16.0	0.0
						Bottom of hole at 16.0 feet.	

GENERAL BH / TP / WELL 2018-05-14_BORING LOGS.GPJ GINT STD US LAB.GDT 4/25/19

BORING NUMBER B-07

TETRA TECH

CLIENT Stantec Consulting Services, Inc.
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18001
PROJECT LOCATION Lynn, Massachusetts
DATE STARTED 5/7/18 **COMPLETED** 5/7/18
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 7.0 ft
LOGGED BY A. Ranieri **CHECKED BY** C. Nitchie
AT END OF DRILLING NM
NOTES 0-8' vac truck
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0				FILL		0.6 ASPHALT	
	GB SS-1			FILL		Brown fine-to-coarse SAND, little gravel and brick fragments, moist, no odor, fill. 2.0	0.2
5	GB SS-2			FILL		Brown to black fine-to-coarse SAND, little gravel, trace silt, coal ash, wet, no odor, fill. 9.0	2.4
10	AU SS-3	83	10-15-12-13 (27)	SP-SM		Tan-brown fine-to-coarse SAND, trace gravel, wet, no odor. 14.0	0.3
15	AU SS-4	50	9-8-10-9 (18)	SP-SM		Brown fine-to-coarse SAND, trace gravel, wet, no odor. 16.0	0.0
						Bottom of hole at 16.0 feet.	

GENERAL BH / TP / WELL 2018-05-14_BORING LOGS.GPJ GINT STD US LAB.GDT 4/25/19

BORING NUMBER TT-019-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/10/19 **COMPLETED** 1/14/19
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Drive and Wash
AT TIME OF DRILLING 5.5 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 32'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.3 ASPHALT							
	AU S-1						Dark brown, fine to coarse SAND, well-graded with silt and gravel, little wood, metal, slag (fill material), slag at 4.5'							0.2
	AU S-2													2.9
	AU S-3				SW-SM			8.5	11	56	33			1.2
5														
	SS S-4	0	1-0-0-0 (0)	5-7' - No recovery in 5-7' spoon			6.5							
	SS S-5	17	1-1-0-0 (1)	8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	SW-SM		Dark gray, fine to coarse SAND, with silt, well sorted, loose, wet							0.6
10							9.5							
	SS S-6	38	6-8-9-10 (17)		SP		Tan to gray, fine to coarse SAND, loose, wet							0.4
					SP		11.0 Tan, fine SAND, some medium sand, little coarse sand, tight, wet							
15							13.5							
	SS S-7	42	4-5-5-7 (10)		SP		Tan, fine SAND, poorly-graded with silt, tight, wet	24.6	10	90	0			1.1
20							18.5							
	SS S-8	38	5-7-10-10 (17)		SP		Tan, fine to medium SAND, tight, wet							0.7
25					SP-SM		23.5 Tan, fine SAND, some medium sand with silt, tight, wet							

(Continued Next Page)

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-019-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission **PROJECT NAME** West Lynn Sewer Separation

PROJECT NUMBER 200-54675-18002 **PROJECT LOCATION** Lynn, MA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
25														
	SS S-9	29	8-8-7-13 (15)		SP-SM		Tan, fine SAND, some medium sand with silt, tight, wet *(continued)*							0.8
							28.5							
30					SP-SM		Tan, fine SAND, some medium sand with silt, tight, wet							
	SS S-10	21	12-10-14-17 (24)				32.0	24	16					10
							Bottom of hole at 32.0 feet.							

BORING NUMBER TT-020-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/11/19 **COMPLETED** 1/14/19
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Drive and Wash / Mud Rotary
AT TIME OF DRILLING 5.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 32'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.5 ASPHALT							
	AU S-1				FILL		Light brown, fine to medium SAND, some fine to coarse gravel, large cobbles up to 8" encountered, fill							0.9
	AU S-2						2.0							7.8
					FILL		COBBLES, fill 3.0							
5	AU S-3				SM		Brown, fine to medium SAND, little fine gravel and silt, wet at ~ 5' 5.0 ∇	17.2	14	85	1			0.3
	SS S-4	92	4-2-1-2 (3)	5-6' - PID = 5.1 ppm 6-7' - PID = 1.4 ppm 8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	SW		Dark brown to black, fine to coarse SAND, loose 6.0							5.1
					SP		Brown to tan, fine SAND, little medium and coarse sand, loose, wet 7.0							
	SS S-5	42	1-1-1-1 (2)		SW		Brown to tan, fine SAND, some coarse sand, little medium sand, loose, wet 9.5							0.7
10														
	SS S-6	42	6-5-6-4 (11)		SM		Gray, silty fine SAND, tight, wet, no odor 13.5							1.0
15														
	SS S-7	50	6-5-9-7 (14)		SM		Gray and orange, silty fine SAND, some medium sand, little coarse sand, tight, wet, no odor 18.5	25.5	13	87	0			5.0
20														
	SS S-8	42	5-6-7-9 (13)		SM		Gray and orange, silty fine SAND, little medium to coarse sand, tight, wet, no odor 23.5							18
25					SM		Gray and orange, silty fine SAND, little medium to coarse sand, tight, wet, no odor							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

(Continued Next Page)

BORING NUMBER TT-020-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission **PROJECT NAME** West Lynn Sewer Separation

PROJECT NUMBER 200-54675-18002 **PROJECT LOCATION** Lynn, MA

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY: MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
25	SS S-9	50	9-7-9-10 (16)		SM		Gray and orange, silty fine SAND, little medium to coarse sand, tight, wet, no odor *(continued)*							23
							28.5							
30					SM		Gray and orange, silty fine SAND, little medium to coarse sand, tight, wet, no odor							
	SS S-10	46	8-7-9-11 (16)				32.0							27
							Bottom of hole at 32.0 feet.							

BORING NUMBER TT-026-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/10/19 **COMPLETED** 1/11/19
GROUND ELEVATION **HOLE SIZE** 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 5.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 16'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.3 ASPHALT							
	AU S-1				FILL		Dark brown, medium to coarse SAND, poorly graded with gravel,railroad tie encountered at 2.5', fill							0.4
	AU S-2													0.3
	AU S-3							2.8	1	64	35			0.4
5							5.0 ▽							
	SS S-4	25	1-1-1-0 (2)	8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	SP		Olive, fine to medium SAND, loose, moist 7.0							0.4
	SS S-5	92	2-5-7-7 (12)		SP		Olive to brown, medium SAND, some fine sand, moist to wet 8.0							0.0
					SP		Olive, silty fine SAND, some medium sand, tight, wet 9.5							
10														
	SS S-6	100	5-5-7-6 (12)		SP		Brown, silty medium to coarse SAND, poorly graded, some fine sand, loose, wet 13.0	19.5	4	94	2			0.0
					SP		Olive to tan, medium SAND, little fine and coarse sand, wet							
15	SS S-7	100		14-16' - Sample consists of soil blown into spoon, no advance during hammering.			16.0							0.0

Bottom of hole at 16.0 feet.

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-027-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/9/19 **COMPLETED** 1/11/19
GROUND ELEVATION
HOLE SIZE 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 7.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 20'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.5 ASPHALT							
	AU S-1, AU S-2				FILL		Fine GRAVEL, some fine to medium sand, little fines, odor at 3-4', fill 4.0							32.4, 18.8
5	AU S-3, AU S-4				SP		Gray, medium to coarse SAND, little fine gravel 8.5							48.5, 29.7
	AU S-5			8-9' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative										22
10	SS S-6	79	5-6-9-8 (15)		SW		Gray to tan, fine to coarse SAND, poorly sorted, loose, wet 10.0							
					SP-SM		Tan, fine to medium SAND, poorly graded with silt, tight, wet 13.0	16.3	10	86	4			
15	SS S-7	75	3-3-11-12 (14)		SP-SM		Tan, fine to medium SAND, poorly graded with silt, tight, wet 16.0							
					CH		Gray, plastic CLAY, fat, stiff 17.5							
20	SS S-8	75	1-1-2-2 (3)		CH		Gray, plastic CLAY, fat, soft 20.0	32.5	96			22	50	
							Bottom of hole at 20.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

WELL NUMBER TT-028-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 2/19/19 **COMPLETED** 2/21/19
GROUND ELEVATION
HOLE SIZE 4"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Drive and Wash
AT TIME OF DRILLING 7.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 21' & MW to 19'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.2 ASPHALT							
					FILL		0.8 COBBLESTONE street							
	AU S-1				SM		1.5 Dark brown, silty fine to medium SAND, dry							0.9
					SP		2.0 Brown, fine to medium SAND, dry							
	AU S-2			Utility encountered at 32" BGS during vac clearing. Move boring ~ 5' south 3-4' - Environmental soil sample collected - TT-028-G/3-4			Brown, fine to medium SAND, poorly-graded with gravel, dry to moist							0.8
	AU S-3				SP			3.3	1	73	26			0.8
5							6.0							
	SS S-4	25	4-2-3-0 (5)	8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	SP		Light brown, fine to medium SAND, little gravel, wet							0.8
							8.0							
	SS S-5	33	3-4-7-7 (11)		SP		Light brown, fine to medium SAND, little gravel, very loose to loose, wet							0.4
10							10.0							
	SS S-6	33	6-9-12-12 (21)		SP-SM		Light brown, fine to medium SAND, with silt, little coarse sand, loose to medium dense, wet							0.4
							14.0							
15	SS S-7	42	4-7-11-13 (18)		SP-SM		Light brown, fine to medium SAND, poorly-graded with silt, loose to medium dense, wet	19.5	8	92	1			1.4
							19.0							
20	SS S-8	38	12-17-18-18 (35)		SP		Light brown, fine SAND, trace medium sand, medium dense, wet							1.5
							21.0							
							Bottom of hole at 21.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

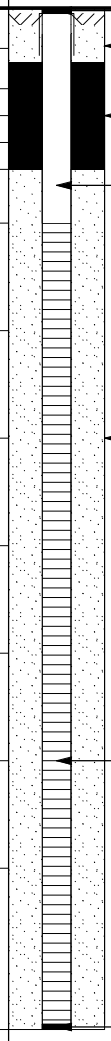
WELL NUMBER TT-028-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 2/19/19 **COMPLETED** 2/21/19
GROUND ELEVATION
HOLE SIZE 4"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Drive and Wash
AT TIME OF DRILLING 7.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 21' & MW to 19'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	MATERIAL DESCRIPTION	PID (ppm)
0					FILL	0.2 ASPHALT	
					FILL	0.8 COBBLESTONE street	
	AU S-1				SM	1.5 Dark brown, silty fine to medium SAND, dry	0.9
					SP	2.0 Brown, fine to medium SAND, dry	0.8
	AU S-2			Utility encountered at 32" BGS during vac clearing. Move boring ~ 5' south 3-4' - Environmental soil sample collected - TT-028-G/3-4		Brown, fine to medium SAND, poorly-graded with gravel, dry to moist	
	AU S-3				SP		0.8
5						6.0	
	SS S-4	25	4-2-3-0 (5)	8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	SP	Light brown, fine to medium SAND, little gravel, wet	0.8
						8.0	
	SS S-5	33	3-4-7-7 (11)		SP	Light brown, fine to medium SAND, little gravel, very loose to loose, wet	0.4
10						10.0	
	SS S-6	33	6-9-12-12 (21)		SP-SM	Light brown, fine to medium SAND, with silt, little coarse sand, loose to medium dense, wet	0.4
						14.0	
15	SS S-7	42	4-7-11-13 (18)		SP-SM	Light brown, fine to medium SAND, poorly-graded with silt, loose to medium dense, wet	1.4
						19.0	
20	SS S-8	38	12-17-18-18 (35)		SP	Light brown, fine SAND, trace medium sand, medium dense, wet	1.5
						21.0	
						Bottom of hole at 21.0 feet.	

WELL DIAGRAM



GENERAL BH / TP / WELL LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 4/25/19

BORING NUMBER TT-029-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 2/19/19 **COMPLETED** 2/22/19
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Drive and Wash
AT TIME OF DRILLING 8.5 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 16'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.3 ASPHALT							
	AU S-1				ML		1.0 Dark brown, sandy SILT, dry							0.4
					SP-SM		Light brown, fine to medium SAND, with silt, trace gravel							
	AU S-2													0.3
5	AU S-3													0.3
				8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative			8.0							
10	SS S-4	29	7-7-8-7 (15)		SP-SM		Light brown, fine to medium SAND, poorly-graded with silt, little gravel, moist to wet 10.0	14.5	5	81	14			0.4
	SS S-5	38	8-10-13-14 (23)		SP		Light brown, medium SAND, some fine sand, little gravel, wet 11.0							1.1
					SP		Light brown, fine SAND, little medium sand, medium dense, wet 14.0							
15	SS S-6	54	6-8-11-11 (19)	14-16' - Environmental soil sample collected - TT-029-G/14-16	SP		Light brown, medium SAND, some fine sand, trace coarse sand, loose to medium dense, wet 16.0							1.4

Bottom of hole at 16.0 feet.

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-030-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/9/19 **COMPLETED** 1/11/19
GROUND ELEVATION
HOLE SIZE 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 15.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 19'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.4 ASPHALT							
					FILL		0.8 Dense road base							
	AU S-1				FILL		Brown, fine to medium SAND (angular), some gravel (angular), some small to medium cobbles (round) with silt, dry, less silt with depth, fill							0.0
	AU S-2													0.0
							4.0							
5	AU S-3				GW		Brown, GRAVEL, well-graded with sand, some cobbles and boulders encountered between approximately 5 to 6'	4	5	31	64			0.0
							8.0							
10	SS S-4	50	8-11-15-13 (26)	9' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	SP		Tan to olive, fine to medium SAND, dry							0.0
							10.0							
	SS S-5	83	16-12-14-10 (26)		SP		Tan, fine SAND, little medium sand, tight, dry	3.5						0.0
							13.5							
15					SP		Tan to brown, medium SAND, little fine and coarse sand, loose, wet							
	SS S-6	67	4-6-8 (14)	16.5-17' - Pushed auger due to blow back			16.0							0.0
					SM		Tan, silty fine SAND, tight, wet							
							17.5							
	SS S-7	100	4-12	18.5' - Encountered blow back attempting to advance spoon, soil sample likely represents soil from at least 18-19'	SP		Tan, fine SAND, little medium sand, tight, wet							0.0
							19.0	24.9						
							Bottom of hole at 19.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

WELL NUMBER TT-031-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 3/1/19 **COMPLETED** 3/11/19
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Drive and Wash
AT TIME OF DRILLING 8.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 21' & MW to 20'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL	0.3	ASPHALT							
					FILL	1.0	Dense road base (compacted silty fine to coarse sand and gravel)							
	AU S-1				SW-SM		Dark brown, fine to coarse SAND, some gravel with silt, dry, no odor							0.2
	AU S-2													0.3
	AU S-3					4.0								0.8
5					SW		Light brown, fine to coarse SAND, well-graded with gravel, dry, no odor							
	AU S-4							6	5	59	36			0.7
	AU S-5			8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative		8.0 ▽								0.7
10	SS S-6	50	9-13-12-12 (25)		SW		Brown, fine to coarse SAND, little gravel, poorly sorted, medium dense, wet							3.6
						14.0								
15	SS S-7	50	6-10-12-10 (22)		SW		Brown, fine to coarse SAND, little gravel, poorly sorted, medium dense, wet							4.6
						19.0								
20	SS S-8	50	7-6-9-11 (15)		SP		Light brown, fine SAND, medium dense, wet							1.2
						21.0								
							Bottom of hole at 21.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

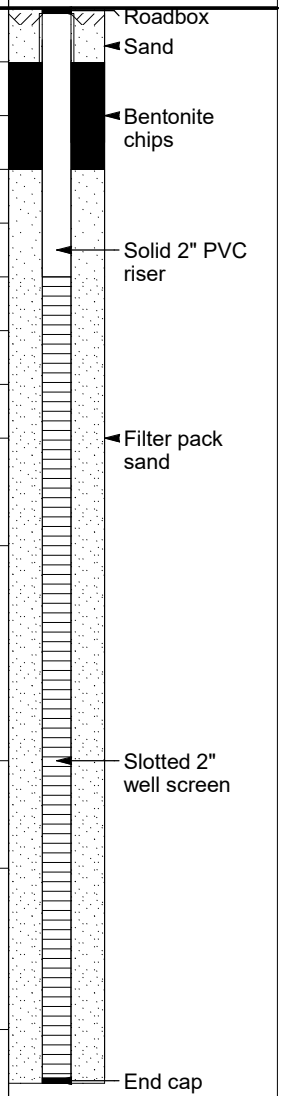
WELL NUMBER TT-031-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 3/1/19 **COMPLETED** 3/11/19
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Drive and Wash
AT TIME OF DRILLING 8.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 21' & MW to 20'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0					FILL	0.3	ASPHALT	
					FILL	1.0	Dense road base (compacted silty fine to coarse sand and gravel)	
	AU S-1				SW-SM		Dark brown, fine to coarse SAND, some gravel with silt, dry, no odor	0.2
	AU S-2							0.3
	AU S-3					4.0		0.8
5					SW		Light brown, fine to coarse SAND, well-graded with gravel, dry, no odor	
	AU S-4							0.7
	AU S-5					8.0 ▽		0.7
10	SS S-6	50	9-13-12-12 (25)	8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	SW		Brown, fine to coarse SAND, little gravel, poorly sorted, medium dense, wet	3.6
						14.0		
15	SS S-7	50	6-10-12-10 (22)		SW		Brown, fine to coarse SAND, little gravel, poorly sorted, medium dense, wet	4.6
						19.0		
20	SS S-8	50	7-6-9-11 (15)		SP		Light brown, fine SAND, medium dense, wet	1.2
						21.0	Bottom of hole at 21.0 feet.	

WELL DIAGRAM



BORING NUMBER TT-032-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/9/19 **COMPLETED** 1/10/19
GROUND ELEVATION **HOLE SIZE** 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 12.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 17'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.6 ASPHALT							
					FILL		1.0 GRAVEL, brick and cobbles present, road base, fill							
	AU S-1				SW-SM		Medium to coarse SAND, well-graded with silt and gravel, increasing fine to coarse gravel with depth							0.1
	AU S-2													0.0
5								7.6	11	47	42			
				8.5' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	GW		6.5 Brown, sandy fine to coarse GRAVEL, loose							
	SS S-3	50	9-10-10-9 (20)		SP		8.8 Orange, fine to medium SAND, poorly graded, dry							0.8
10							10.0							
	SS S-4	54	7-8-6-6 (14)		SP		Orange, fine to coarse SAND, poorly graded, loose, wet at tip (12')							0.3
							13.5							
15					SP		Orange, fine to coarse SAND, poorly graded, loose							
	SS S-5	67	2-8-9 (17)	16.5-17' - Pushed auger due to blow back										0.5
							17.0	21.4	4	95	1			

Bottom of hole at 17.0 feet.

