TOWN OF HARWICH, MA SEWERAGE WORKS IMPROVEMENTS

PHASE 2 - CONTRACT NO. 2

PROJECT NO. CWSRF - 4424/2



LARRY G. BALLANTINE, CHAIR EDWARD J. McMANUS, VICE-CHAIR STEPHEN P. FORD, CLERK DONALD F. HOWELL MICHAEL D. MacASKILL

TOWN ADMINISTRATOR

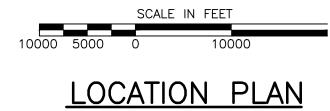
CHRISTOPHER CLARK

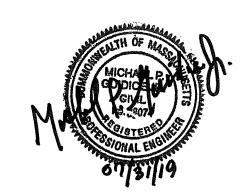
WATER/SEWER SUPERINTENDENT

DANIEL PELLETIER



JULY 2019







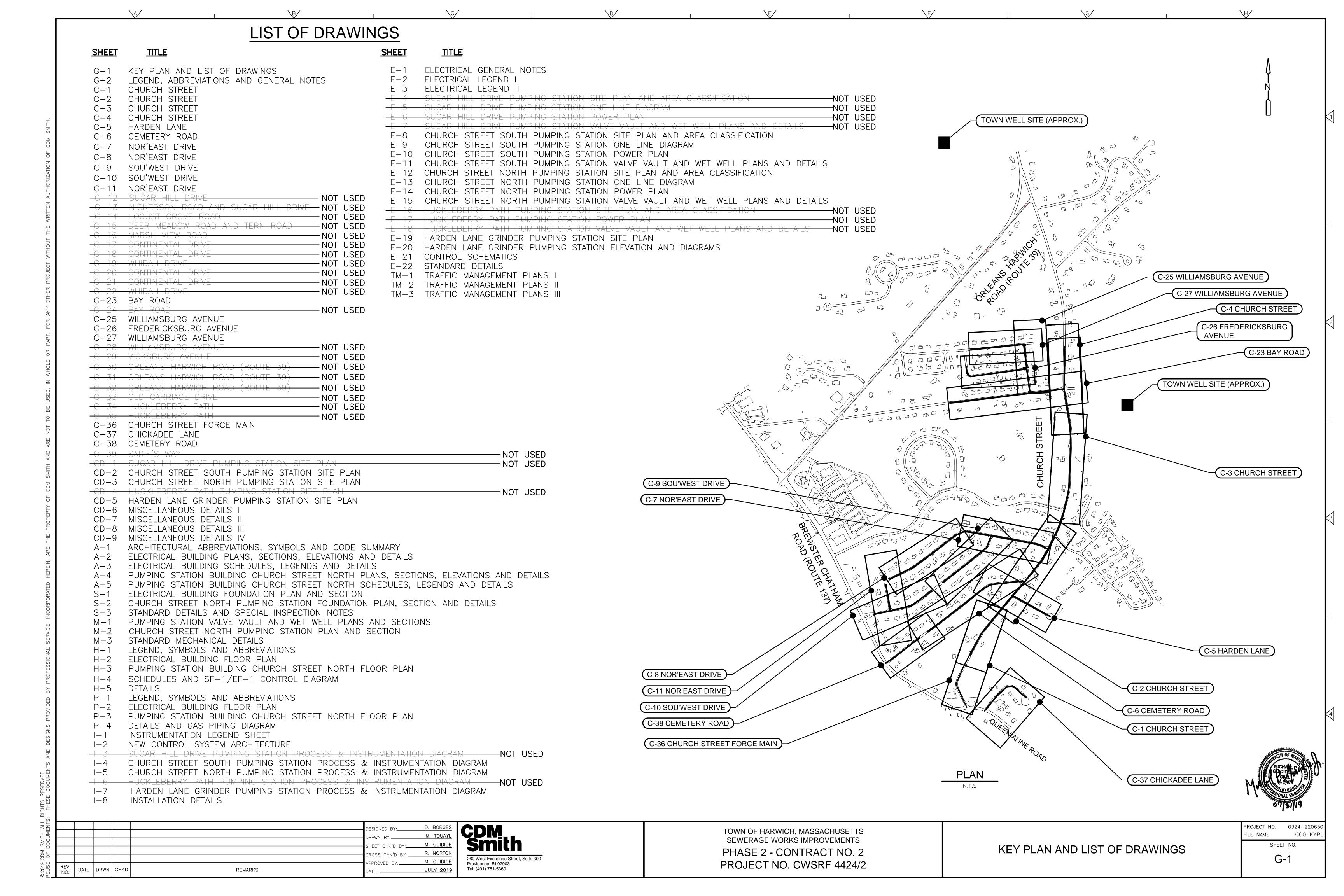
PROVIDENCE, RHODE ISLAND

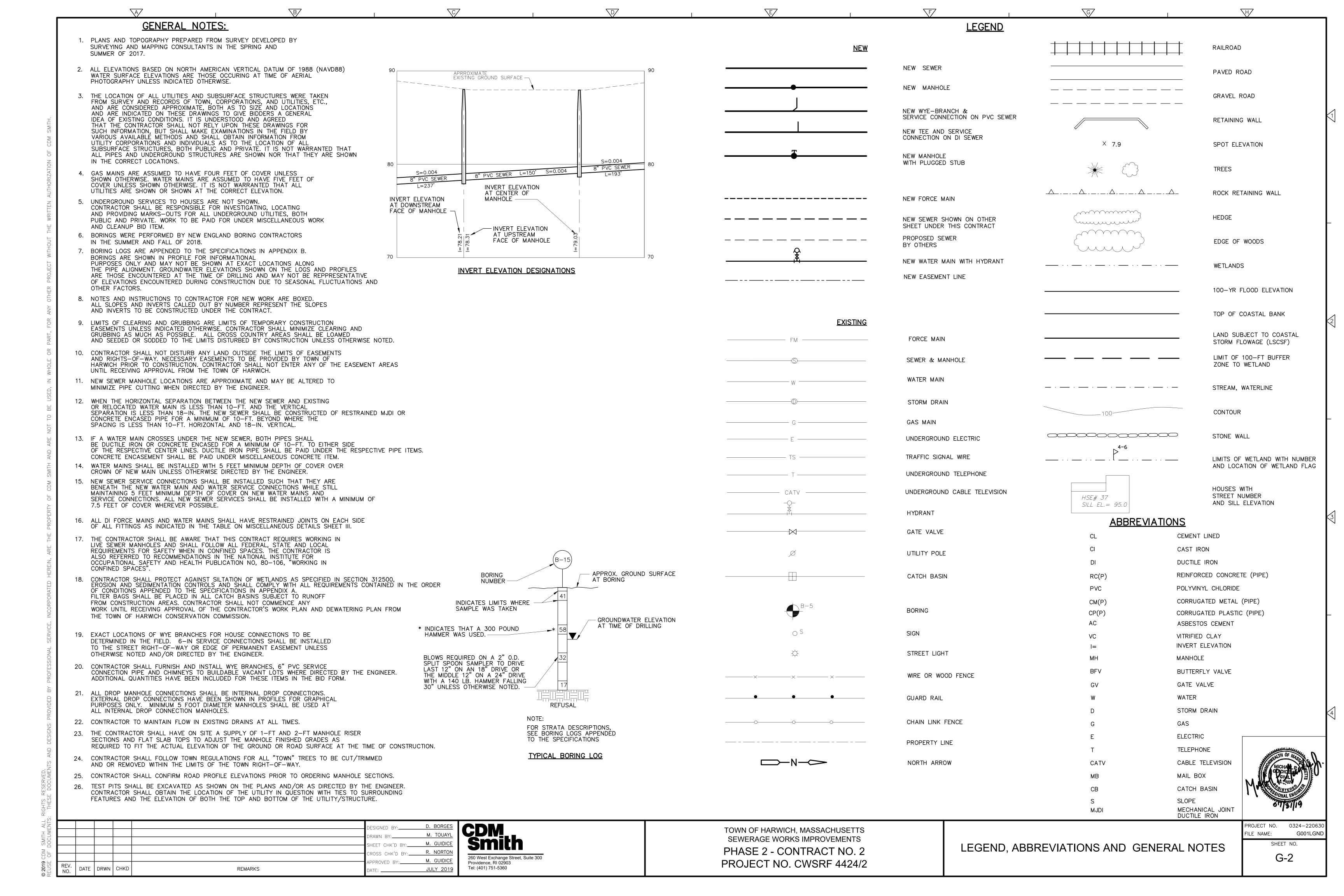
Environment

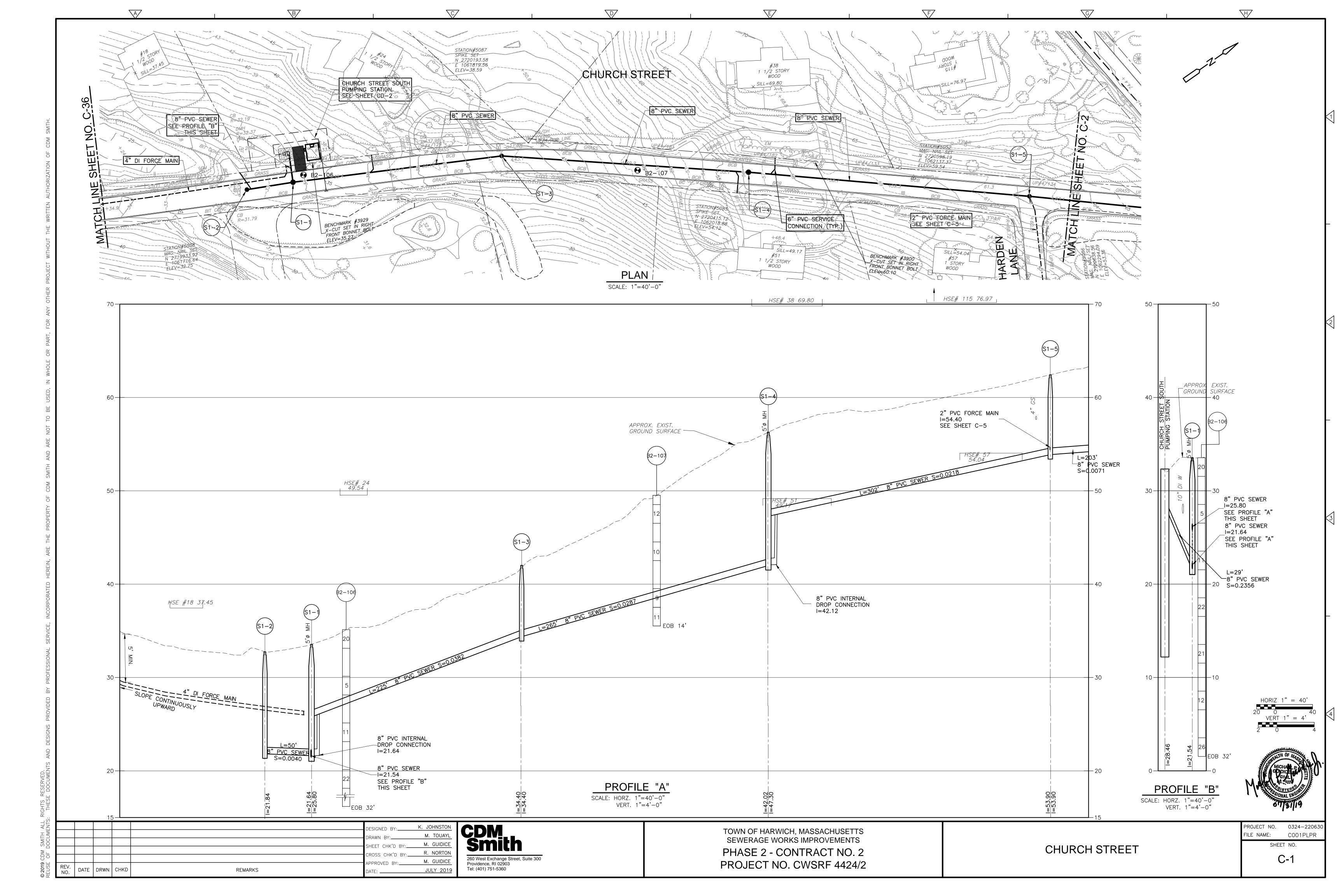
Transportation

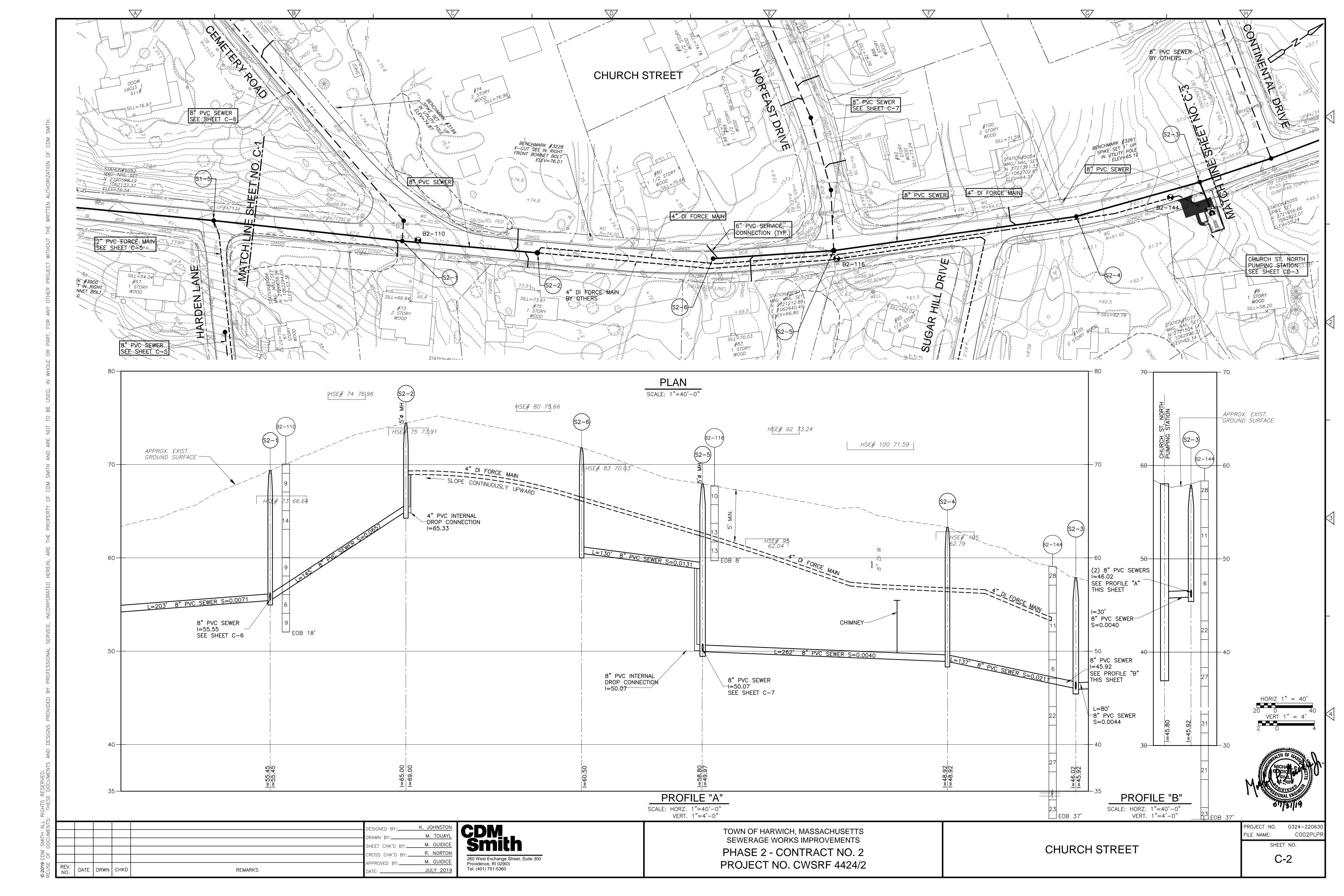
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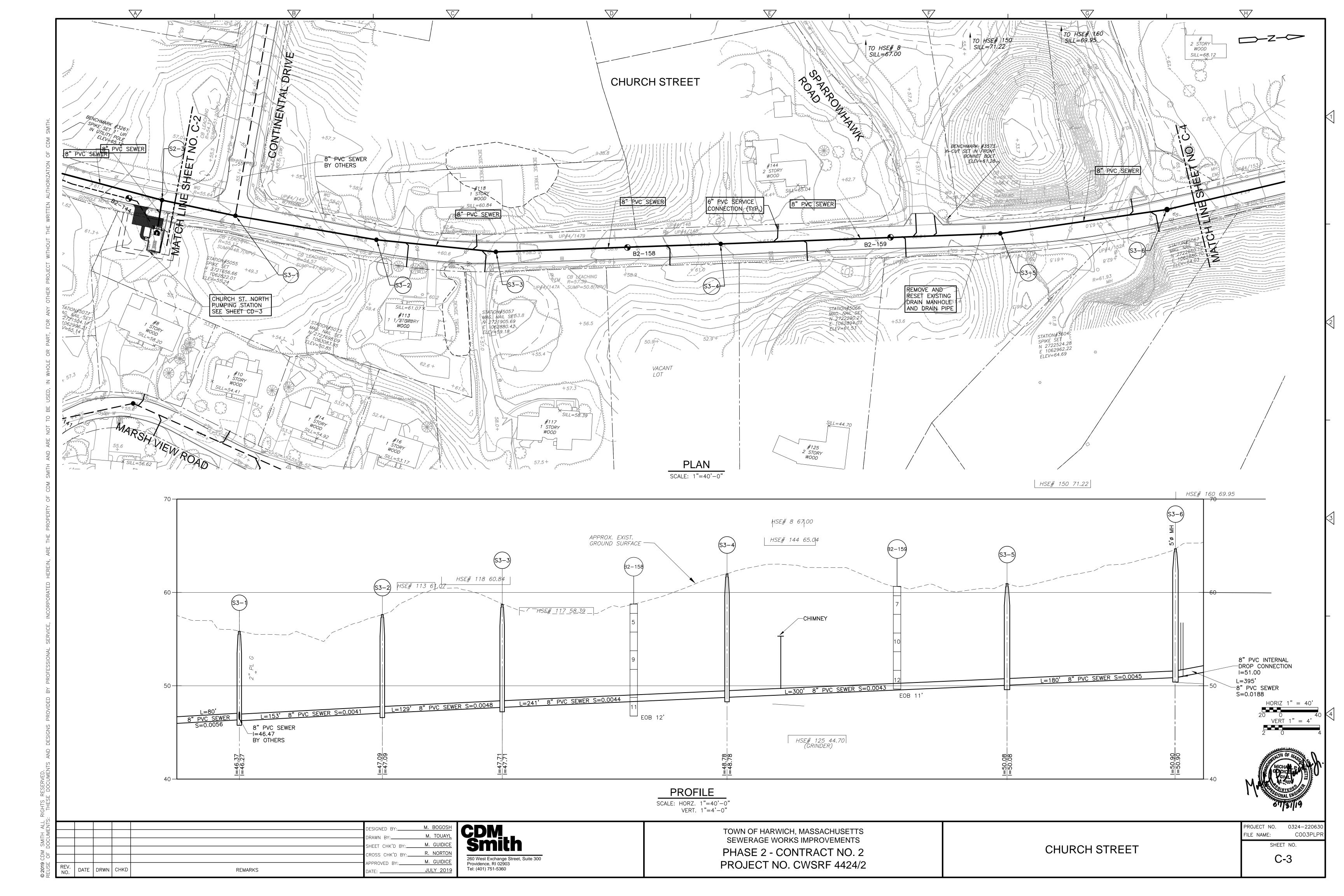
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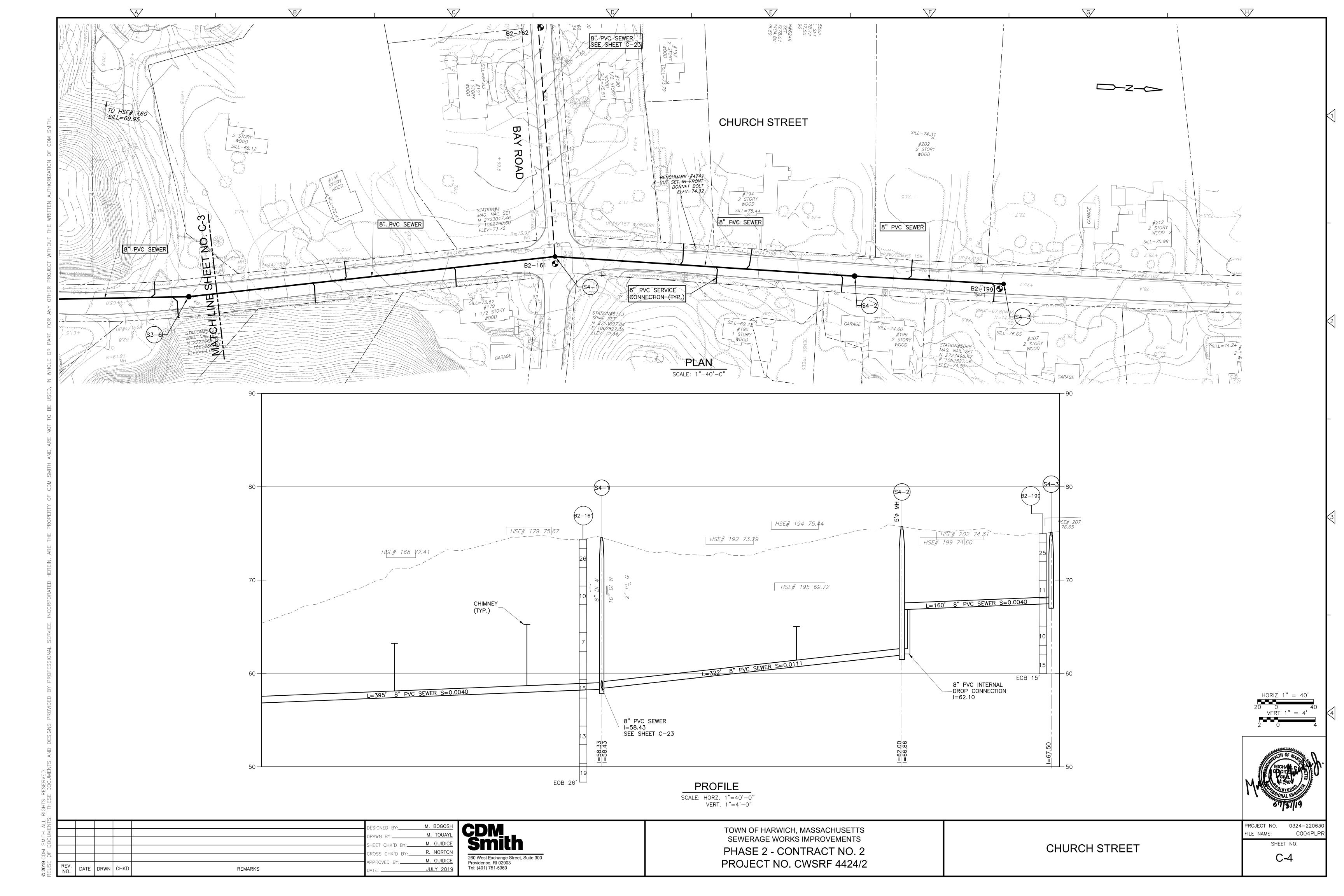


