

MEMO

To:	Ms. Sue Brown Town Planner Town of Manchester-by-the-Sea 10 Central Street Manchester-by-the-Sea, MA 01944	From:	Carlton M. Quinn, P.E.
		A&M Project #:	2725-01
		Date:	July 7, 2022
		Re:	Municipal Sewer Capacity The Sanctuary – School Street Manchester-by-the-Sea, MA

Copy:

Allen & Major Associates, Inc. (A&M) is pleased to present our review of the municipal sewer capacity for the proposed development (The Sanctuary) on School Street in Manchester-by-the-Sea, Massachusetts. The purpose of the review was to confirm there is adequate sewer capacity in the School Street sewer system.

The following documents are attached and were used in the evaluation:

- School Street Sewer Capacity Table, dated June 27, 2022, prepared by Allen & Major Associates, Inc.
- Title 5 Sewage Flow from SMH #22 Table, dated June 27, 2022, prepared by Allen & Major Associates, Inc.
- Flow Monitoring Summaries, dated June 22, 2022, prepared by Flow Assessment Services (FAS).
- Conceptual Sewer & Water Main Extension Plan & Profile, dated July 7, 2022, prepared by Allen & Major Associates, Inc.
- Sewer on School Street Plan & Profile (pages 2-5), prepared by Raymond Allen, Engineer.

Project Description

SLV School Street LLC's proposed multi-family development, The Sanctuary includes 136 residential units (232 bedrooms). The development's wastewater will be collected via an onsite gravity pipe sewer collection system in an underground septic tank at the entrance to the site and pumped southerly approximately 4,000 linear feet (LF) down School Street and discharged to municipal sewer manhole (SMH) #24. From SMH #24, the wastewater will continue to flow southerly via the existing gravity municipal sewer system to SMH #6, located at the intersection of School Street and Central Street. During pre-study coordination discussions with the Town of Manchester Department of Public Works (DPW), it was noted that capacity analysis downstream of SMH #6 would not be required.

The proposed development will produce an estimated Title V flow of 25,520 gallons per day (GPD) (232 bedrooms x 110 GPD/bedroom), and an estimated peak flow of 145,464 GPD (25,520 GPD x 5.7 peaking factor). Title V was used to determine per bedroom flows from the development. Title V flows were originally established to provide guidance for the design of septic systems but are commonly used to determine per bedroom flows from proposed developments. Title V flows are generally accepted to be "peaked" flows and are larger than anticipated average daily flow rates. A second peaking factor of 5.7 from the TR-16, Design of

Wastewater Treatment Works, 2011 Edition, Figure 2-1 Ratio of Extreme Flow to Average Daily Flow, was applied to Title V flows to calculate the peak flows used in our analysis. This method produces the most conservative flow rate, which is unlikely to be reached and is being used solely to demonstrate sewer capacity using a conservative analysis of the available pipe capacity. Additionally, the flows from the project will be stored onsite and pumped at a constant rate that will be substantially lower than the flows used for the analysis, so the design of the pump system connecting into the gravity sewer can be controlled as-needed in order to limit the maximum, flow rate coming from the project so as to not surcharge the existing system under peak flow conditions.

Hydraulic Capacity Analysis

A&M performed a hydraulic capacity analysis of the sewers downstream of the proposed development's connection, SMH #24. The purpose of the analysis was to determine if the existing sewers have adequate capacity to accommodate the proposed sewer flows from the Sanctuary development. The hydraulic capacity analysis table (attached) was constructed using sewer pipe invert elevations, diameters, lengths, and materials from sewer record drawings provided by the DPW and as indicated on the attached Conceptual Sewer & Water Extension Profile Plan. This analysis does not consider flow conditions in the municipal collection system, downstream of SMH#6.

Based on the hydraulic capacity analysis, the existing pipe capacities range from 238,649 GPD to 3,748,882 GPD. Existing flow data was provided by FAS for the period from May 13, 2022, through June 3, 2022. Please note that FAS is routinely sub-contracted by the DPW's sewer consultant to provide sewer monitoring services for the Town.

Although there were eighteen (18) pipe segments analyzed, only four (4) flow meters were required because there were similar existing design capacities. Meters were installed in the most down-gradient pipe, and the existing flows of the downstream pipe segments were conservatively assumed for the up-gradient pipes, with one exception for pipe segment between SMH #22 and SMH #21. This flow was calculated by adding metered flow from SMH #22 (12,000 GPD) to a title 5 calculation (11,600 GPD) of additional properties discharging wastewater to SMH #21. This is summarized in the attached table.

The flow meters were installed in SMH #6, SMH #13, SMH #18, and SMH #22 on School Street. The average daily flow (ADF) during the metering period was 179,000, 147,000, 95,000, and 12,000 GPD, respectively. The estimated peak flow used in our analysis is 1,020,030, 837,900, 541,500, and 68,400 GPD (ADF x 5.7 peaking factor) respectfully, except for SMH #21 for which we used an estimated peak flow of 134,862 GPD as noted previously.

The total estimated post development peak flow, including the existing sewer's estimated peak flow and the development's estimated peak flow, results in less than 90% capacity for all pipe segments. It is noted that the capacity for SMH#17 to SMH #16 is illustrated as 91%, but the flow in that segment is assuming a down-gradient metered flow rate that is overly conservative and % capacity is much lower in reality.

Therefore, the existing sewer capacity within the flow path of the proposed development is adequate to accommodate the proposed sewer flows. **Please note that the since the proposed development is being pumped, the projects peak capacities used in the analysis can be tailored to the existing sewer capacity and/or discharged to the municipal system at off-peak hours. The applicant will continue to work with the DPW to provide the most appropriate design for the Town.**

Conceptual Sewer & Water Main Extension Plan & Profile

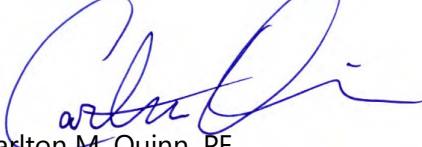
A&M has provided a conceptual sewer system plan and profile. The plan proposes to install approximately 4,000 LF of 4-inch PVC force main from the project driveway to proposed manhole SMH #24, located at the end of the Hidden Ledge Road. This force main will need to cross Route 128 and is currently proposed to be direction drilled approximately 600 linear feet between the exit ramp clover leaves with the remainder of the main extension is proposed to be standard trenched installation within the paved area of school street.

Sewer System Evaluation

A&M has evaluated the sewer infrastructure in the proposed development's flow path from the development's pump station to connection at SMH #24 to manhole SMH #6, where it discharges into the municipal treatment plant collection system. A&M has concluded the municipal system has available capacity for the proposed project.

Very Truly Yours,

ALLEN & MAJOR ASSOCIATES, INC.



Carlton M. Quinn, PE
Senior Project Manager

Pipe Run		Station		Length	Pipe Size	Slope	Design Capacity			Metered Average Daily Flow		Existing Peak Design Flow		The Sanctuary Average Daily Design Flow		The Sanctuary Design Peak Flow		Total Design Peak Flow		Percent Capcaity
From	To	Upper	Lower	L	D	s	V _{full}	Q _{full}		Q		Q		Q		Q		Q		
Upper	Lower	(Station)	(Station)	Feet	(in)	(%)	(fps)	(gpm)	(GPD)	(gpm)	(GPD)	(gpm)	(GPD)	(gpm)	(GPD)	(gpm)	(GPD)	(gpm)	(GPD)	
SMH#24	SMH#23	38+32	35+81	250.40	6	0.50%	1.88	166	238,649	8.33	12,000	48	68,400	18	25,520	101.04	145,464	148.55	213,864	90%
SMH#23	SMH#22	35+81	33+32	249.20	6	0.50%	1.88	166	238,649	8.33	12,000	48	68,400	18	25,520	101.04	145,464	148.55	213,864	90%
SMH#22	SMH#21	33+32	29+23	408.80	8	0.50%	2.27	357	513,959	16.43	23,660	94	134,862	18	25,520	101.04	145,464	194.71	280,326	55%
SMH#21	SMH#20	29+23	25+59	364.40	10	0.50%	2.64	647	931,870	65.99	95,000	376	541,500	18	25,520	101.04	145,464	477.15	686,964	74%
SMH#20	SMH#19	25+59	23+66	193.20	10	0.50%	2.64	647	931,870	65.99	95,000	376	541,500	18	25,520	101.04	145,464	477.15	686,964	74%
SMH#19	SMH#18	23+66	21+80	185.60	10	0.50%	2.64	647	931,870	65.99	95,000	376	541,500	18	25,520	101.04	145,464	477.15	686,964	74%
SMH#18	SMH#17	21+80	18+90	289.80	9	2.00%	4.92	977	1,407,231	102.10	147,000	582	837,900	18	25,520	101.04	145,464	683.03	983,364	70%
SMH#17	SMH#16	18+90	15+89	301.50	8	2.20%	4.77	749	1,078,090	102.10	147,000	582	837,900	18	25,520	101.04	145,464	683.03	983,364	91%
SMH#16	SMH#15	15+89	14+71	117.80	10	1.00%	3.73	915	1,317,864	102.10	147,000	582	837,900	18	25,520	101.04	145,464	683.03	983,364	75%
SMH#15	SMH#14	14+71	12+21	249.60	10	2.42%	5.80	1424	2,050,115	102.10	147,000	582	837,900	18	25,520	101.04	145,464	683.03	983,364	48%
SMH#14	SMH#13	12+21	10+98	123.00	10	1.00%	3.73	915	1,317,864	102.10	147,000	582	837,900	18	25,520	101.04	145,464	683.03	983,364	75%
SMH#13	SMH#12	10+98	9+52	145.90	10	1.50%	4.57	1121	1,614,047	124.33	179,000	709	1,020,300	18	25,520	101.04	145,464	809.72	1,165,764	72%
SMH#12	SMH#11	9+52	8+61	91.20	14.8	1.00%	4.84	2603	3,748,882	124.33	179,000	709	1,020,300	18	25,520	101.04	145,464	809.72	1,165,764	31%
SMH#11	SMH#10	8+61	7+38	123.50	14.8	0.50%	3.43	1841	2,650,860	124.33	179,000	709	1,020,300	18	25,520	101.04	145,464	809.72	1,165,764	44%
SMH#10	SMH#9	7+38	5+89	148.80	14.8	0.50%	3.43	1841	2,650,860	124.33	179,000	709	1,020,300	18	25,520	101.04	145,464	809.72	1,165,764	44%
SMH#9	SMH#8	5+89	4+30	158.80	14.8	0.50%	3.43	1841	2,650,860	124.33	179,000	709	1,020,300	18	25,520	101.04	145,464	809.72	1,165,764	44%
SMH#8	SMH#7	4+30	2+16	214.00	14.8	0.50%	3.43	1841	2,650,860	124.33	179,000	709	1,020,300	18	25,520	101.04	145,464	809.72	1,165,764	44%
SMH#7	SMH#6	2+16	0	216.10	14.8	0.50%	3.43	1841	2,650,860	124.33	179,000	709	1,020,300	18	25,520	101.04	145,464	809.72	1,165,764	44%

- Metered Flow Rate, provided by FAS
- Flow based on downstream condition (most conservative)
- Title 5 Calculated Flow Rate, By A&M
- Sewer Pipe has been lined, based on field measuments by FAS

Allen & Major Associates, Inc.Title: **Title 5 Sewage Flow from SMH #22 to SMH #21**

Project: The Sanctuary | Manchester by the Sea, MA

Date: June 27, 2022

A&M Project Number: 2725-01

By CMQ

Chk'd CMQ

Apprv'd CMQ

Assessors Parcel ID	Bedrooms	Title 5 Flow (110 GPD/Bedroom)
40-0-1	3	330
55-0-1	5	550
55-0-2	0	0
55-0-3	3	330
55-0-4	3	330
55-0-5	3	330
55-0-8	3	330
57-0-2	4	440
57-0-7	4	440
57-0-8	3	330
57-0-9	4	440
40-0-19	4	440
55-0-10	4	440
55-0-11	5	550
55-0-12	4	440
55-0-13	3	330
55-0-14	5	550
55-0-25	4	440
57-0-10	2	220
57-0-11	3	330
57-0-12	2	220
57-0-13	3	330
57-0-14	3	330
57-0-15	3	330
57-0-16	2	220
57-0-17	3	330
57-0-19	3	330
57-0-20	3	330
57-0-21	5	550
57-0-22	3	330
57-0-23	4	440
57-0-24	3	330
57-0-29	0	0
Total Title 5 Flow		11,660.00
Metered Average Dailly Flow into SMH #22		12,000.00
Total Flow from SMH #22 to SMH #21		23,660.00



Allen & Major
100 Commerce Way
Woburn, MA 01801
Attn: Carlton Quinn

June 22, 2022

Re: Manchester By The Sea, MA
Flow Monitoring
May – June 2022

Dear Mr. Quinn,

This letter is written to present the flow monitoring data collected in Manchester By The Sea, MA. The meters were installed on 05/13/22. This letter presents the data from 05/13/22 to 06/03/22. The meters were removed 06/03/22.