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-033-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/8/19 **COMPLETED** 1/10/19
GROUND ELEVATION **HOLE SIZE** 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 4.5 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 20'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.3 ASPHALT							
	AU S-1			4' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	FILL		Grayish-tan, fine to medium SAND, some fine gravel, little fines, construction sand, fill							13.1
5							5.0							
	SS S-2	17	3-2-4-4 (6)		SW		Gray, angular fine to coarse SAND, some gravel, poorly sorted, loose 7.0							1.2
	SS S-3	50	3-5-9-6 (14)		SP		Gray, medium SAND, little coarse sand, loose, wet 8.0	22.7	5	90	5			0.2
					SP-SM		Tan, fine SAND, poorly graded with silt, loose, wet 9.0							
10	SS S-4	117	7-60	Blow count: 7-60/12". Split spoons cannot be advanced further due to sand and water running into auger.	SP		Dark tan, fine to medium SAND, wet 10.4							0
					SW		Tan to orange, fine to coarse SAND, poorly sorted, tight, wet 12.0							
	AU S-5			Approximately 13' - Sample collected from auger cuttings	SP-SM		Tan, medium SAND, some fine sand with silt, tight, wet							0.4
15							15.0							
	AU S-6			Approximately 17' - Sample collected from auger cuttings	SP-SM		Tan, fine to medium SAND, poorly graded with silt, tight, wet	21.1	12	88	0			0.1
20							20.0							

Bottom of hole at 20.0 feet.

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-034-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/8/19 **COMPLETED** 1/10/19
GROUND ELEVATION
HOLE SIZE 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 7.5 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 22'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.3 ASPHALT							
	AU S-1				FILL		Tan to dark gray, fine to medium SAND, poorly graded with silt and gravel, construction sand, fill							0.2
	AU S-2													0.5
5	AU S-3													0.3
	AU S-4							6.9	11	50	39			0.7
							6.5							
				8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	SP		Tan, fine to medium SAND (angular), loose, wet							
	SS S-5	72	1-4-7 (11)											0.1
10							10.0							
	SS S-6	86	3-8		SP		10.5 Dark tan, medium SAND, well sorted, wet							1.3
					SM		Dark tan to orange, silty fine to medium SAND, tight, wet							
							13.0							
15					SP		Tan to orange, fine to medium SAND, wet							
	SS S-7	100	6-8-8-5 (16)				16.0							1.3
					SM		Tan, fine SAND, silty, loose, wet	25	16	84	0			
							18.5							
20					SP		Olive to tan, fine SAND, little medium sand, tight, moist to wet							
	SS S-8	83	1-1-5-4 (6)				22.0							0.2
							Bottom of hole at 22.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-035-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/17/19 **COMPLETED** 1/17/19
GROUND ELEVATION **HOLE SIZE** 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 8.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 16'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL	0.4	ASPHALT							
					FILL	0.9	COBBLESTONE street							
	AU S-1				SM		Brown, silty fine to coarse SAND, some fine gravel (round to subround)							0.0
	AU S-2					3.0								0.1
	AU S-3				SP		Brown fine to coarse SAND, poorly-graded with gravel, gravel round to subround							0.1
5	AU S-4							3.3	2	61	37			0.2
	AU S-5													0.4
				8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative		8.0 ▽								
	SS S-6	50	5-8-9-8 (17)		SW		Tan, fine to coarse SAND, poorly sorted, loose, wet							0.4
10						10.0								
	SS S-7	50	1-1-3-4 (4)		SW		Tan, fine to coarse SAND, poorly sorted, loose, wet	20.9						0.4
						13.0		22						
					SW		Tan, fine to coarse SAND, poorly sorted, loose, wet							
15	SS S-8	100	10-13-13-14 (26)	14-16' - Soil sample collected		16.0								0.3
							Bottom of hole at 16.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

WELL NUMBER TT-039-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/11/19 **COMPLETED** 1/15/19
GROUND ELEVATION
HOLE SIZE 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 5.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 17' & MW to 12'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.3 ASPHALT							
					FILL		0.8 COBBLESTONE street							
	AU S-1				SP		Light brown, fine to medium SAND, little fine gravel, odor at 2-3'							0.2
	AU S-2						3.0							135.5
	AU S-3			3-4' - Soil sample collected	SP		Gray, fine to medium SAND, damp, petroleum (gasoline) odor							206.9
5	AU S-4						5.0 ▽							197.6
	SS S-5	58	2-4-6-6 (10)		SP		Gray, medium SAND, poorly graded, some fine and coarse sand, loose, wet, petroleum odor	20.8	5	92	3			27
				8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative			8.5							
10					SP		Gray to tan, fine to medium SAND, little coarse sand, tight, wet, petroleum odor							
	SS S-6	38	5-6-10-8 (16)											27
							13.5							
15					SP		Tan, fine to medium SAND, tight, wet							
	SS S-7	71	9	15.5' - Encountered blow back attempting to advance spoon										2
							17.0							
							Bottom of hole at 17.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

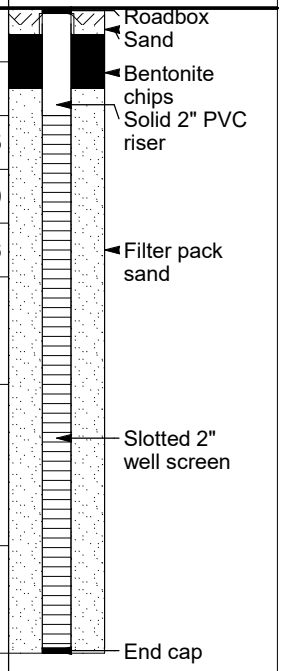
WELL NUMBER TT-039-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/11/19 **COMPLETED** 1/15/19
GROUND ELEVATION
HOLE SIZE 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 5.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 17' & MW to 12'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	PID (ppm)
0					FILL		0.3 ASPHALT	
					FILL		0.8 COBBLESTONE street	
	AU S-1				SP		Light brown, fine to medium SAND, little fine gravel, odor at 2-3'	0.2
	AU S-2						3.0	135.5
	AU S-3			3-4' - Soil sample collected	SP		Gray, fine to medium SAND, damp, petroleum (gasoline) odor	206.9
5	AU S-4			5' - Vacuum cleared depth			5.0 ▽	197.6
	SS S-5	58	2-4-6-6 (10)		SP		Gray, medium SAND, poorly graded, some fine and coarse sand, loose, wet, petroleum odor	27
				8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative			8.5	
10							Gray to tan, fine to medium SAND, little coarse sand, tight, wet, petroleum odor	
	SS S-6	38	5-6-10-8 (16)		SP			27
							13.5	
15							Tan, fine to medium SAND, tight, wet	
	SS S-7	71	9	15.5' - Encountered blow back attempting to advance spoon	SP			2
							17.0	
							Bottom of hole at 17.0 feet.	

WELL DIAGRAM



BORING NUMBER TT-040-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 2/19/19 **COMPLETED** 2/22/19
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Drive and Wash
AT TIME OF DRILLING 8.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 10'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL	0.2	ASPHALT							
					FILL	0.8	COBBLESTONE street							
	AU S-1				SP-SM	1.5	Light brown, fine to medium SAND, little gravel and silt, dry							0.1
	AU S-2				SM	3.0	Dark brown, silty fine to medium SAND, some gravel, dry							0.4
	AU S-3				SP-SM		Brown, fine to medium SAND, poorly-graded with silt and gravel							0.4
5	AU S-4							4.6	6	61	33			0.6
	AU S-5													0.4
				8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative		8.0 ▽								
10	SS S-6	83	4-6-9-12 (15)		SP	10.0	Olive, fine SAND, some medium sand, loose to medium dense, wet							1.1
							Bottom of hole at 10.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-055-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 2/21/19 **COMPLETED** 2/21/19
GROUND ELEVATION **HOLE SIZE** 4"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Drive and Wash
AT TIME OF DRILLING 8.5 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 21'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL	0.7	ASPHALT							
	AU S-1				FILL	2.0	Gray, fine to coarse SAND, some fine gravel (angular to subangular), road base material, fill							0.5
5	AU S-2				SW	9.0	Brown, fine to coarse SAND, little gravel (subangular to subround)							0.0
10	SS S-4	21	9-14-12-10 (26)	9' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	GW	10.0	Sandy GRAVEL (angular), wet							0.5
					SW	14.0	Gravelly fine to coarse SAND, poorly sorted, medium dense, wet							
15	SS S-5	42	4-7-10-12 (17)		SP	19.0	Light brown, medium SAND, poorly-graded, little fine sand, loose to medium dense, wet	17.4	5	92	3			0.9
20	SS S-6	50	8-9-12-13 (21)		SP	19.5	Light brown to orange-brown, fine SAND, little medium sand							0.9
					SP	21.0	Light brown, medium SAND, some fine sand, loose to medium dense							
							Bottom of hole at 21.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-057-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/18/19 **COMPLETED** 1/18/19
GROUND ELEVATION **HOLE SIZE** 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 7.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 16'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.4 ASPHALT							
					FILL		0.9 COBBLESTONE street							
	AU S-1				FILL		2.0 Gray, fine to coarse SAND, little fine gravel, cobbles present at 1.5-2', fill							2.0
					ML		3.0 Black, SILT, some fine to coarse sand, slight odor							
	AU S-2				SW		Olive, fine to coarse SAND							2.5
5	AU S-3													0.4
	AU S-4			7' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative 8-9' - PID = 0.0 ppm 9-10' - PID = 0.0 ppm 10-11' - PID = 0.0 ppm 10-12' - Soil sample collected 11-12' - PID = 0.0 ppm										0.1
							7.0 ▽							
					SP		Brown to tan, medium SAND, well sorted, loose							
	SS S-5	54	3-6-10-4 (16)				9.0							0.0
10					SP		10.0 Brown to tan, fine SAND, little medium sand, tight							
	SS S-6	100	4-7-7-5 (14)		SP		11.0 Brown to tan, medium SAND, well sorted, loose							0.0
					SP-SM		Brown to tan, fine to medium SAND, poorly-graded with silt, tight	22.6	7	92	1			
							13.0							
					SP		Brown to tan, medium SAND, well sorted, loose							
15	SS S-7	100	3-4-6-7 (10)				15.0							0.0
					SP		16.0 Brown to tan, fine SAND, little medium sand, tight							

Bottom of hole at 16.0 feet.

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-061-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/17/19 **COMPLETED** 1/17/19
GROUND ELEVATION
HOLE SIZE 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING NM
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 10'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.3 ASPHALT							
	AU S-1				FILL		Gray, fine GRAVEL with fine to coarse sand, road base 2.0							0.4
	AU S-2						Brown, fine to coarse SAND, poorly-graded with gravel							0.1
	AU S-3													0.0
5	AU S-4			4-5' - Environmental soil sample collected	SP			2.9	1	65	34			0.0
				8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative			7.2 Tan, medium SAND (angular), little fine and coarse sand, loose, dry							
10	SS S-5	50	6-7-8-7 (15)	Groundwater not encountered in borehole, dry to 10'	SP		10.0							0.0
							Bottom of hole at 10.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

BORING NUMBER TT-062-G

TETRA TECH

CLIENT Lynn Water and Sewer Commission
PROJECT NAME West Lynn Sewer Separation
PROJECT NUMBER 200-54675-18002
PROJECT LOCATION Lynn, MA
DATE STARTED 1/9/19 **COMPLETED** 1/10/19
GROUND ELEVATION **HOLE SIZE** 4.25"
DRILLING CONTRACTOR New England Boring Contractors
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger
AT TIME OF DRILLING 7.0 ft
LOGGED BY KDS/JWF **CHECKED BY** Chris Nitchie
AT END OF DRILLING NM
NOTES Soil boring completed to 16'
AFTER DRILLING NM

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	REMARKS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	LABORATORY MC (%)	FINES (%)	SAND(%)	GRAVEL (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PID (ppm)
0					FILL		0.3 ASPHALT							
					FILL		0.5 Dense road base							
	AU S-1				SP-SM		Brown, fine to medium SAND, some gravel (round) with silt, loose, dry, silt content less with depth							0.0
	AU S-2													0.0
	AU S-3													0.0
5	AU S-4													0.0
							6.5							
				8' - Vacuum/Air knife cleared depth, all N values above this depth potentially not representative	SP		Tan, fine to medium SAND, loose, wet, medium sand content increases with depth							
10	SS S-5	38	0-1-1-1 (2)				10.0							0.4
	SS S-6	50	1-1-2-2 (3)		SP-SM		Tan, fine to medium SAND, poorly-graded with silt, loose, wet,	19.6	6	86	8			0.5
							13.0							
					SM		Tan, silty fine to medium SAND, tight, wet							
15	SS S-7	38	1-2-3-6 (5)				16.0							0.4
							Bottom of hole at 16.0 feet.							

GENEREAL BH TP WELL WITH LAB DATA LYNN BORING LOGS.GPJ GINT STD US LAB.GDT 5/2/19

ATTACHMENT 2

LABORATORY TEST RESULTS

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Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	---	Sample Type:	---	Tested By:	GA
Sample ID:	---	Test Date:	03/28/19	Checked By:	bfs
Depth :	---	Test Id:	497362		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content, %
TT-010-G	S- 3	3 ft	Moist, pale olive silty sand	9.5
TT-010-G	S- 5	9 ft	Moist, very dark gray silty sand with gravel	39.7
TT-010-G	S- 6	11 ft	Moist, dark gray silt with sand	37.6
TT-010-G	S- 7	15 ft	Wet, dark gray clay	55.6
TT-010-G	S- 8	18 ft	Moist, dark gray silt with sand	61.9
TT-011-G	S- 4	11 ft	Moist, very dark brown sand with silt and gravel	33.4
TT-019-G	S- 10	31 ft	Moist, olive brown silty sand	24.0
TT-019-G	S- 3	3 ft	Moist, very dark brown sand with silt and gravel	8.5
TT-019-G	S- 7	17 ft	Moist, olive sand with silt	24.6

Phase I Boring

Notes: Temperature of Drying : 110° Celsius

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Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	---	Sample Type:	---	Tested By:	GA
Sample ID:	---	Test Date:	03/28/19	Checked By:	bfs
Depth :	---	Test Id:	497347		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content, %
TT-020-G	S- 3	4 ft	Moist, dark brown silty sand	17.2
TT-020-G	S- 7	16 ft	Moist, olive silty sand	25.5
TT-025-G	S- 7	11 ft	Moist, grayish brown silty sand	18.0
TT-025-G	S- 9	21 ft	Moist, dark gray clay	35.0
TT-026-G	S- 3	4 ft	Moist, light yellowish brown sand with gravel	2.8
TT-026-G	S- 6	11 ft	Moist, brown sand	19.5
TT-027-G	S- 6	11 ft	Moist, dark brown sand with silt	16.3
TT-027-G	S- 8	20 ft	Moist, dark gray clay	32.5

Phase I Boring

Notes: Temperature of Drying : 110° Celsius

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Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	---	Sample Type:	---	Tested By:	GA
Sample ID:	---	Test Date:	03/28/19	Checked By:	bfs
Depth :	---	Test Id:	497334		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content, %
TT-030-G	S- 3	5 ft	Moist, yellowish brown gravel with sand	4.0
TT-030-G	S- 5	12 ft	Moist, yellowish brown sand	3.5
TT-030-G	S- 7	19 ft	Moist, olive brown sand	24.9
TT-032-G	S- 2	3 ft	Moist, dark brown sand with silt and gravel	7.6
TT-032-G	S- 5	17 ft	Moist, grayish brown sand	21.4
TT-033-G	S- 3	8 ft	Moist, light olive brown sand with silt	22.7
TT-033-G	S- 6	17 ft	Moist, yellowish brown silty sand	21.1
TT-034-G	S- 3	5 ft	Moist, very dark brown sand with silt and gravel	6.9
TT-034-G	S- 7	17 ft	Moist, olive silty sand	25.0

Phase I Boring

Notes: Temperature of Drying : 110° Celsius

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Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	---	Sample Type:	---	Tested By:	GA
Sample ID:	---	Test Date:	03/28/19	Checked By:	bfs
Depth :	---	Test Id:	497343		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content, %
TT-035-G	S- 4	4 ft	Moist, grayish brown sand with gravel	3.3
TT-035-G	S- 6	10 ft	Moist, grayish brown sand	20.9
TT-035-G	S- 7	12 ft	Moist, olive brown sand	22.0
TT-039-G	S- 5	6.5 ft	Moist, olive brown sand	20.8
TT-042-G	S- 4	9 ft	Moist, olive brown sand with silt	16.3
TT-042-G	S- 6	22 ft	Moist, olive silty sand	23.6
TT-043-G	S- 4	9 ft	Moist, olive gray gravel with silt and sand	11.6
TT-043-G	S- 6	16 ft	Wet, olive silt with sand	30.6
TT-043-G	S- 7	21 ft	Wet, olive gray sandy silt	25.6

Phase I Boring

Notes: Temperature of Drying : 110° Celsius

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Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	---	Sample Type:	---	Tested By:	ckg
Sample ID:	---	Test Date:	03/23/19	Checked By:	bfs
Depth :	---	Test Id:	497330		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content, %
TT-051-G	S- 6	10 ft	Moist, dark yellowish brown sand	19.3
TT-057-G	S- 6	12 ft	Moist, dark yellow brown sand with silt	22.6
TT-058-G	S- 4	4 ft	Moist, yellowish brown sand	5.8
TT-058-G	S- 6	11 ft	Moist, dark yellowish brown sand	20.0
TT-060-G	S- 7	8 ft	Moist, olive brown silty sand with gravel	12.3
TT-060-G	S- 8	16 ft	Moist, light olive brown silty sand	12.8
TT-061-G	S- 4	5 ft	Moist, yellowish brown sand with gravel	2.9
TT-062-G	S- 6	10 ft	Moist, dark yellowish brown sand with silt	19.6

Phase I Boring

Notes: Temperature of Drying : 110° Celsius

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Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	---	Sample Type:	---	Tested By:	ckg
Sample ID:	---	Test Date:	04/11/19	Checked By:	bfs
Depth :	---	Test Id:	499720		

Moisture Content of Soil and Rock - ASTM D2216

Boring ID	Sample ID	Depth	Description	Moisture Content,%
TT-028-G	S- 3	3.5 ft	Moist, light olive brown sand with gravel	3.3
TT-028-G	S- 7	15 ft	Moist, yellow sand with silt	19.5
TT-029-G	S- 4	9 ft	Moist, olive yellow sand with silt	14.5
TT-031-G	S- 4	5.5 ft	Moist, yellowish brown sand with gravel	6.0
TT-040-G	S- 4	4.5 ft	Moist, brownish yellow sand with silt and gravel	4.6
TT-055-G	S- 5	15 ft	Moist, light yellowish brown sand	17.4

Phase I Boring

Notes: Temperature of Drying : 110º Celsius

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Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	---	Sample Type:	---	Tested By:	GA
Sample ID:	---	Test Date:	03/28/19	Checked By:	bfs
Depth :	---	Test Id:	497390		