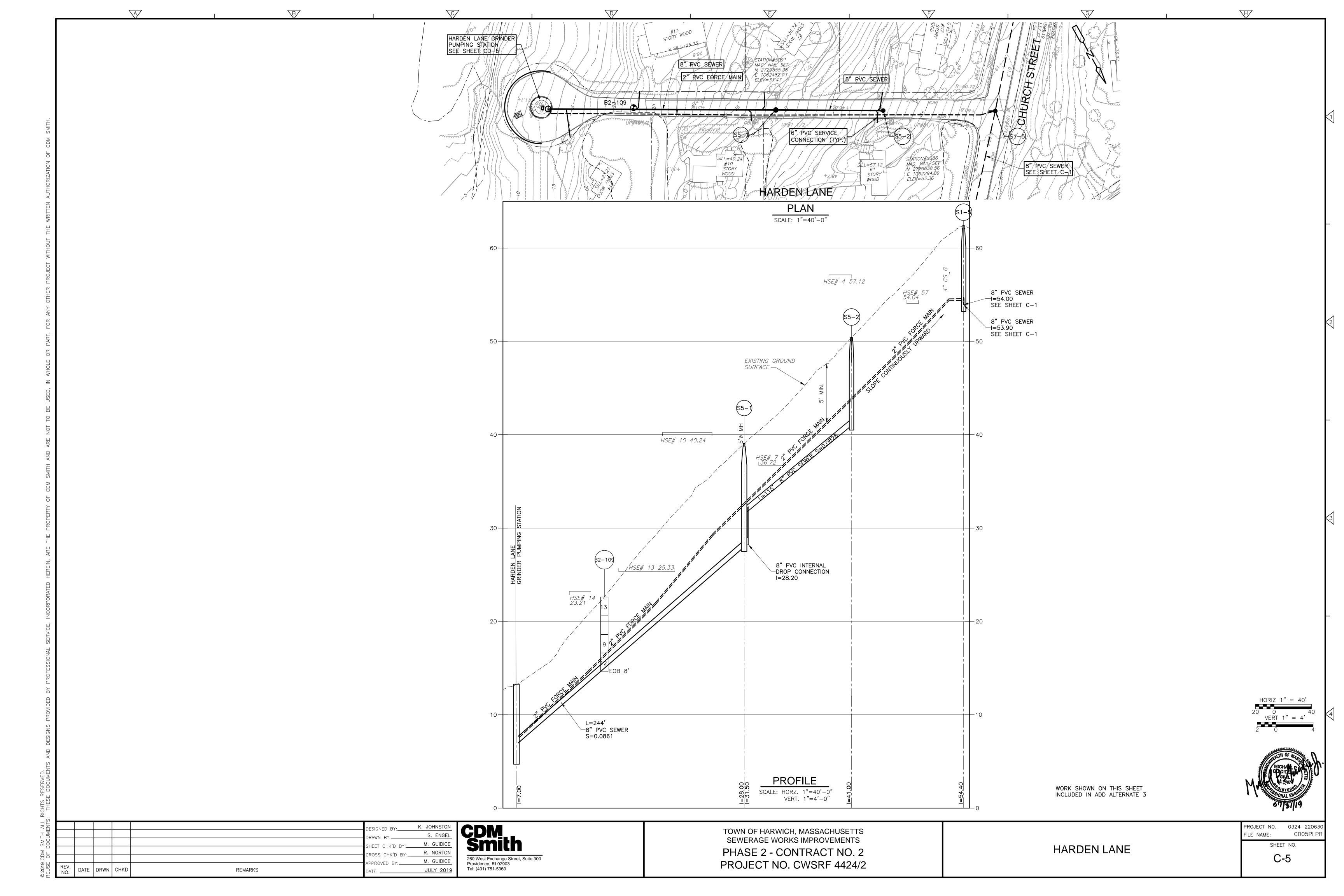


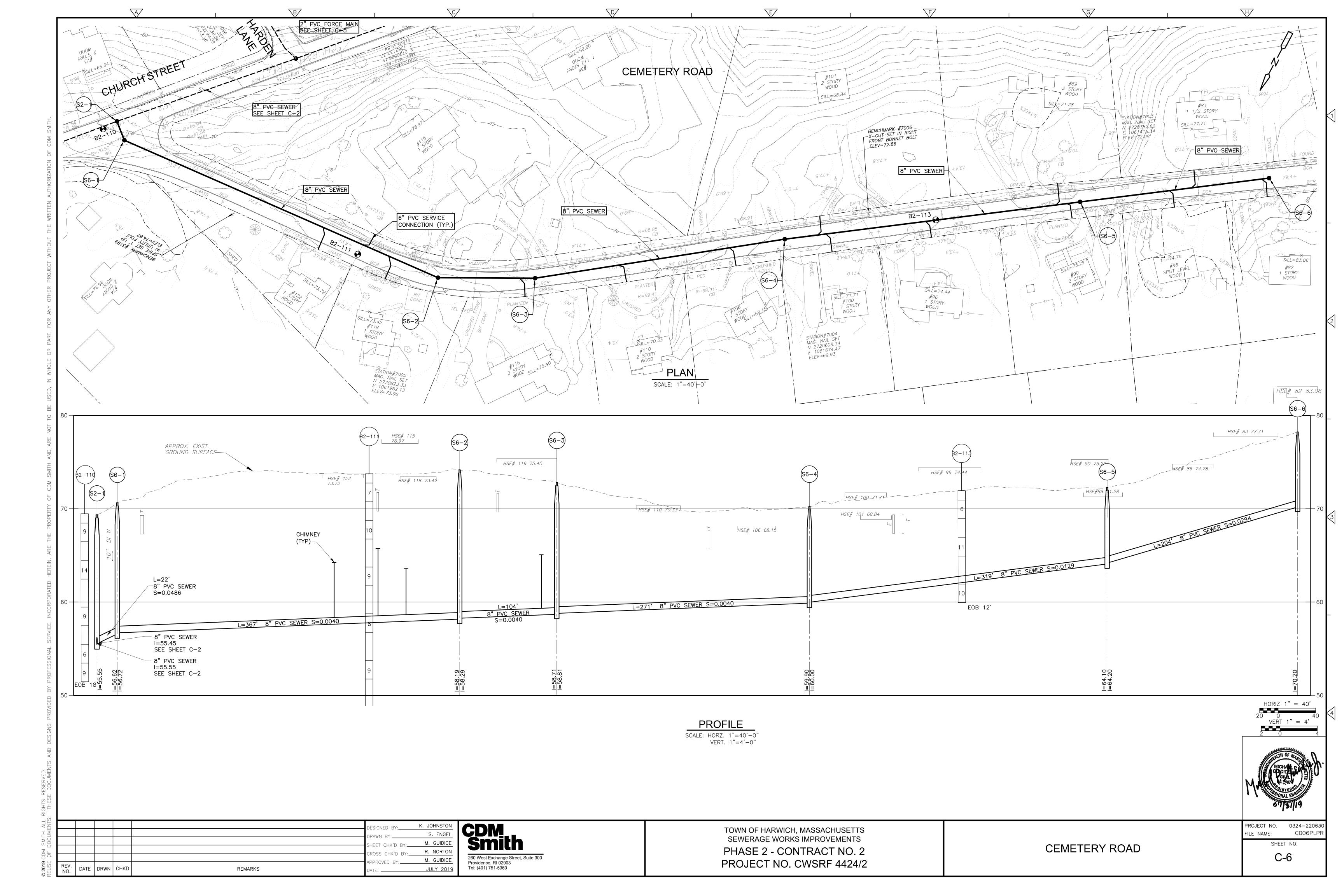


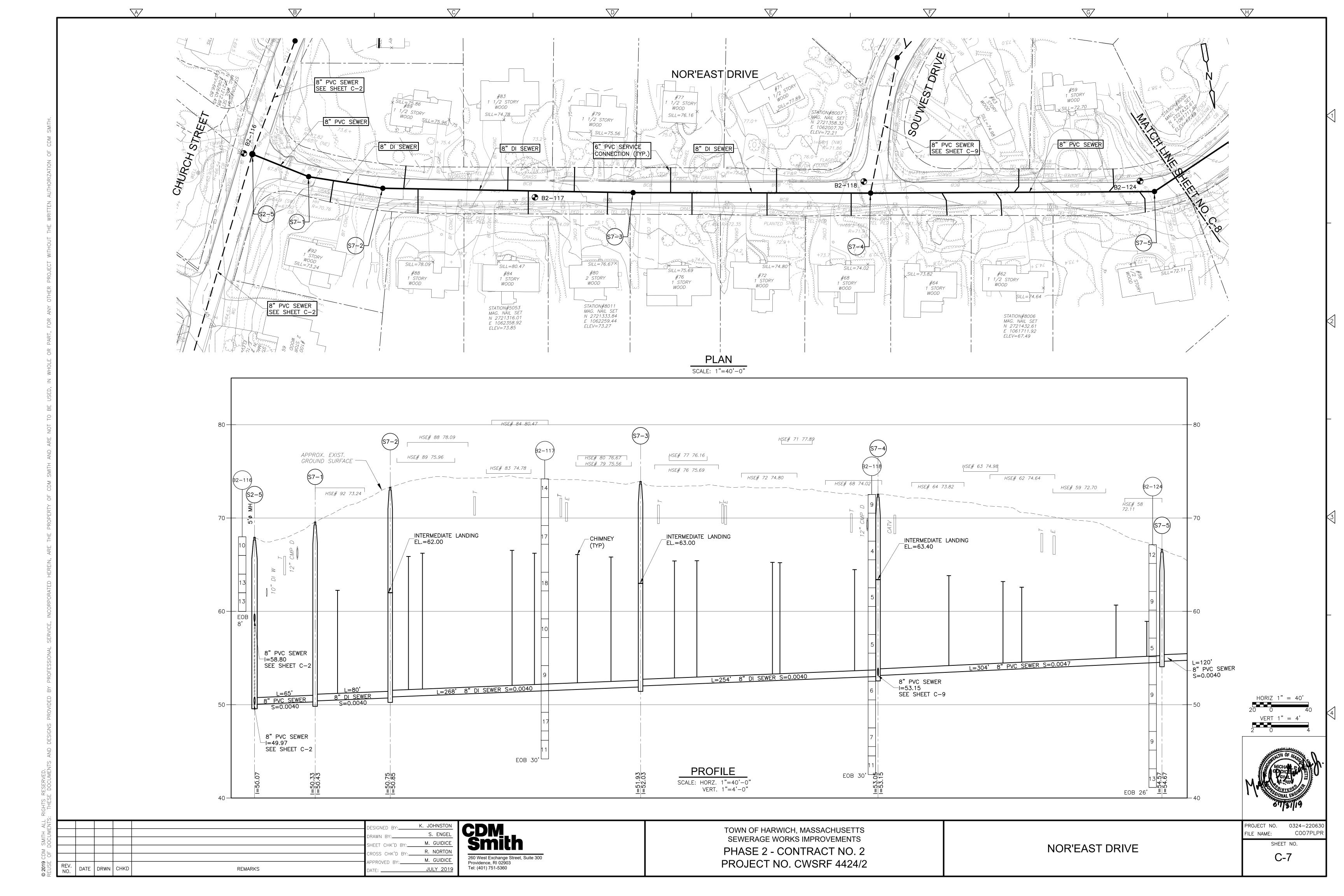


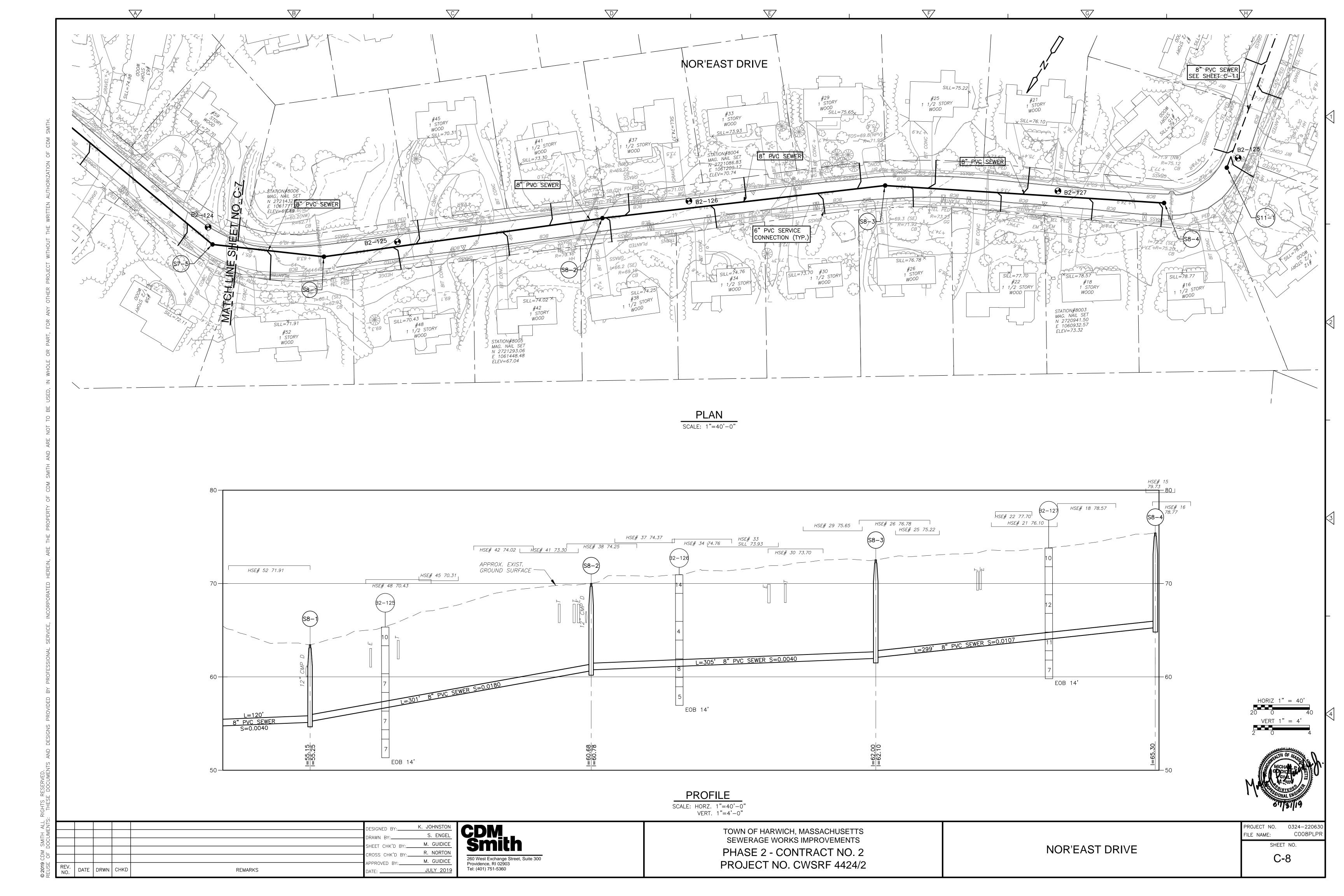


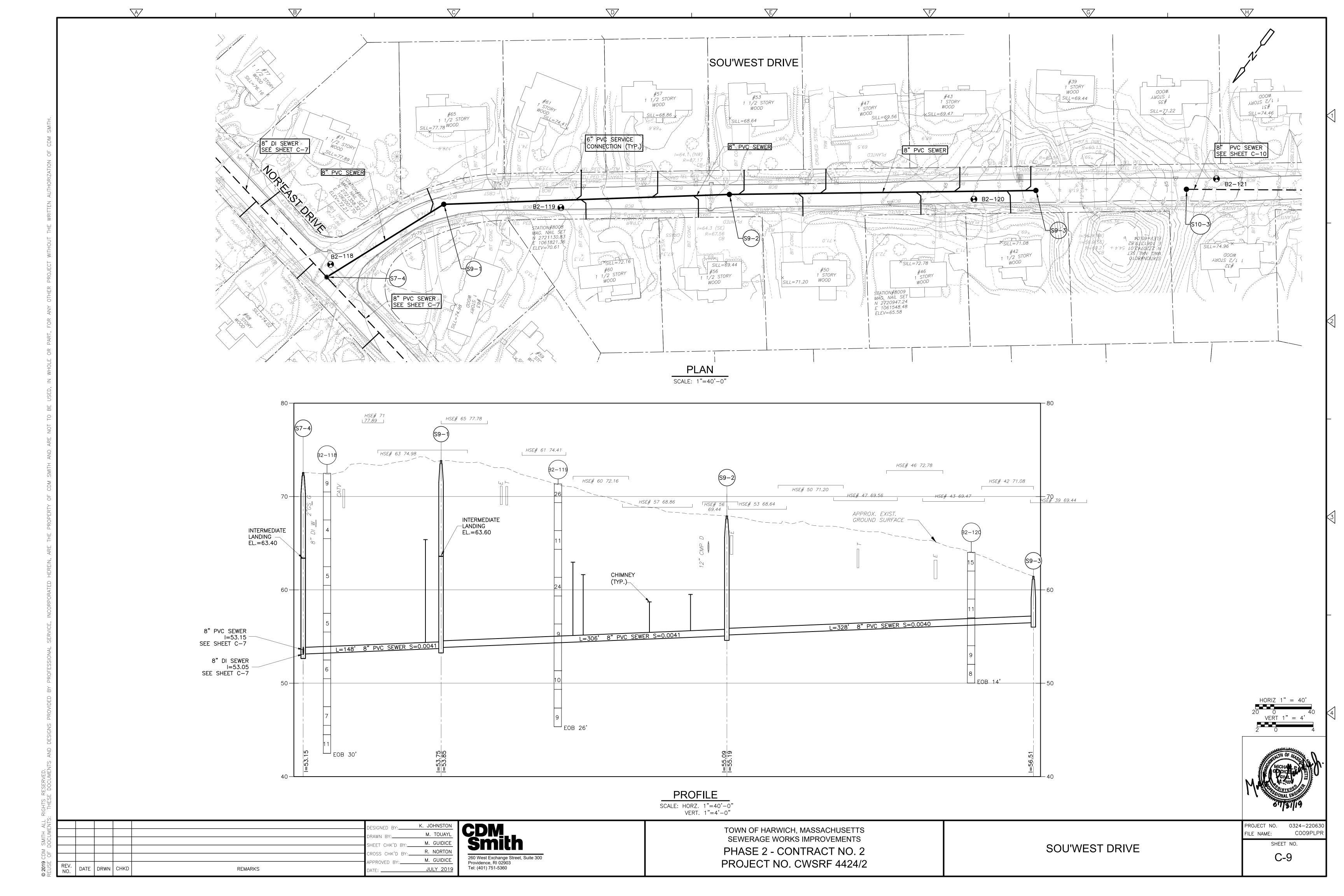


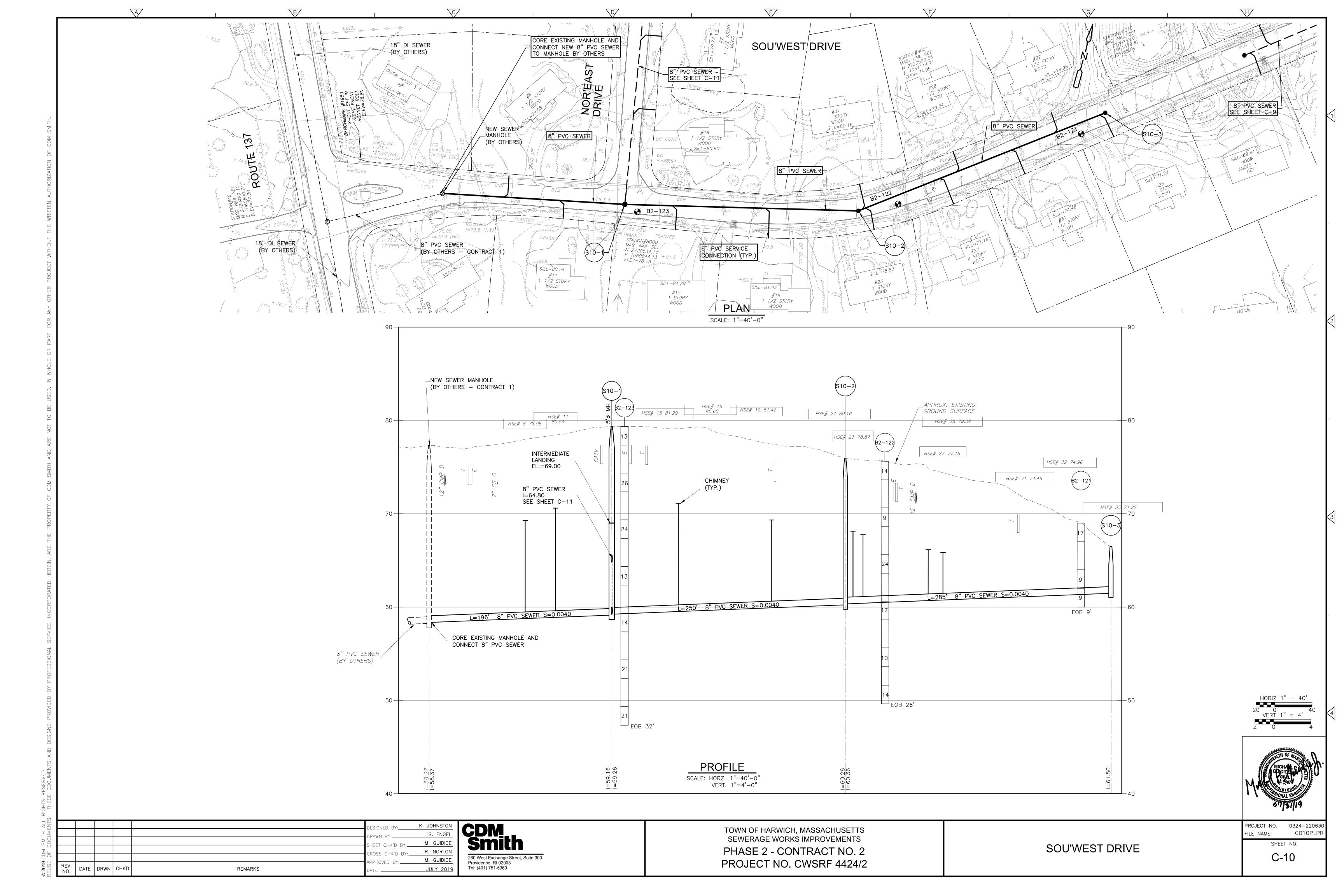


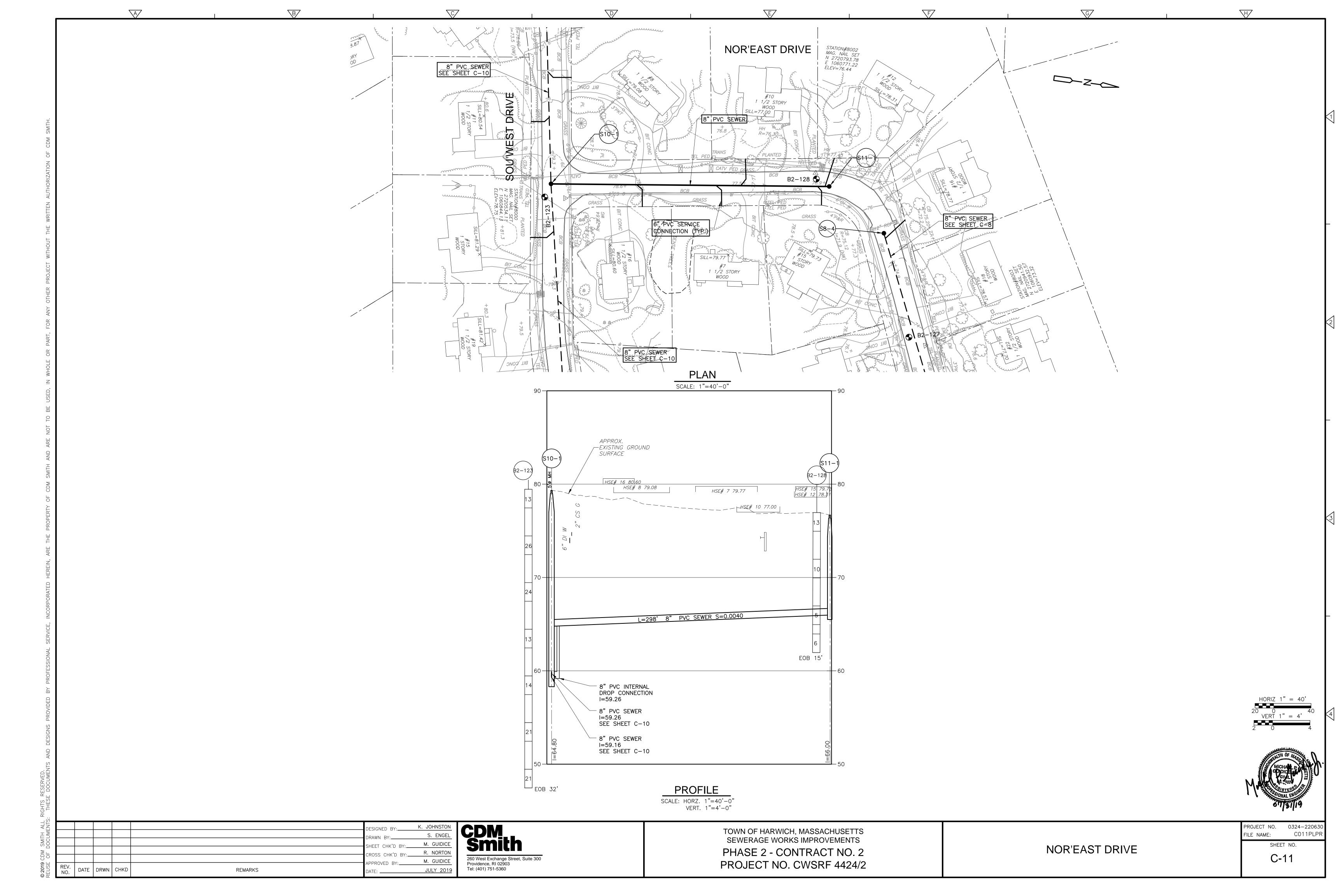


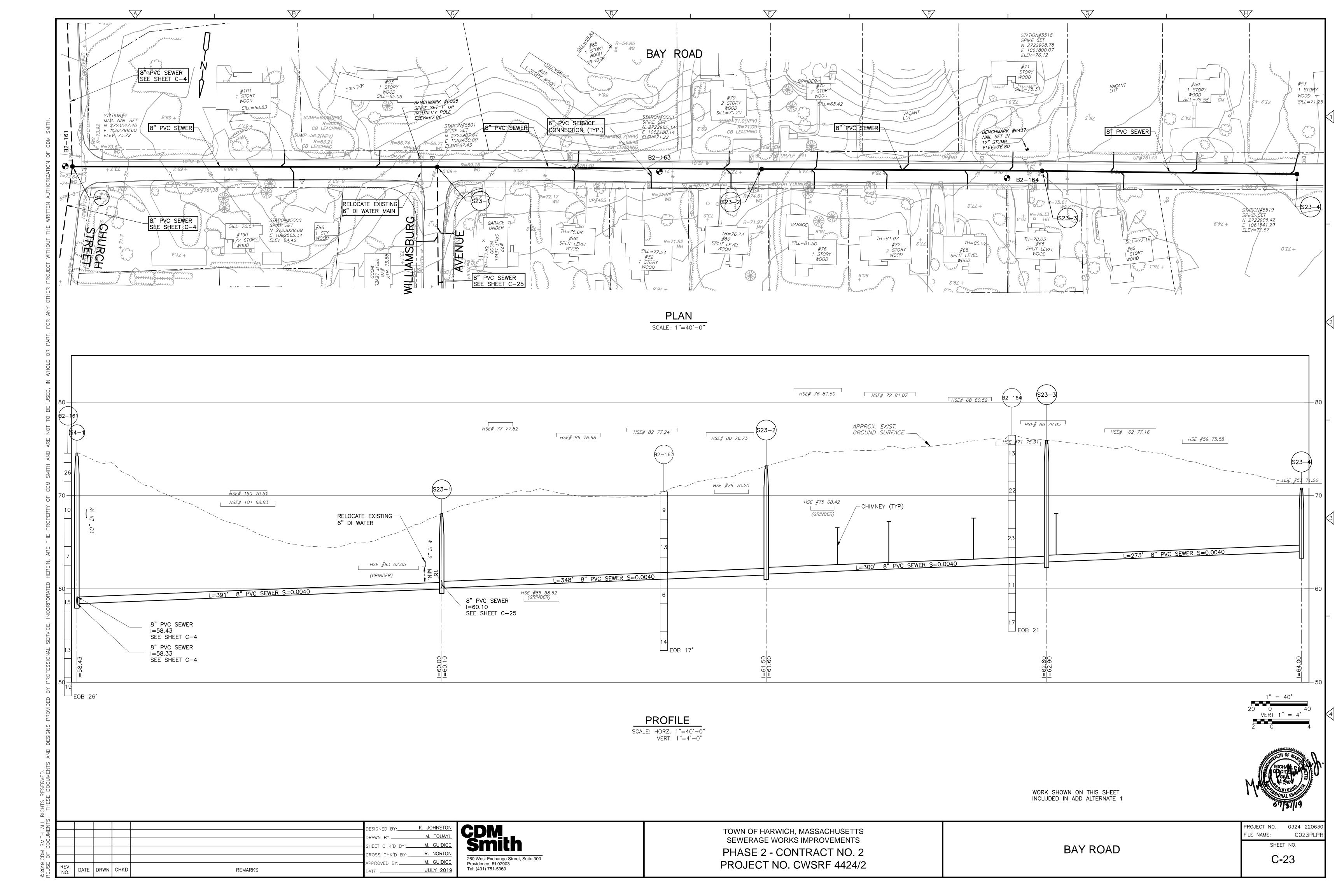


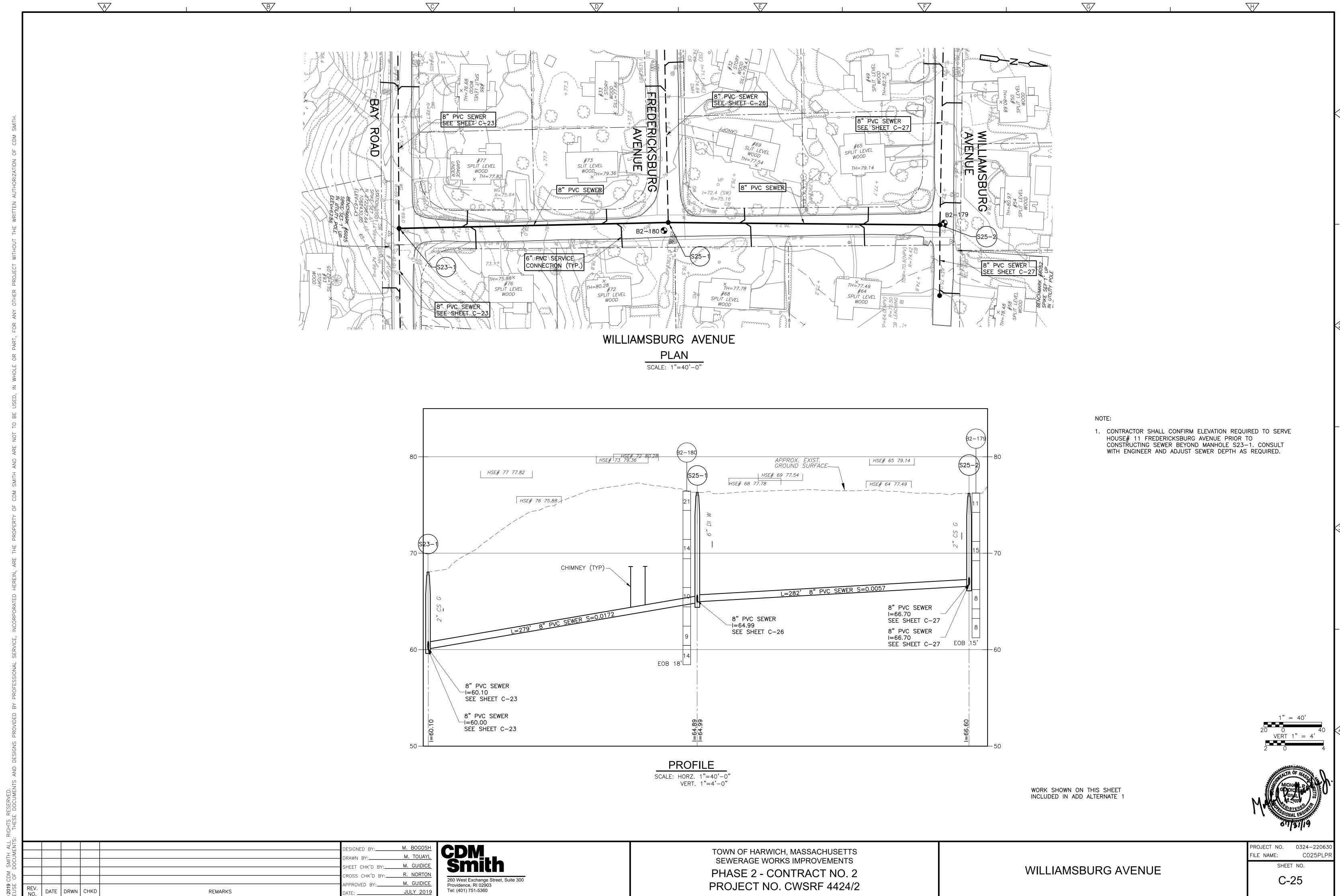




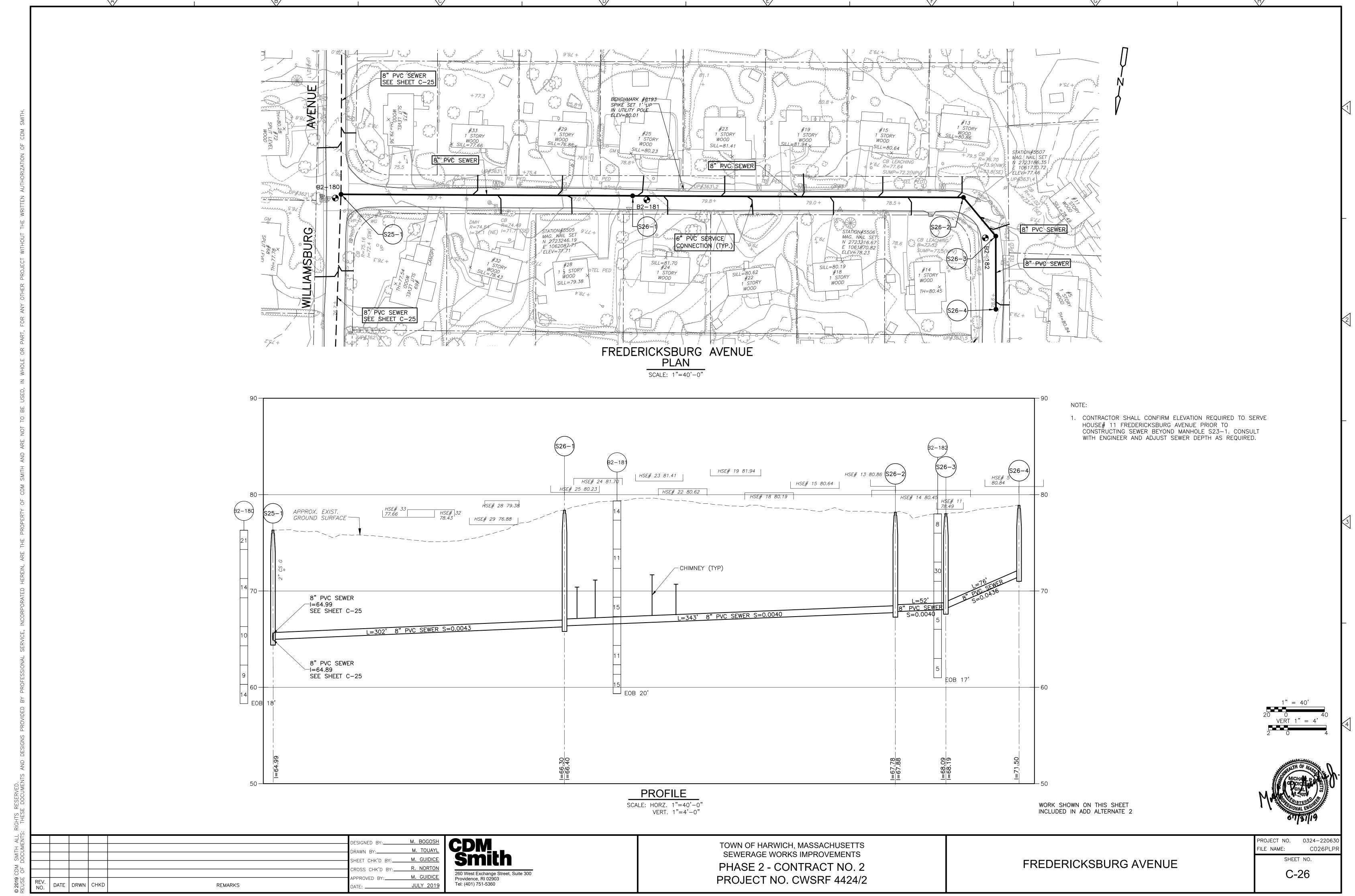


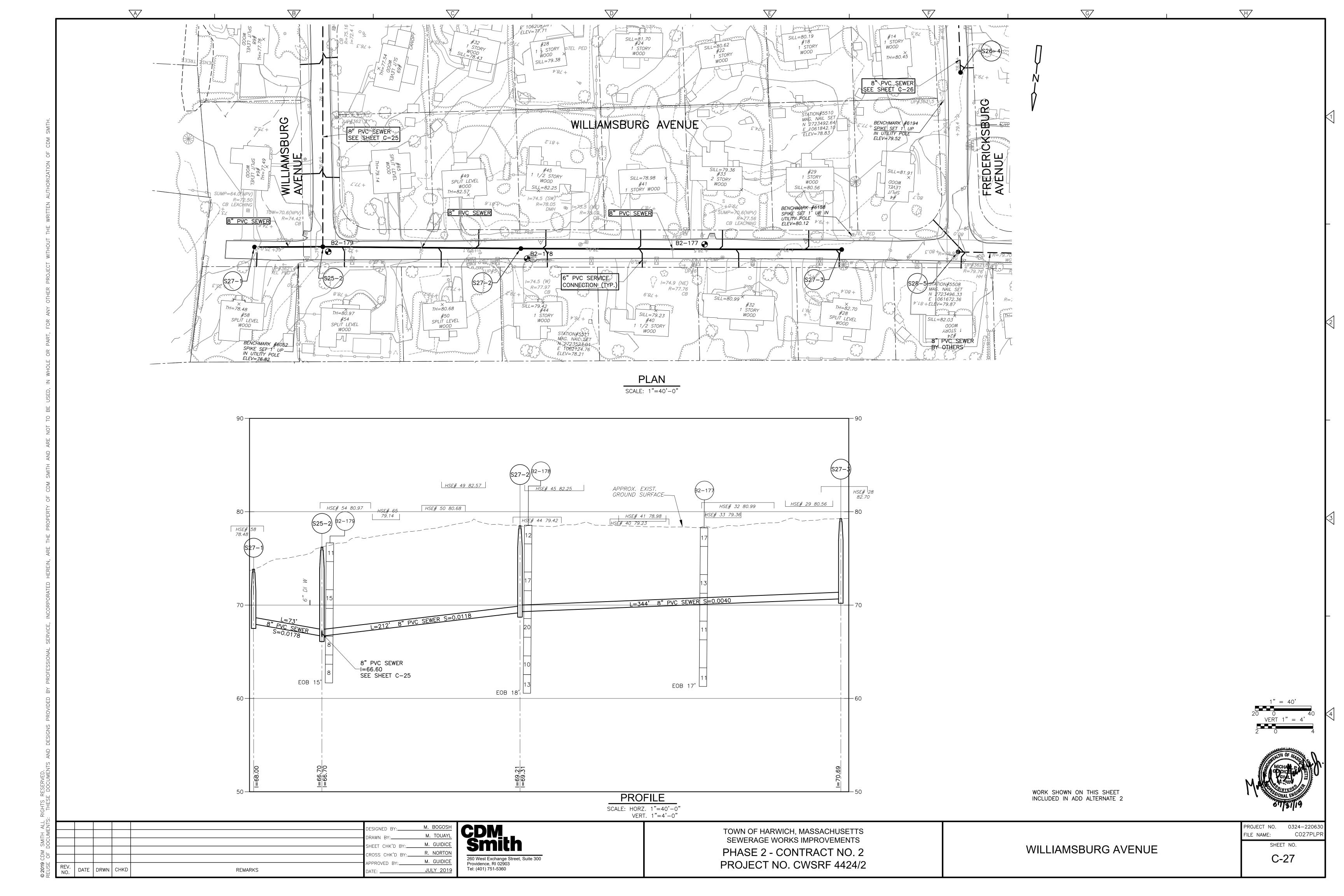


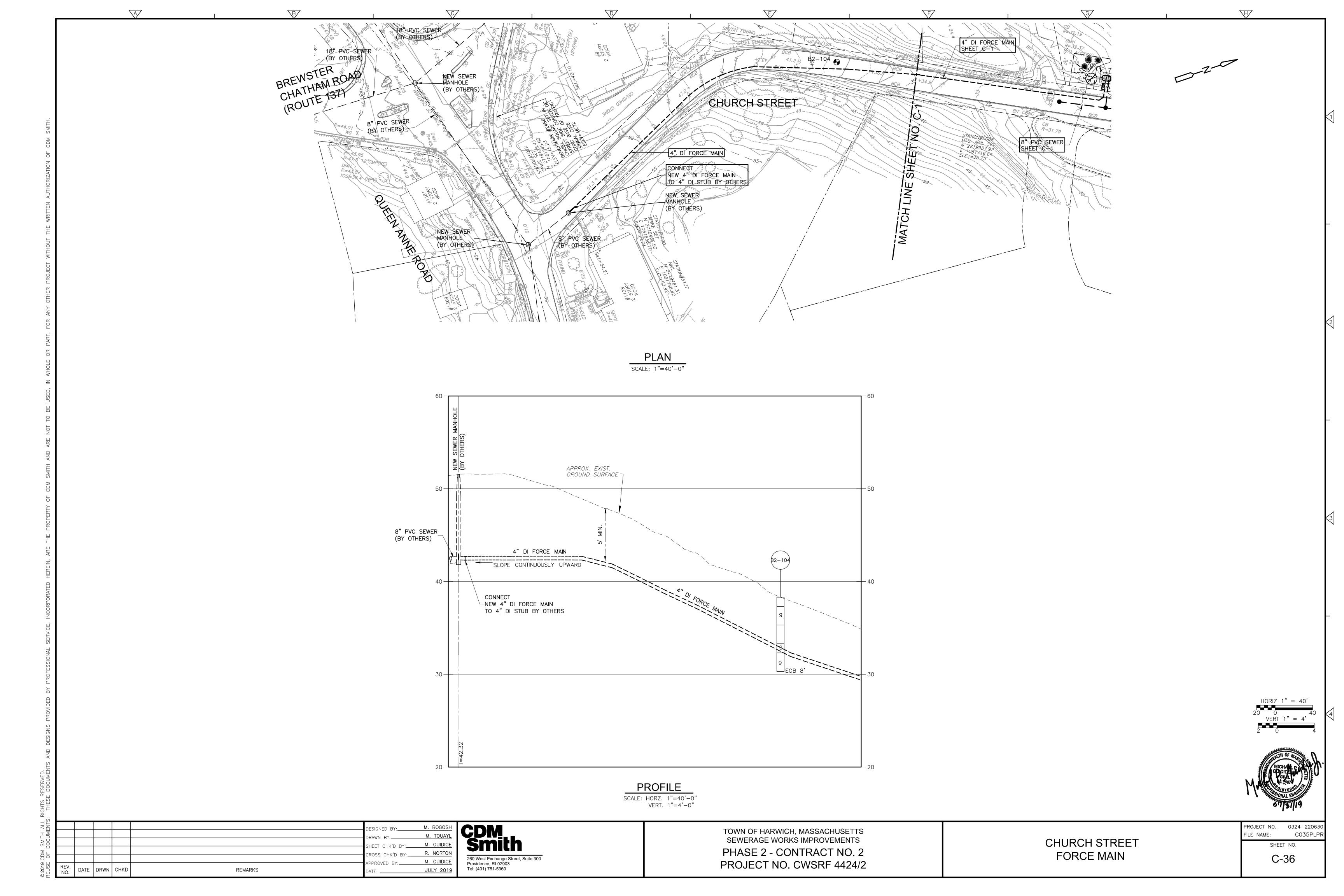


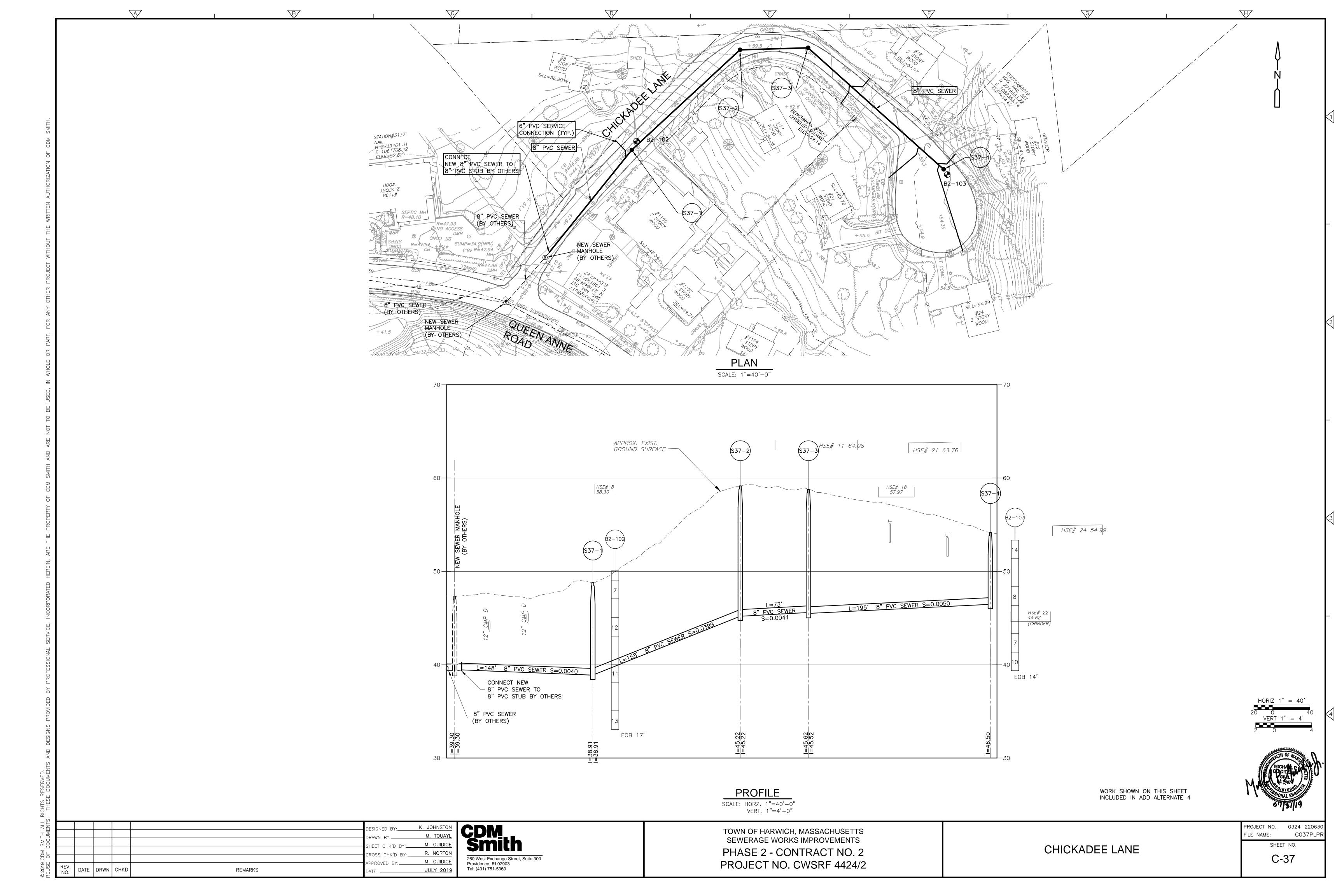


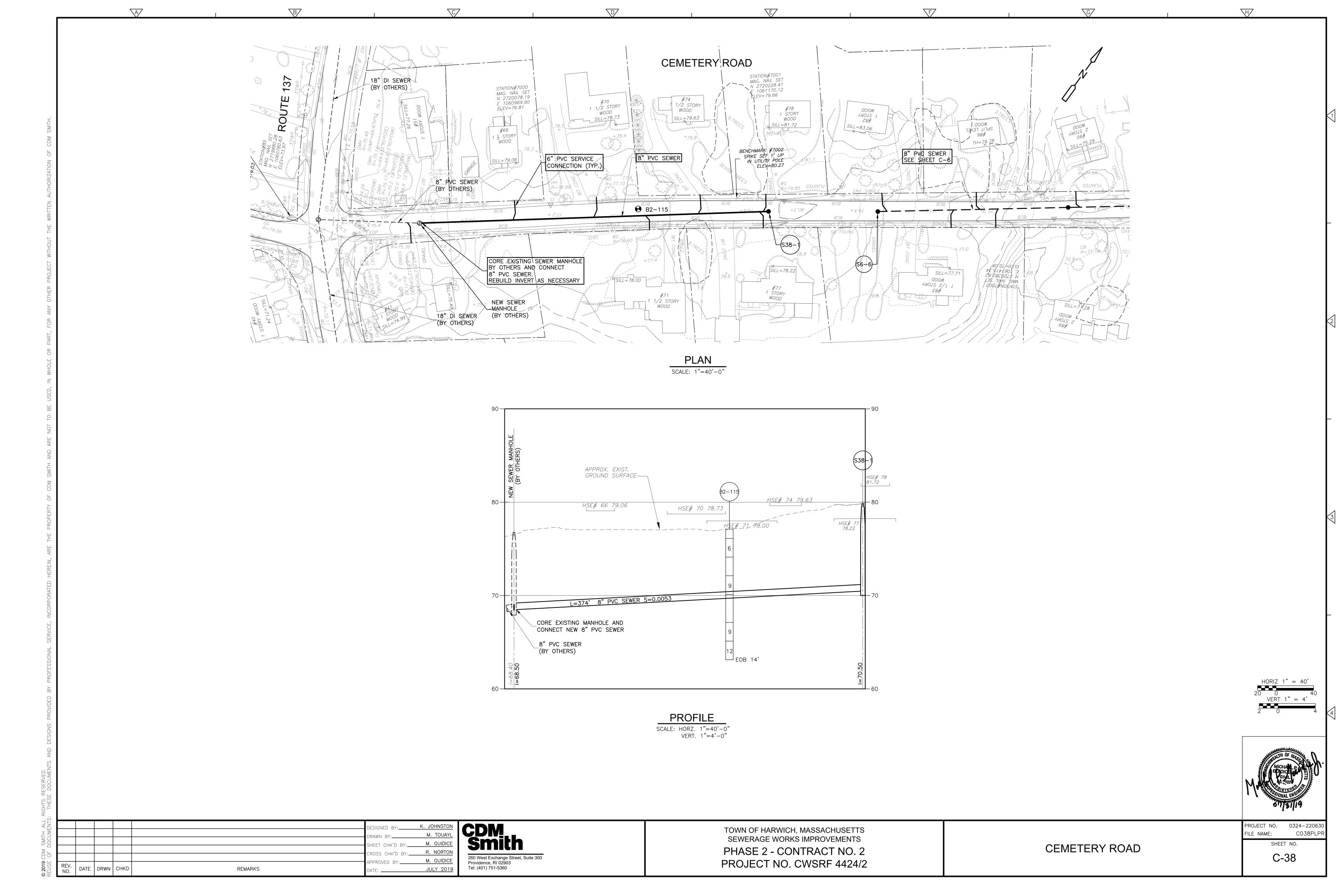
260 West Exchange Street, Suite 300 Providence, RI 02903 Tel: (401) 751-5360

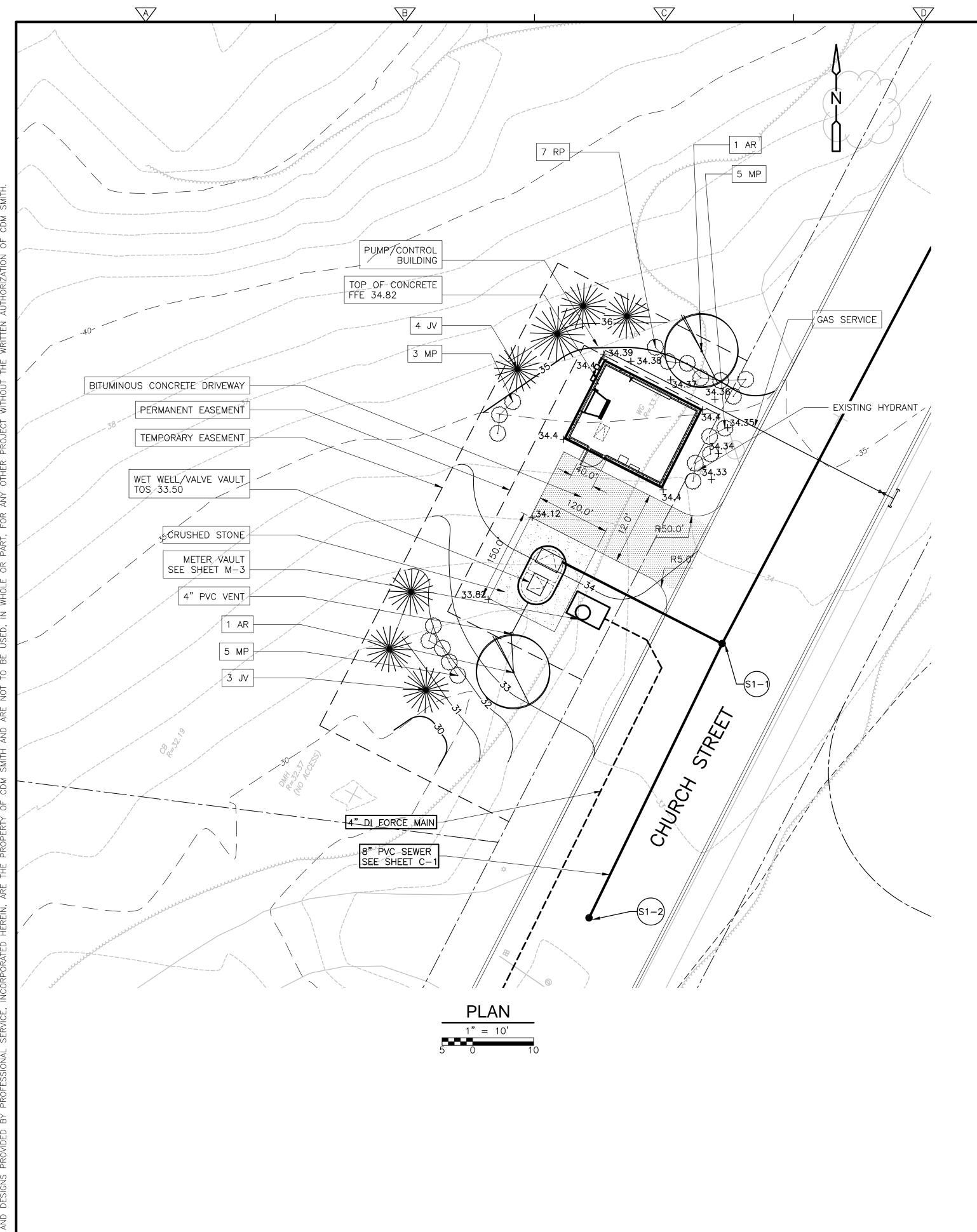












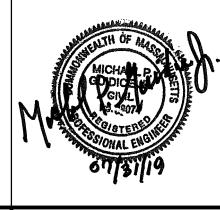
PLA	NT LIST				
7	JV JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	7-FT	B&B	
2	AR ACER RUBRUM 'RED SUNSET'	RED SUNSET MAPLE	2.5-3" CAL.	B&B	SINGLE LEADER
13	MP MYRICA PENSYLVANICA	BAYBERRY	#3	CONT.	1 MALE PLANT
7	RP RHODODENDRON 'PJM'	PJM RHODODENDRON	4-FT	B&B	

LANDSCAPE NOTES:

- ALL PROPOSED PLANTING LOCATIONS SHALL BE STAKED AS SHOWN ON THE PLANS FOR FIELD REVIEW BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
- 2. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES AND NOTIFY OWNERS REPRESENTATIVE OF CONFLICTS.
- 3. NO PLANT MATERIALS SHALL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