Site configuration information:

Site	Location	Meter
SMH06	School Street at Central Avenue	Area Velocity Flow Meter installed in an existing 14.8" diameter line.
SMH13	45 School Street	Area Velocity Flow Meter installed in an existing 10" diameter line.
SMH18	82 School Street	Area Velocity Flow Meter installed in an existing 10" diameter line.
SMH22	School Street at Windemere Park	Level Meter installed with a 4" Palmer- Bowlus Flume in an existing 6" diameter line.

The Area Velocity Flow Meter senses both depth and velocity. This depth and velocity information is stored in the meter's memory. The Level Meter also senses depth. This depth information is stored in the meter's memory. The recorded data is uploaded from the flow meters with a laptop computer. During the installation, maintenance visits and removal, the depth and velocity information is confirmed and calibration measurements are noted.

This report contains a summary flow report and flow analysis graph for each meter site. The summary flow report presents minimum, peak and total daily flow based on the recorded 5-minute interval readings. The flow analysis graph data is presented averaged hourly to make it easier to visualize the overall flow pattern during the monitoring period.

Additionally, this report contains meter site investigation sketches for each meter site.

The final data is also included in Excel format in its recorded 5-minute intervals. All data is recorded and presented in Eastern Standard Time.

No rainfall data was collected during this project.

Site & Data Observations

SMH06	This site experienced issues with ragging on the sensor which caused issues with velocity readings.
SMH13	Crew noted flows at this site were very choppy causing erratic velocity readings and dropouts. Low flow conditions at this site also contributed to velocity issues.
SMH18	Low flow conditions at this site caused occasional dropouts in velocity readings.

If you have any questions or require anything additional, please feel free to contact me via email or phone.

Sincerely,

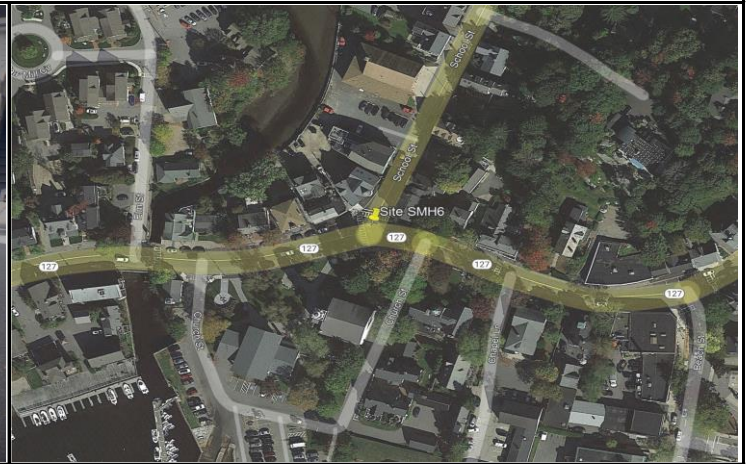
A handwritten signature in cursive script that reads "Margaret Fryer".

Margaret Fryer
Data Analyst

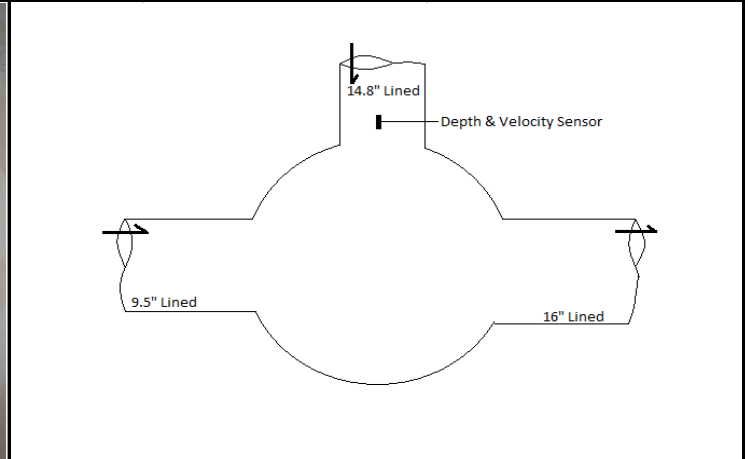


METER SITE INFORMATION FIELD LOG

PROJECT: Manchester By The Sea, MA	DATE: May 13, 2022	JOB#: 22056
LOCATION: School Street at Central Avenue	MH#:	METER SITE: SMH6
GPS/COMMENTS: 42.575406, -70.771749		

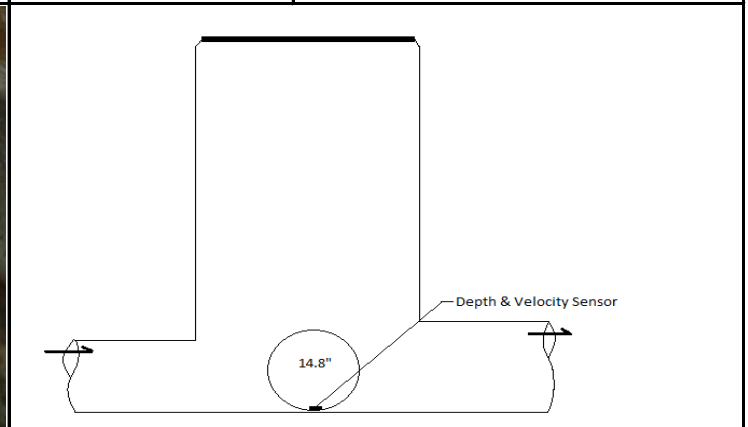


	Size (")	Material	Flow Depth (")	Debris	Shape	MH Depth
Incoming	9.5	Lined	2	0	Circular	17' 02"
Incoming	14.8	Lined	4	0	Circular	17' 02"
Incoming						
Outgoing	16	Lined	4	0	Circular	17' 04"



SURCHARGE INFORMATION

SURCHARGE NONE EVIDENT:	LENGTH:	HEIGHT ABOVE WEIR:
SURCHARGED MARKS TO: 15'	BREADTH:	OVERFLOW OCCURS AT:
SURCHARGE CURRENTLY TO:	LEVEL:	



Summary Flow Report

**Site:**

SMH06

School Street at Central Street

Manchester-by-the-Sea, MA

14.8" Circular Pipe

Date	Minimum Flow (mgd)	Peak Flow (mgd)	Total Daily Flow (mg)	Total Rain (in)	Peak Hourly Rain (in)	Peak Interval Rain (in)
5/13/2022 (Fri)	0.159	0.296	0.133			
5/14/2022 (Sat)	0.128	0.303	0.202			
5/15/2022 (Sun)	0.118	0.287	0.201			
5/16/2022 (Mon)	0.117	0.271	0.203			
5/17/2022 (Tue)	0.114	0.312	0.199			
5/18/2022 (Wed)	0.104	0.524	0.200			
5/19/2022 (Thu)	0.094	0.299	0.195			
5/20/2022 (Fri)	0.098	0.283	0.185			
5/21/2022 (Sat)	0.087	0.328	0.177			
5/22/2022 (Sun)	0.085	0.272	0.180			
5/23/2022 (Mon)	0.100	0.439	0.183			
5/24/2022 (Tue)	0.073	0.256	0.158			
5/25/2022 (Wed)	0.085	0.265	0.163			
5/26/2022 (Thu)	0.085	0.308	0.170			
5/27/2022 (Fri)	0.084	0.270	0.170			
5/28/2022 (Sat)	0.095	0.295	0.176			
5/29/2022 (Sun)	0.080	0.273	0.157			
5/30/2022 (Mon)	0.071	0.262	0.161			
5/31/2022 (Tue)	0.075	0.248	0.159			
6/1/2022 (Wed)	0.071	0.242	0.158			
6/2/2022 (Thu)	0.082	0.272	0.164			
6/3/2022 (Fri)	0.072	0.257	0.058			
Total for period			3.754			
Min:			0.071			
Avg:			0.171			
Max:			0.524			

Flow Graph

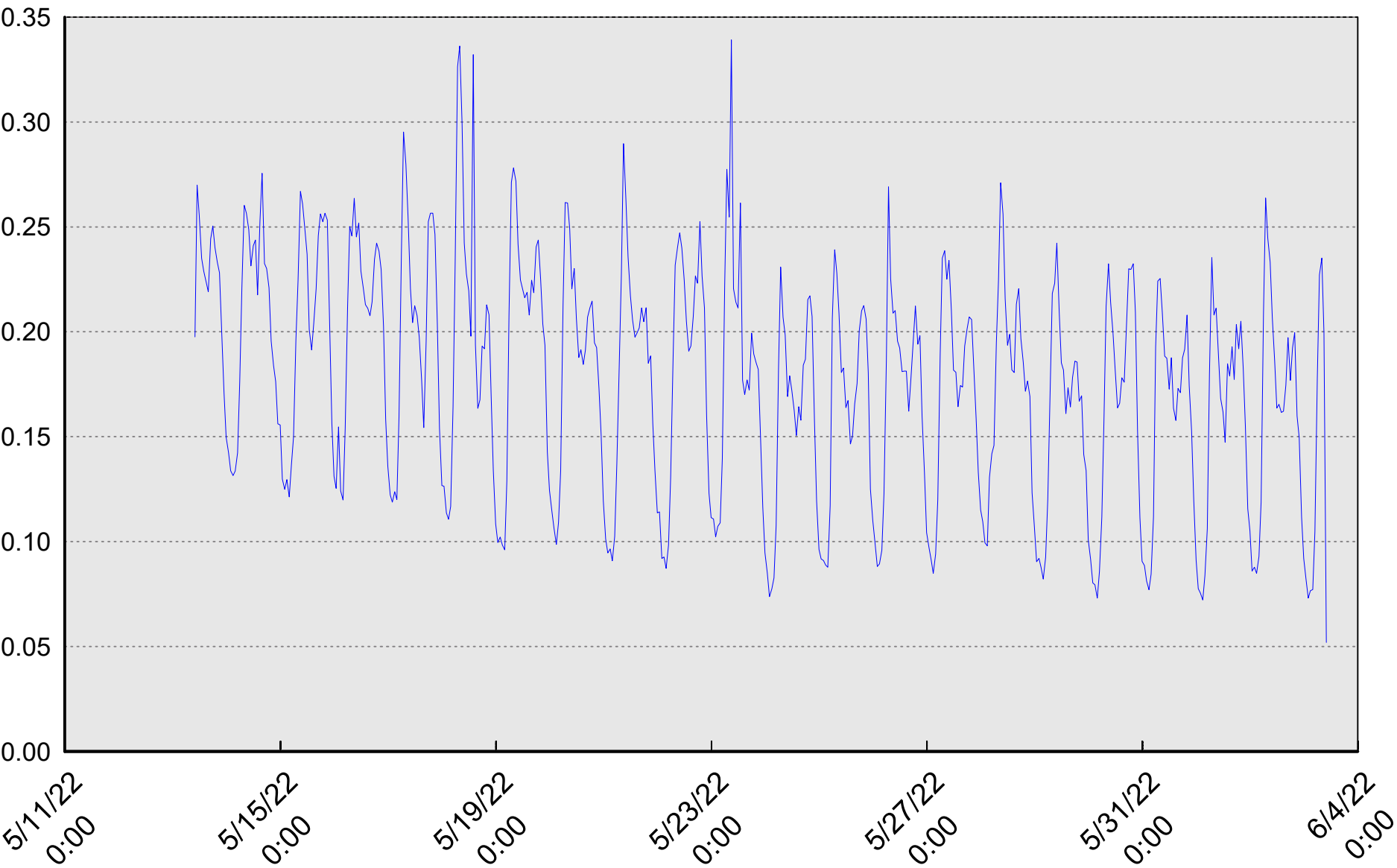
Site:
SMH06
School Street at Central Street