Amount of Material Passing #200 Sieve - ASTM D1140

Boring ID	Sample ID	Depth	Visual Description	Fines, %
TT-010-G	S-6	11 ft	Moist, dark gray silt with sand	83.5
TT-010-G	S-7	15 ft	Wet, dark gray clay	86.9
TT-010-G	S-8	18 ft	Moist, dark gray silt with sand	78.9
TT-019-G	S-10	31 ft	Moist, olive brown silty sand	15.5
TT-025-G	S-9	21 ft	Moist, dark gray clay	97.8
TT-027-G	S-8	20 ft	Moist, dark gray clay	95.6
TT-043-G	S-6	16 ft	Wet, olive silt with sand	71.4
TT-043-G	S-7	21 ft	Wet, olive gray sandy silt	68.4

Phase I Boring

Notes: Tests performed using Method B - washing using a wetting agent
Dry mass of test specimen was determined directly

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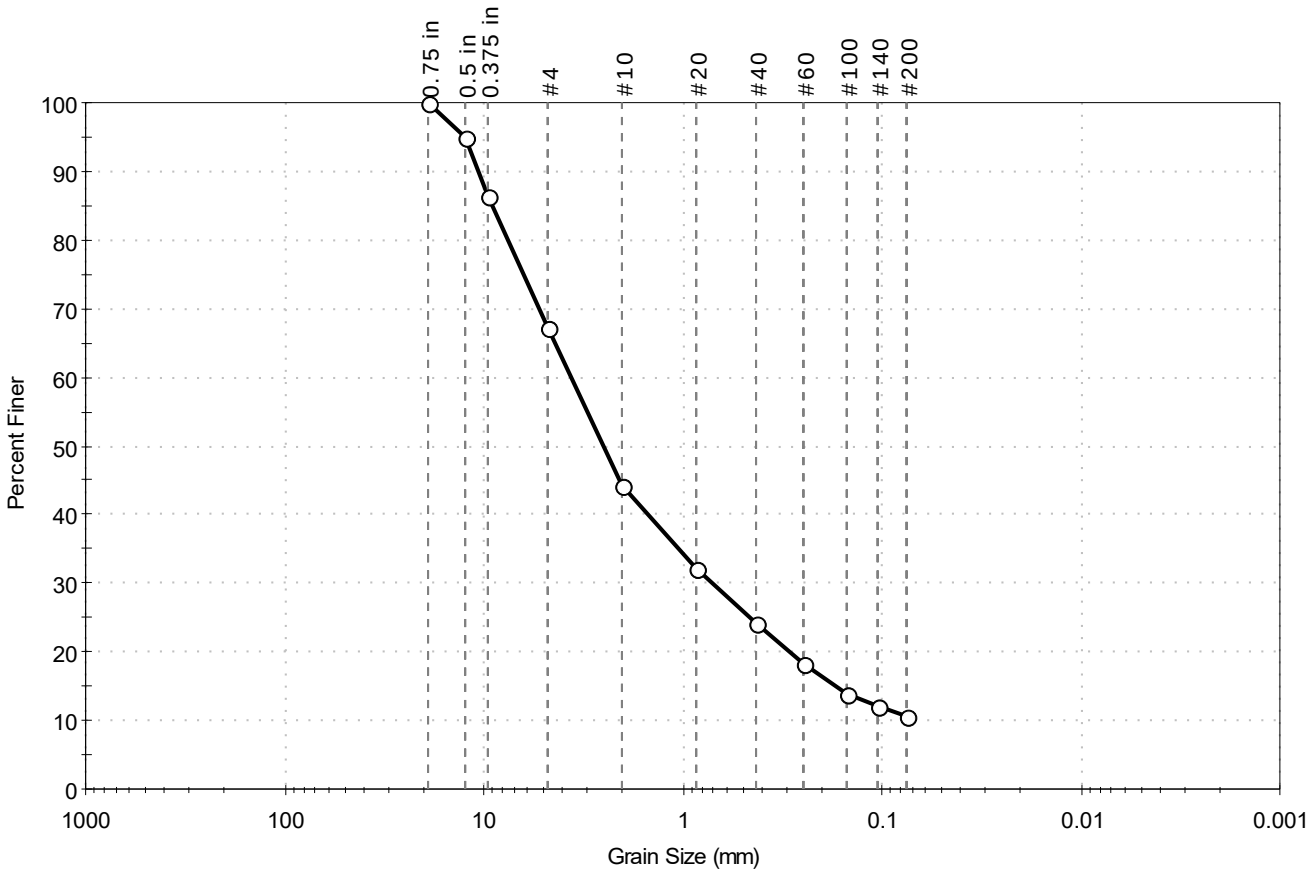
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-019-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-3	Test Date:	03/28/19	Checked By:	bfs
Depth :	3 ft	Test Id:	497416		
Test Comment:	---				
Visual Description:	Moist, very dark brown sand with silt and gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	32.8	56.6	10.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	95		
0.375 in	9.50	86		
#4	4.75	67		
#10	2.00	44		
#20	0.85	32		
#40	0.42	24		
#60	0.25	18		
#100	0.15	14		
#140	0.11	12		
#200	0.075	11		

Coefficients

D_{85} = 9.0636 mm D_{30} = 0.7007 mm

D_{60} = 3.6144 mm D_{15} = 0.1706 mm

D_{50} = 2.4824 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-a (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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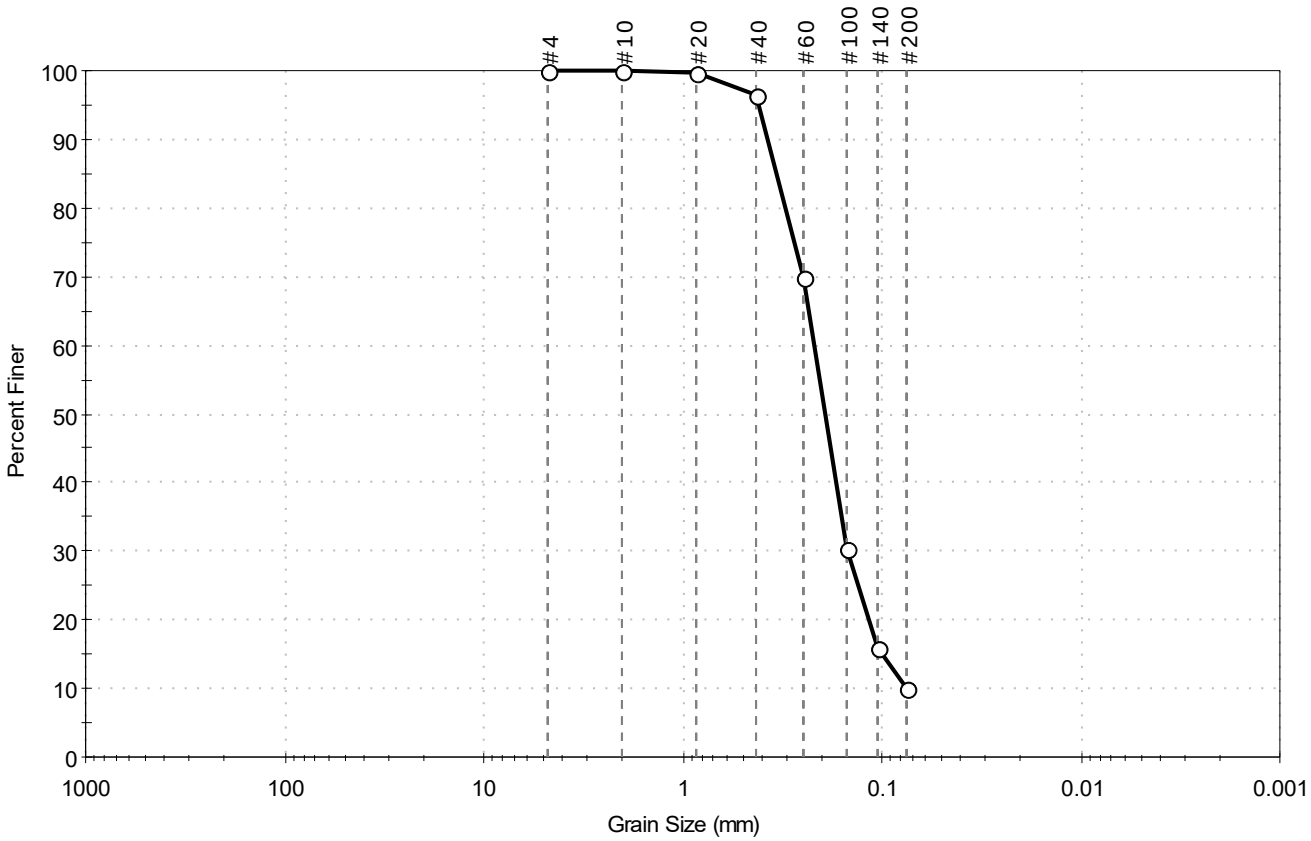
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-019-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-7	Test Date:	03/28/19	Checked By:	bfs
Depth :	17 ft	Test Id:	497417		
Test Comment:	---				
Visual Description:	Moist, olive sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	89.9	10.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	96		
#60	0.25	70		
#100	0.15	30		
#140	0.11	16		
#200	0.075	10		

Coefficients

D_{85} = 0.3383 mm D_{30} = 0.1490 mm

D_{60} = 0.2200 mm D_{15} = 0.1006 mm

D_{50} = 0.1934 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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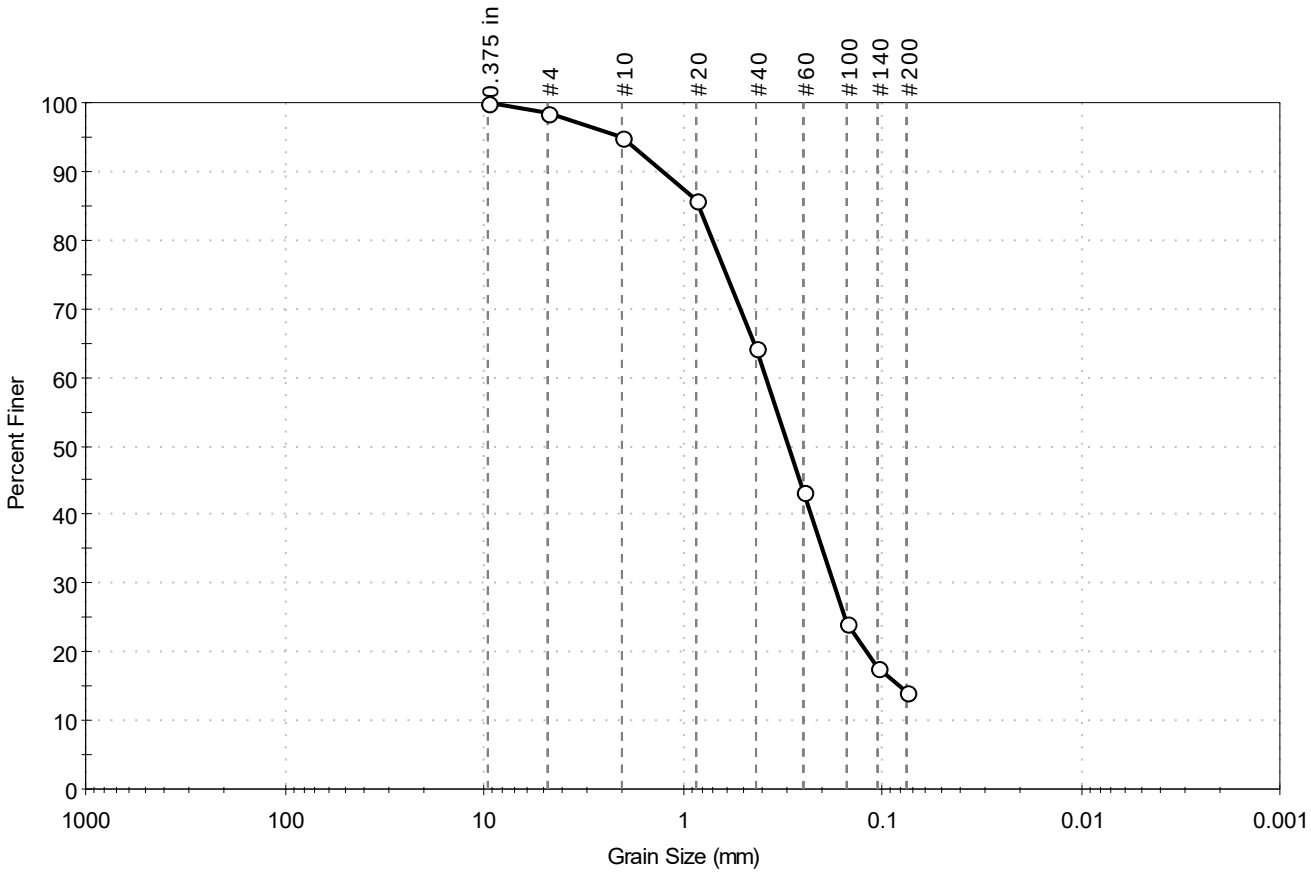
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-020-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-3	Test Date:	03/23/19	Checked By:	bfs
Depth :	4 ft	Test Id:	497374		
Test Comment:	---				
Visual Description:	Moist, dark brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	1.3	84.4	14.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	95		
#20	0.85	86		
#40	0.42	64		
#60	0.25	43		
#100	0.15	24		
#140	0.11	18		
#200	0.075	14		

Coefficients

D_{85} = 0.8304 mm D_{30} = 0.1753 mm

D_{60} = 0.3807 mm D_{15} = 0.0810 mm

D_{50} = 0.2955 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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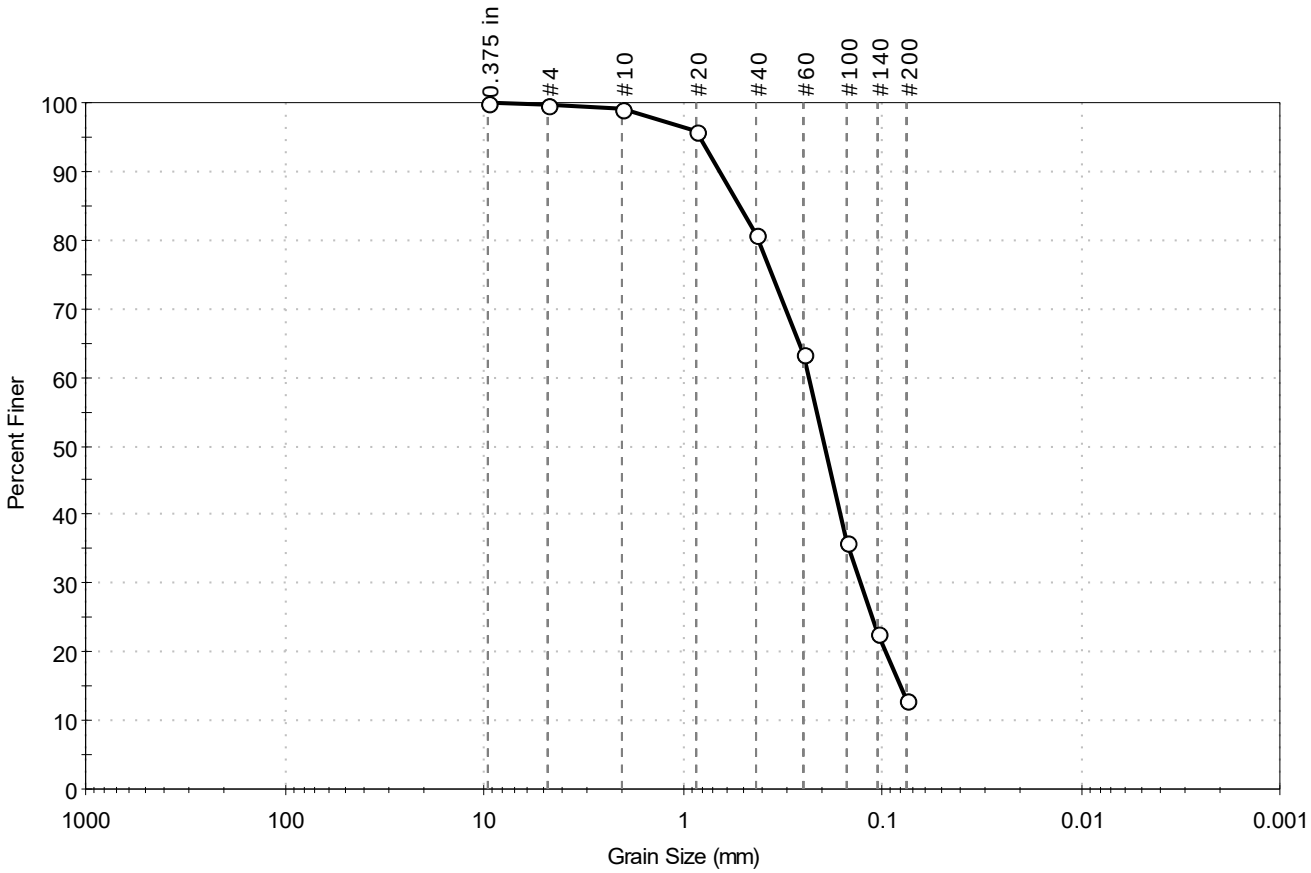
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-020-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-7	Test Date:	03/28/19	Checked By:	bfs
Depth :	16 ft	Test Id:	497418		
Test Comment:	---				
Visual Description:	Moist, olive silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.2	86.8	13.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	99		
#20	0.85	96		
#40	0.42	81		
#60	0.25	63		
#100	0.15	36		
#140	0.11	23		
#200	0.075	13		