- 4. A 3-INCH DEEP SHREDDED PINE BARK SAUCER SHALL BE INSTALLED UNDER ALL TREES AND SHRUBS, AND IN ALL PLANTING BEDS, AS SHOWN ON THE PLANS, OR AS DIRECTED BY OWNER'S REPRESENTATIVE.
- 5. ALL TREES SHALL BE BALLED AND BURLAPPED, UNLESS OTHERWISE NOTED, OR APPROVED BY THE OWNER'S REPRESENTATIVE.
- 6. FINAL QUANTITY FOR EACH PLANT TYPE SHALL BE AS SHOWN ON THE PLAN. THIS NUMBER SHALL TAKE PRECEDENCE IN CASE OF ANY DISCREPANCY BETWEEN QUANTITIES SHOWN ON THE PLANT LIST AND ON THE PLAN. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES BETWEEN THE NUMBER OF PLANTS SHOWN ON THE PLAN AND PLANT LABELS PRIOR TO BIDDING.
- 7. ANY PROPOSED PLANT SUBSTITUTIONS MUST BE APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE.
- 8. ALL PLANT MATERIALS INSTALLED SHALL MEET OR EXCEED THE SPECIFICATIONS OF THE "AMERICAN STANDARDS FOR NURSERY STOCK" BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
- 9. ALL PLANT MATERIALS SHALL BE MAINTAINED AND GUARANTEED AS SPECIFIED. 3
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PLANT MAINTENANCE NOTES:

- 1. CONTRACTOR SHALL PROVIDE COMPLETE MAINTENANCE OF THE PLANTINGS AS SPECIFIED. THE CONTRACTOR SHALL SUPPLY TEMPORARY WATERING FOR PLANTINGS DURING THE PLANT MAINTENANCE AND GUARANTEE PERIOD, IF IRRIGATION ALTERNATE IS NOT SELECTED.
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- 5. CONTRACTOR SHALL REPLACE DEAD OR DYING PLANTS DURING AND AT THE END OF THE MAINTENANCE AND GUARANTEE