Manchester-by-the-Sea, MA

14.8" Circular Pipe



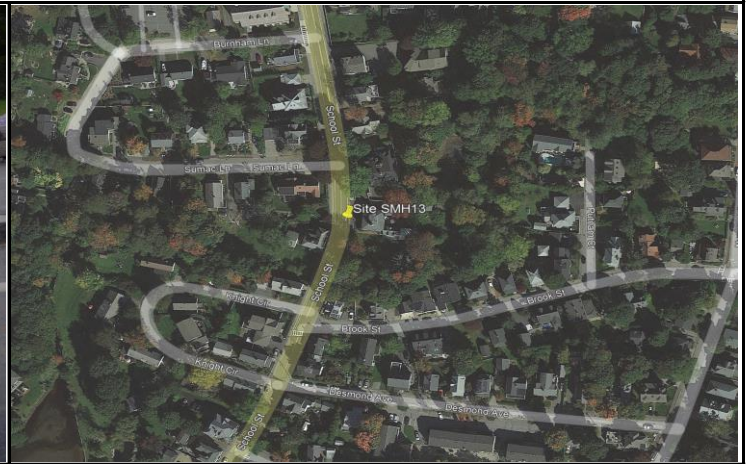
Flow (mgd) Printed on: 6/22/2022 Period Covered: 05/13/2022 - 06/04/2022 Every 1 Hour



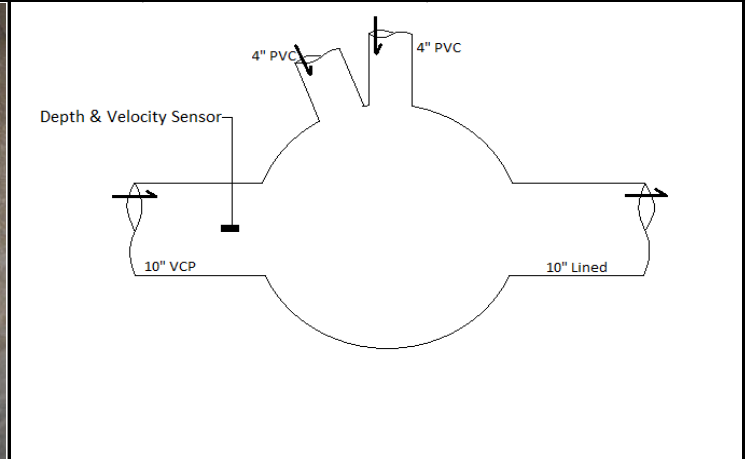


METER SITE INFORMATION FIELD LOG

PROJECT: Manchester By The Sea, MA	DATE: May 13, 2022	JOB#: 22056
LOCATION: 45 School Street	MH#:	METER SITE: SMH13
GPS/COMMENTS: 42.578164, -70.770142		

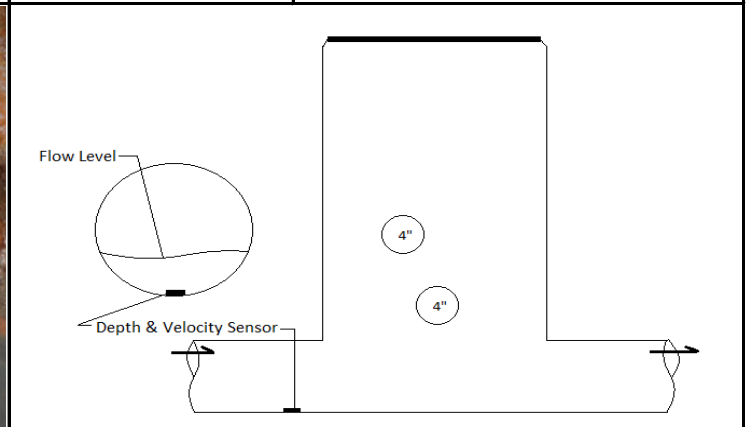


	Size (")	Material	Flow Depth (")	Debris	Shape	MH Depth
Incoming	10	VCP	3.2	0	Circular	09' 01"
Incoming	4	PVC	0	0	Circular	05' 00"
Incoming	4	PVC	0	0	Circular	07' 09"
Outgoing	10	Lined	3.2	0	Circular	09' 02"



SURCHARGE INFORMATION

SURCHARGE NONE EVIDENT:	LENGTH:	HEIGHT ABOVE WEIR:
SURCHARGED MARKS TO: 7'	BREADTH:	OVERFLOW OCCURS AT:
SURCHARGE CURRENTLY TO:	LEVEL:	



Summary Flow Report

Site:

SMH13

45 School Street

Manchester-by-the-Sea, MA



10" Circular Pipe

Date	Minimum Flow (mgd)	Peak Flow (mgd)	Total Daily Flow (mg)	Total Rain (in)	Peak Hourly Rain (in)	Peak Interval Rain (in)
5/13/2022 (Fri)	0.126	0.232	0.110			
5/14/2022 (Sat)	0.085	0.248	0.168			
5/15/2022 (Sun)	0.094	0.271	0.163			
5/16/2022 (Mon)	0.093	0.233	0.165			
5/17/2022 (Tue)	0.090	0.256	0.167			
5/18/2022 (Wed)	0.074	0.318	0.171			
5/19/2022 (Thu)	0.084	0.228	0.154			
5/20/2022 (Fri)	0.085	0.214	0.150			
5/21/2022 (Sat)	0.074	0.218	0.143			
5/22/2022 (Sun)	0.074	0.238	0.156			
5/23/2022 (Mon)	0.091	0.358	0.156			
5/24/2022 (Tue)	0.081	0.244	0.136			
5/25/2022 (Wed)	0.072	0.215	0.131			
5/26/2022 (Thu)	0.077	0.213	0.137			
5/27/2022 (Fri)	0.077	0.213	0.131			
5/28/2022 (Sat)	0.088	0.231	0.138			
5/29/2022 (Sun)	0.078	0.255	0.146			
5/30/2022 (Mon)	0.074	0.230	0.145			
5/31/2022 (Tue)	0.076	0.232	0.126			
6/1/2022 (Wed)	0.063	0.193	0.125			
6/2/2022 (Thu)	0.064	0.221	0.128			
6/3/2022 (Fri)	0.064	0.196	0.045			
Total for period			3.092			
Min:			0.063			
Avg:			0.141			
Max:			0.358			

Flow Graph

Site:
SMH13
45 School Street

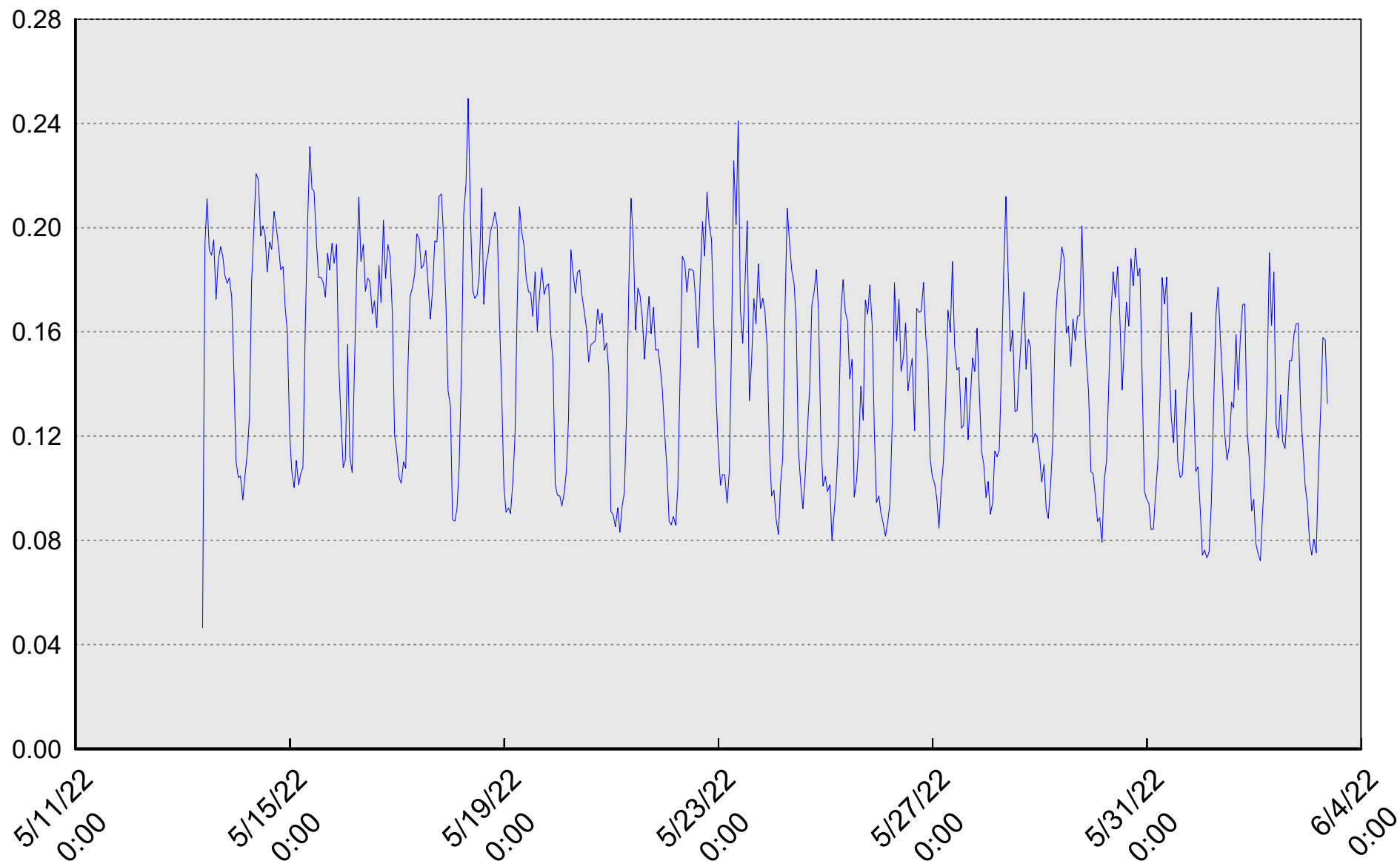
Manchester-by-the-Sea, MA



10" Circular Pipe

Flow (mgd) Printed on: 6/22/2022

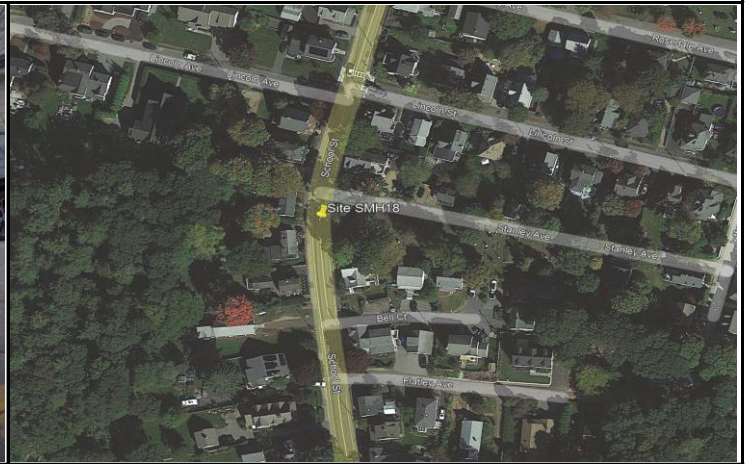
Period Covered: 05/13/2022 - 06/04/2022 Every 1 Hour