Coefficients

D_{85} = 0.5133 mm D_{30} = 0.1283 mm

D_{60} = 0.2345 mm D_{15} = 0.0805 mm

D_{50} = 0.1947 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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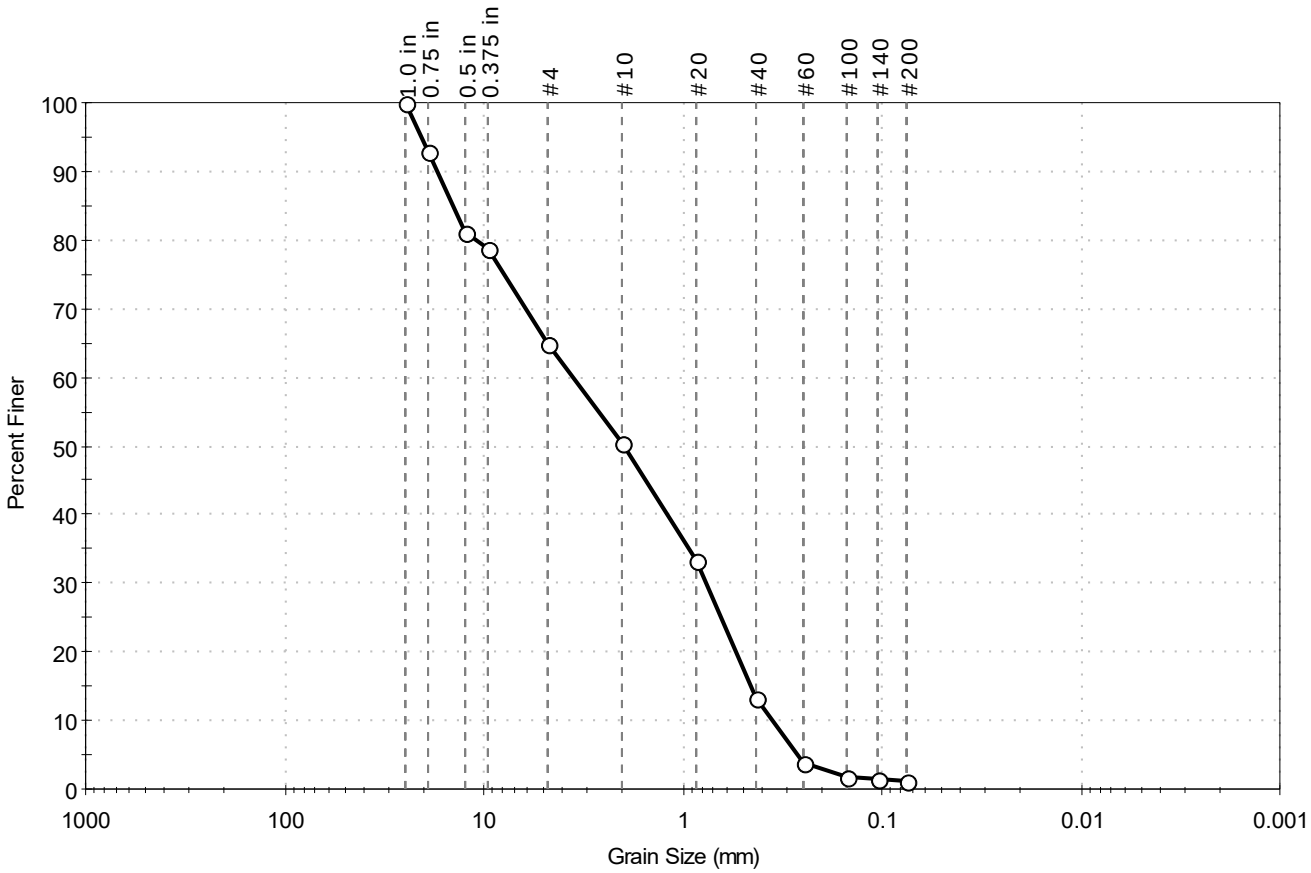
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-026-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-3	Test Date:	03/28/19	Checked By:	bfs
Depth :	4 ft	Test Id:	497392		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	35.2	63.7	1.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.0 in	25.00	100		
0.75 in	19.00	93		
0.5 in	12.50	81		
0.375 in	9.50	79		
#4	4.75	65		
#10	2.00	50		
#20	0.85	33		
#40	0.42	13		
#60	0.25	4		
#100	0.15	2		
#140	0.11	1		
#200	0.075	1.1		

Coefficients

D_{85} = 14.3761 mm D_{30} = 0.7598 mm

D_{60} = 3.5601 mm D_{15} = 0.4501 mm

D_{50} = 1.9576 mm D_{10} = 0.3518 mm

C_u = 10.120 C_c = 0.461

Classification

ASTM Poorly graded SAND with Gravel (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

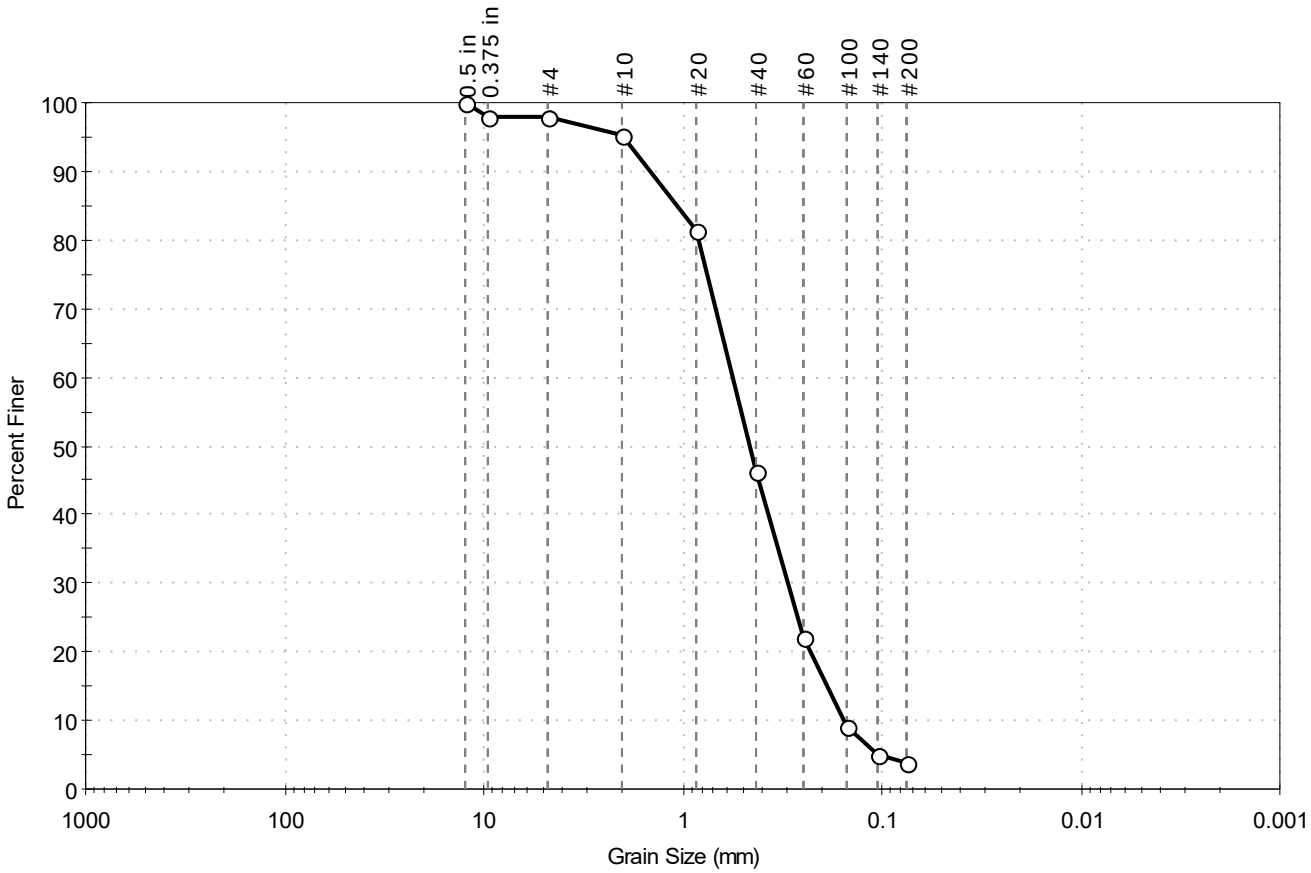
Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-026-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-6	Test Date:	03/28/19	Checked By:	bfs
Depth :	11 ft	Test Id:	497393		
Test Comment:	---				
Visual Description:	Moist, brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.0	94.2	3.8

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	98		
#4	4.75	98		
#10	2.00	95		
#20	0.85	81		
#40	0.42	46		
#60	0.25	22		
#100	0.15	9		
#140	0.11	5		
#200	0.075	3.8		

Coefficients

D_{85} = 1.0612 mm D_{30} = 0.2975 mm

D_{60} = 0.5560 mm D_{15} = 0.1891 mm

D_{50} = 0.4561 mm D_{10} = 0.1549 mm

C_u = 3.589 C_c = 1.028

Classification

ASTM Poorly graded SAND (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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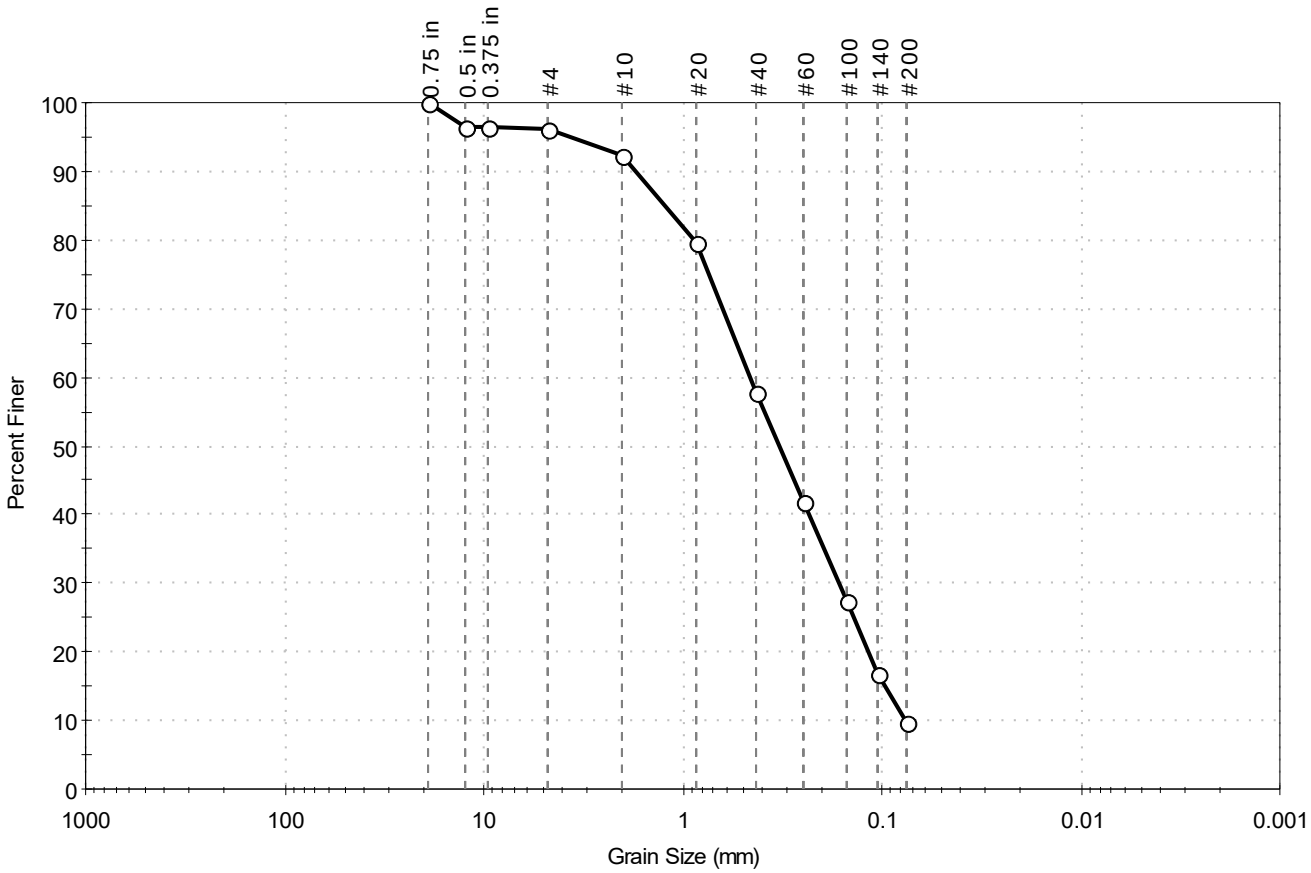
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-027-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-6	Test Date:	03/28/19	Checked By:	bfs
Depth :	11 ft	Test Id:	497394		
Test Comment:	---				
Visual Description:	Moist, dark brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	4.0	86.3	9.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	97		
0.375 in	9.50	97		
#4	4.75	96		
#10	2.00	92		
#20	0.85	80		
#40	0.42	58		
#60	0.25	42		
#100	0.15	27		
#140	0.11	17		
#200	0.075	9.7		

Coefficients

D_{85} = 1.2223 mm D_{30} = 0.1645 mm
D_{60} = 0.4560 mm D_{15} = 0.0974 mm
D_{50} = 0.3282 mm D_{10} = 0.0762 mm
C_u = 5.984 C_c = 0.779

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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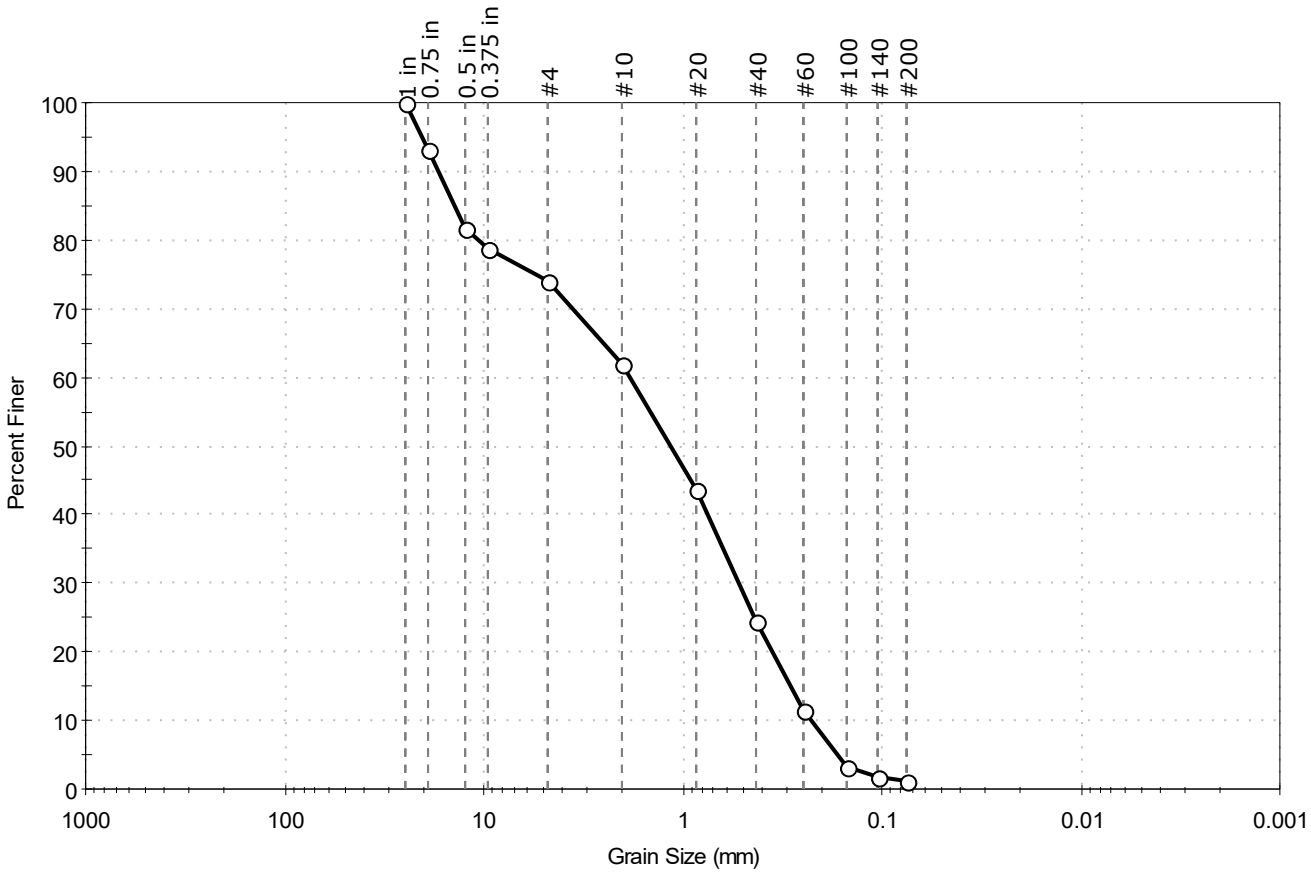
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-028-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-3	Test Date:	04/15/19	Checked By:	bfs
Depth :	3.5 ft	Test Id:	499709		
Test Comment:	---				
Visual Description:	Moist, light olive brown sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	25.9	72.8	1.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	93		
0.5 in	12.50	82		
0.375 in	9.50	79		
#4	4.75	74		
#10	2.00	62		
#20	0.85	44		
#40	0.42	25		
#60	0.25	11		
#100	0.15	3		
#140	0.11	2		
#200	0.075	1.3		

Coefficients

D_{85} = 14.1142 mm D_{30} = 0.5185 mm

D_{60} = 1.8208 mm D_{15} = 0.2894 mm

D_{50} = 1.1427 mm D_{10} = 0.2290 mm

C_u = 7.951 C_c = 0.645

Classification

ASTM Poorly graded SAND with Gravel (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

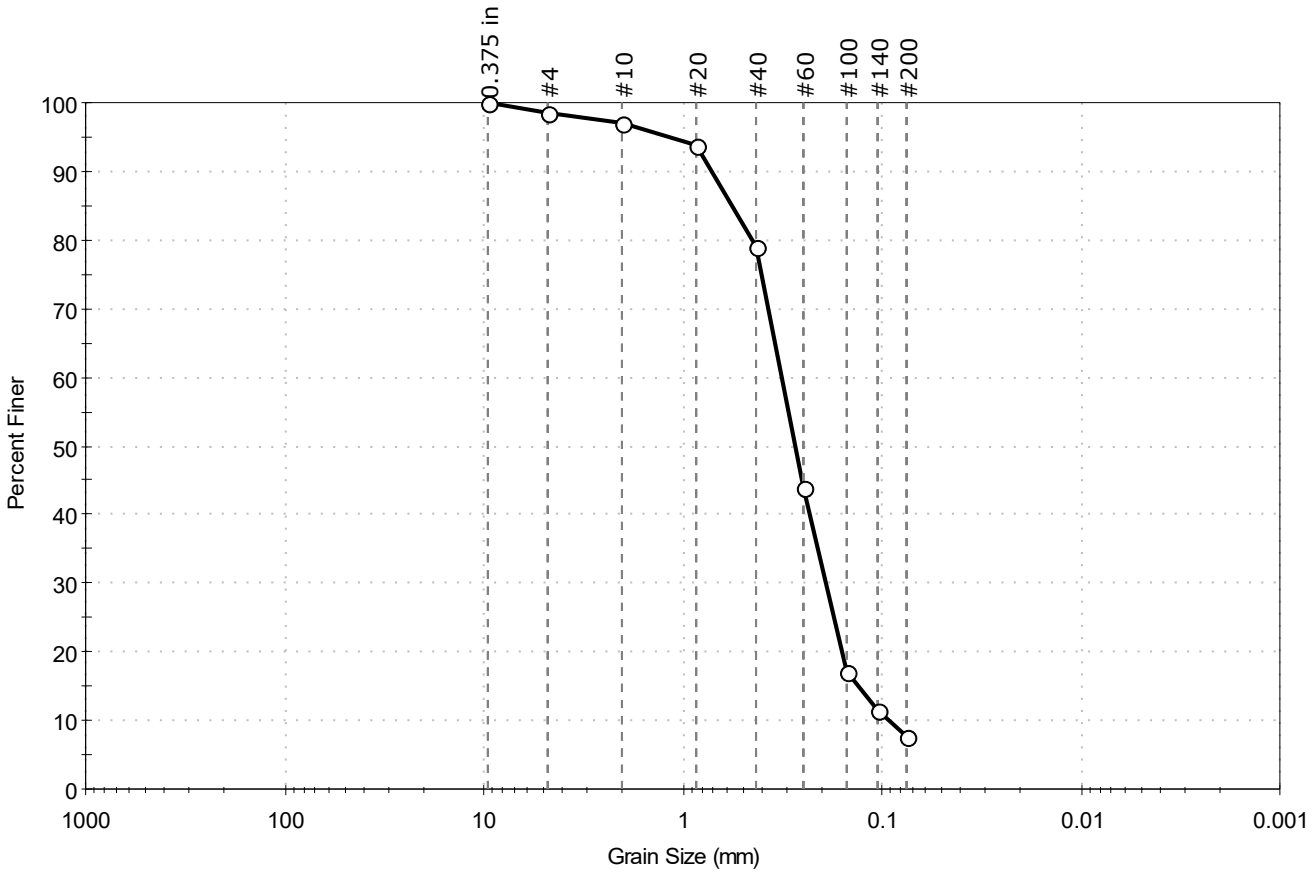
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-028-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-7	Test Date:	04/15/19	Checked By:	bfs
Depth :	15 ft	Test Id:	499710		
Test Comment:	---				
Visual Description:	Moist, yellow sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	1.4	91.1	7.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	97		
#20	0.85	94		
#40	0.42	79		
#60	0.25	44		
#100	0.15	17		
#140	0.11	11		
#200	0.075	7.5		