CDM Smith

260 West Exchange Street, Suite 300
Providence, RI 02903
Tel: (401) 751-5360

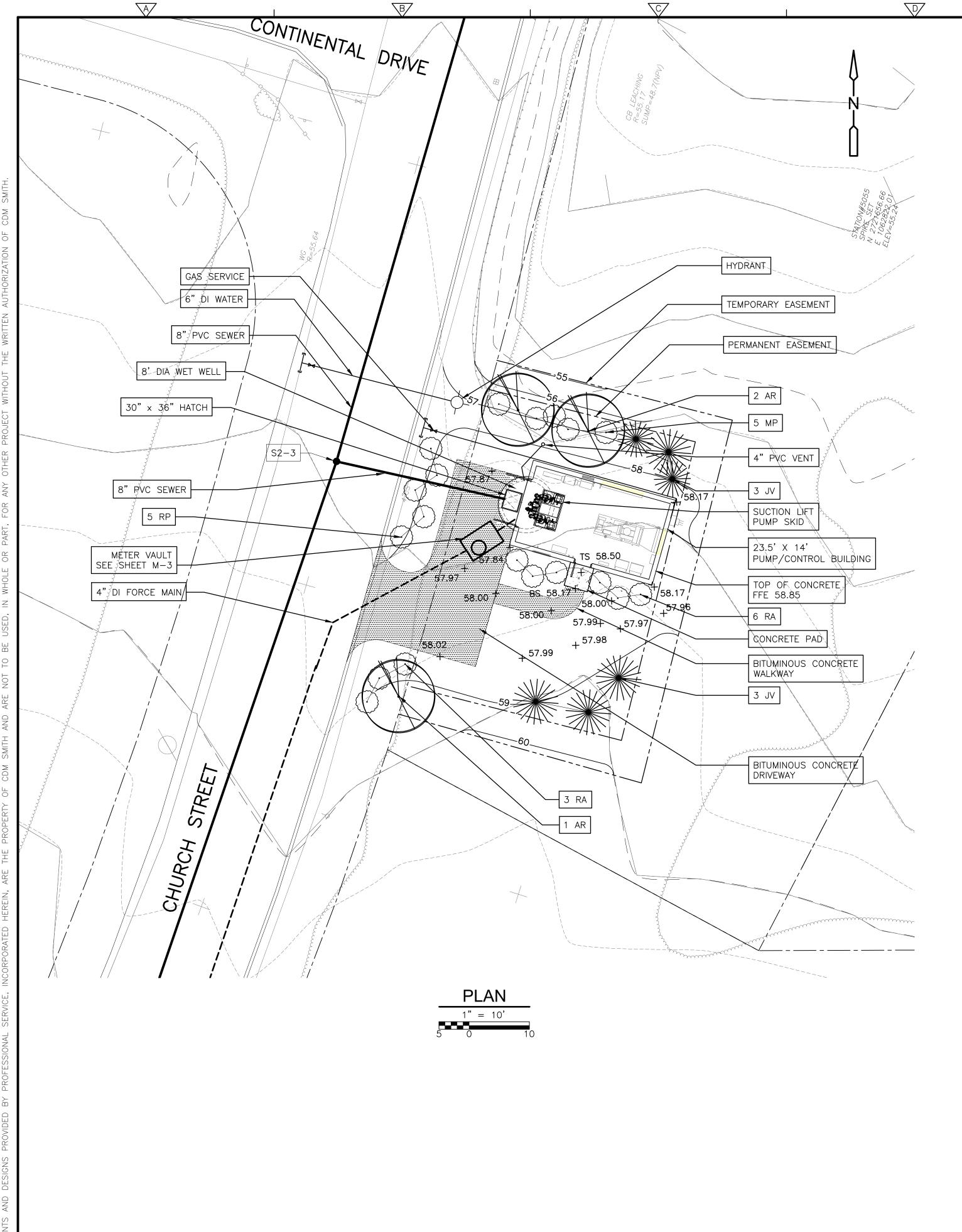
TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2

PROJECT NO. CWSRF 4424/2

CHURCH STREET SOUTH PUMPING STATION SITE PLAN

PROJECT NO. 0324-220630
FILE NAME: CD02STDT
SHEET NO.

CD-2



PLA	NT LIST				
6	JV JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	7-FT	B&B	
3	AR ACER RUBRUM 'RED SUNSET'	RED SUNSET MAPLE	2.5-3" CAL.	B&B	SINGLE LEADER
5	MP MYRICA PENSYLVANICA	BAYBERRY	#3	CONT.	1 MALE PLANT
9	RA RHUS AROMATICA 'GRO-LOW'	GRO-LOW SUMAC	#3	CONT.	
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H

					DESIGNED BY:	R. GUILFOIL
					DRAWN BY:	R. GUILFOIL
					SHEET CHK'D BY:	D. MARTIN
					CROSS CHK'D BY:	R. NORTON
					APPROVED BY:	M. GUIDICE
REV.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 2019



TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS

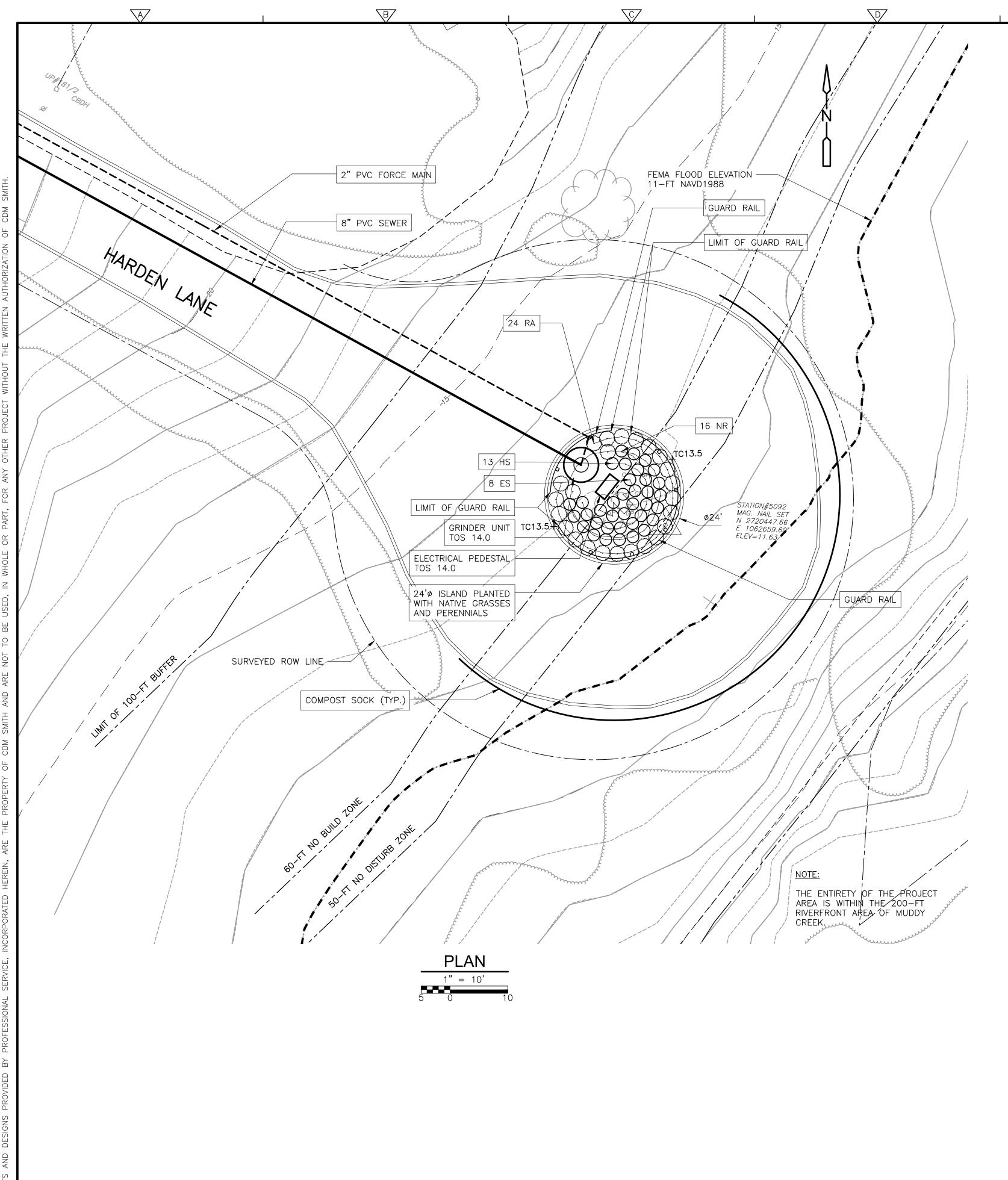
PHASE 2 - CONTRACT NO. 2

PROJECT NO. CWSRF 4424/2

CHURCH STREET NORTH PUMPING STATION SITE PLAN

PROJECT NO. 0324-220630
FILE NAME: CD03STDT
SHEET NO.

CD-3



PLANT LIST				
GRASSES				
8 ES ERAGOSTIS SPECTABLILIS	PURPLE LOVE GRASS	#2	CONT.	
13 HS HELICTOTRICHON SEMPERVIRENS	BLUE OAT GRASS	#2	CONT.	
PERENNIALS				
16 NR NEPETA RACEMOSA 'WALKER'S LOW'	WALKER'S LOW CATMINT	#2	CONT.	
24 RA RHUS AROMATICA 'GRO-LOW'	GRO-LOW SUMAC	#3	CONT.	