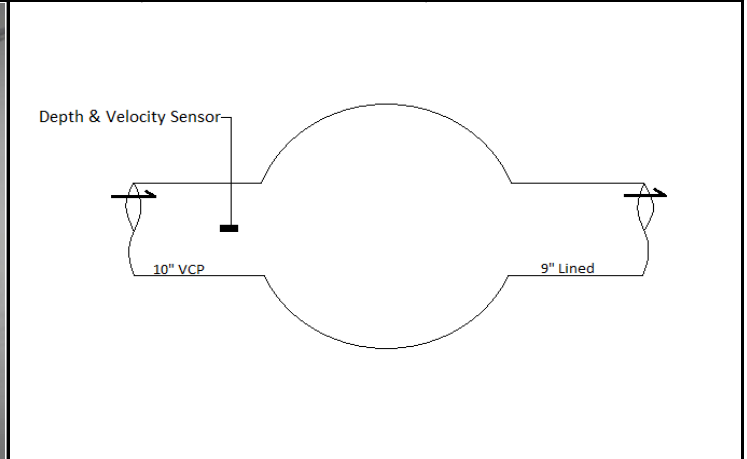


METER SITE INFORMATION FIELD LOG

PROJECT: Manchester By The Sea, MA	DATE: May 13, 2022	JOB#: 22056
LOCATION: 82 School Street	MH#:	METER SITE: SMH18
GPS/COMMENTS: 42.581106, -70.770658		

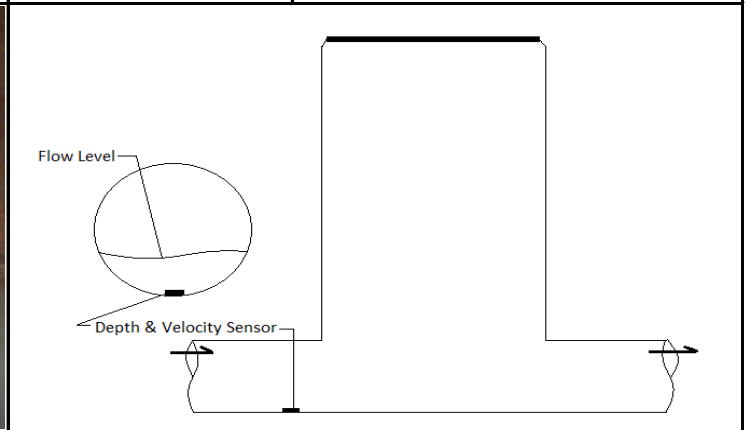


	Size (")	Material	Flow Depth (")	Debris	Shape	MH Depth
Incoming	10	VCP	3.3	0	Circular	15' 04"
Incoming						
Incoming						
Outgoing	9	Lined	3.3	0	Circular	15' 05"



SURCHARGE INFORMATION

SURCHARGE NONE EVIDENT:	LENGTH:	HEIGHT ABOVE WEIR:
SURCHARGED MARKS TO: 4'	BREADTH:	OVERFLOW OCCURS AT:
SURCHARGE CURRENTLY TO:	LEVEL:	



Summary Flow Report

Site:

SMH18

82 School Street

Manchester-by-the-Sea, MA



10" Circular Pipe

Date	Minimum Flow (mgd)	Peak Flow (mgd)	Total Daily Flow (mg)	Total Rain (in)	Peak Hourly Rain (in)	Peak Interval Rain (in)
5/13/2022 (Fri)	0.090	0.229	0.085			
5/14/2022 (Sat)	0.074	0.191	0.115			
5/15/2022 (Sun)	0.059	0.196	0.107			
5/16/2022 (Mon)	0.063	0.179	0.106			
5/17/2022 (Tue)	0.061	0.190	0.098			
5/18/2022 (Wed)	0.050	0.398	0.104			
5/19/2022 (Thu)	0.050	0.171	0.090			
5/20/2022 (Fri)	0.048	0.145	0.087			
5/21/2022 (Sat)	0.056	0.204	0.095			
5/22/2022 (Sun)	0.048	0.191	0.092			
5/23/2022 (Mon)	0.050	0.414	0.102			
5/24/2022 (Tue)	0.050	0.182	0.090			
5/25/2022 (Wed)	0.044	0.171	0.084			
5/26/2022 (Thu)	0.044	0.235	0.090			
5/27/2022 (Fri)	0.046	0.158	0.085			
5/28/2022 (Sat)	0.049	0.174	0.092			
5/29/2022 (Sun)	0.048	0.182	0.092			
5/30/2022 (Mon)	0.048	0.169	0.099			
5/31/2022 (Tue)	0.044	0.161	0.085			
6/1/2022 (Wed)	0.042	0.137	0.081			
6/2/2022 (Thu)	0.042	0.200	0.083			
6/3/2022 (Fri)	0.043	0.145	0.029			
Total for period			1.993			
Min:			0.042			
Avg:			0.091			
Max:			0.414			

Flow Graph

Site:
SMH18
82 School Street

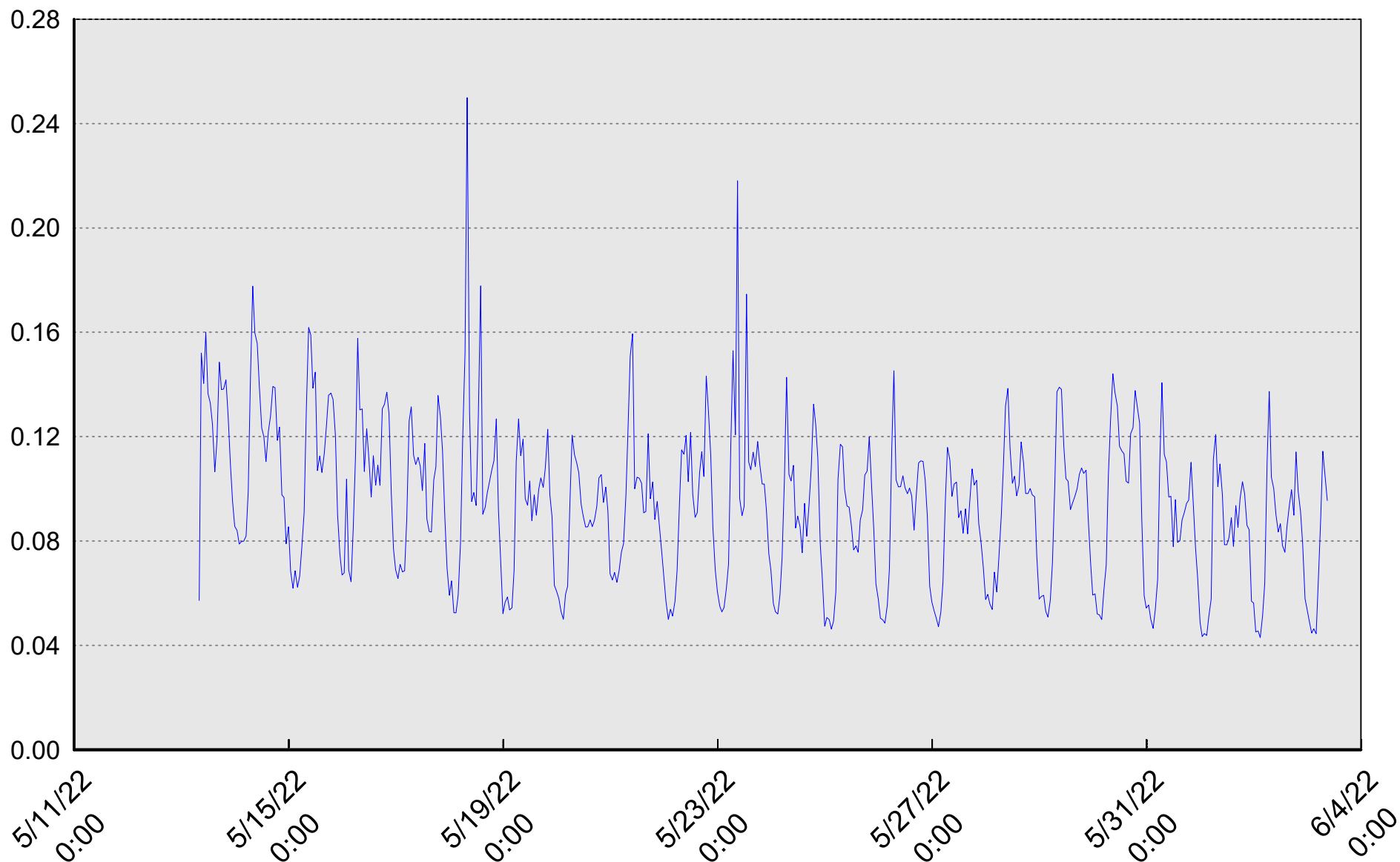
Manchester-by-the-Sea, MA



10" Circular Pipe

Flow (mgd) Printed on: 6/22/2022

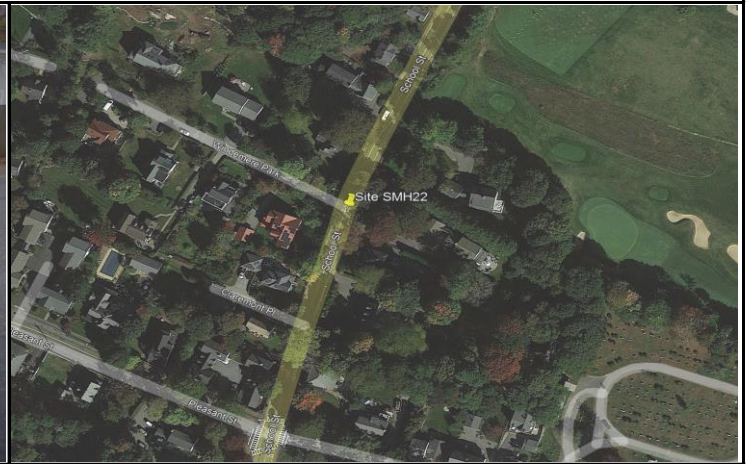
Period Covered: 05/13/2022 - 06/04/2022 Every 1 Hour