Coefficients

D_{85} = 0.5632 mm D_{30} = 0.1913 mm

D_{60} = 0.3185 mm D_{15} = 0.1311 mm

D_{50} = 0.2736 mm D_{10} = 0.0933 mm

C_u = 3.414 C_c = 1.232

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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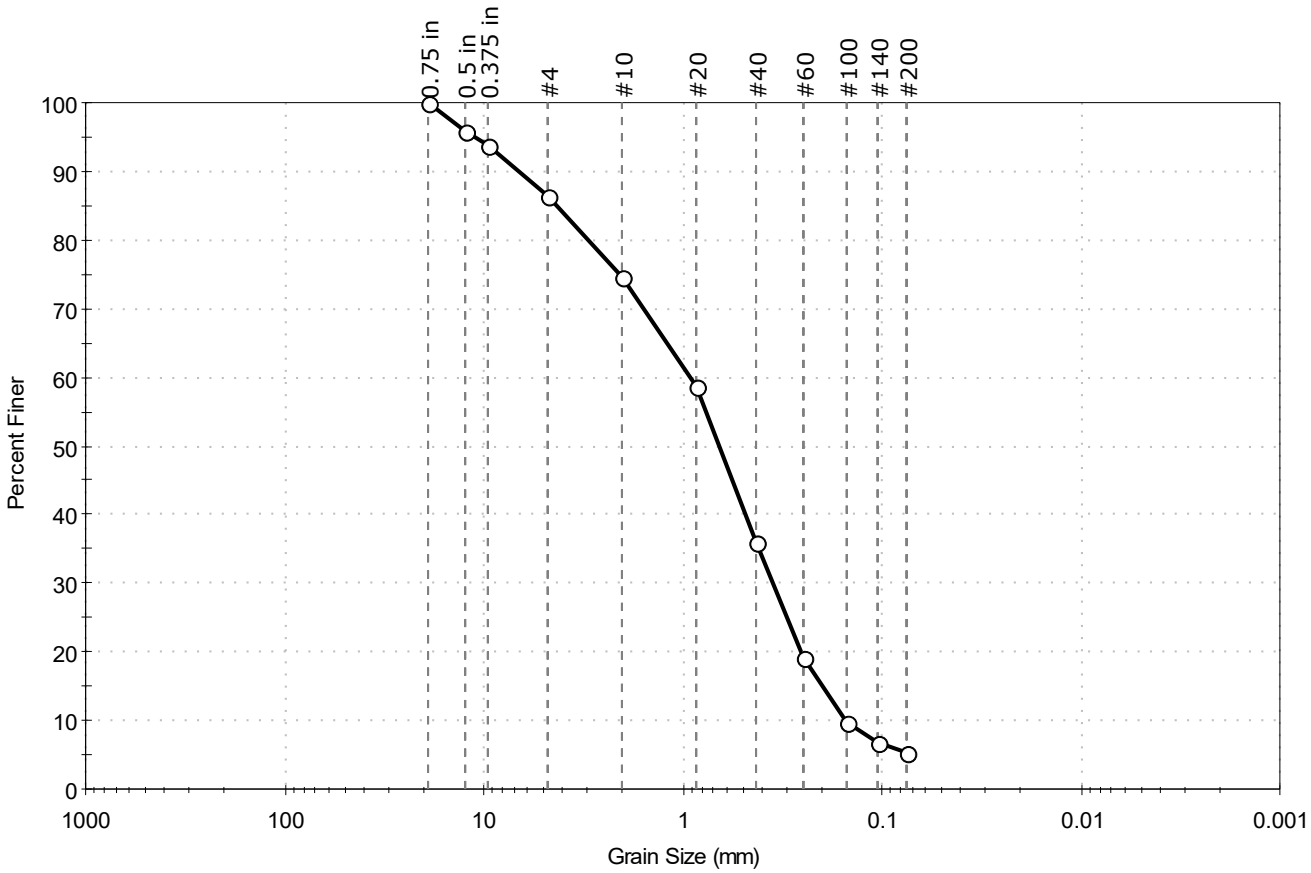
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-029-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-4	Test Date:	04/15/19	Checked By:	bfs
Depth :	9 ft	Test Id:	499711		
Test Comment:	---				
Visual Description:	Moist, olive yellow sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	13.5	81.1	5.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	96		
0.375 in	9.50	94		
#4	4.75	86		
#10	2.00	75		
#20	0.85	59		
#40	0.42	36		
#60	0.25	19		
#100	0.15	10		
#140	0.11	7		
#200	0.075	5.4		

Coefficients

D_{85} = 4.2717 mm D_{30} = 0.3515 mm

D_{60} = 0.9170 mm D_{15} = 0.1997 mm

D_{50} = 0.6533 mm D_{10} = 0.1529 mm

C_u = 5.997 C_c = 0.881

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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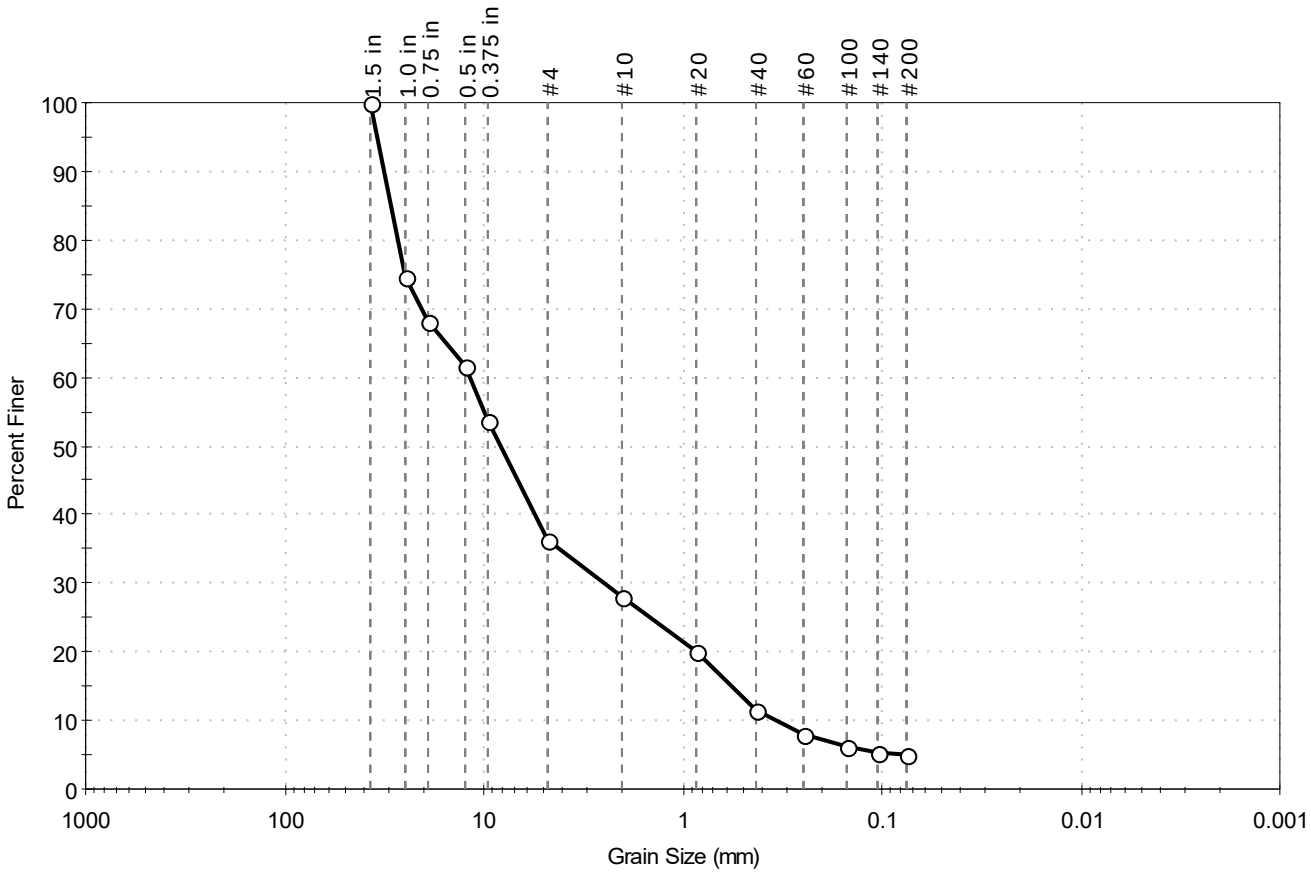
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-030-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-3	Test Date:	03/28/19	Checked By:	bfs
Depth :	5 ft	Test Id:	497395		
Test Comment:	---				
Visual Description:	Moist, yellowish brown gravel with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	63.8	31.3	4.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1.0 in	25.00	75		
0.75 in	19.00	68		
0.5 in	12.50	62		
0.375 in	9.50	54		
#4	4.75	36		
#10	2.00	28		
#20	0.85	20		
#40	0.42	11		
#60	0.25	8		
#100	0.15	6		
#140	0.11	5		
#200	0.075	4.9		

Coefficients

D_{85} = 29.5149 mm D_{30} = 2.4697 mm

D_{60} = 11.8050 mm D_{15} = 0.5656 mm

D_{50} = 8.2318 mm D_{10} = 0.3415 mm

C_u = 34.568 C_c = 1.513

Classification

ASTM Well-graded GRAVEL with Sand (GW)

AASHTO Stone Fragments, Gravel and Sand (A-1-a (1))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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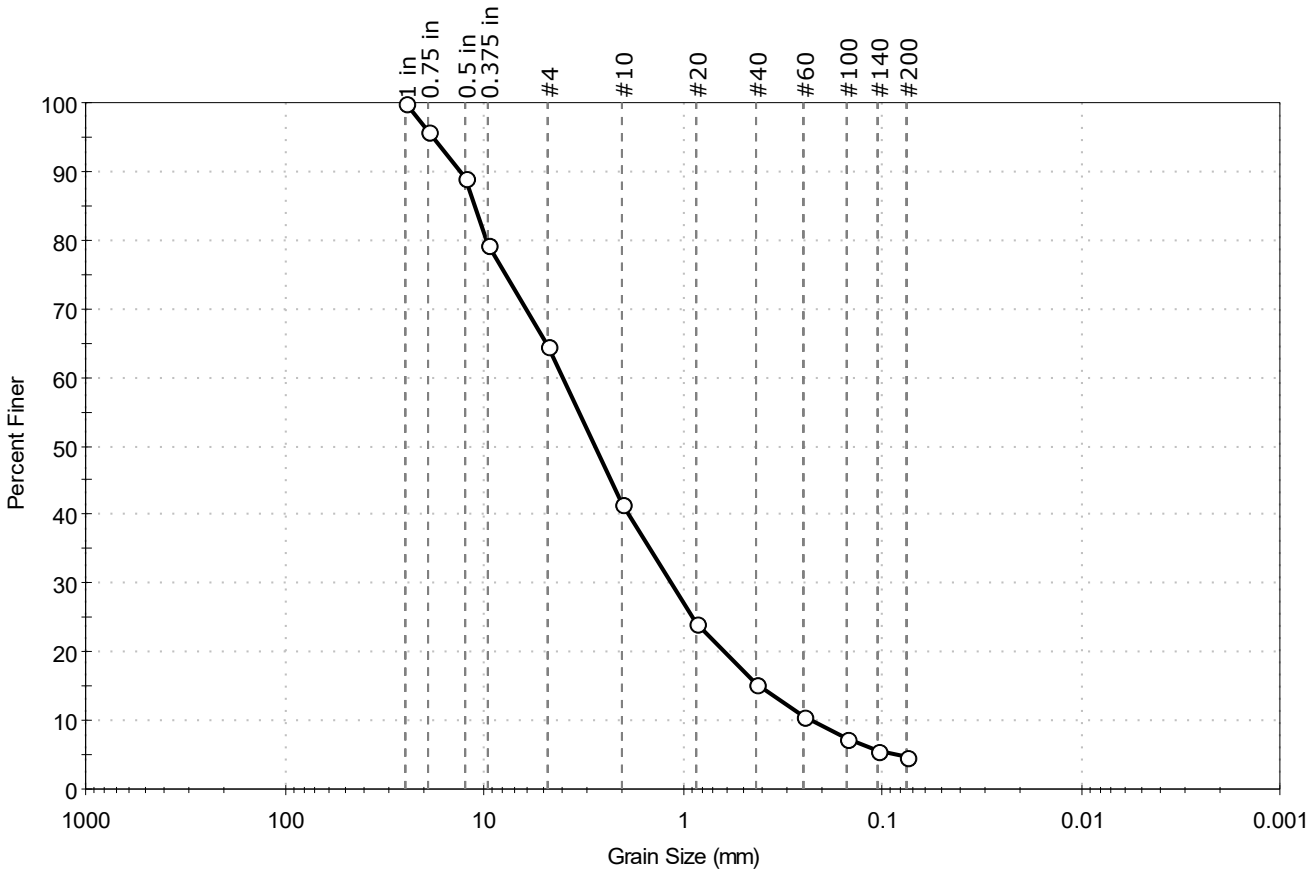
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-031-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-4	Test Date:	04/15/19	Checked By:	bfs
Depth :	5.5 ft	Test Id:	499712		
Test Comment:	---				
Visual Description:	Moist, yellowish brown sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	35.5	59.9	4.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	96		
0.5 in	12.50	89		
0.375 in	9.50	79		
#4	4.75	64		
#10	2.00	42		
#20	0.85	24		
#40	0.42	15		
#60	0.25	11		
#100	0.15	7		
#140	0.11	6		
#200	0.075	4.6		

Coefficients

D_{85} = 11.1655 mm D_{30} = 1.1299 mm

D_{60} = 4.0058 mm D_{15} = 0.4032 mm

D_{50} = 2.7384 mm D_{10} = 0.2243 mm

C_u = 17.859 C_c = 1.421

Classification

ASTM Well-graded SAND with Gravel (SW)

AASHTO Stone Fragments, Gravel and Sand (A-1-a (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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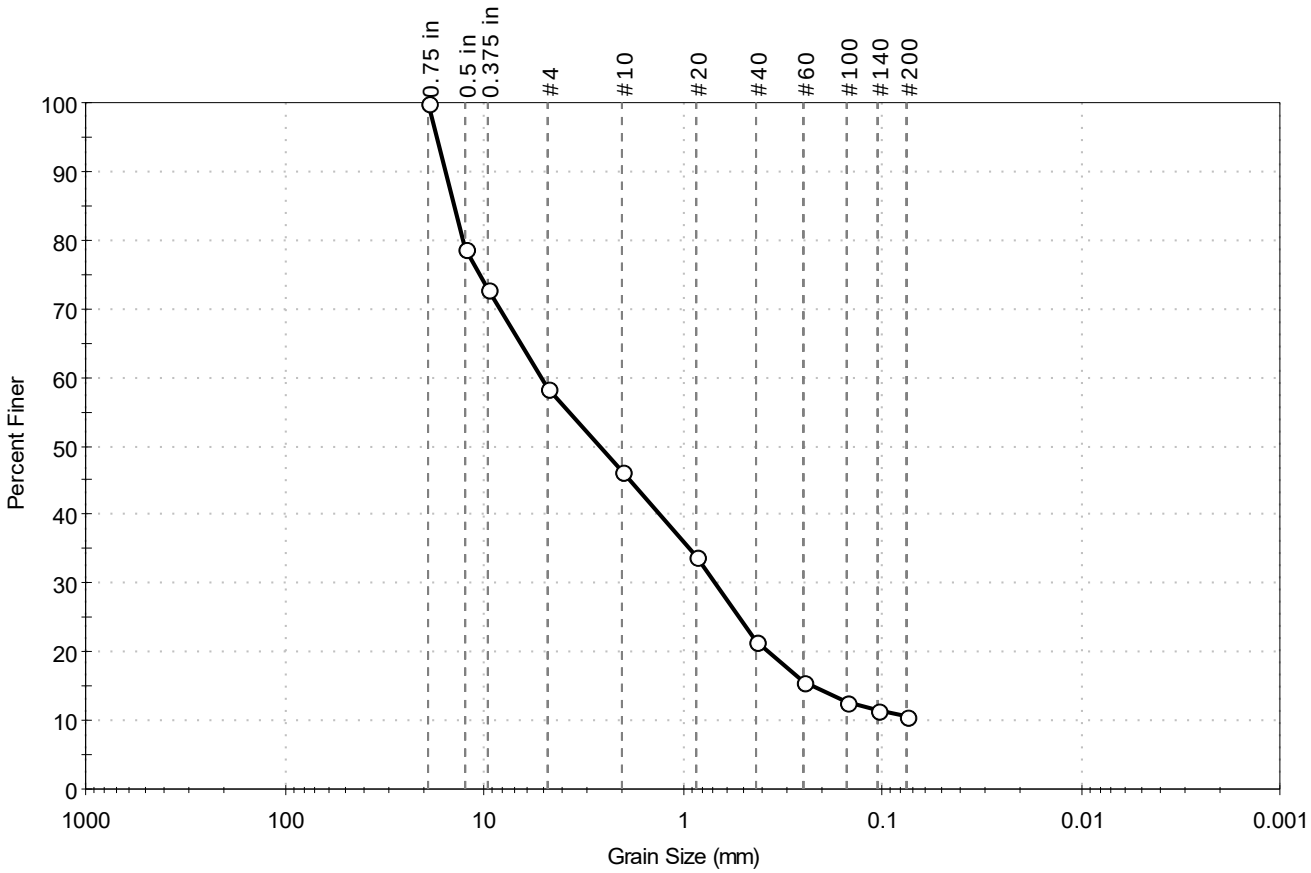
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-032-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-2	Test Date:	04/01/19	Checked By:	bfs
Depth :	3 ft	Test Id:	497396		
Test Comment:	---				
Visual Description:	Moist, dark brown sand with silt and gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	41.7	47.6	10.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	79		
0.375 in	9.50	73		
#4	4.75	58		
#10	2.00	46		
#20	0.85	34		
#40	0.42	22		
#60	0.25	16		
#100	0.15	13		
#140	0.11	12		
#200	0.075	11		