LANDSCAPE NOTES:

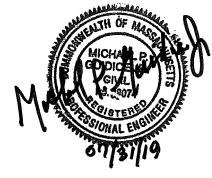
IMMEDIATE AREA.

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WORK SHOWN ON THIS SHEET INCLUDED IN ADD ALTERNATE 3



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_						DESIGNED BY:	R. GUILFO
5						DRAWN BY:	R. GUILFO
						SHEET CHK'D BY:	D. MART
-						CROSS CHK'D BY:	R. NORTO
ر ا						APPROVED BY:	M. GUIDIO
)	REV.	DATE	DRWN	CHKD	DEMARKS	DATF.	JULY 20

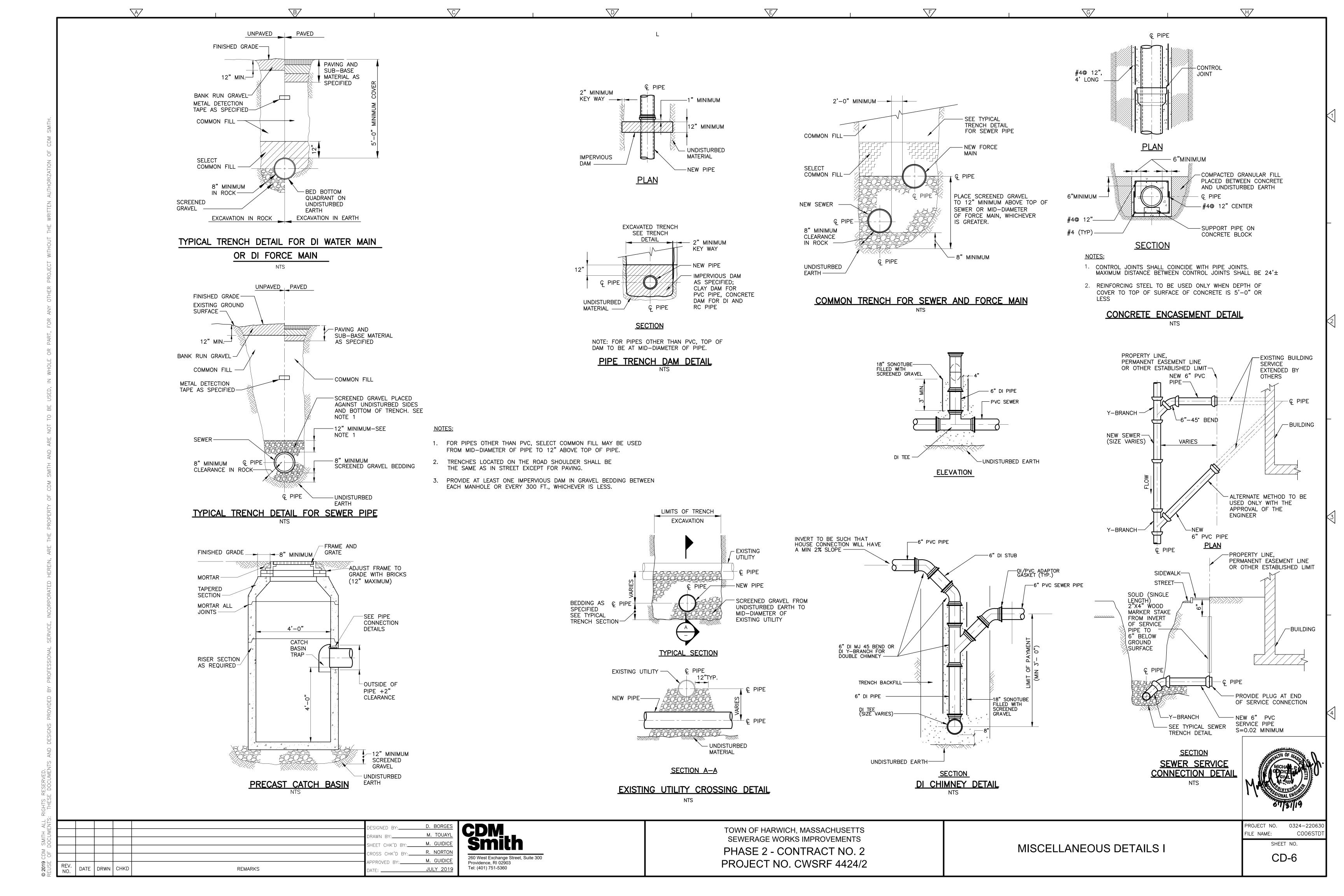
	CDM Smith
-	260 West Exchange Street, Suite 300
-	Providence, RI 02903
-	Tel: (401) 751-5360

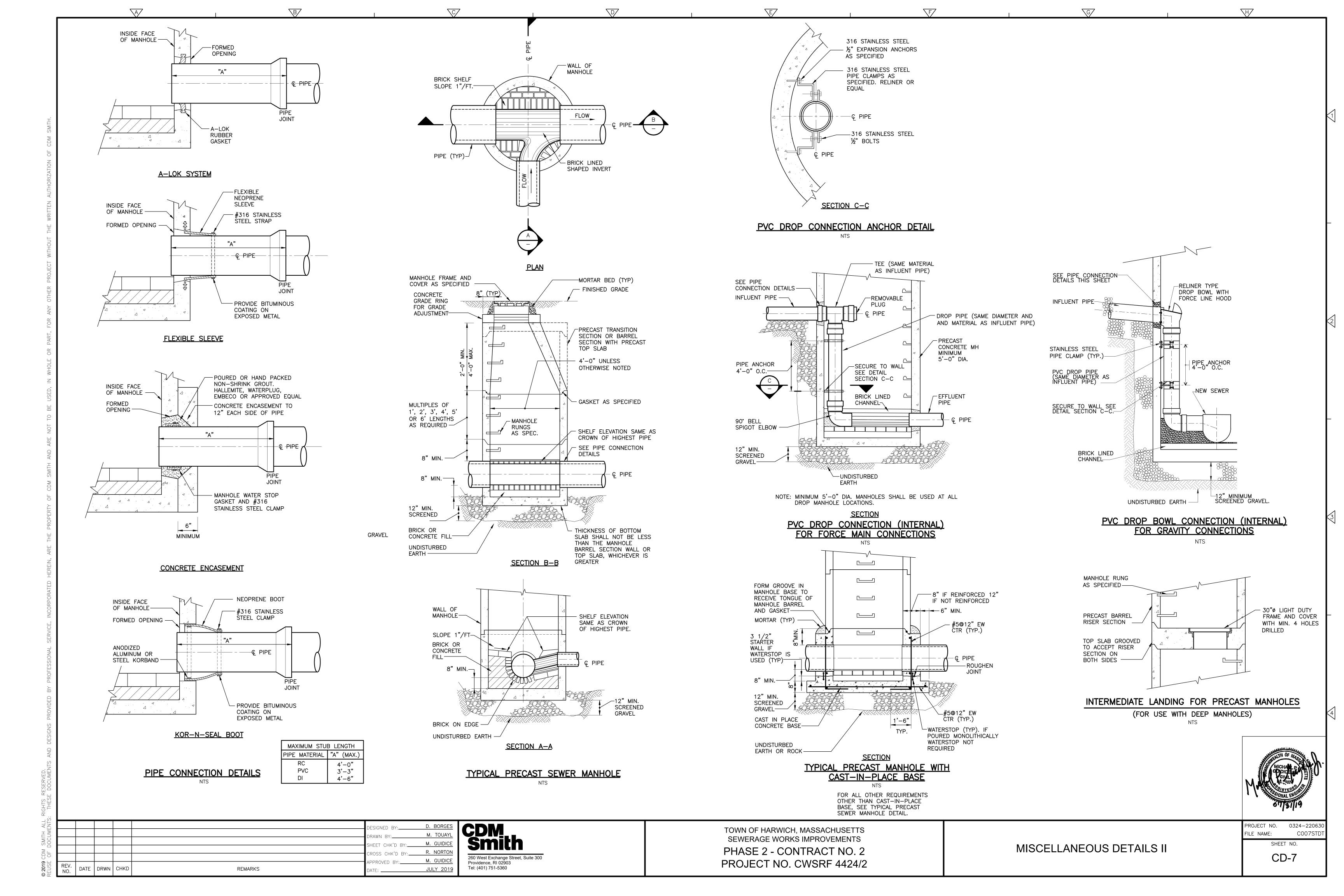
TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS
PHASE 2 - CONTRACT NO. 2
PROJECT NO. CWSRF 4424/2

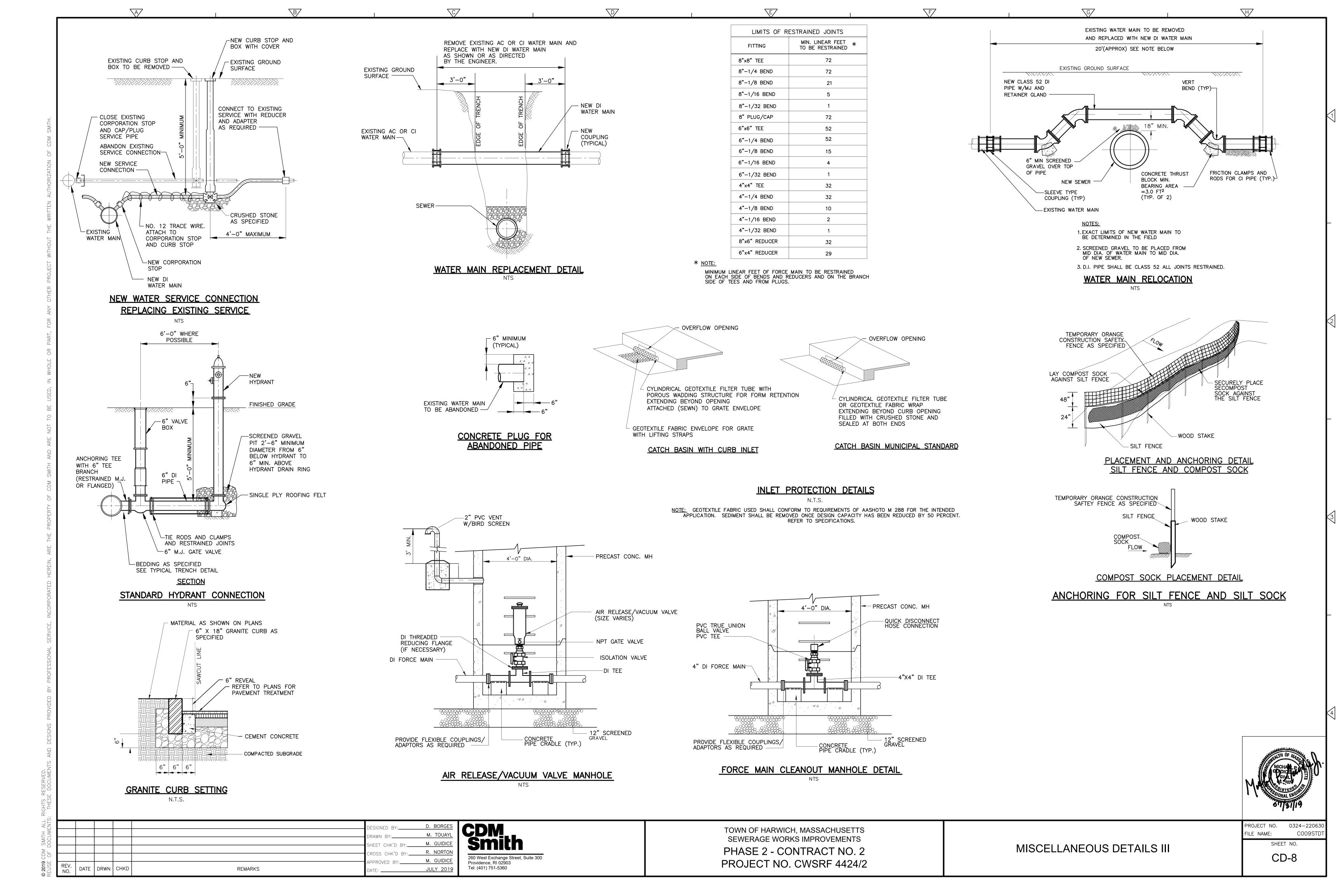
HARDEN LANE GRINDER PUMPING STATION SITE PLAN

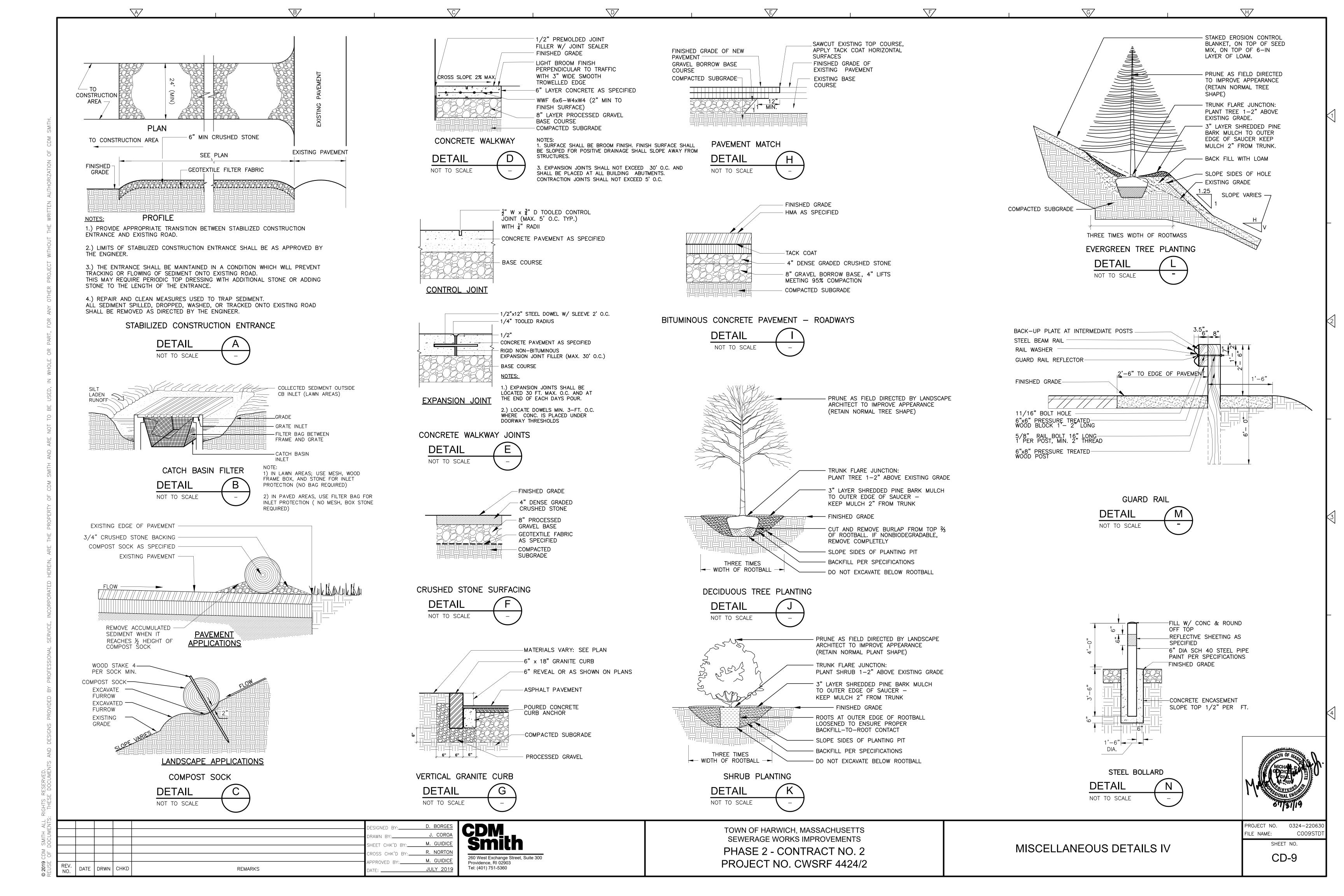
PROJECT NO. 0324-220630
FILE NAME: CD05STD7
SHEET NO.

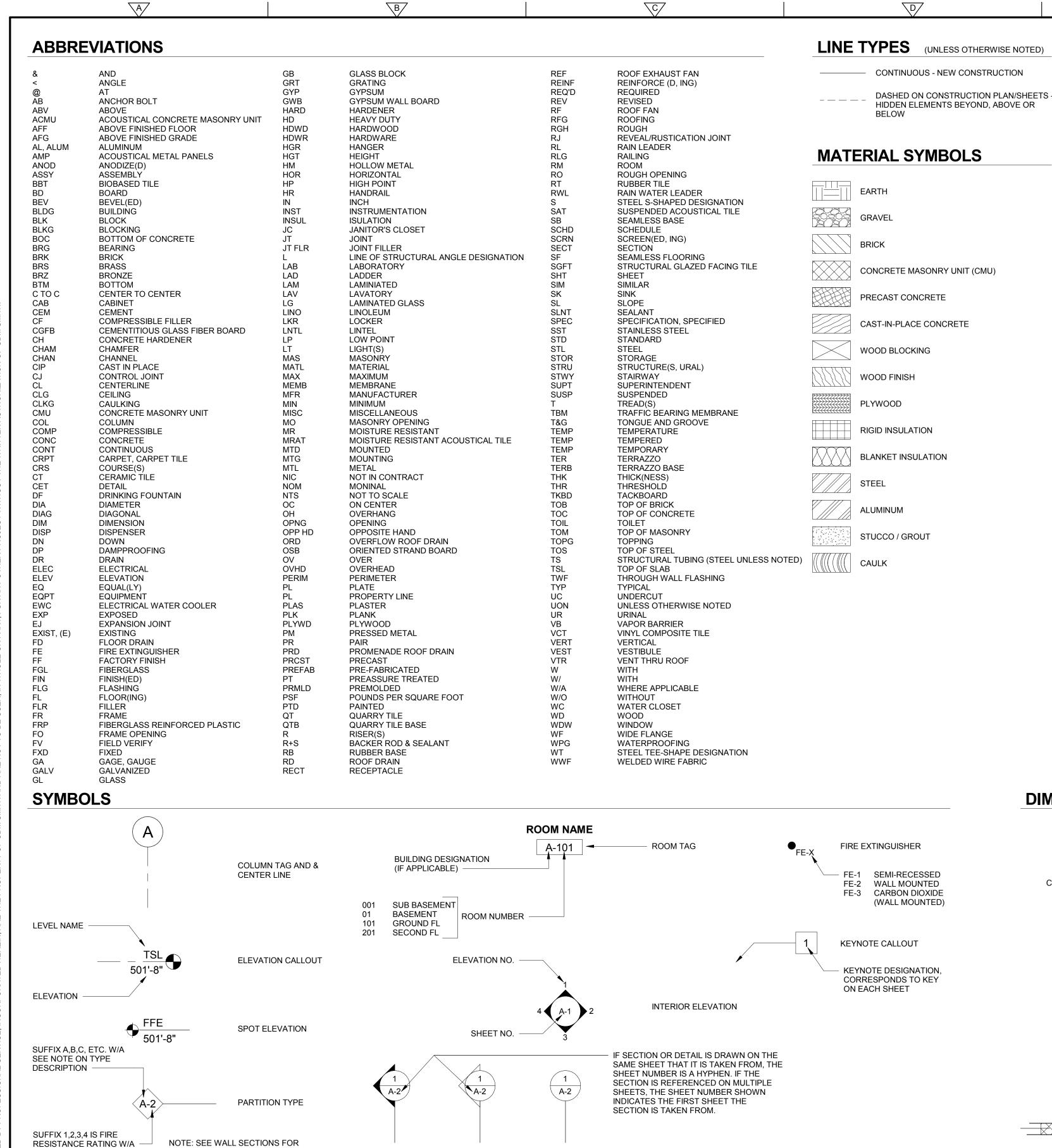
CD-5











BUILDING SECTION WALL SECTION DETAIL INDICATOR INDICATOR

GENERAL NOTES

HEIGHT OF INTERIOR STUD AND CMU PARTITIONS ARE FROM FLOOR TO THE UNDERSIDE OF ROOF DECK UNLESS OTHERWISE NOTED. PROVIDE DEFLECTION HEADS AT TOP OF WALL (TYPICAL).

NOT ALL EQUIPMENT IS SHOWN FOR CLARITY. REFER TO THE APPROPRIATE DISCIPLINE SHEETS FOR SPECIFIC EQUIPMENT LAYOUT AND OTHER REQUIREMENTS

SEE CIVIL SHEETS FOR SIDEWALK, ROAD PAVING AND FINISH GRADE ELEVATIONS.

SEE STRUCTURAL SHEETS FOR SIZE AND LOCATION OF CONCRETE PADS, TRENCHES, VAULTS,

SEE STRUCTURAL SHEETS FOR CONCRETE AND MASONRY REINFORCEMENT

ALL INTERIOR CMU WALLS SHALL BE PROVIDED WITH INSULATION INSERTS (SEE SPEC 04200)

PATCH AND REPAIR ANY MATERIALS OR SURFACES DAMAGED DURING THE CONSTRUCTION PROCESS TO MATCH THE EXISTING ADJACENT SURFACES.

ALL ITEMS TO BE NEW UNLESS SPECIFICALLY NOTED OTHERWISE.

ALL JOINTS, VOIDS AND PENETRATIONS THROUGH FIRE-RATED WALL SYSTEMS ARE TO BE FILLED/SEALED WITH UL APPROVED FIRESAFING/FIRESTOPPING MATERIALS TO ACHIEVE THE REQUIRED FIRE-RATING (REFER TO CODE DRAWINGS FOR LOCATIONS).

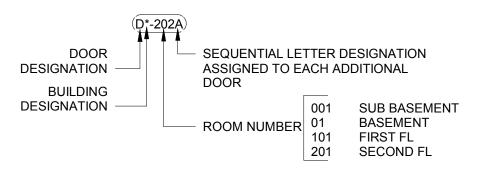
DO NOT SCALE FROM THE DRAWINGS

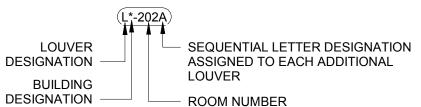
NOTIFY ARCHITECT IF CONSTRUCTION DOCUMENTS DIFFER FROM ACTUAL FIELD CONDITIONS PRIOR TO FABRICATION OR NEW CONSTRUCTION

THIS DRAWING CONTAINS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS. NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS.