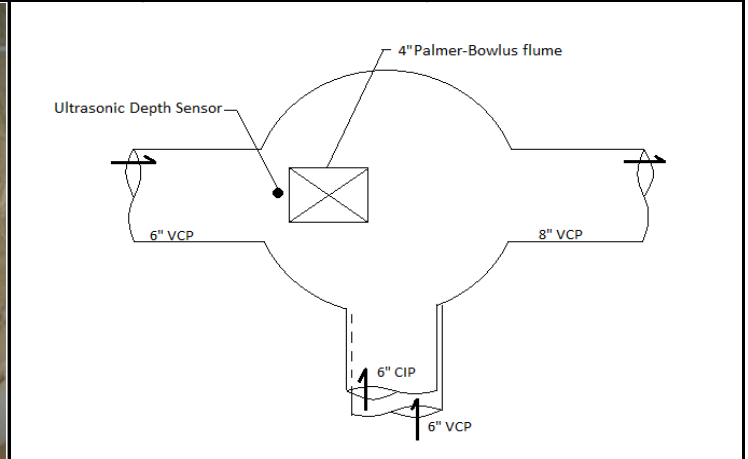


METER SITE INFORMATION FIELD LOG

PROJECT: Manchester By The Sea, MA	DATE: May 13, 2022	JOB#: 22056
LOCATION: School Street at Windemere Park	MH#:	METER SITE: SMH22
GPS/COMMENTS: 42.584165, -70.769597		

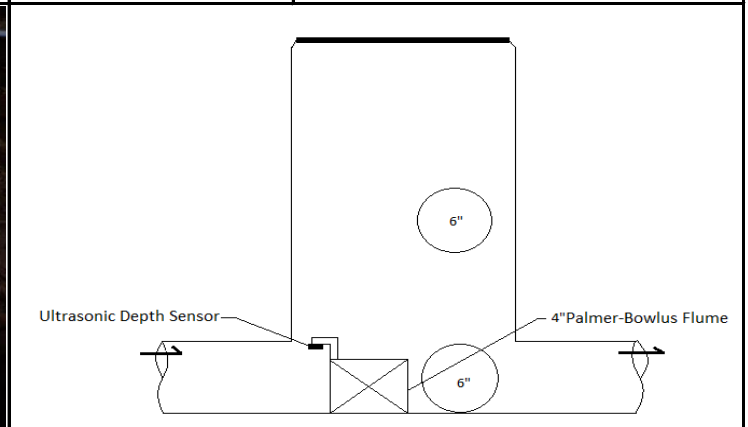


	Size (")	Material	Flow Depth (")	Debris	Shape	MH Depth
Incoming	10	VCP	3.3	0	Circular	15' 04"
Incoming						
Incoming						
Outgoing	9	Lined	3.3	0	Circular	15' 05"



SURCHARGE INFORMATION

SURCHARGE NONE EVIDENT:	LENGTH:	HEIGHT ABOVE WEIR:
SURCHARGED MARKS TO: 4'	BREADTH:	OVERFLOW OCCURS AT:
SURCHARGE CURRENTLY TO:	LEVEL:	



Summary Flow Report

Site:

SMH22

School Street at Windemere Park

Manchester-by-the-Sea, MA



4" Palmer-Bowlus Flume in 6" Pipe

Date	Minimum Flow (mgd)	Peak Flow (mgd)	Total Daily Flow (mg)	Total Rain (in)	Peak Hourly Rain (in)	Peak Interval Rain (in)
5/13/2022 (Fri)	0.012	0.029	0.010			
5/14/2022 (Sat)	0.012	0.117	0.016			
5/15/2022 (Sun)	0.011	0.090	0.015			
5/16/2022 (Mon)	0.011	0.068	0.014			
5/17/2022 (Tue)	0.010	0.057	0.014			
5/18/2022 (Wed)	0.010	0.049	0.014			
5/19/2022 (Thu)	0.009	0.034	0.013			
5/20/2022 (Fri)	0.009	0.035	0.012			
5/21/2022 (Sat)	0.009	0.045	0.012			
5/22/2022 (Sun)	0.009	0.064	0.012			
5/23/2022 (Mon)	0.008	0.115	0.013			
5/24/2022 (Tue)	0.008	0.019	0.011			
5/25/2022 (Wed)	0.008	0.119	0.012			
5/26/2022 (Thu)	0.007	0.057	0.011			
5/27/2022 (Fri)	0.008	0.031	0.010			
5/28/2022 (Sat)	0.007	0.099	0.013			
5/29/2022 (Sun)	0.007	0.027	0.010			
5/30/2022 (Mon)	0.006	0.060	0.010			
5/31/2022 (Tue)	0.006	0.018	0.009			
6/1/2022 (Wed)	0.006	0.030	0.009			
6/2/2022 (Thu)	0.006	0.053	0.009			
6/3/2022 (Fri)	0.006	0.014	0.003			
Total for period			0.253			
Min:			0.006			
Avg:			0.011			
Max:			0.119			

Flow Graph

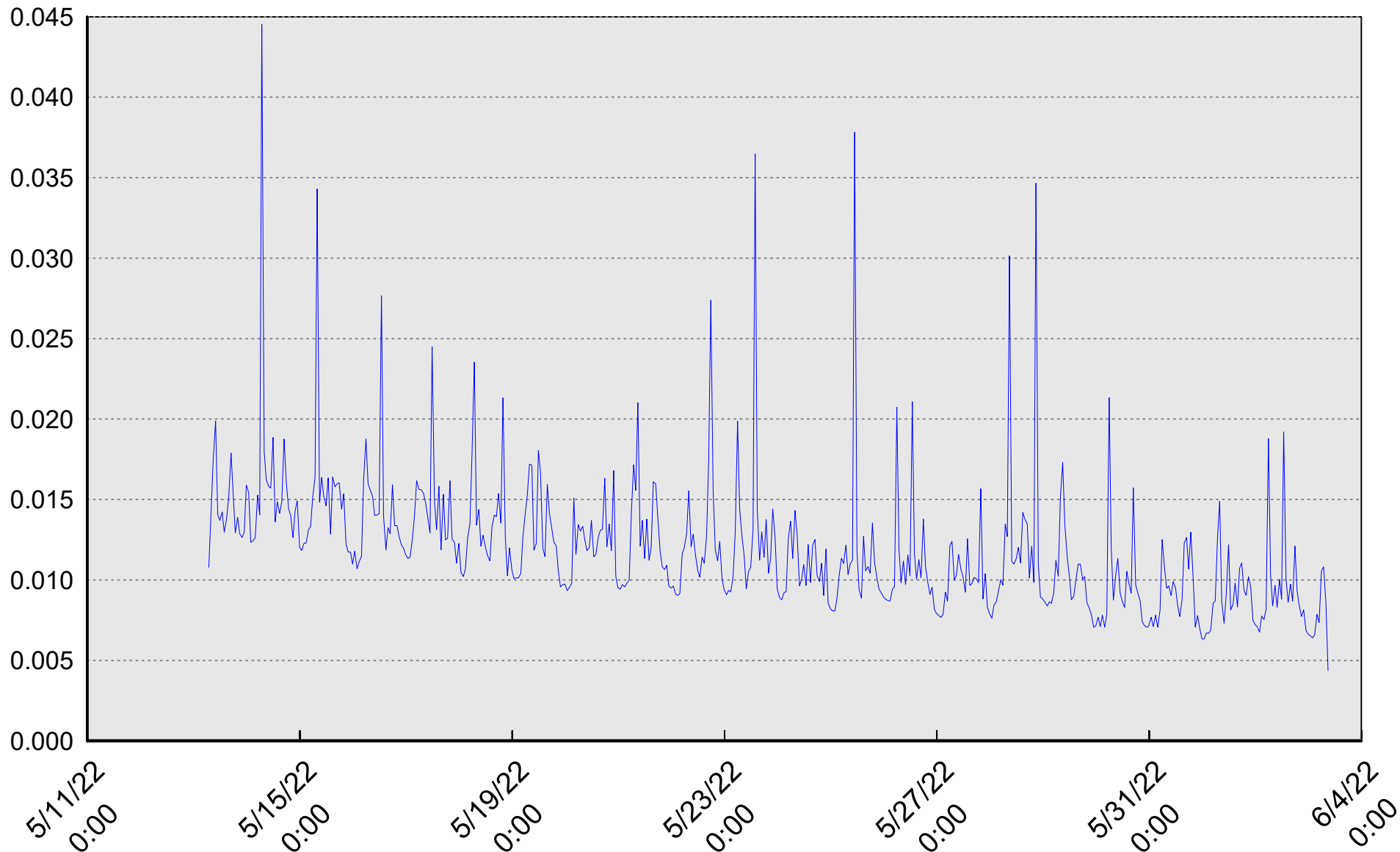
Site:
SMH22
School Street at Windemere Park

Manchester-by-the-Sea, MA



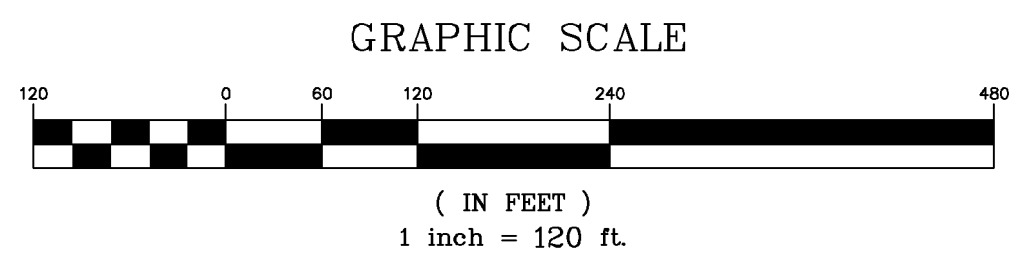
4" Palmer-Bowlus Flume in 6" Pipe

Flow (mgd) Printed on: 6/22/2022 Period Covered: 05/13/2022 - 06/04/2022 Every 1 Hour





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 6. ALL PROPOSED PIPE SHALL ME A CLASS 52 CEMENT LINED DUCTILE IRON PIPE.