Coefficients

D_{85} = 14.1141 mm D_{30} = 0.6796 mm

D_{60} = 5.1329 mm D_{15} = 0.2277 mm

D_{50} = 2.6213 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-a (0))

Sample/Test Description

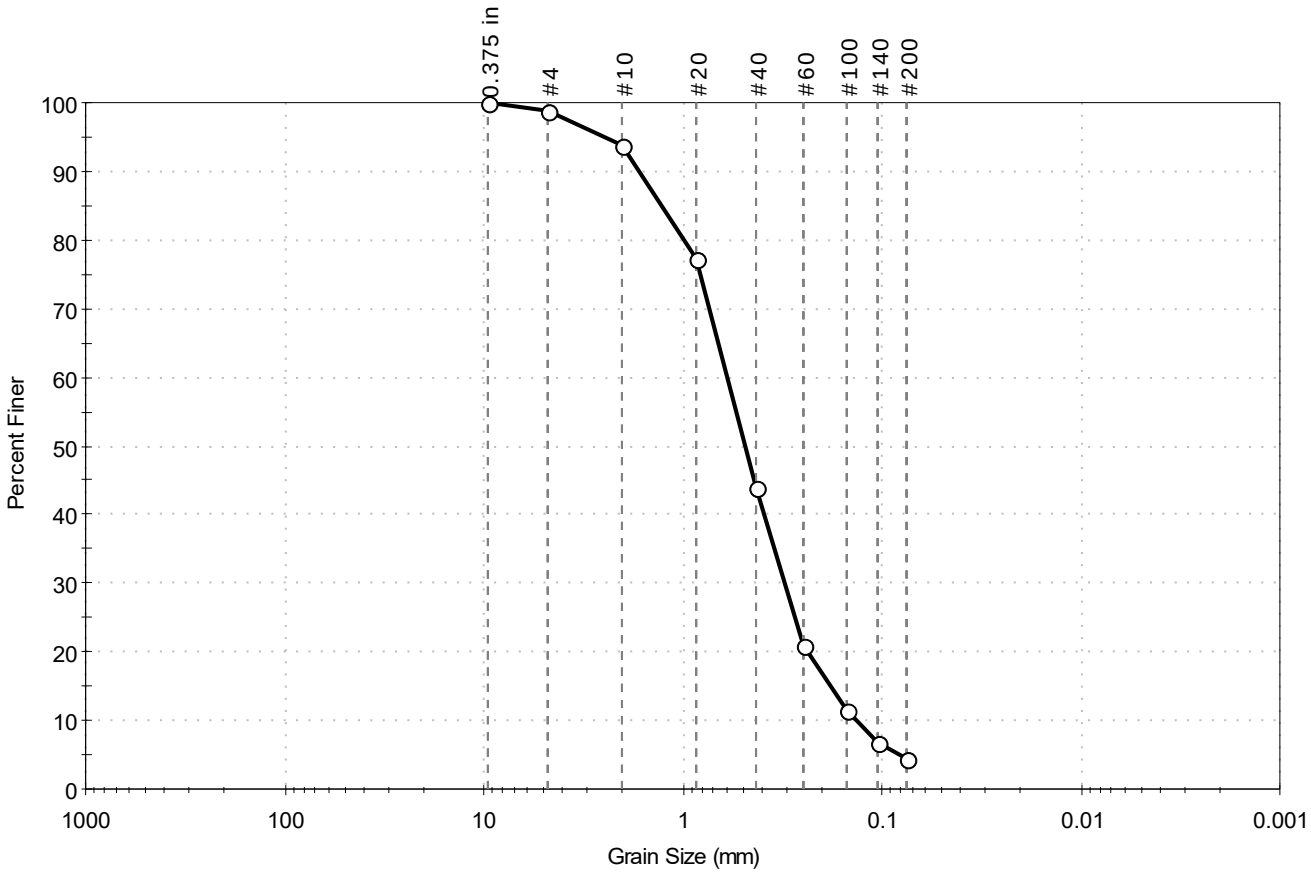
Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

printed 4/1/2019 1:10:36 PM

Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-032-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-5	Test Date:	03/28/19	Checked By:	bfs
Depth :	17 ft	Test Id:	497397		
Test Comment:	---				
Visual Description:	Moist, grayish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	1.3	94.3	4.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	94		
#20	0.85	77		
#40	0.42	44		
#60	0.25	21		
#100	0.15	11		
#140	0.11	7		
#200	0.075	4.4		

Coefficients

D_{85} = 1.2746 mm D_{30} = 0.3079 mm

D_{60} = 0.5944 mm D_{15} = 0.1810 mm

D_{50} = 0.4829 mm D_{10} = 0.1348 mm

C_u = 4.409 C_c = 1.183

Classification

ASTM Poorly graded SAND (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

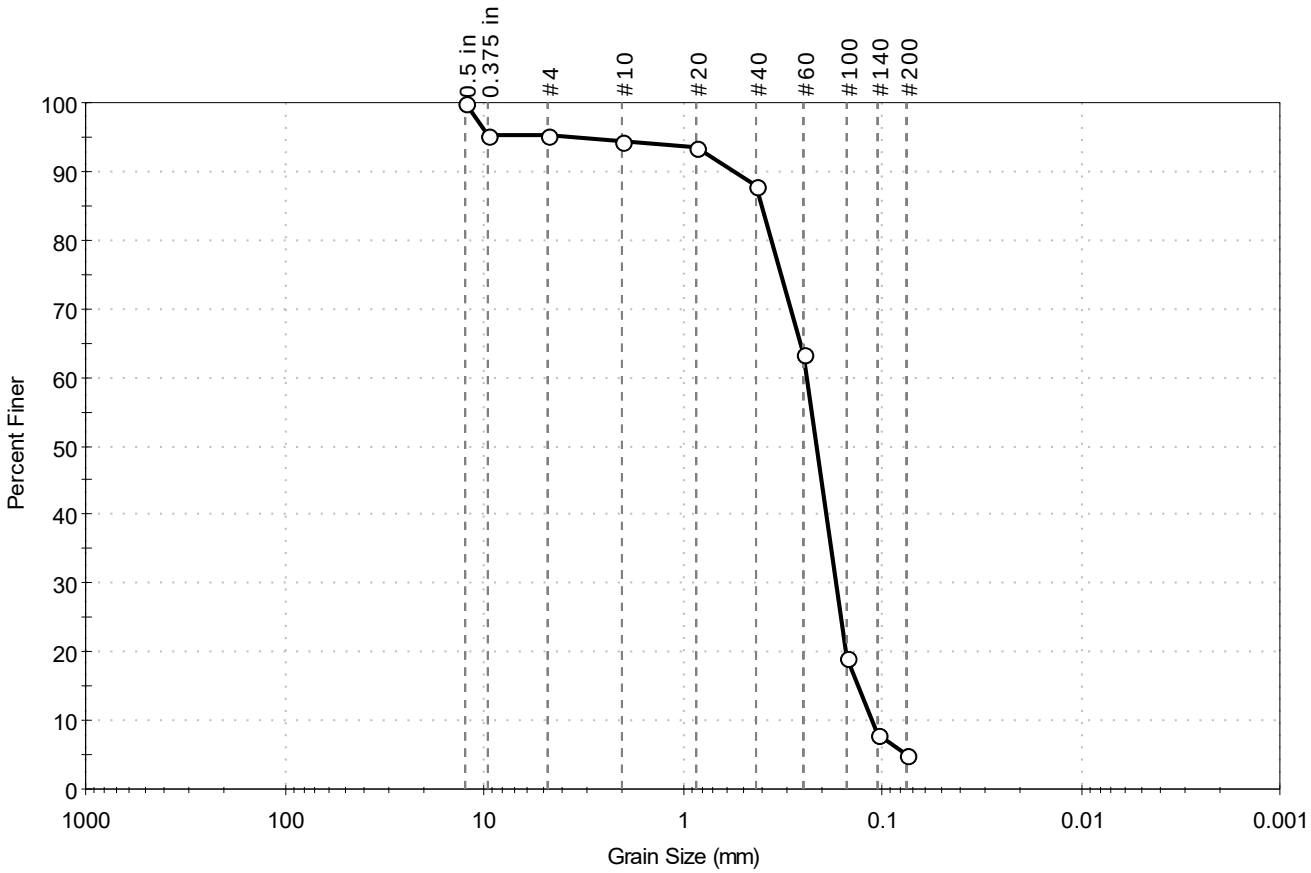
Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-033-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-3	Test Date:	03/28/19	Checked By:	bfs
Depth :	8 ft	Test Id:	497398		
Test Comment:	---				
Visual Description:	Moist, light olive brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	4.9	90.0	5.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.5 in	12.50	100		
0.375 in	9.50	95		
#4	4.75	95		
#10	2.00	94		
#20	0.85	94		
#40	0.42	88		
#60	0.25	63		
#100	0.15	19		
#140	0.11	8		
#200	0.075	5.1		

Coefficients

D_{85} = 0.3983 mm D_{30} = 0.1701 mm
D_{60} = 0.2404 mm D_{15} = 0.1321 mm
D_{50} = 0.2142 mm D_{10} = 0.1130 mm
C_u = 2.127 C_c = 1.065

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

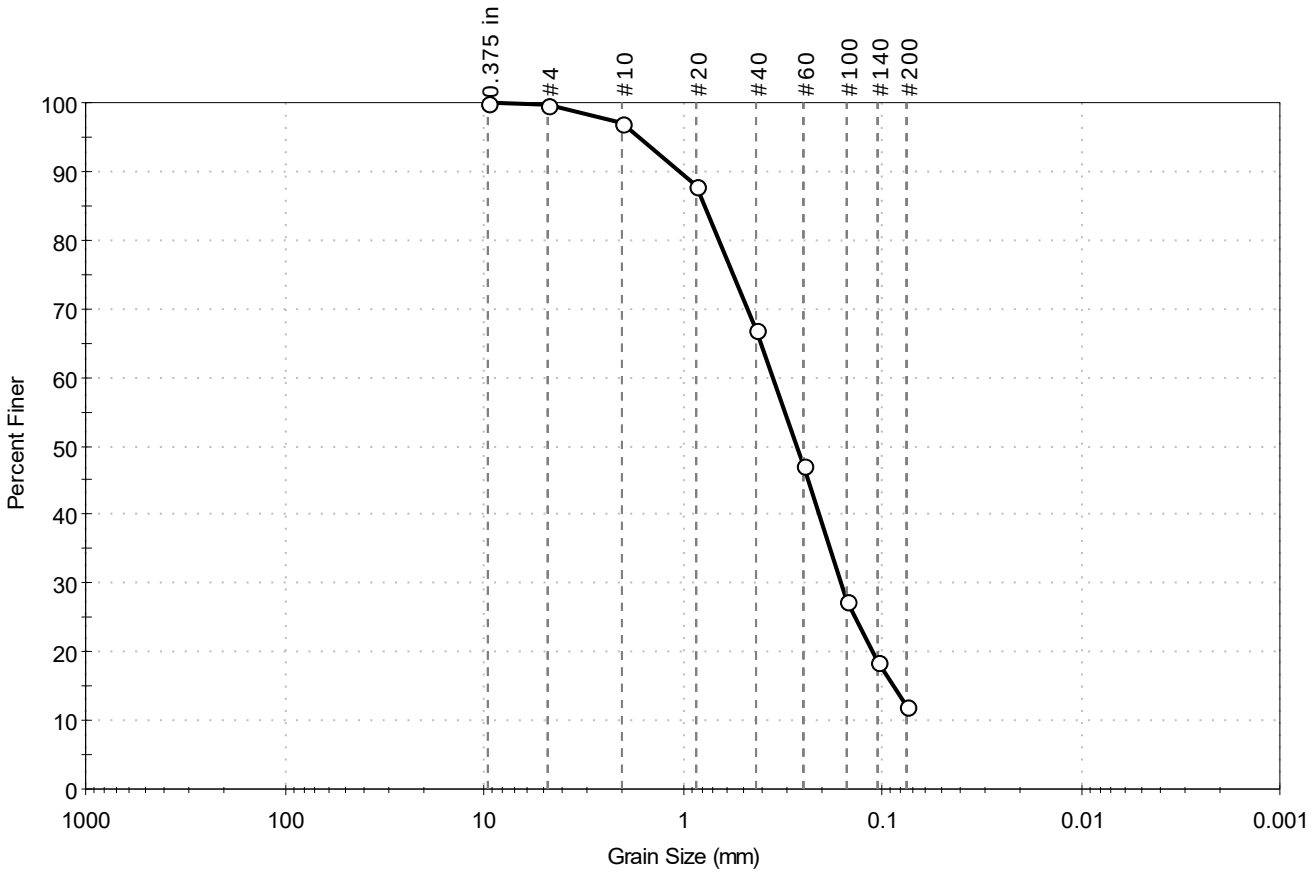
Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

printed 4/1/2019 1:10:39 PM

Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-033-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-6	Test Date:	03/28/19	Checked By:	bfs
Depth :	17 ft	Test Id:	497399		
Test Comment:	---				
Visual Description:	Moist, yellowish brown silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.2	87.8	12.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	100		
#10	2.00	97		
#20	0.85	88		
#40	0.42	67		
#60	0.25	47		
#100	0.15	27		
#140	0.11	19		
#200	0.075	12		

Coefficients

D_{85} = 0.7738 mm D_{30} = 0.1602 mm

D_{60} = 0.3532 mm D_{15} = 0.0878 mm

D_{50} = 0.2694 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

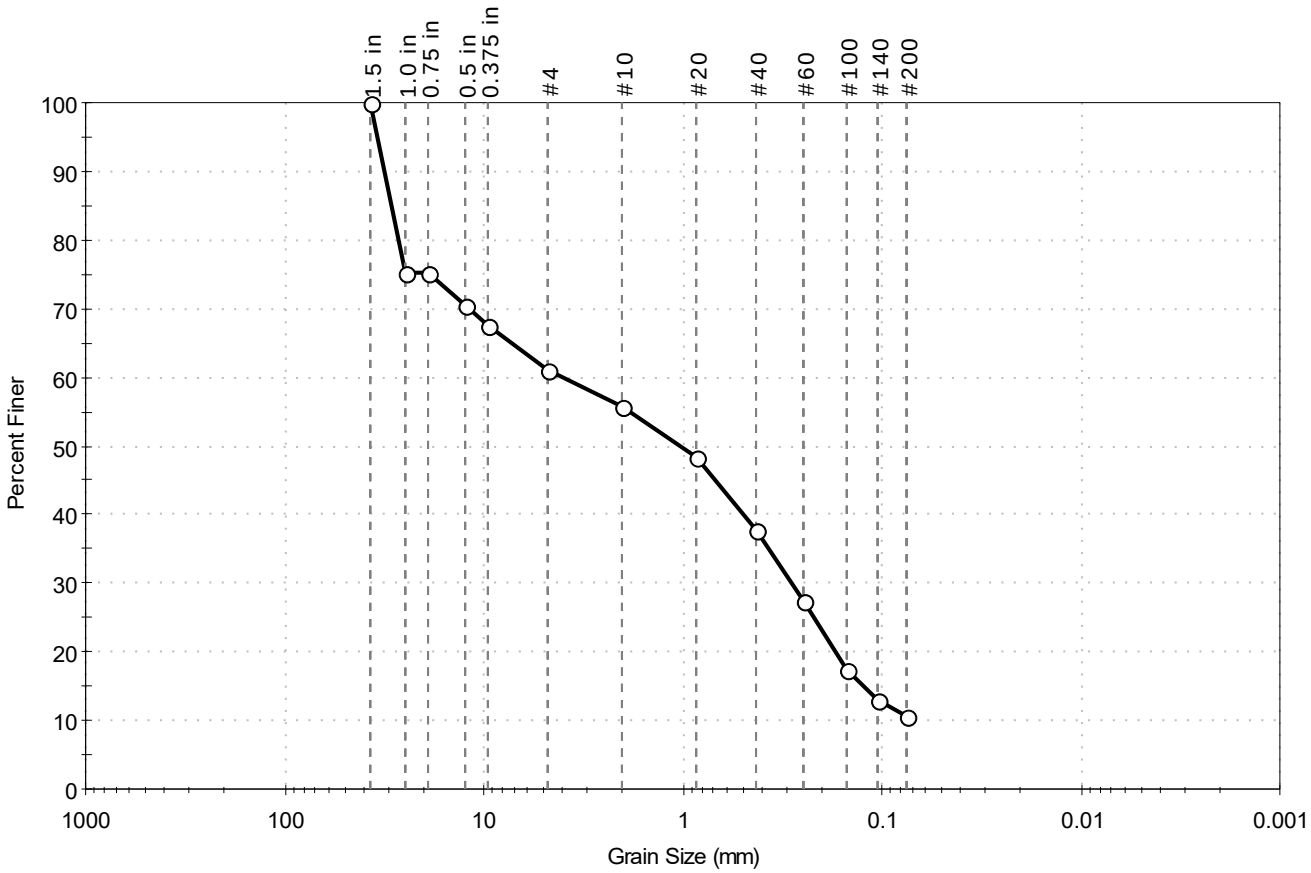
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-034-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-3	Test Date:	03/28/19	Checked By:	bfs
Depth :	5 ft	Test Id:	497376		
Test Comment:	---				
Visual Description:	Moist, very dark brown sand with silt and gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	38.9	50.4	10.7

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1.5 in	37.50	100		
1.0 in	25.00	75		
0.75 in	19.00	75		
0.5 in	12.50	70		
0.375 in	9.50	68		
#4	4.75	61		
#10	2.00	56		
#20	0.85	48		
#40	0.42	38		
#60	0.25	27		
#100	0.15	17		
#140	0.11	13		
#200	0.075	11		