OPENINGS

USUALLY LABELED IN PLAN VIEW; HOWEVER, OPENINGS NOT SHOWN IN PLAN ARE LABELED ON ELEVATIONS





_		Code Summary	F. L
Owner:	Town of Harwich, MA		February, 2019
Facilty Name:	Sewerage Works Improvements	Location:	Harwich, MA
Project Name:	Phase 2	Architect of Record:	CDM Smith
Building Name:	Electrical Building	New or Existing	NEW
	Applicable Ordinan	ces, Codes, and Standard	
Building Code	780 CMR 9th Edition (IBC 2015 with Massachu	setts Amendments)	
Fire / Life Safety Code	527 CMR 1.00 Massachusetts Comprehensive	Fire Safety Code (NFPA 1-2015 w/	Massachusetts Amendments)
Accessibility Code	521 CMR Architectural Access Regulations / (s	ee accessibility ADAAG 2010)	
Energy Code	2015 IECC with Massachusetts Amendments		
Other	MGL 148 26G/NFPA 110		
		pancy Classification	
Mixed Use (y/n)	See Section 508	NO	
Section 312	Utility and Miscellaneous	Group U	Non-Occupied Building
	General Buildin	ng Heights and Areas	
	Allowable Height and Building Areas	Allowable	Proposed
Table 503	Building Height in Feet	55 feet	15 feet
Table 303	Building Height in Stories	2 Stories	1 Story
	Building Area in Square Feet	8500 SF	270 Gross
Section 504.2	Height - Automatic Sprinkler Increase		NO
505.2 & 505.3	Mezzanines or Equipment Platforms		NO
Section 506	Area Modifications		NO
506.3	Automatic Sprinkler System Increase		NO
	Types o	f Construction	
602.2	Construction Classification	Type II B (Non-	Combustible, Unprotected)
	Fire Resista	nce Rating Requirements for Buildir	ng Elements
	Building Element	Req'd Rating	Remarks
	Primary Structural Frame	0 hours	
	Bearing Walls Exterior	0 hours	
Table 601	Bearing Walls Interior	0 hours	
	Non Bearing Exterior Walls & Partitions	Se	ee Table 602
	Non Bearing Interior Walls & Partitions	0 hours	
	Floor Constr & Assoc Secondary Members	0 hours	
	Roof Constr-& Assoc Secondary Members	0 hours	

Fire Resistance Rating Requirements for Exterior Walls based on Fire Separation Distance

Reg'd Rating (hours)

0

Not Required / Not Provided

Proposed (hours)

NA

NA

Building Code Summary

Section 906	Portable Fire Extinguishers	As required by the Fire Code and NFPA
Section 907	Fire Alarm and Detection Systems	As required by the Fire Code and NFPA
		Accessibility
Chapter 11	1103.2.9 Equipment Spaces	Equipment spaces frequented by personnel only, not required to comply.
ADAAG	203.5 Machinery Spaces	Spaces frequented only by service personnel for maintenance, repair, or occasional monitoring of equipment shall not be required to comply with these requirements or to be on an accessible route. Machinery spaces include mechanical or electrical equipment rooms; water or sewage treatment pump rooms and stations

Fire Protection Systems

Fire Separation Distance (feet)

Automatic Sprinkler Systems

Table 602

Section 903.2

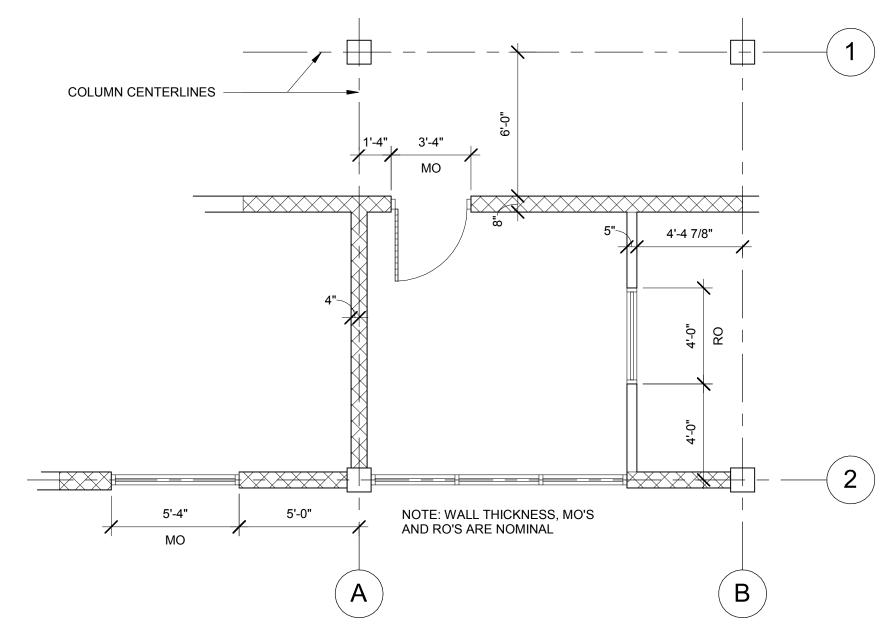
X < 5

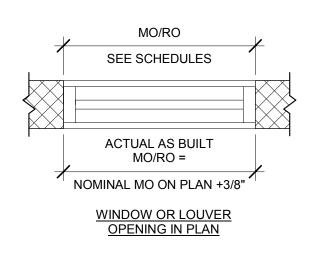
5 ≤ X < 10

10 ≤ X < 30

X ≥ 30

DIMENSIONING SYSTEM







					DESIGNED BY:	B. GIORGI
					DRAWN BY:	E. ROSA
					SHEET CHK'D BY:	B. GIORGI
					CROSS CHK'D BY:	D. MARTIN
					APPROVED BY:	B. GIORGI
REV. NO	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 2019

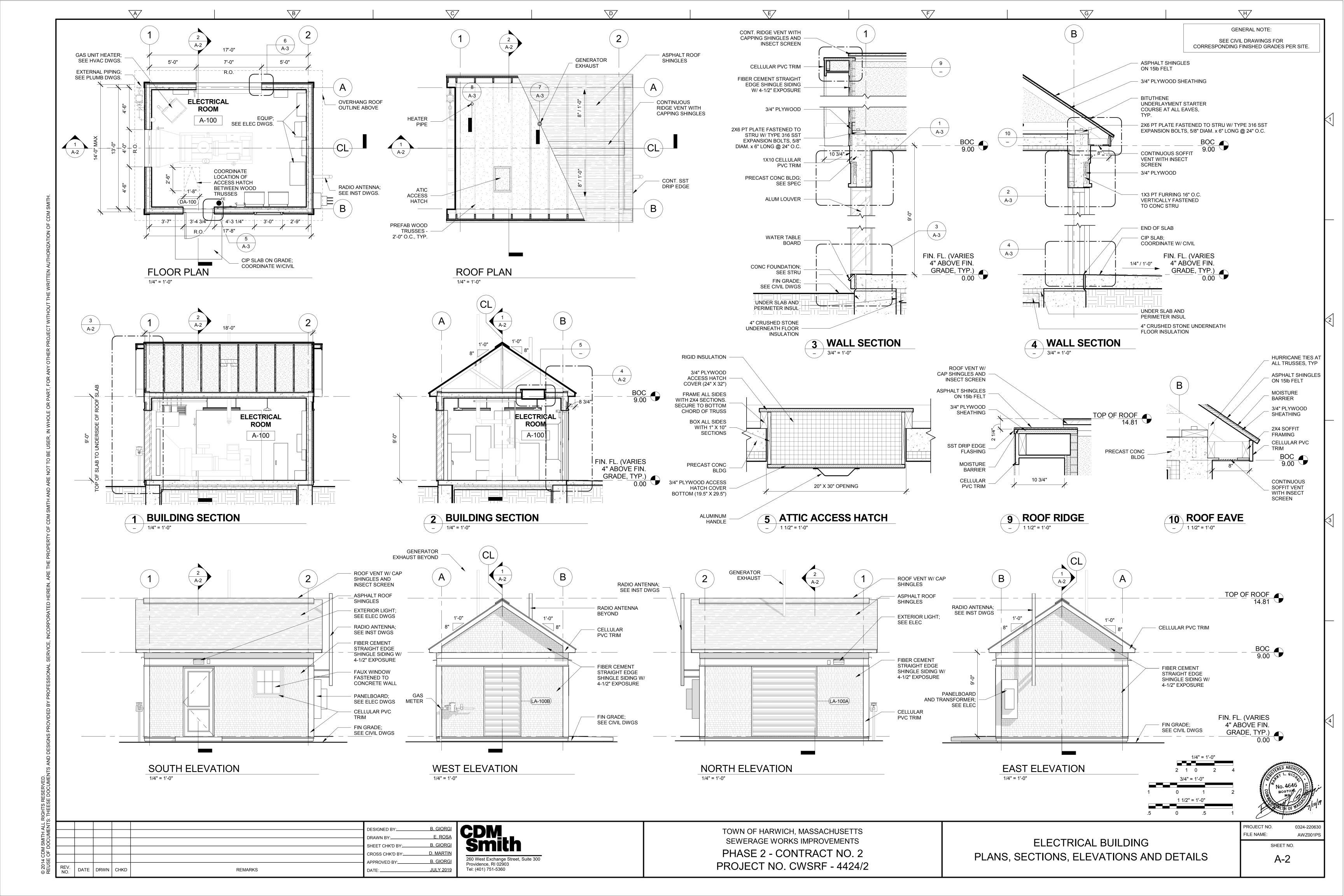
ADDITIONAL REQUIREMENTS

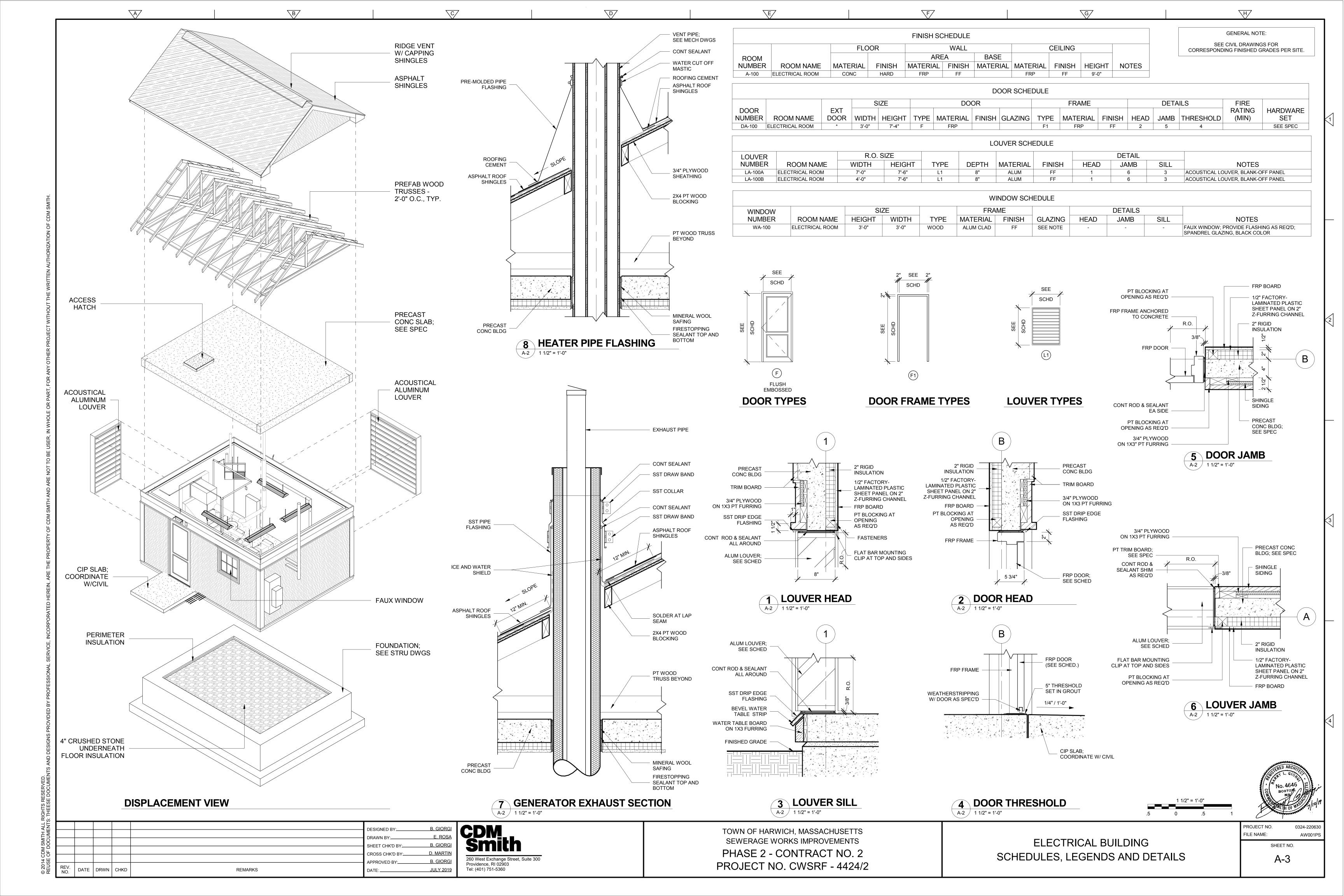
GIORGI	CDM
. ROSA	
<u>GIORGI</u>	SMITH
<u>MARTIN</u>	
<u>GIORGI</u>	260 West Exchange Street, Suite 300 Providence, RI 02903
LY 2019	Tel: (401) 751-5360

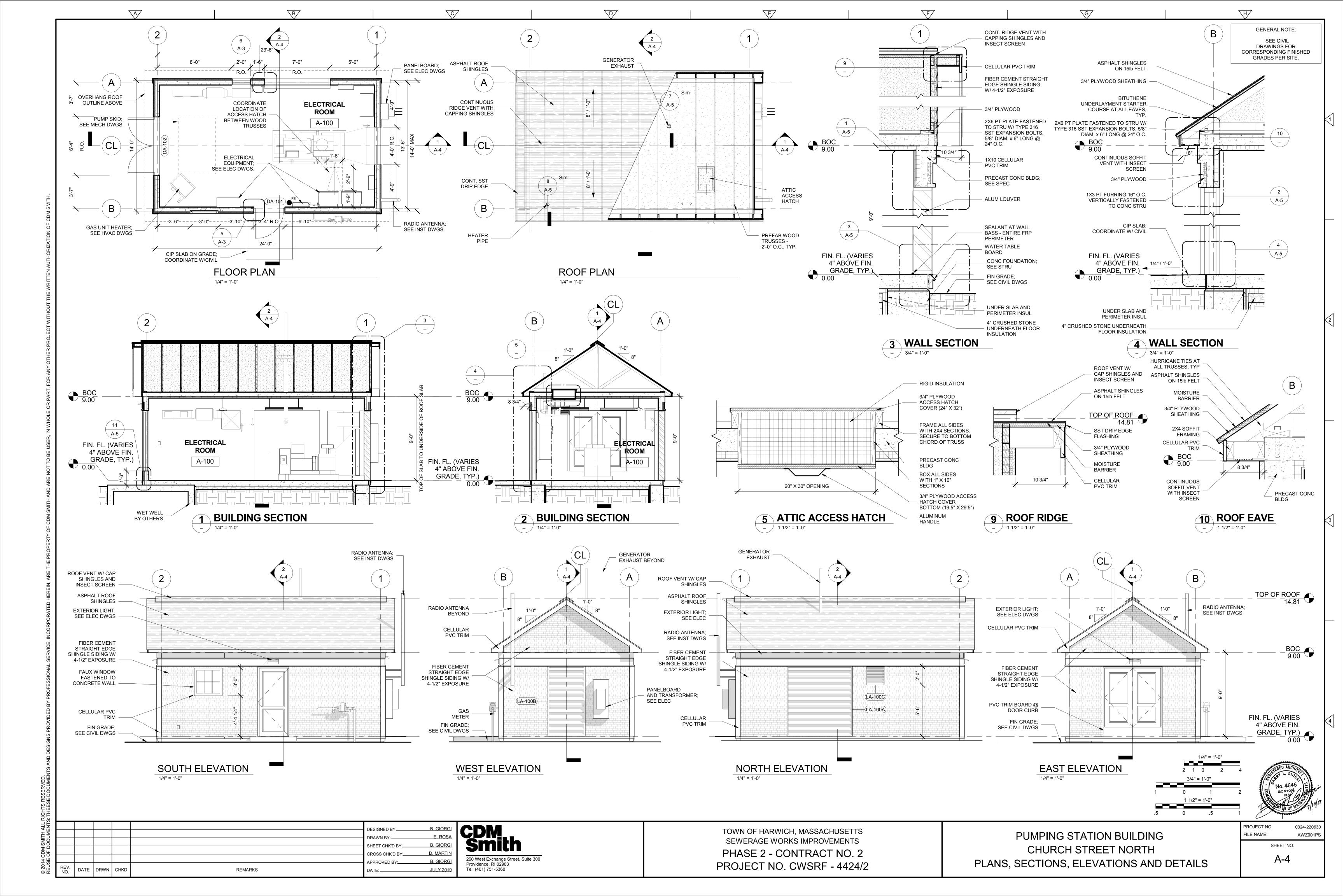
TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2

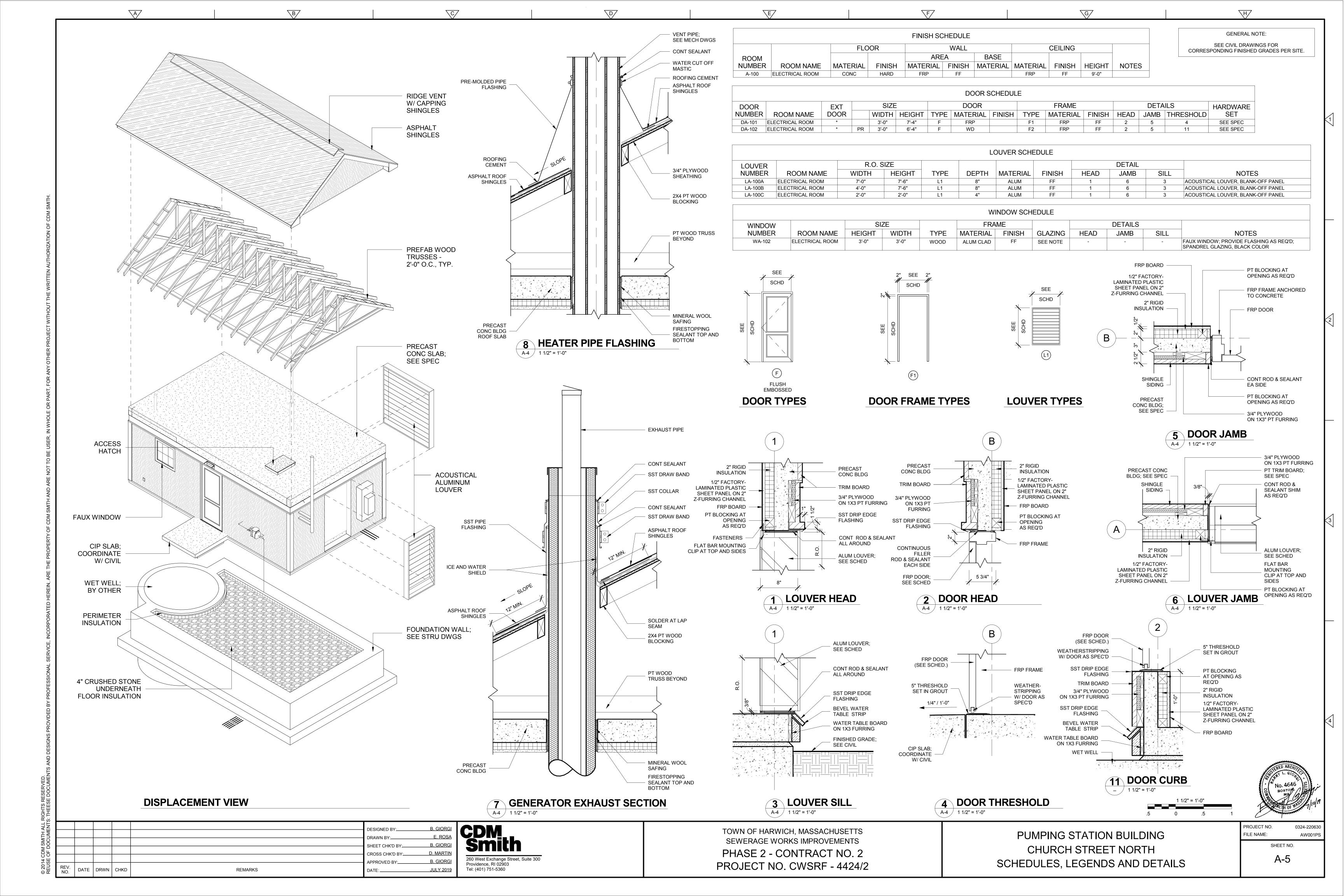
ARCHITECTURAL ABBREVIATIONS, SYMBOLS AND CODE SUMMARY

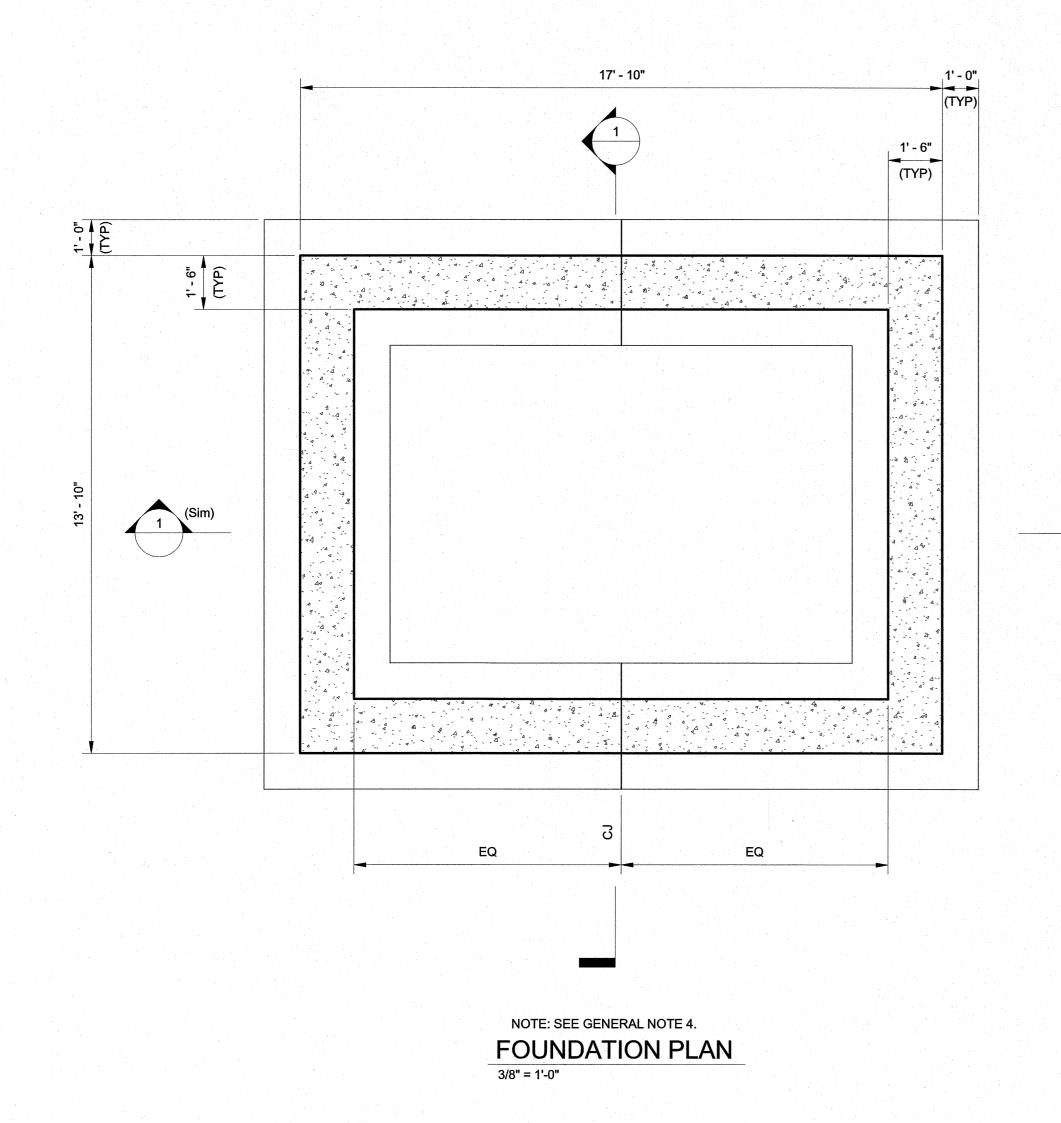
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
PROJECT NO.	0324-220630
ILE NAME:	AW001PS
SHEET	NO.
A-	1