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REV	DATE	DESCRIPTION

APPLICANT/OWNER:
SLV SCHOOL STREET, LLC
257 HILLSIDE AVENUE
NEEDHAM, MA 02494

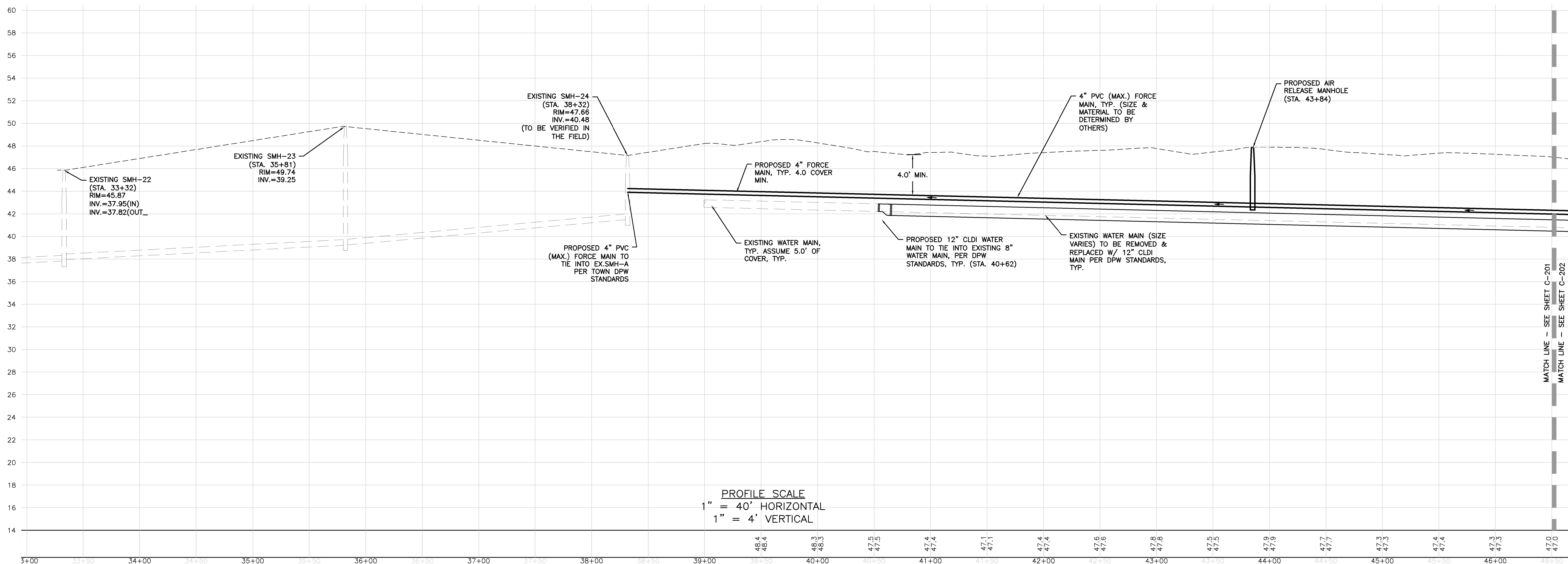
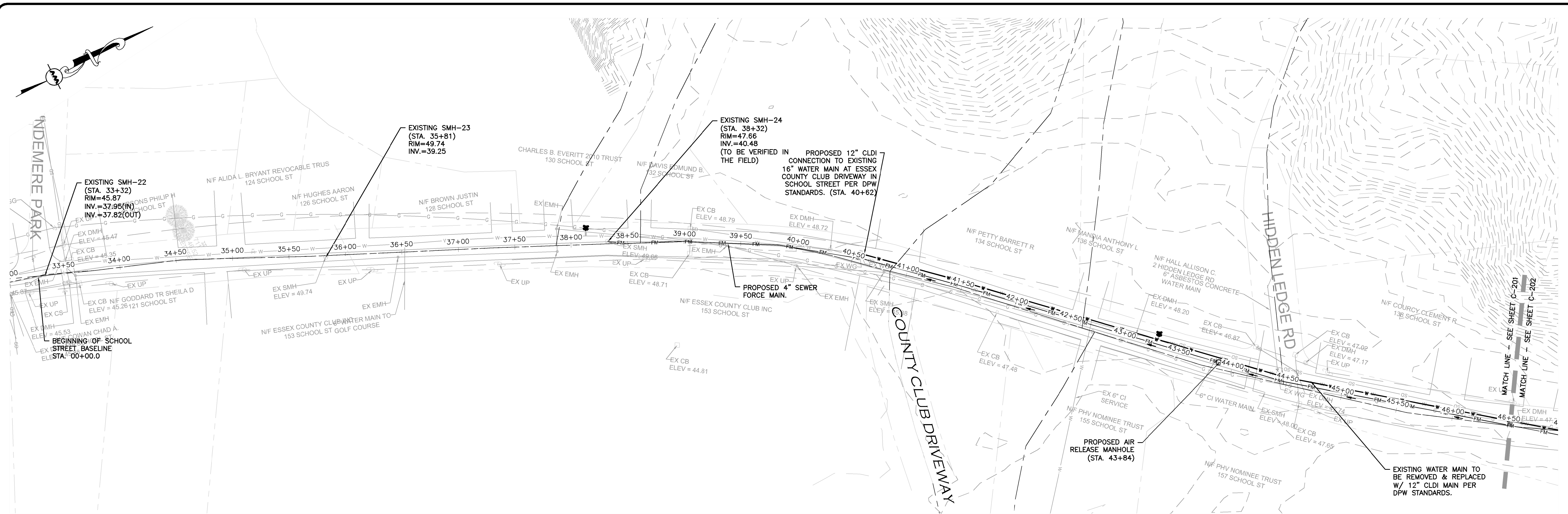
PROJECT:
**THE SANCTUARY
SCHOOL STREET
MANCHESTER-BY-THE-SEA, MA**

PROJECT NO. 2725-01 DATE: 07-07-2022
SCALE: 1"=120' DWG. NAME: C-2725-01
DESIGNED BY: SJL CHECKED BY: CMQ

PREPARED BY:
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PLAN**
SHEET No.
C-200
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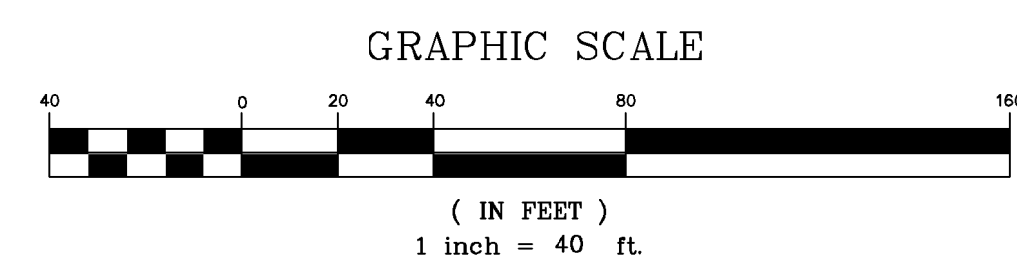
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FIRE DEPARTMENTS.

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REV	DATE	DESCRIPTION

APPLICANT/OWNER:
SLV SCHOOL STREET, LLC
257 HILLSIDE AVENUE
NEEDHAM, MA 02494

PROJECT:
**THE SANCTUARY
SCHOOL STREET
MANCHESTER-BY-THE-SEA, MA**

PROJECT NO. 2725-01 DATE: 07-07-2022
SCALE: 1"=40' DWG. NAME: C2725-01
DESIGNED BY: SJL CHECKED BY: CMQ

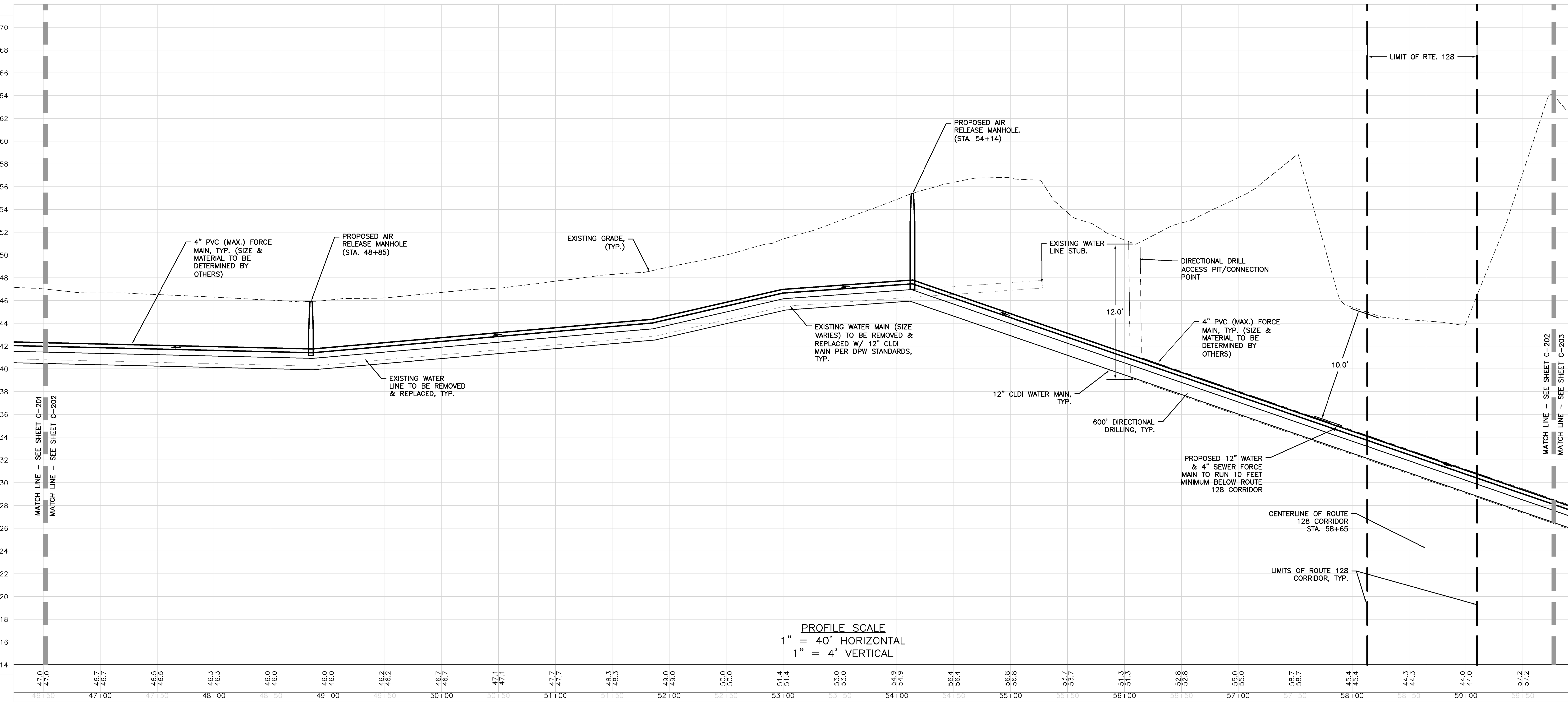
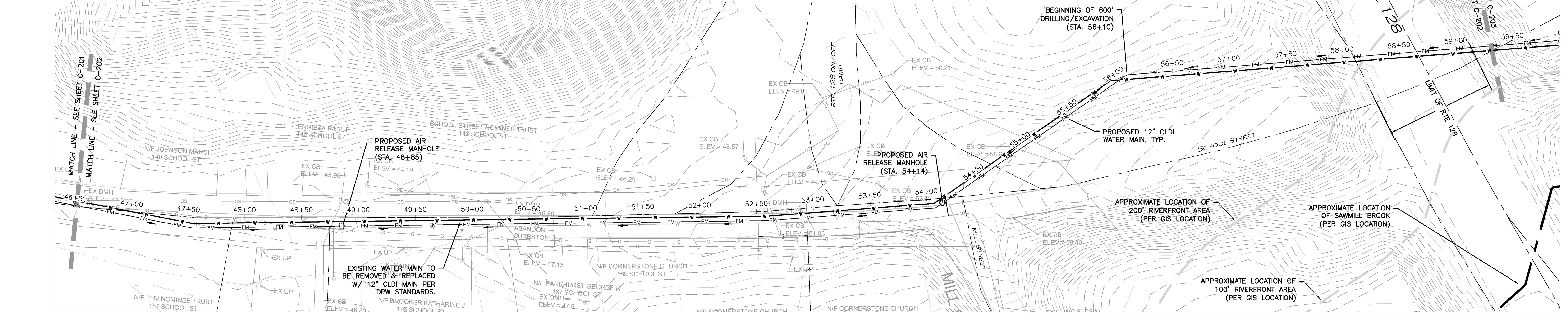
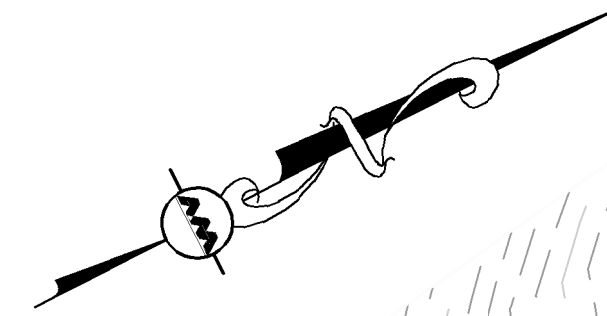
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DRAWING TITLE:
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PROFILE**