Coefficients

D_{85} = 29.3686 mm D_{30} = 0.2861 mm

D_{60} = 3.9305 mm D_{15} = 0.1252 mm

D_{50} = 1.0246 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

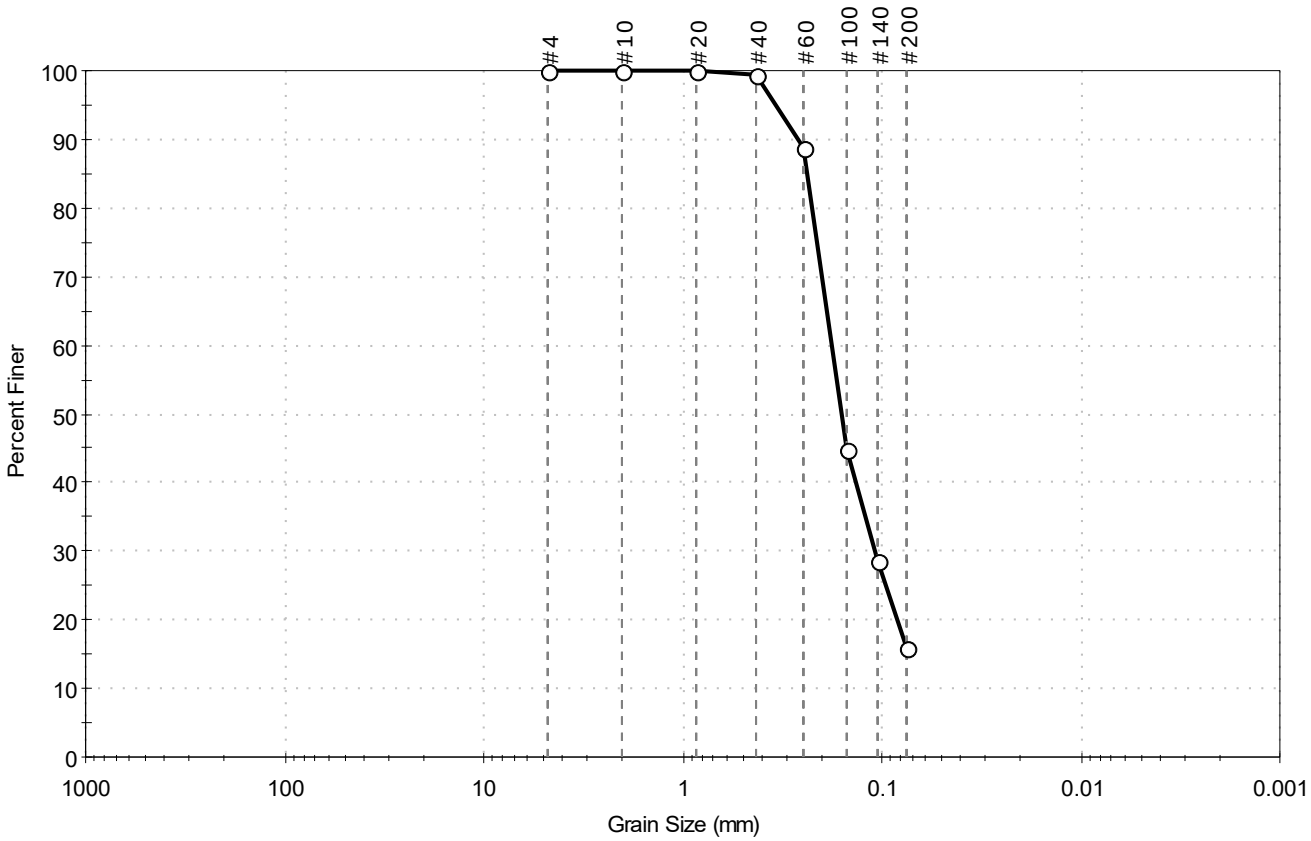
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-034-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-7	Test Date:	03/28/19	Checked By:	bfs
Depth :	17 ft	Test Id:	497377		
Test Comment:	---				
Visual Description:	Moist, olive silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.0	84.1	15.9

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	100		
#60	0.25	89		
#100	0.15	45		
#140	0.11	28		
#200	0.075	16		

Coefficients

D_{85} = 0.2394 mm D_{30} = 0.1095 mm

D_{60} = 0.1790 mm D_{15} = N/A

D_{50} = 0.1593 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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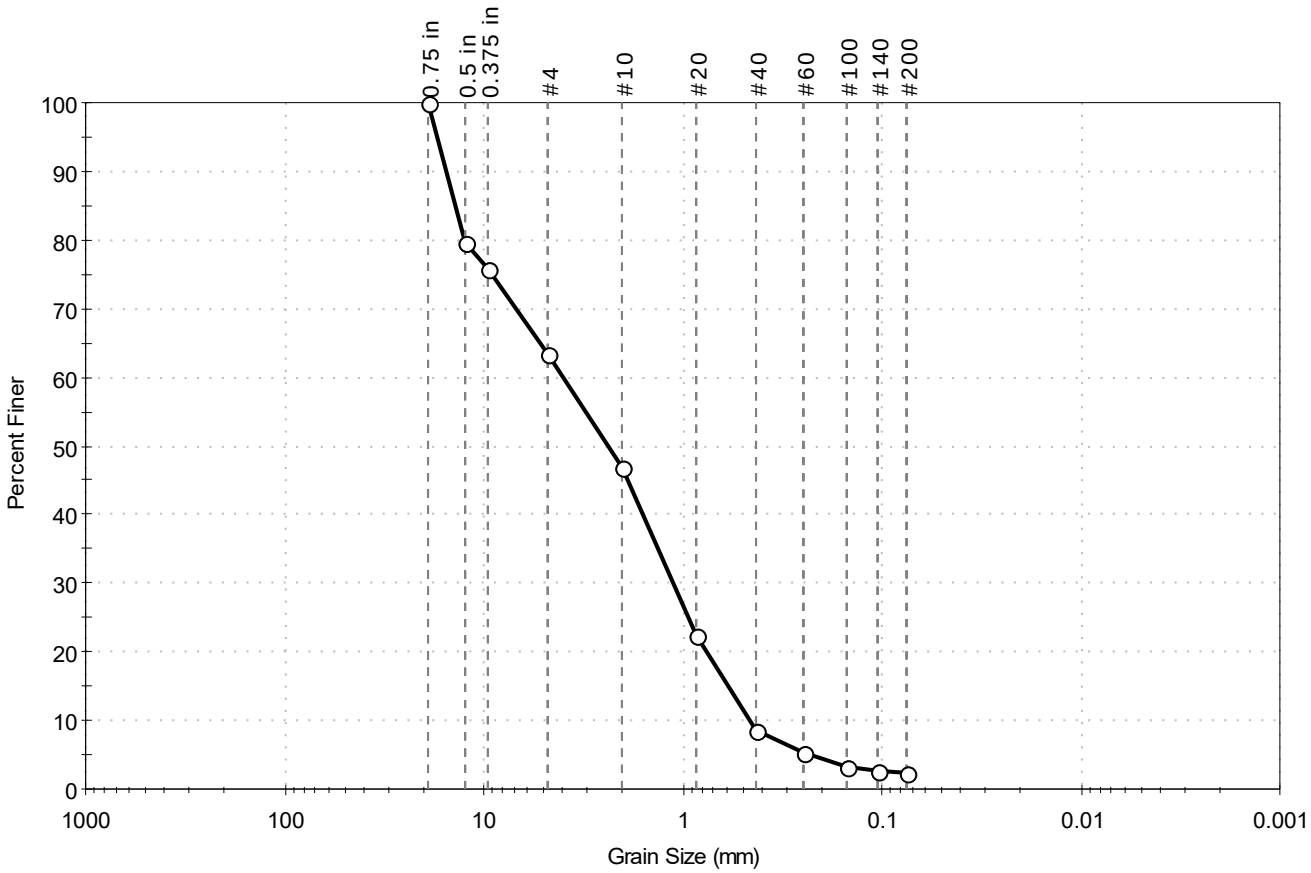
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-035-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-4	Test Date:	03/28/19	Checked By:	bfs
Depth :	4 ft	Test Id:	497378		
Test Comment:	---				
Visual Description:	Moist, grayish brown sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	36.7	61.0	2.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	80		
0.375 in	9.50	76		
#4	4.75	63		
#10	2.00	47		
#20	0.85	22		
#40	0.42	9		
#60	0.25	5		
#100	0.15	3		
#140	0.11	3		
#200	0.075	2.3		

Coefficients

D_{85} = 13.9708 mm D_{30} = 1.1079 mm

D_{60} = 3.9801 mm D_{15} = 0.5878 mm

D_{50} = 2.3447 mm D_{10} = 0.4578 mm

C_u = 8.694 C_c = 0.674

Classification

ASTM Poorly graded SAND with Gravel (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-a (1))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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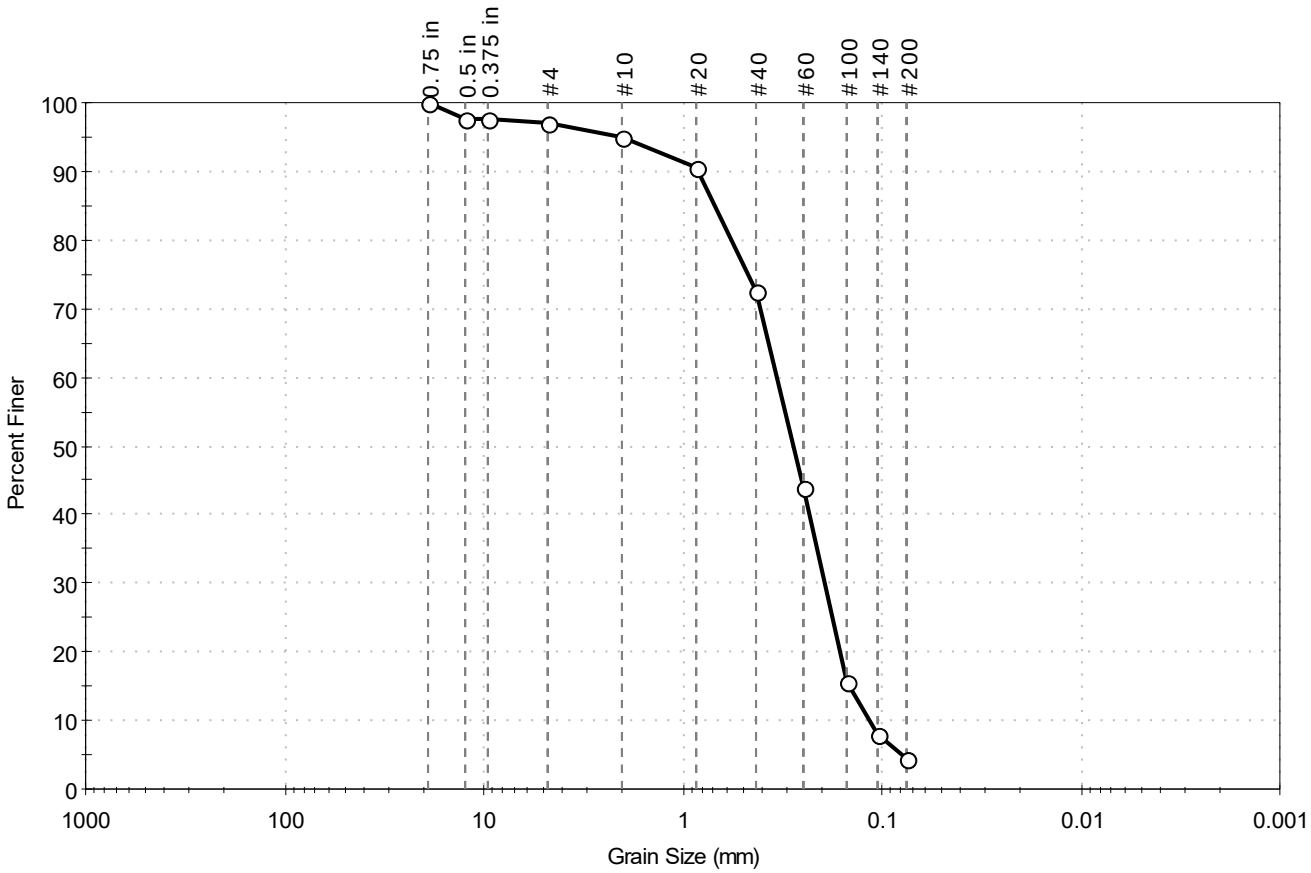
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-039-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-5	Test Date:	03/23/19	Checked By:	bfs
Depth :	6.5 ft	Test Id:	497379		
Test Comment:	---				
Visual Description:	Moist, olive brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	3.0	92.4	4.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	98		
0.375 in	9.50	98		
#4	4.75	97		
#10	2.00	95		
#20	0.85	91		
#40	0.42	73		
#60	0.25	44		
#100	0.15	16		
#140	0.11	8		
#200	0.075	4.6		

Coefficients

D_{85} = 0.6838 mm D_{30} = 0.1939 mm

D_{60} = 0.3360 mm D_{15} = 0.1449 mm

D_{50} = 0.2791 mm D_{10} = 0.1160 mm

C_u = 2.897 C_c = 0.965

Classification

ASTM Poorly graded SAND (SP)

AASHTO Fine Sand (A-3 (1))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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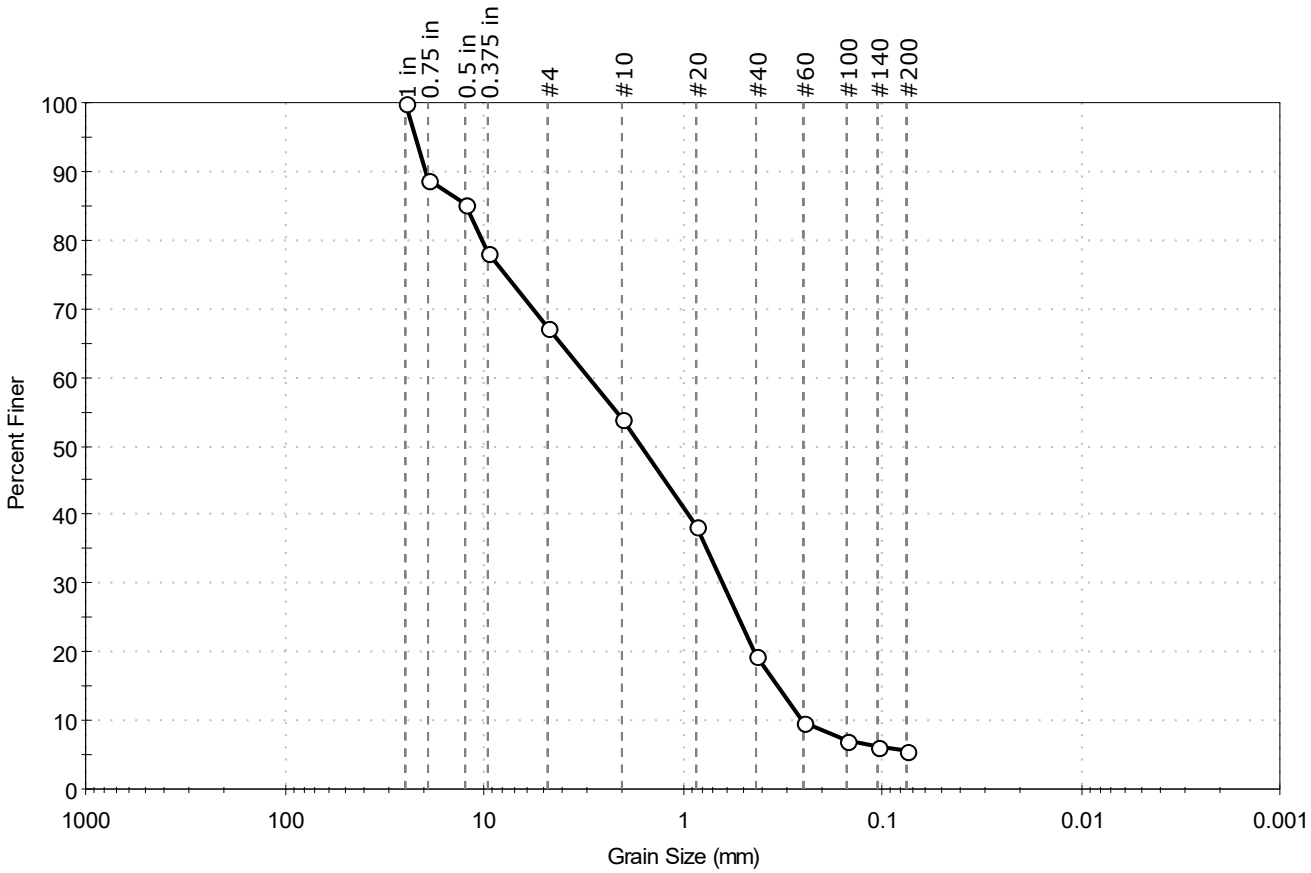
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-040-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-4	Test Date:	04/15/19	Checked By:	bfs
Depth :	4.5 ft	Test Id:	499713		
Test Comment:	---				
Visual Description:	Moist, brownish yellow sand with silt and gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	32.7	61.7	5.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	89		
0.5 in	12.50	85		
0.375 in	9.50	78		
#4	4.75	67		
#10	2.00	54		
#20	0.85	38		
#40	0.42	20		
#60	0.25	10		
#100	0.15	7		
#140	0.11	6		
#200	0.075	5.6		

Coefficients

D_{85} = 12.4231 mm D_{30} = 0.6240 mm

D_{60} = 2.9598 mm D_{15} = 0.3319 mm

D_{50} = 1.6103 mm D_{10} = 0.2537 mm

C_u = 11.667 C_c = 0.519

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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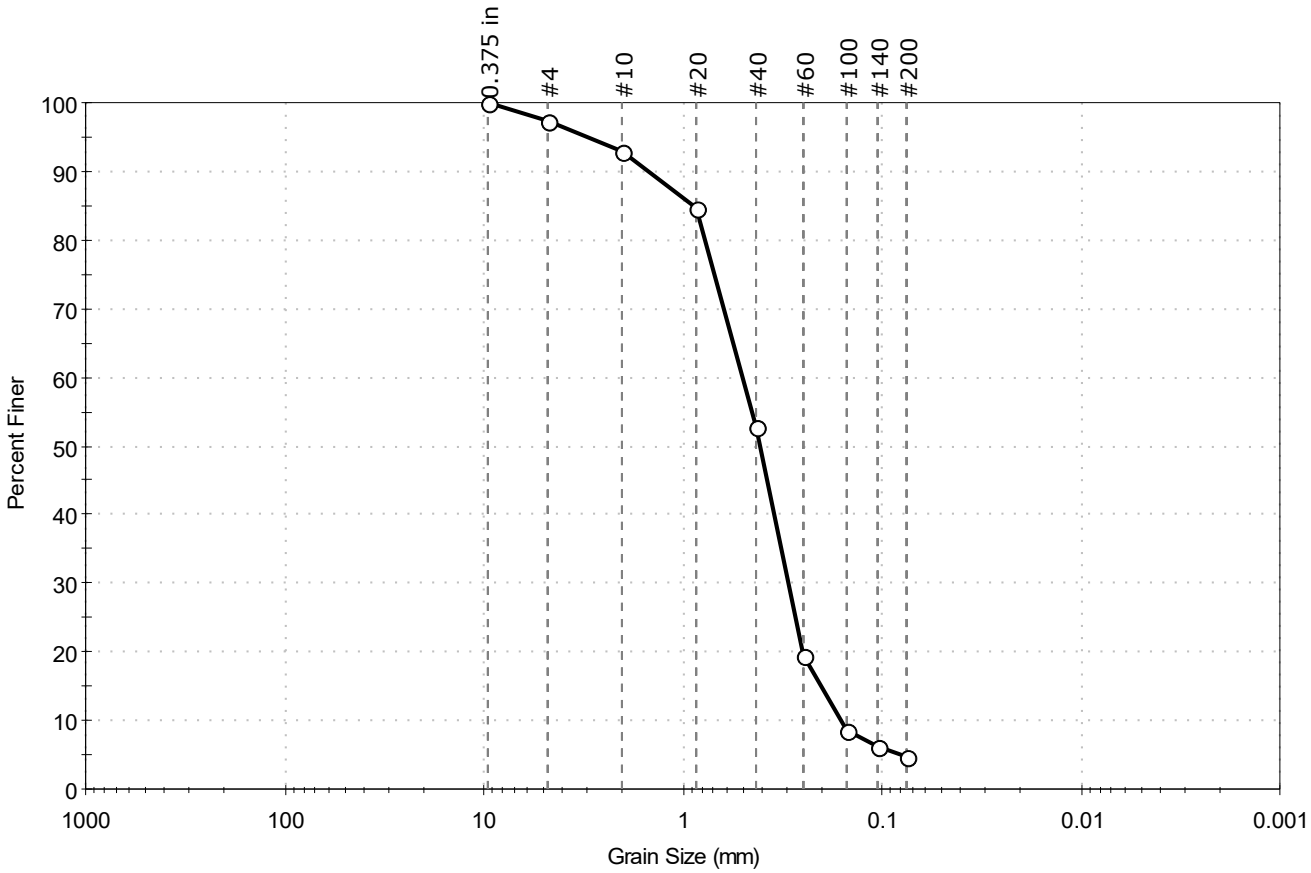
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-055-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-5	Test Date:	04/15/19	Checked By:	bfs
Depth :	15 ft	Test Id:	499714		
Test Comment:	---				
Visual Description:	Moist, light yellowish brown sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	2.8	92.6	4.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	97		
#10	2.00	93		
#20	0.85	85		
#40	0.42	53		
#60	0.25	19		
#100	0.15	9		
#140	0.11	6		
#200	0.075	4.6		