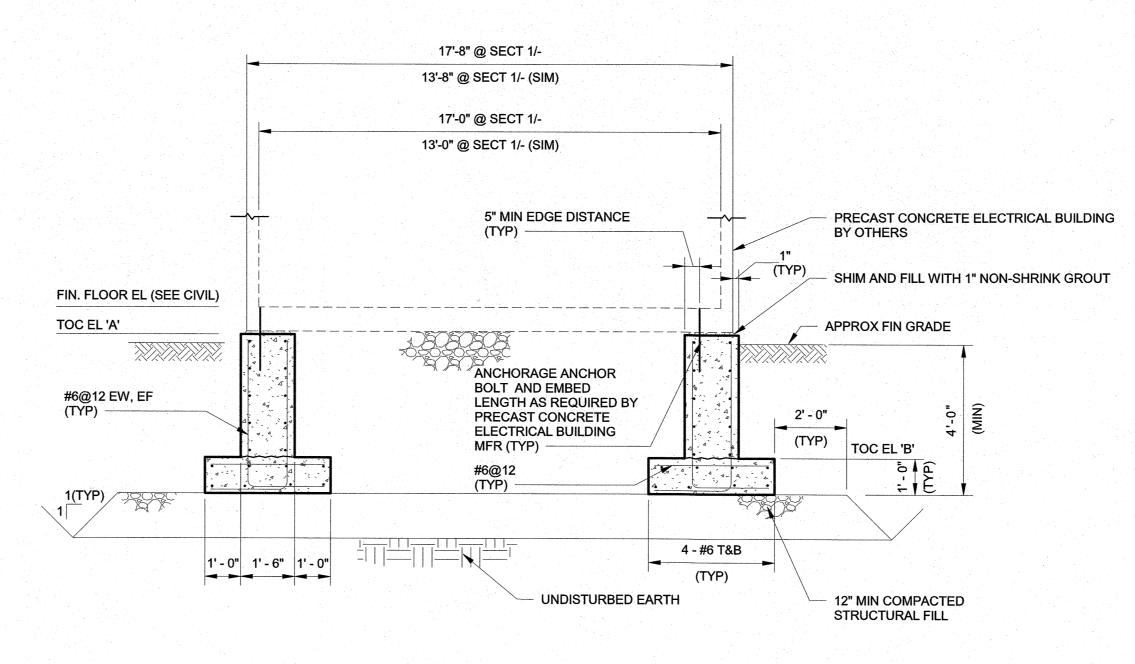












NOTE: SEE GENERAL NOTE 4.

1 SECTION
- 3/8" = 1'-0"

GEOTECHNICAL NOTES:

PRECAST CONCRETE ELECTRICAL BUILDING: MAXIMUM ALLOWABLE BEARING PRESSURE: 4 KSF

GENERAL NOTES:

- 1. FOR ORIENTATION AND LOCATION OF PRECAST CONCRETE ELECTRICAL BUILDING FOUNDATION REFERENCE CIVIL DRAWINGS.
- ALL STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE CIVIL, ARCHITECTURAL, MECHANICAL, ELECTRICAL, HEATING AND VENTILATING, PLUMBING DRAWINGS, SHOP DRAWINGS AND SPECIFICATIONS.
- 3. SEE CIVIL, ARCHITECTURAL, MECHANICAL, HEATING AND VENTILATING, PLUMBING, AND ELECTRICAL DRAWINGS FOR REGLETS, PIPE SLEEVES, CONDUITS OR OTHER ITEMS TO BE EMBEDDED OR PASSED THROUGH THE CONCRETE.
- 4. PRECAST CONCRETE ELECTRICAL BUILDING FOUNDATION SHALL NOT BE FABRICATED OR CONSTRUCTED UNTIL SUBMITTAL OF THE BUILDING EXTERIOR DIMENSIONS, FLOOR SLAB THICKNESS, ANCHORAGE LOCATIONS AND FOUNDATION REACTIONS HAVE BEEN REVIEWED AND ADJUSTMENTS TO THE FOUNDATION DESIGN HAVE BEEN COMPLETED, IF REQUIRED, BY THE ENGINEER.
- 5. NO BACKFILL SHALL BE PLACED AGAINST WALLS UNTIL WALLS HAVE ATTAINED DESIGN STRENGTH.
- 6. CJ INDICATES LOCATION OF CONSTRUCTION JOINT.

PUMP STATION	EL 'A'	EL 'B'
SUGAR HILL DRIVE	12.11	9.00
CHURCH STREET SOUTH	34.40	31.00

NOTE: SEE SHEET S-2 FOR CHURCH STREET NORTH **FOUNDATION**

REV. DATE DRWN CHKD REMARKS

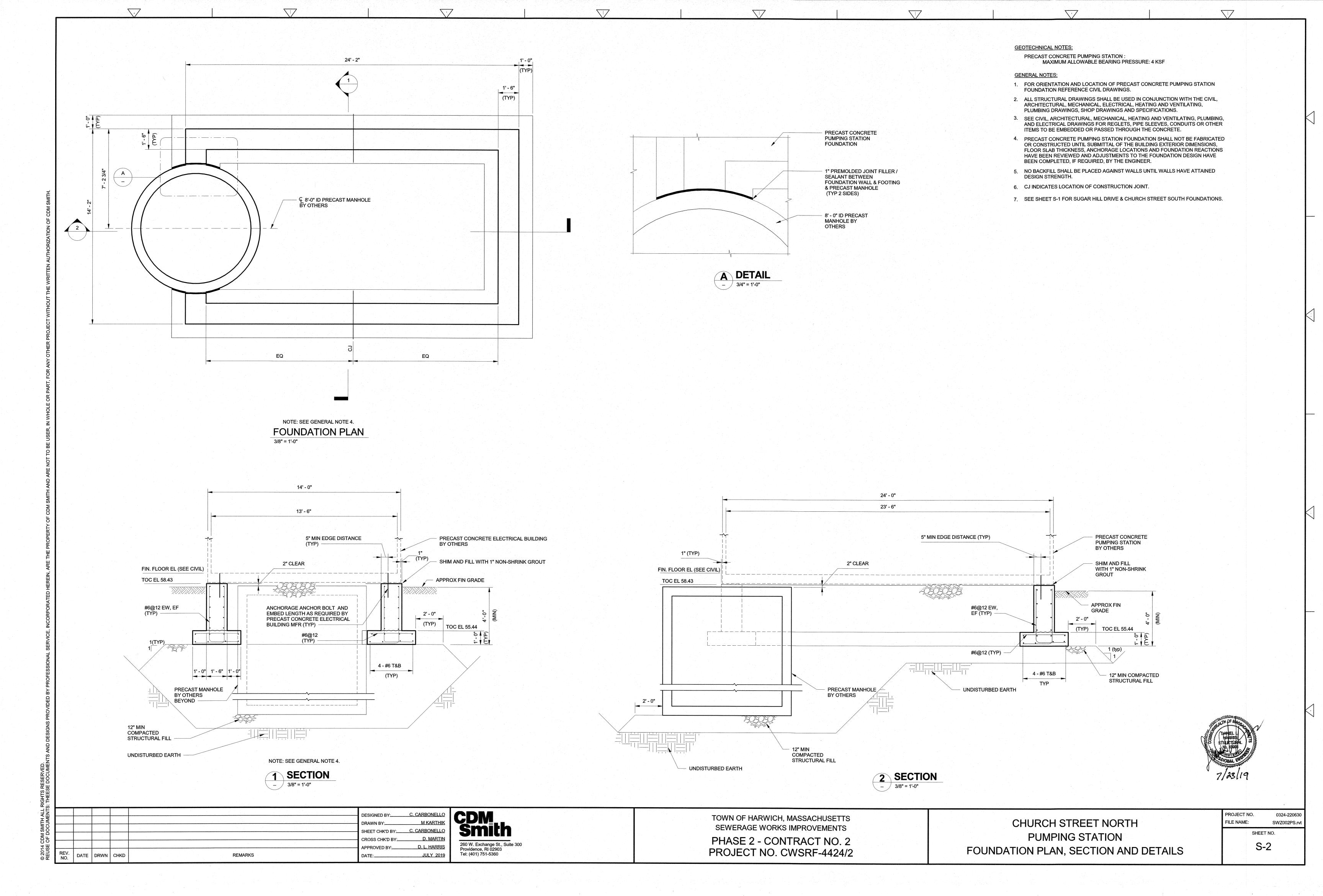


TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS

PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF-4424/2

ELECTRICAL BUILDING FOUNDATION PLAN AND SECTION PROJECT NO. FILE NAME: SWZ001PS.rvt SHEET NO.

S-1



- NOTES:

 1. THIS DRAWING IS PROVIDED TO OUTLINE THE MINIMUM LEVEL OF SPECIAL INSPECTIONS DURING CONSTRUCTION TO ENSURE CONFORMANCE TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. A STATEMENT OF SPECIAL INSPECTIONS WILL BE PREPARED BY A REGISTERED DESIGN PROFESSIONAL AND SUBMITTED WITH THE BUILDING PERMIT APPLICATION.
- 2. SPECIAL INSPECTIONS WILL BE CONDUCTED IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH IN CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE (IBC) AND CHAPTER 17 OF THE MASSACHUSETTS STATE BUILDING CODE (MSBC).
- 3. IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE, THE OWNER WILL PROVIDE AN APPROVED AGENCY OR AGENCIES, INDEPENDENT FROM THE CONTRACTOR AND EMPLOYING QUALIFIED PERSONNEL TO PERFORM SPECIAL INSPECTIONS IDENTIFIED IN THE STATEMENT OF SPECIAL INSPECTIONS. THE APPROVED AGENCY WILL FURNISH INSPECTION REPORTS TO THE DP, RC AND BUILDING OFFICIAL.
- 4. SPECIAL INSPECTIONS SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR QUALITY CONTROL OF THE WORK OR FOR CONFORMANCE TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. DETECTION, OR FAILURE TO DETECT, DEFECTS IN THE WORK SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY TO CORRECT ALL DEFECTS IN THE WORK, WHETHER DETECTED OR NOT, AND OF RESPONSIBILITY FOR CONFORMANCE TO THE REQUIREMENTS OF
- 5. REMOVE AND REPLACE, OR REPAIR, DEFECTS IN THE WORK AND WORK NOT IN CONFORMANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL BEAR THE COSTS FOR THE INSPECTION OF ANY REPLACED OR REPAIRED PORTIONS OF THE WORK.
- 6. CONTRACTOR SHALL COOPERATE WITH SPECIAL INSPECTIONS BY PROVIDING SUFFICIENT NOTICE FOR THE SCHEDULING OF PERSONNEL AND BY ALLOWING FREE AND SAFE ACCESS TO THE WORK FOR OBSERVATION, VERIFICATION, SAMPLING AND INSPECTION. PROVIDE AND PERMIT THE USE OF LADDERS, SCAFFOLDING, INCIDENTAL EQUIPMENT, AND SAFETY EQUIPMENT AS MAY BE REQUIRED TO CONDUCT SPECIAL INSPECTIONS. ALL SUCH PROVISIONS FOR FREE AND SAFE ACCESS AND EQUIPMENT SHALL BE SAFE, IN GOOD WORKING CONDITION, AND ERECTED, MAINTAINED, AND HANDLED BY QUALIFIED PERSONNEL.
- 7. SPECIAL INSPECTIONS DO NOT APPLY TO CONTRACTOR'S EQUIPMENT, TEMPORARY STRUCTURES USED FOR CONSTRUCTION, MEANS AND METHODS OF CONSTRUCTION, OR SITE SAFETY. CONTRACTOR SHALL REMAIN RESPONSIBLE FOR ADEQUACY AND SAFETY OF EQUIPMENT, TEMPORARY STRUCTURES USED FOR CONSTRUCTION, MEANS AND METHODS OF CONSTRUCTION AND SITE SAFETY.

VERIFICATION AND INSPECTION	IBC REFERENCE	INSPECTION FREQUENCY		REFERENCE	DEMARKS
		CONTINUOUS	PERIODIC	STANDARD	REMARKS
VERIFY MATERIALS BELOW ALL FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY	1705.6		×	CONTRACT DOCUMENTS AND GEOTECHNICAL REPORT	REFER TO THE FOLLOWING TABLES FOR ADDITIONAL RELATED SPECIAL INSPECTIONS
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL			×		
PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS			×		
VERIFY USE OF PROPER MATERIALS, DENSITIES, AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL		X			
PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY			×		

TABLE 2 - REQUIRED SI		CTIONS AND TE C, TABLE 1705.3		NCRETE
	IBC REFERENCE	INSPECTION FREQUENCY		
VERIFICATION AND INSPECTION		CONTINUOUS	PERIODIC	REFERENCE
INSPECT REINFORCEMENT AND VERIFY PLACEMENT	1705.3 1908.4		×	ACI 318: CH 20, 25.2, 25.3, 26.5.1-26.5.3
VERIFYING USE OF REQUIRED DESIGN MIX	1705.3 1904.1 1904.2 1908.2 1908.3		Х	ACI 318: CH 19, 26.4.3, 26.4.4
PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	1705.3 1908.10	×		ACI 318: 26.4.5, 26.12 ASTM C172 ASTM C31
INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	1705.3 1908.6 1908.7 1908.8	X		ACI 318: 26.4.5
VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	1705.3 1908.9		×	ACI 318: 26.4.7 -26.4.9
INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED	1705.3		×	ACI 318: SECTION 26.10.1(b)

CAST IN PLACE CONCRETE NOTES:

1. REINFORCED CONCRETE SHALL COMPLY WITH ACI 318.

2. MINIMUM CONCRETE STRENGTH AT 28 DAYS: STRUCTURAL CONCRETE

fc = 4000 psi

3. REINFORCING STEEL SHALL BE NEW STEEL CONFORMING TO ASTM SPECIFICATION A615 GRADE 60.

4. REINFORCING STEEL FABRICATION SHALL BE IN COMPLIANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE.

5. REINFORCING STEEL SHALL HAVE THE FOLLOWING MINIMUM

CLEAR CONCRETE COVER UNLESS OTHERWISE NOTED:

CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: CONCRETE SURFACES IN CONTACT WITH SOIL,

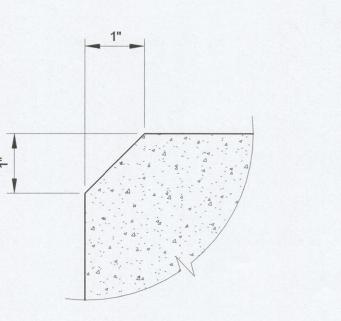
2 IN. OR EXPOSED TO WEATHER:

6. SPLICED BARS SHALL HAVE A CLASS B TENSION LAP SPLICE OF 2'-6" (MIN). 7. REINFORCING BARS TO EXTEND 12 BAR DIAMETERS BUT NOT LESS THAN

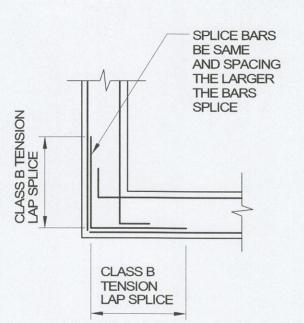
12" BEYOND BEND UNLESS OTHERWISE NOTED. 8. CONSTRUCTION JOINTS SHALL NOT BE PLACED AT LOCATIONS OTHER THAN

THOSE SHOWN ON THE DRAWINGS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.

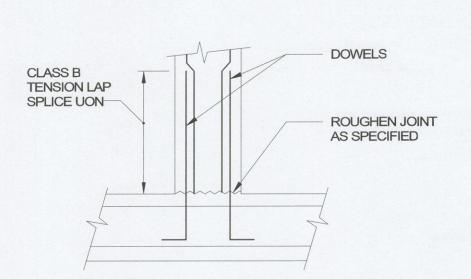
9. ALL EXPOSED CORNERS OF CONCRETE TO HAVE 1" MINIMUM CHAMFER UNLESS OTHERWISE NOTED.







WALL REINFORCEMENT DETAIL



AS SPECIFIED

CLASS B

TENSION LAP

SPLICE UON

ROUGHEN JOINT

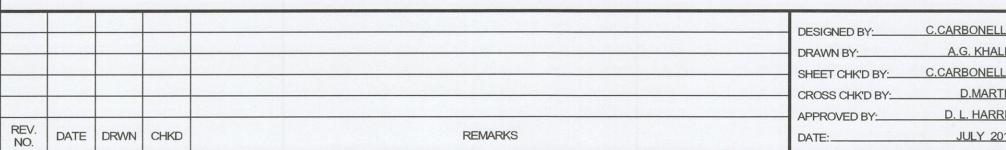
NOTE: DETAIL SHOWN FOR WALLS; SLABS SIMILAR

WALL CONSTRUCTION JOINT AT SLAB

CONSTRUCTION JOINT

3 IN.

VERIFICATION AND INSPECTION	IBC REFERENCE	INSPECTION FREQUENCY		DEFEDENCE
		CONTINUOUS	PERIODIC	REFERENCE
NSPECT REINFORCEMENT AND VERIFY PLACEMENT	1705.3 1908.4		×	ACI 318: CH 20, 25.2, 25.3, 26.5.1-26.5
VERIFYING USE OF REQUIRED DESIGN MIX	1705.3 1904.1 1904.2 1908.2 1908.3		Х	ACI 318: CH 19, 26.4.3, 26.4.4
PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	1705.3 1908.10	×		ACI 318: 26.4.5, 26.12 ASTM C172 ASTM C31
INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	1705.3 1908.6 1908.7 1908.8	×		ACI 318: 26.4.5
VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	1705.3 1908.9		X	ACI 318: 26.4.7 -26.4.9
INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED	1705.3		x	ACI 318: SECTION 26.10.1(b)





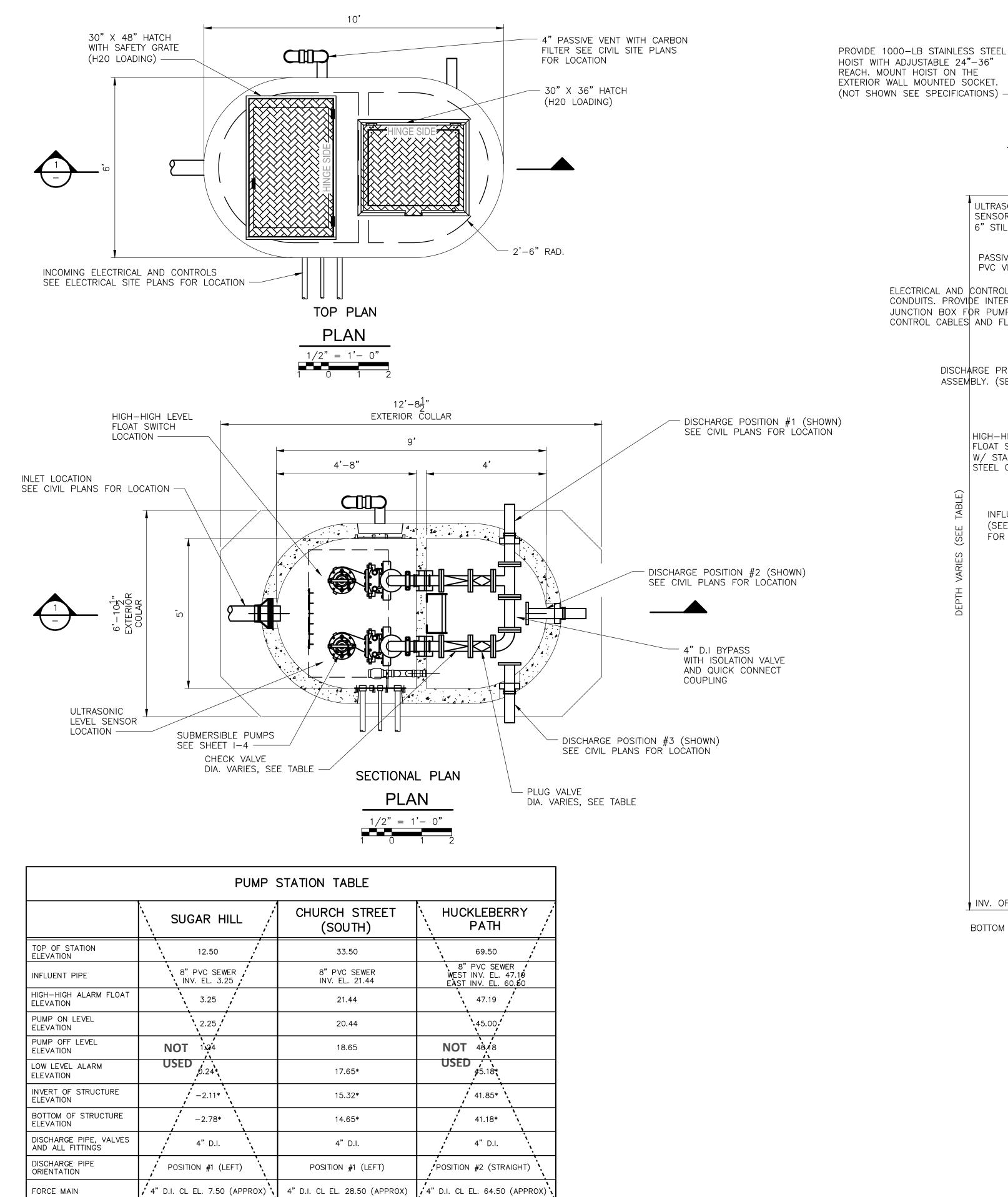
TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF-4424/2

STANDARD DETAILS AND SPECIAL INSPECTION NOTES

Destina L. Mossiess SIRLICTURA My SINS TORNAL TO TORNAL TO	119
PPO JECT NO	01

FILE NAME: SHEET NO.