SHEET No.
C-201



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REV	DATE	DESCRIPTION

APPLICANT/OWNER:
SLV SCHOOL STREET, LLC
257 HILLSIDE AVENUE
NEEDHAM, MA 02494

PROJECT:
**THE SANCTUARY
SCHOOL STREET
MANCHESTER-BY-THE-SEA, MA**

PROJECT NO. 2725-01 DATE: 07-07-2022
SCALE: 1"=40' DWG. NAME: C2725-01
DESIGNED BY: SJL CHECKED BY: CMQ

PREPARED BY:

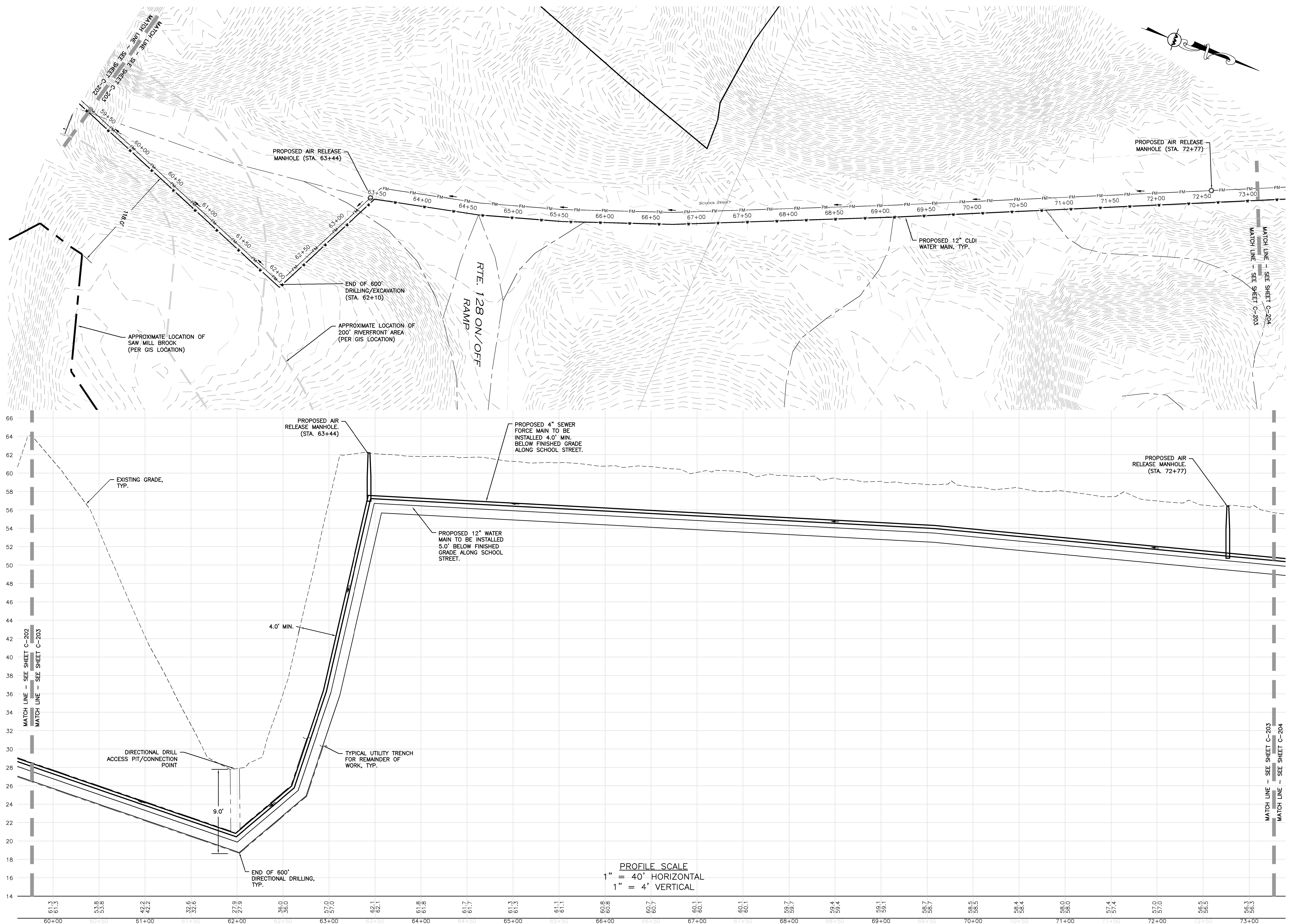
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PROFILE SCALE
1" = 40' HORIZONTAL
1" = 4' VERTICAL

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

REV	DATE	DESCRIPTION

APPLICANT/OWNER:
SLV SCHOOL STREET, LLC
257 HILLSIDE AVENUE
NEEDHAM, MA 02494

PROJECT:
**THE SANCTUARY
SCHOOL STREET
MANCHESTER-BY-THE-SEA, MA**

PROJECT NO.	2725-01	DATE:	07-07-2022
SCALE:	1"=40'	DWG. NAME:	C2725-01
DESIGNED BY:	SJL	CHECKED BY:	CMQ

PREPARED BY:

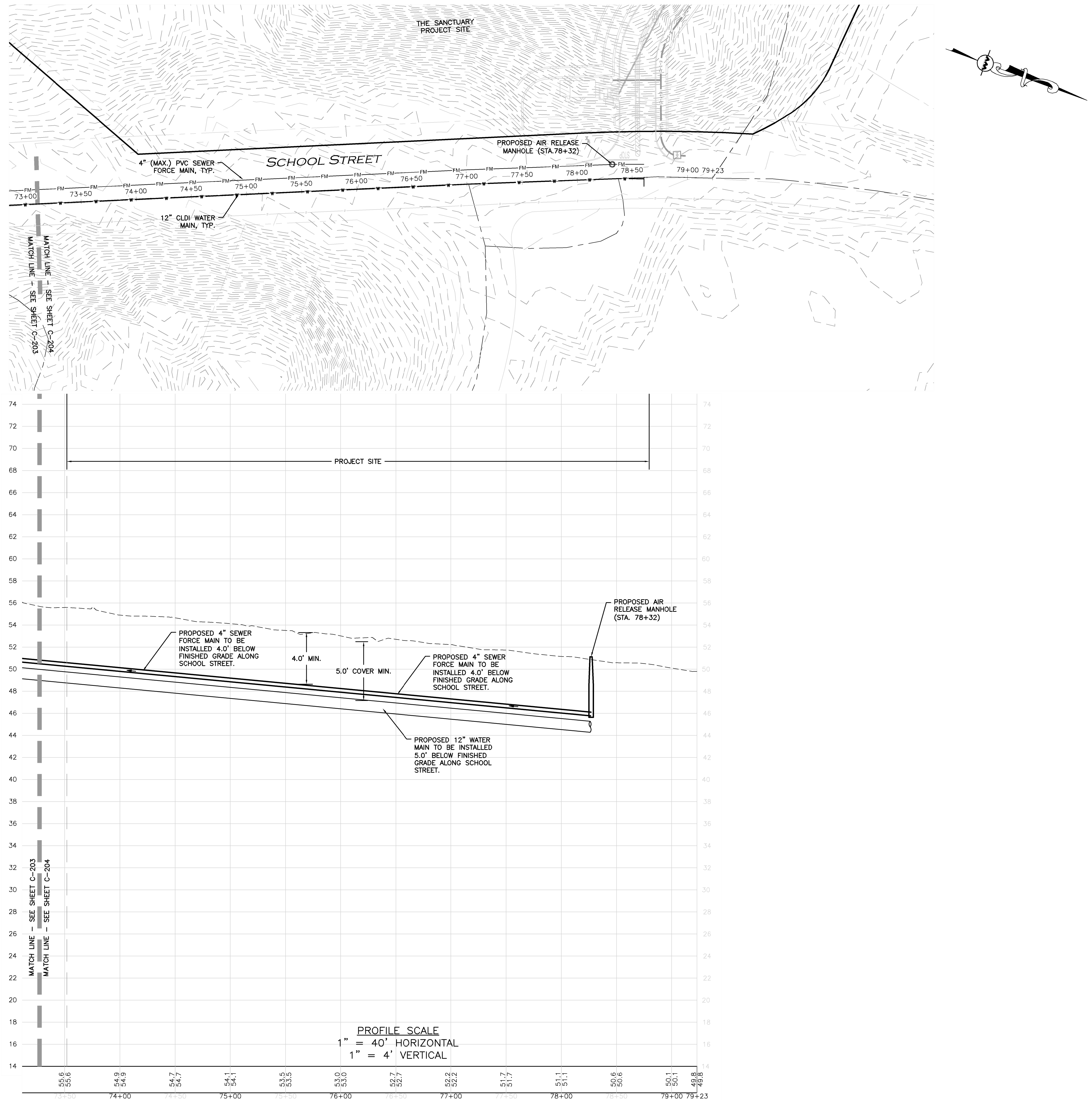
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257 HILLSIDE AVENUE
NEEDHAM, MA 02494

PROJECT:

THE SANCTUARY
SCHOOL STREET
MANCHESTER-BY-THE-SEA, MA

PROJECT NO. 2725-01 DATE: 07-07-2022

SCALE: 1"=40' DWG. NAME: C-2725-01

DESIGNED BY: SJL CHECKED BY: CMQ

PREPARED BY:



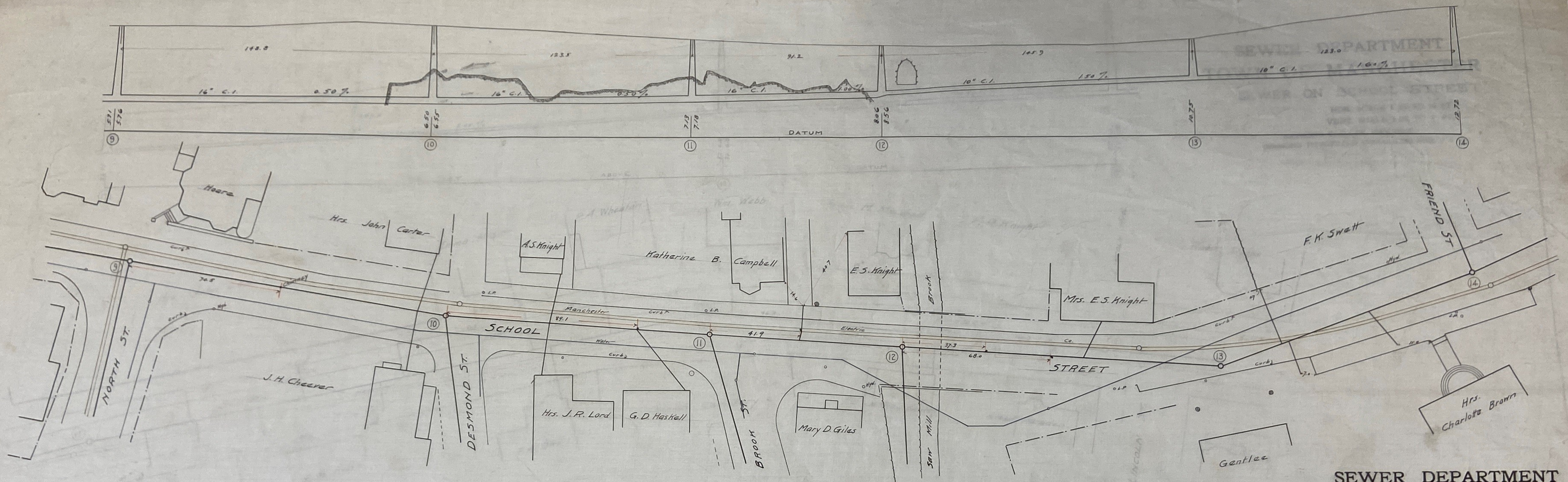
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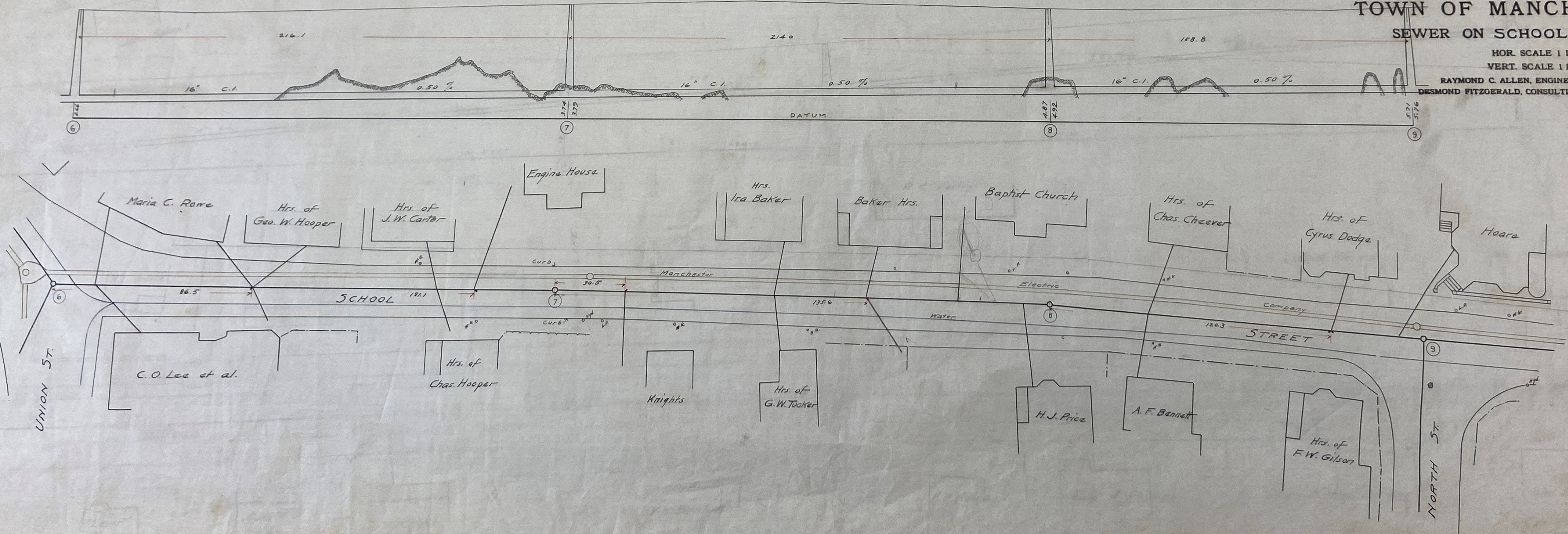
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CONCEPTUAL SEWER &
WATER EXTENSION PLAN &
PROFILE
SHEET No.
C-204