Coefficients

D_{85} = 0.8871 mm D_{30} = 0.2955 mm

D_{60} = 0.4967 mm D_{15} = 0.2024 mm

D_{50} = 0.4061 mm D_{10} = 0.1599 mm

C_u = 3.106 C_c = 1.099

Classification

ASTM Poorly graded SAND (SP)

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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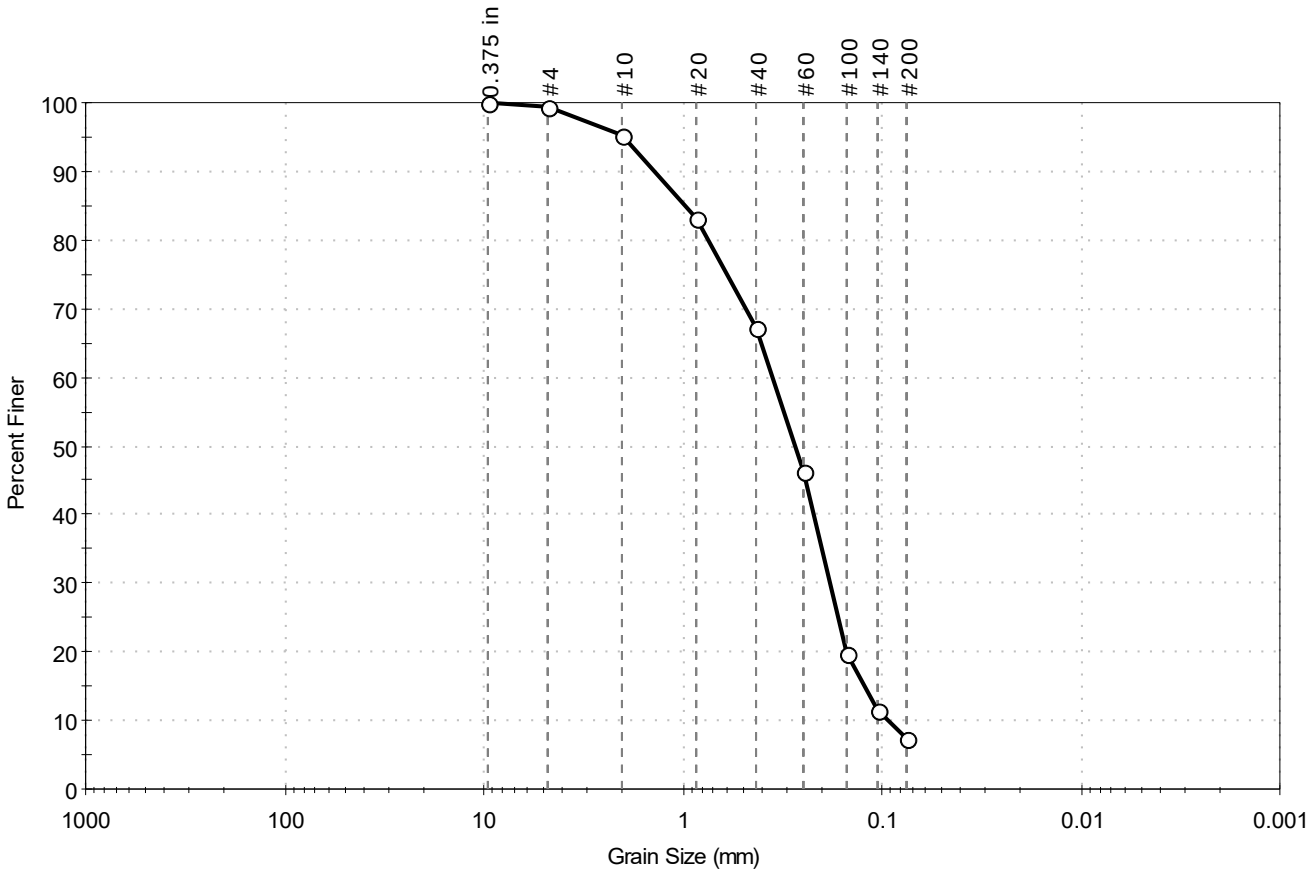
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-057-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-6	Test Date:	03/25/19	Checked By:	bfs
Depth :	12 ft	Test Id:	497367		
Test Comment:	---				
Visual Description:	Moist, dark yellow brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	0.6	92.0	7.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	99		
#10	2.00	95		
#20	0.85	83		
#40	0.42	67		
#60	0.25	46		
#100	0.15	20		
#140	0.11	12		
#200	0.075	7.4		

Coefficients

D_{85} = 0.9612 mm D_{30} = 0.1827 mm

D_{60} = 0.3542 mm D_{15} = 0.1227 mm

D_{50} = 0.2749 mm D_{10} = 0.0933 mm

C_u = 3.796 C_c = 1.010

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (1))

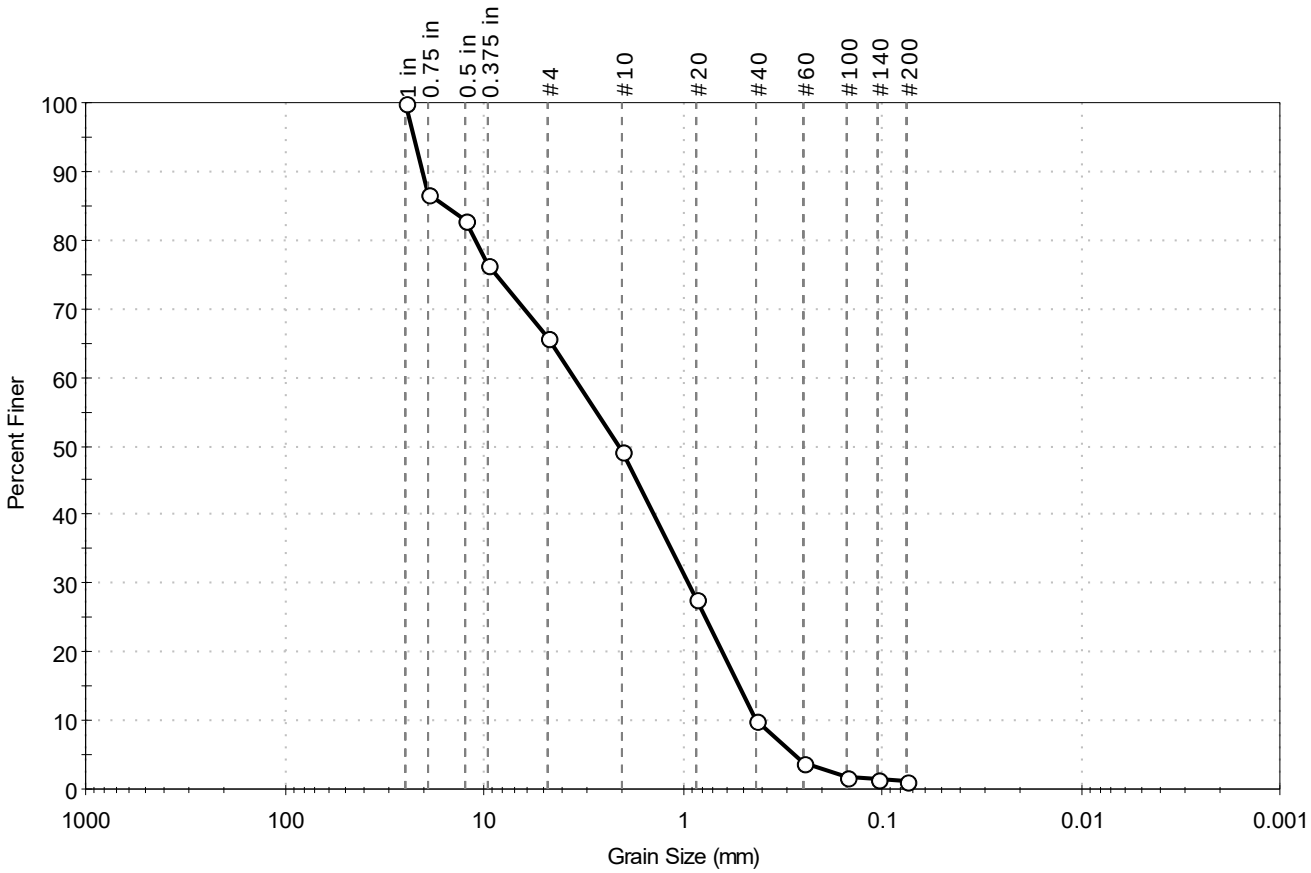
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-061-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-4	Test Date:	03/23/19	Checked By:	bfs
Depth :	5 ft	Test Id:	497372		
Test Comment:	---				
Visual Description:	Moist, yellowish brown sand with gravel				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
—	34.2	64.6	1.2

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
1 in	25.00	100		
0.75 in	19.00	87		
0.5 in	12.50	83		
0.375 in	9.50	76		
#4	4.75	66		
#10	2.00	49		
#20	0.85	28		
#40	0.42	10		
#60	0.25	4		
#100	0.15	2		
#140	0.11	1		
#200	0.075	1.2		

Coefficients

D_{85} = 15.6448 mm D_{30} = 0.9321 mm

D_{60} = 3.5004 mm D_{15} = 0.5171 mm

D_{50} = 2.0636 mm D_{10} = 0.4250 mm

C_u = 8.236 C_c = 0.584

Classification

ASTM Poorly graded SAND with Gravel (SP)

AASHTO Stone Fragments, Gravel and Sand (A-1-a (1))

Sample / Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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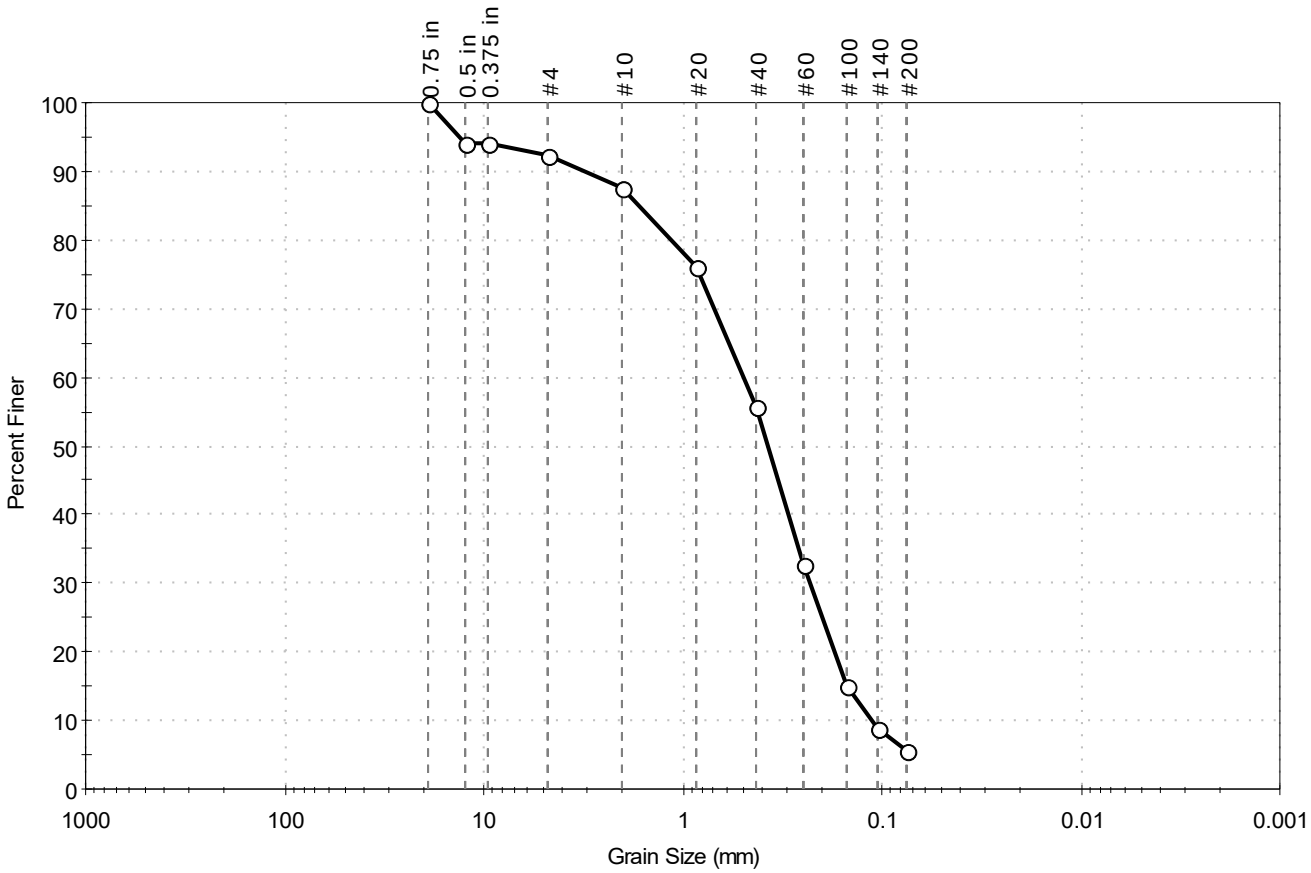
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-062-G	Sample Type:	jar	Tested By:	ckg
Sample ID:	S-6	Test Date:	03/23/19	Checked By:	bfs
Depth :	10 ft	Test Id:	497373		
Test Comment:	---				
Visual Description:	Moist, dark yellowish brown sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D6913



% Cobble	% Gravel	% Sand	% Silt & Clay Size
--	7.7	86.7	5.6

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.75 in	19.00	100		
0.5 in	12.50	94		
0.375 in	9.50	94		
#4	4.75	92		
#10	2.00	88		
#20	0.85	76		
#40	0.42	56		
#60	0.25	33		
#100	0.15	15		
#140	0.11	9		
#200	0.075	5.6		

Coefficients

D_{85} = 1.6424 mm D_{30} = 0.2314 mm

D_{60} = 0.4929 mm D_{15} = 0.1499 mm

D_{50} = 0.3732 mm D_{10} = 0.1135 mm

C_u = 4.343 C_c = 0.957

Classification

ASTM N/A

AASHTO Fine Sand (A-3 (1))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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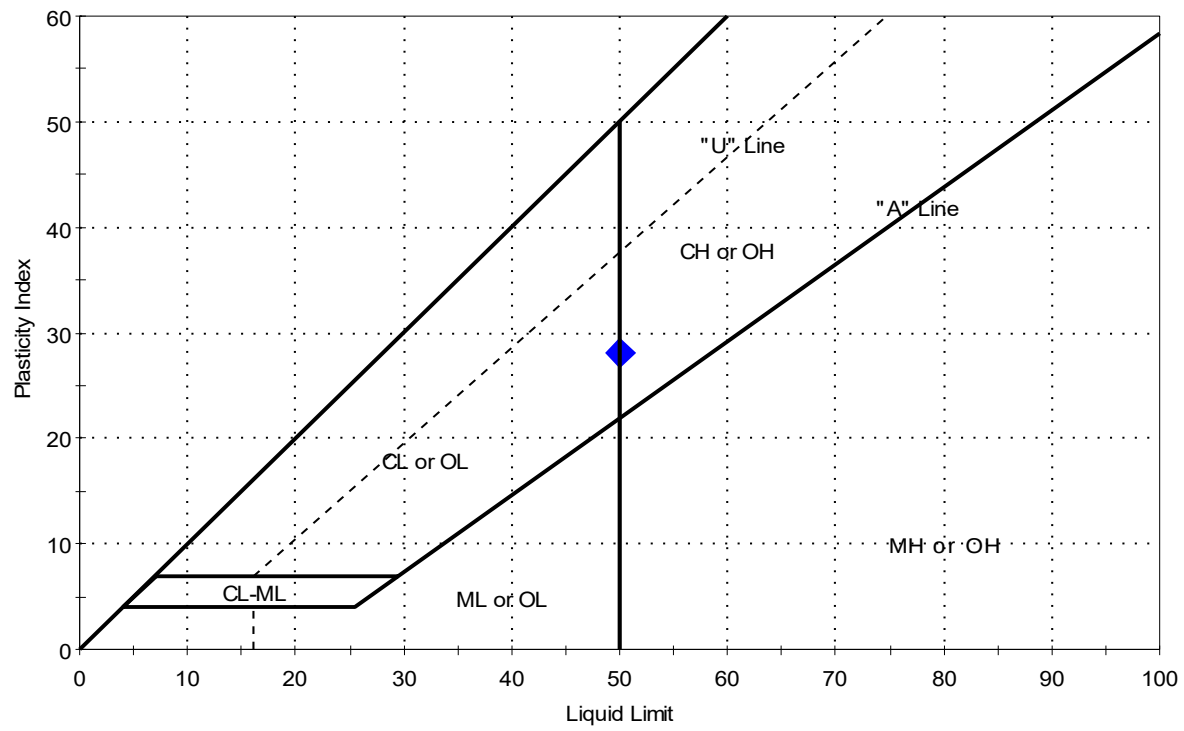
Client:	Ardaman & Associates, Inc.				
Project:	Lynn Sewer Drilling				
Location:	Lynn, MA			Project No:	GTX-309596
Boring ID:	TT-027-G	Sample Type:	jar	Tested By:	GA
Sample ID:	S-8	Test Date:	03/28/19	Checked By:	bfs
Depth :	20 ft	Test Id:	497400		
Test Comment:	---				
Visual Description:	Moist, dark gray clay				
Sample Comment:	---				

Atterberg Limits - ASTM D4318



Symbol	Sample ID	Boring	Depth	Natural Moisture Content, %	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index	Soil Classification
◆	S-8	TT-027-G	20 ft	32	50	22	28	0.4	

Sample Prepared using the WET method

Dry Strength: HIGH

Dilatancy: SLOW

Toughness: MEDIUM

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