SEWER DEPARTMENT
TOWN OF MANCHESTER
SEWER ON SCHOOL STREET

HOR. SCALE 1 IN. TO 20 FT.
VERT. SCALE 1 IN. TO 8 FT.

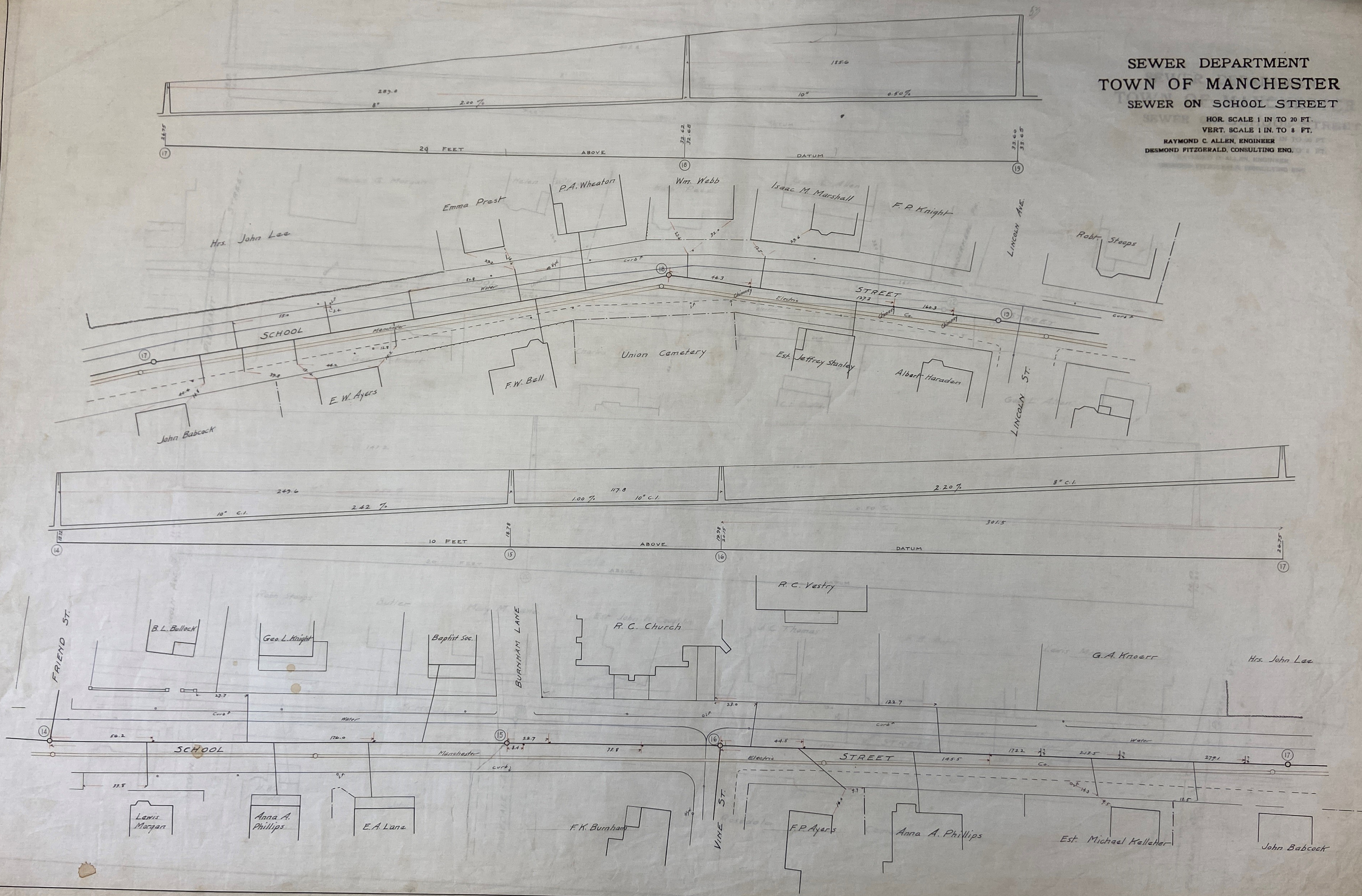
RAYMOND C. ALLEN, ENGINEER
DESMOND FITZGERALD, CONSULTING ENG.



SEWER DEPARTMENT
TOWN OF MANCHESTER
SEWER ON SCHOOL STREET

HOR. SCALE 1 IN. TO 20 FT.
VERT. SCALE 1 IN. TO 8 FT.

RAYMOND C. ALLEN, ENGINEER
DESMOND FITZGERALD, CONSULTING ENG.

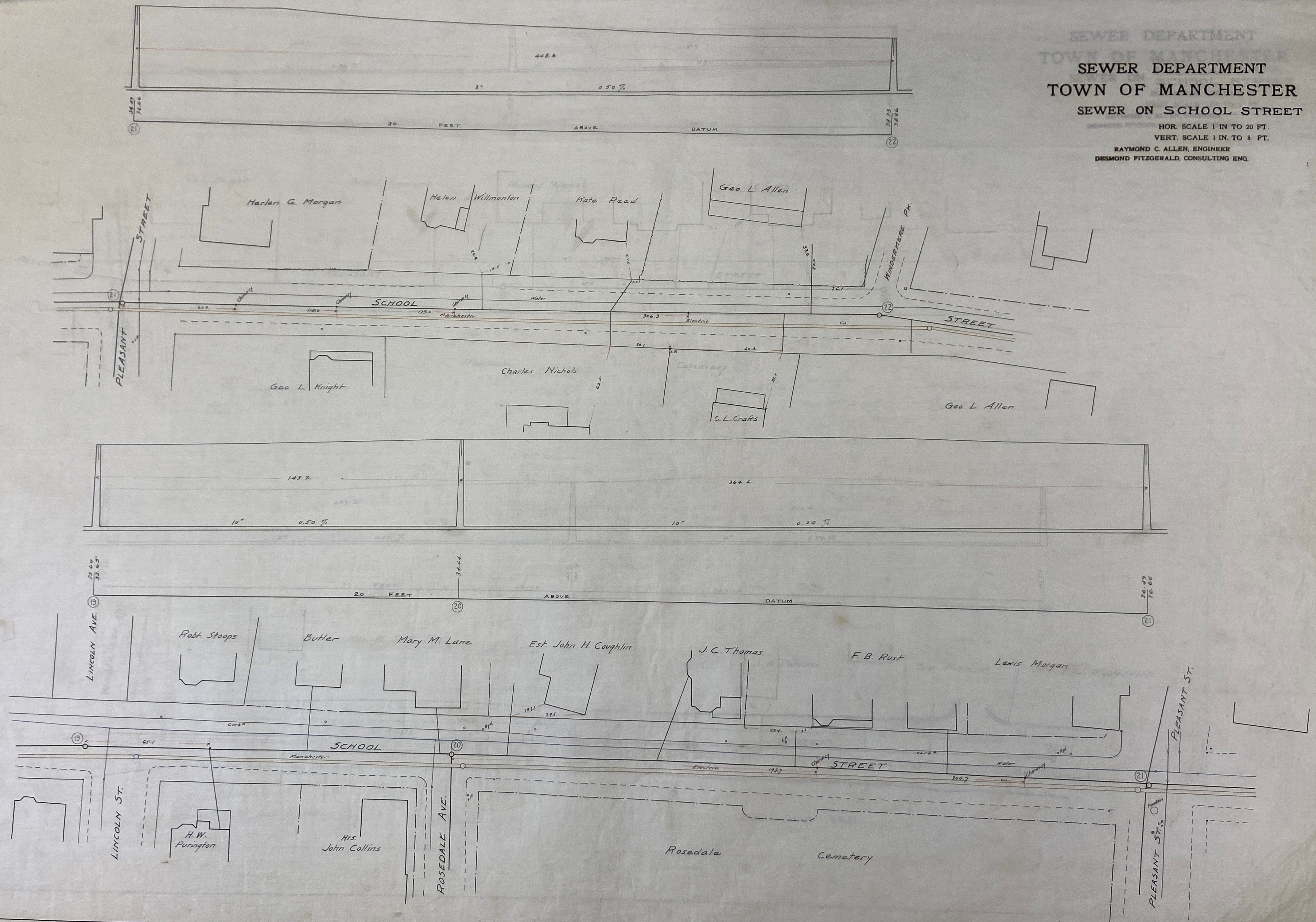


SEWER DEPARTMENT
TOWN OF MANCHESTER
SEWER ON SCHOOL STREET

HOR. SCALE 1 IN. TO 20 FT.

VERT. SCALE 1 IN. TO 8 FT.

RAYMOND C. ALLEN, ENGINEER
DESMOND FITZGERALD, CONSULTING ENG.



SEWER DEPARTMENT
TOWN OF MANCHESTER
PLEASANT ST.
SEWER ON SCHOOL STREET

HOR. SCALE 1 IN. TO 20 FT.
VERT. SCALE 1 IN. TO 8 FT.

RAYMOND C. ALLEN, ENGINEER
DESMOND FITZGERALD, CONSULTING ENG.