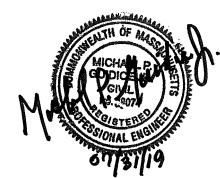
S-3



REACH. MOUNT HOIST ON THE EXTERIOR WALL MOUNTED SOCKET (NOT SHOWN SEE SPECIFICATIONS) 4" CARBON CANISTER WITH CARBON REFILL 4" SCH 80 6" WALLS PVC VENT - HATCH DRAIN PIPING TOP OF STATION ULTRASONIC LEVEL SENSOR IN 6" STILLING WELL PASSIVE 4" SCH 80 PVC VENT -4" D.I BYPASS ELECTRICAL AND CONTROL WITH ISOLATION VALVE CONDUITS. PROVIDE INTERNAL AND QUICK CONNECT JUNCTION BOX FOR PUMP POWER/ COUPLING CONTROL CABLES AND FLOAT SWITCH — PRECAST CONCRETE INTEGRAL VALVE VAULT STRUCTURE WITH SLOPED FLOOR TO DRAIN PIPING DISCHARGE PRESSURE GAUGE STAINLESS STEEL ASSEMBLY. (SET OF 2) PIPE SUPPORTS AS REQUIRED. - ALUMINUM WALL MOUNTED HIGH-HIGH LEVEL LADDER WITH LADDER UP ACCESS ASSIST ASSEMBLY FLOAT SWITCH W/ STAINLESS STEEL CHAIN 3" PVC DRAIN WITH RED VALVE TIDEFLEX TF-2 CHECK VALVE OR EQUAL AT WET WELL INFLUENT PIPE (SEE TABLE FOR SIZE) -— PRECAST CONCRETE WET WELL WITH INTEGRAL VALVE VAULT STRUCTURE DISCHARGE PIPE. DIAMETER VARIES SEE TABLE THIS SHEET. 2" STAINLESS STEEL GUIDE RAILS INV. OF STRUCTURE ELEV. BOTTOM OF STATION 12" COMPACTED SCREENED GRAVEL

1. THE PURPOSE OF THIS SCHEMATIC IS TO PROVIDE A GENERAL CONCEPTUAL DESIGN LAYOUT OF THE PIPING, FITTINGS, AND EQUIPMENT FOR THE PREFABRICATED PUMP STATION INCLUDING THE VALVE VAULT AND WET WELL AS SPECIFIED IN SECTION 333254. THESE DRAWINGS ARE INTENDED TO GIVE A GENERAL DESCRIPTION OF WHAT IS REQUIRED, BUT DO NOT PURPORT TO COVER ALL OF THE DETAILS WHICH WILL VARY IN ACCORDANCE WITH THE REQUIREMENTS OF THE EQUIPMENT AS OFFERED. THE PUMPING STATION MANUFACTURER SHALL STRICTLY ADHERE TO THE SPECIFICATIONS WHEN PREPARING AND SUBMITTING A DESIGN FOR THE PREFABRICATED BOOSTER PUMPING STATION AS SPECIFIED IN SECTION 333254. THIS SCHEMATIC IS FOR ILLUSTRATIVE PURPOSES TO CONVEY THE DESIRED STATION LAYOUT BUT IS NOT INTENDED TO LIMIT AN INNOVATIVE

- 2. THE CONTRACTOR AND PUMPING STATION MANUFACTURER SHALL PREPARE AND SUBMIT TO THE ENGINEER SUBMITTALS AS REQUIRED IN SECTION 333254 SHOWING ALL FEATURES OF THE PUMPING STATION AND PROCESS EQUIPMENT. THE EQUIPMENT WITHIN THE PREFABRICATED PUMPING STATION CAPSULE PROVIDED BY THE STATION MANUFACTURER SHALL BE AS SPECIFIED IN SECTION 333254. THESE SUBMITTALS SHALL INCLUDE BUT NOT BE LIMITED TO PLANS, SECTIONS, DETAILS, SCHEMATICS, AND CUT SHEETS OF ALL APPURTENANCES AND EQUIPMENT REQUIRED. THE CONTRACTOR SHALL ASSUME ALL COSTS AND RESPONSIBILITY OF SATISFACTORILY COMPLYING WITH THE REQUIREMENTS OF THE SPECIFICATIONS.
- 3. THE PUMPING STATION MANUFACTURER IS RESPONSIBLE FOR DETERMINING THE NECESSARY SIZES OF ALL EQUIPMENT AND PIPING AS WELL AS DIMENSIONS OF THE CAPSULE LAYOUT AS SPECIFIED. EXACT DIMENSIONS AND SIZES OF EQUIPMENT SHALL BE DETERMINED BY THE STATION MANUFACTURER IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS FOR THE EQUIPMENT FURNISHED BY HIM/HER.
- 4. THE STATION MANUFACTURER IS RESPONSIBLE FOR INSTALLING ALL EQUIPMENT SHOWN PER NEC STANDARDS, STATE AND LOCAL BUILDING CODES.
- 5. DIELECTRIC COUPLINGS, FLANGES OR UNIONS SHALL BE INSTALLED AT ALL CONNECTIONS OF COPPER PIPE TO OTHER TYPES OF METALLIC PIPING.
- 6. UNLESS OTHERWISE DETAILED ON THE DRAWINGS, ALL PIPE SUPPORTS SHALL BE DESIGNED, FURNISHED AND INSTALLED BY THE STATION MANUFACTURER AS SPECIFIED. ALL PIPING ADJACENT TO EQUIPMENT, VALVES, COUPLINGS, INSTRUMENT DEVICES AND OTHER APPURTENANCES SHALL BE PROPERLY SUPPORTED AND/OR ANCHORED ACCORDING TO THE STATION MANUFACTURER'S RECOMMENDATIONS.
- 7. REFER TO SPECIFICATION SECTION 333254 FOR DETAILS OF THE PREFABRICATED PUMPING STATION'S REQUIRED INSTRUMENTATION AND ELECTRICAL COMPONENTS THAT MUST BE FURNISHED AND INSTALLED BY THE STATION MANUFACTURER AS PART OF THE PREFABRICATED STATION. REFER TO THE ELECTRICAL AND INSTRUMENTATION DRAWINGS FOR CONNECTION OF THE PREFABRICATED PUMPING STATION TO THE SITE UTILITIES.
- 8. EXTERIOR PIPING IS SHOW ON THE CIVIL DRAWINGS.



NOTES:										
1.	ELEVATIONS	NOTED	WITH *	' ARE	SUBJEC	OT TO	CHANGE	BASED	ON	
	CONTRACTO		MITTED	FOLUE	MICKIT A	NID CL	IALL DE	A D D D O V	ED DV	TI

- CONTRACTORS SUBMITTED EQUIPMENT AND SHALL BE APPROVED BY THE ENGINEER.
- 2. CONFIRM ACCESS HATCH SIZE WITH PUMP MANUFACTURER FOR REMOVAL/MAINTENANCE

					DESIGNED BY:	D. MARTIN
					DRAWN BY:	D. MARTIN
					SHEET CHK'D BY:	D. BORGES
					CROSS CHK'D BY:	J. DOHERTY
					APPROVED BY:	M. GUIDICE
REV.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 2019

CDM Smith
260 West Exchange Street, Suite 300 Providence, RI 02903 Tel: (401) 751-5360

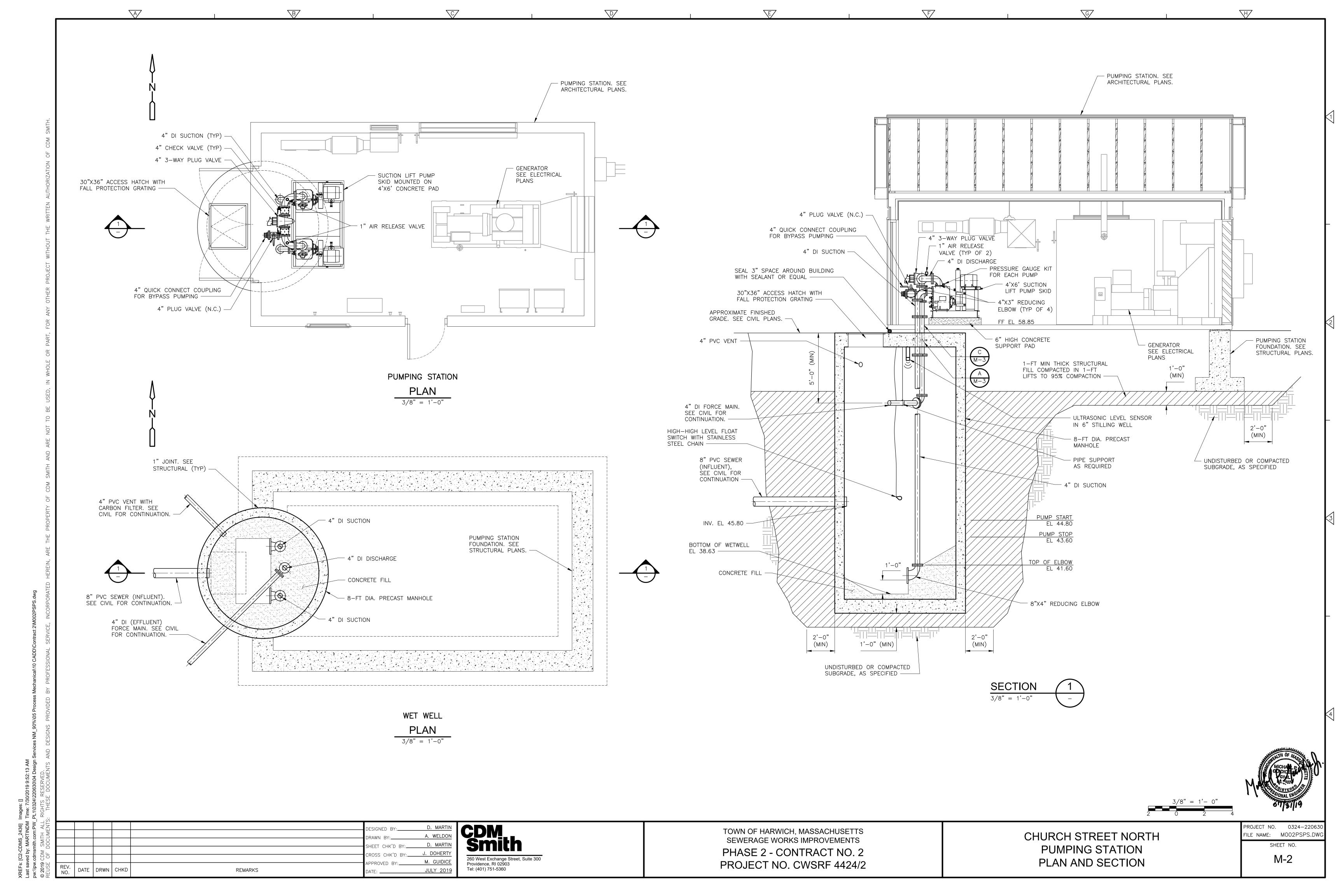
TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF 4424/2

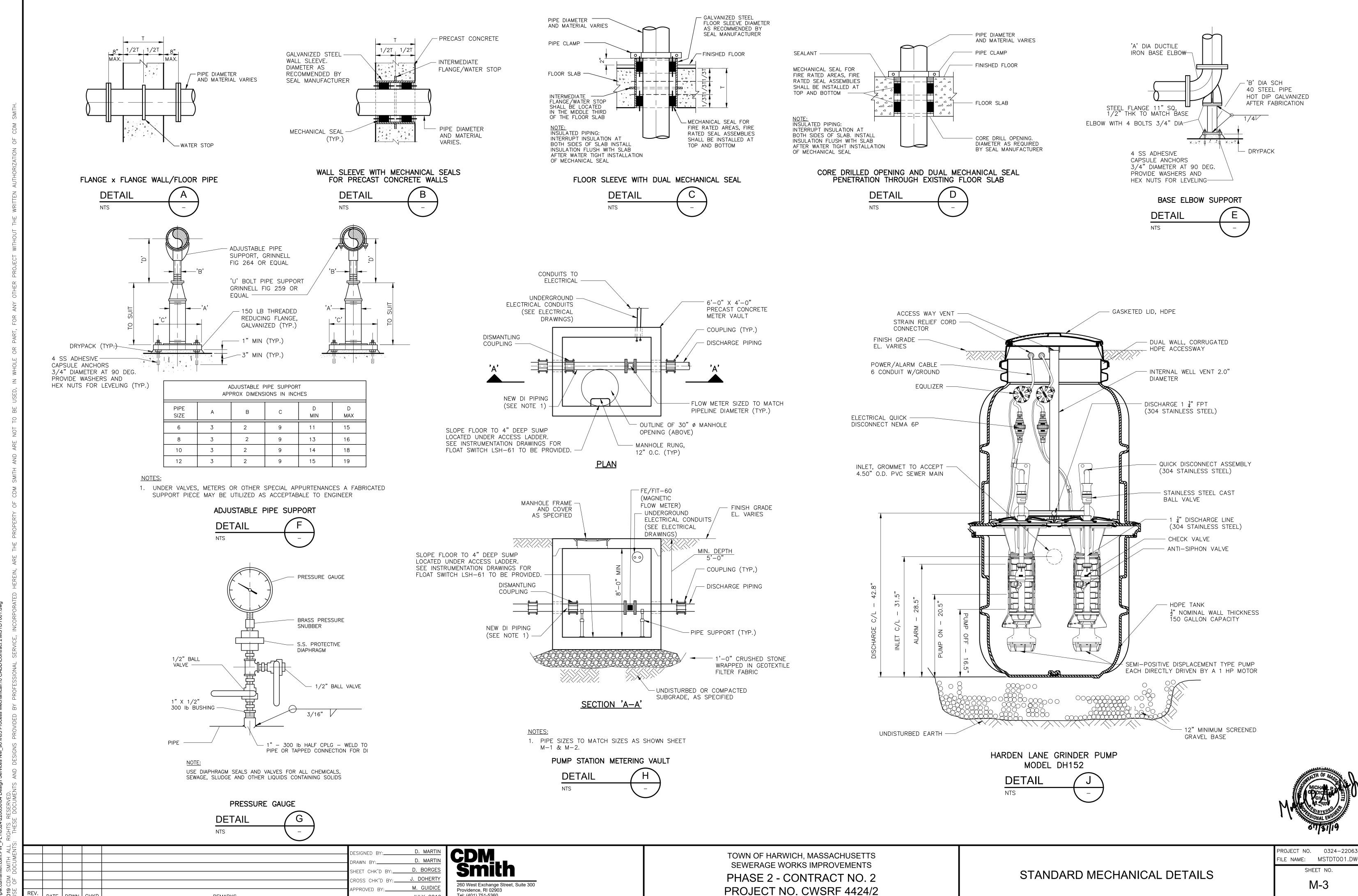
PUMPING STATION VALVE VAULT AND WET WELL PLANS AND SECTIONS

PROJECT NO. 0324-22063 FILE NAME: MPSPL200.DV SHEET NO.

M-1

SECTION





Tel: (401) 751-5360

JULY 2019

DATE DRWN CHKD

REMARKS

CAP **BOTTOM CONNECTION** MANUAL VOLUME DAMPER TOP CONNECTION $\overline{}$ ELBOW UP COMBINATION **ELBOW DOWN** FIRE/SMOKE DAMPER -1.5(1-1/2HR RATED) REDUCER CONCENTRIC REDUCER ECCENTRIC STRAIGHT INVERT MOTOR OPERATED REDUCER ECCENTRIC DAMPER STRAIGHT CROWN TEE DIRECTION OF FLOW TEE UP DUCT SIZE-FIRST TEE DOWN 12X20 NUMBER IS SIDE SHOWN **UNION SCREWED** DUCT SECTION, POSITIVE PRESS, FIRST NUMBER IS TOP UNION FLANGED **SPECIALITIES** DUCT SECTION. **NEGATIVE PRESS.** FIRST NUMBER IS TOP ALIGNMENT GUIDE **ANCHOR ELEVATION CHANGE** (R) RISE, (D) DROP **EXPANSION JOINT** ACCESS DOOR HUMIDISTAT PRESSURE GAGE AND COCK FLEXIBLE CONNECTION STRAINER FLEXIBLE DUCT THERMOMETER PRESS. DIFF. W/ **INDICATOR LIGHT &** DUCT LINING REMOTE ALARM @ ATC **THERMOSTAT** TRANSITION PRESSURE SWITCH 20X12 DUCK MOUNTED **TURNING VANES** SMOKE DETECTOR TRAP MONITOR STEAM TRAP (HP) STEAM TRAP (LP) SIDE MOUNTED 12X20 FROM SPACE BOTTOM MOUNTED TO SPACE DEVICE 1" UC 60 CFM CHILLED WATER SUPPLY/RETURN UNDERCUT DOOR CONDENSER WATER 20X12 LD OR DG SUPPLY/RETURN 200 CFM LOUVER DOOR OR ——HPS—— HIGH PRESSURE STEAM DOOR GRILLE ——LPS—— LOW PRESSURE STEAM WIRELESS CONNECTION (SHOWN ON **CONTROLS ARCHITECTURE SHEETS)** WIRELESS SERVER. X=CHANNEL (PROVIDE 110V OUTLET)

SYMBOLS DUCT

WORK

SYMBOLS

PIPE FITTINGS

GENERAL NOTES

HVAC EQUIPMENT DIMENSIONS, LOCATIONS, DUCTWORK AND PIPING SYSTEM LAYOUTS ARE BASED ON EQUIPMENT SELECTED BY THE ENGINEER. IF THE CONTRACTOR PROPOSES TO FURNISH EQUIPMENT THAT REQUIRES AN ARRANGEMENT OR SPACE DIFFERING FROM THAT INDICATED ON THE DRAWINGS OR SPECIFIED, THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE ENGINEER FOR APPROVAL, DETAILED ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING, INSTRUMENTATION, HVAC AND ELECTRICAL DRAWINGS AND EQUIPMENT LISTS SHOWING ALL NECESSARY CHANGES AND EMBODYING ALL FEATURES FOR WHAT HE PROPOSES TO FURNISH. THIS INFORMATION SHALL INCLUDE BUT NOT BE LIMITED TO PLANS, SECTIONS, DETAILS, AND SCHEMATICS OF EQUIPMENT AND ALL APPURTENANCES. ALL SUCH CHANGES IF APPROVED BY THE ENGINEER, SHALL BE AT NO EXTRA COST TO THE OWNER. THE CONTRACTOR SHALL ASSUME THE COST OF, AND THE RESPONSIBILITY FOR SATISFACTORILY ACCOMPLISHING ALL THE NECESSARY CHANGES CORRESPONDING TO THE DIMENSIONS AND CHARACTERISTICS OF THE EQUIPMENT SUBMITTED AND APPROVED BY THE ENGINEER. REFER TO SPECIFICATIONS FOR FURTHER DETAILS. DIELECTRIC COUPLINGS, FLANGES OR UNIONS SHALL BE INSTALLED AT ALL CONNECTIONS OF COPPER PIPE TO OTHER TYPES OF METALLIC PIPING. HVAC DRAWINGS DO NOT SHOW ALL DRAINS, VENTS, OFFSETS AND FITTINGS, SMALL PIPING ETC. REQUIRED FOR THE COMPLETE SYSTEM HVAC PIPING AND DUCTWORK IS SHOWN APPROXIMATELY TO SCALE BUT SOME VALVES AND APPURTENANCES MAY BE OMITTED FOR THE SAKE OF CLARITY. THE CONTRACTOR SHALL FURNISH, INSTALL AND TEST ALL HVAC SYSTEMS SHOWN AND/OR AS DEFINED IN THE SPECIFICATIONS TO ON THE DRAWINGS AND DETAILS TO PROVIDE THE COMPLETE SYSTEM. NOT ALL AND ONLY CERTAIN TYPES OF SUPPORTS ARE SHOWN ON THE HVAC DRAWINGS. UNLESS OTHERWISE DETAILED ON THE DRAWINGS ALL PIPE AND DUCT SUPPORTS SHALL BE DESIGNED, FURNISHED AND INSTALLED BY THE CONTRACTOR AS SPECIFIED AND TO THE APPROVAL OF THE ENGINEER

THIS IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS. NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS.

FLOW STREAM CODE

COND CONDENSATE CHWS CHILLED WATER SUPPLY CHWR CHILLED WATER RETURN CITY WATER CW CWS **CONDENSER WATER SUPPLY** CWR CONDENSER WATER RETURN DRAIN EXHAUST AIR EΑ HIGH PRESSURE CONDENSATE HPC HPS HIGH PRESSURE STEAM LPS LOW PRESSURE STEAM PUMPED DISCHARGE PD SUPPLY AIR

PIPE MATERIAL CODE

COPPER FIBER REINFORCED PLASTIC GALVANIZED STEEL PVC POLYVINYL CHLORIDE **BLACK STEEL**

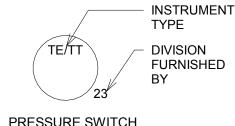
TYPICAL TAG

TYPE OF DEVICE EG 20X20 SIZE 400 CFM CAPACITY

REGISTER GRILLES AND DIFFUSERS

EXHAUST GRILLE EXHAUST REGISTER RETURN GRILLE RETURN REGISTER SUPPLY GRILLE SUPPLY REGISTER

INSTRUMENTATION LEGEND



PRESSURE SWITCH TEMPERATURE ELEMENT (SENSOR) TEMPERATURE SWITCH TS TEMPERATURE TRANSMITTER

MOTOR STARTER

I/O LEGEND

ANALOG INPUT ANALOG OUPUT DIGITAL INPUT DIGITAL OUPUT

I1 INPUT 1 I2 INPUT 2 O1 OUTPUT

R1 RELAY 1 R2 RELAY 2

R3 RELAY 3

DANIEL M. FLAHERTY MECHANICAL No. 46834

B. BUCCHIANER SHEET CHK'D BY: D. FLAHERTY D. MARTIN D. FLAHERTY APPROVED BY:__ DATE DRWN CHKD REMARKS JULY 2019

260 West Exchange Street, Suite 300 Providence, RI 02903 Tel: (401) 751-5360

TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2

WIRELESS REPEATER. Y=REPEATER NUMBER, X=CHANNEL (PROVIDE 110V OUTLET)

DA

LAN

DEAERATOR

WIRELESS TRANSDUCER READER

LOCAL AREA NETWORK DROP (INSTALLED BY OTHERS)

LEGEND, SYMBOLS AND ABBREVIATIONS

PROJECT NO. 0324-220630 FILE NAME: HWZ001PS SHEET NO.

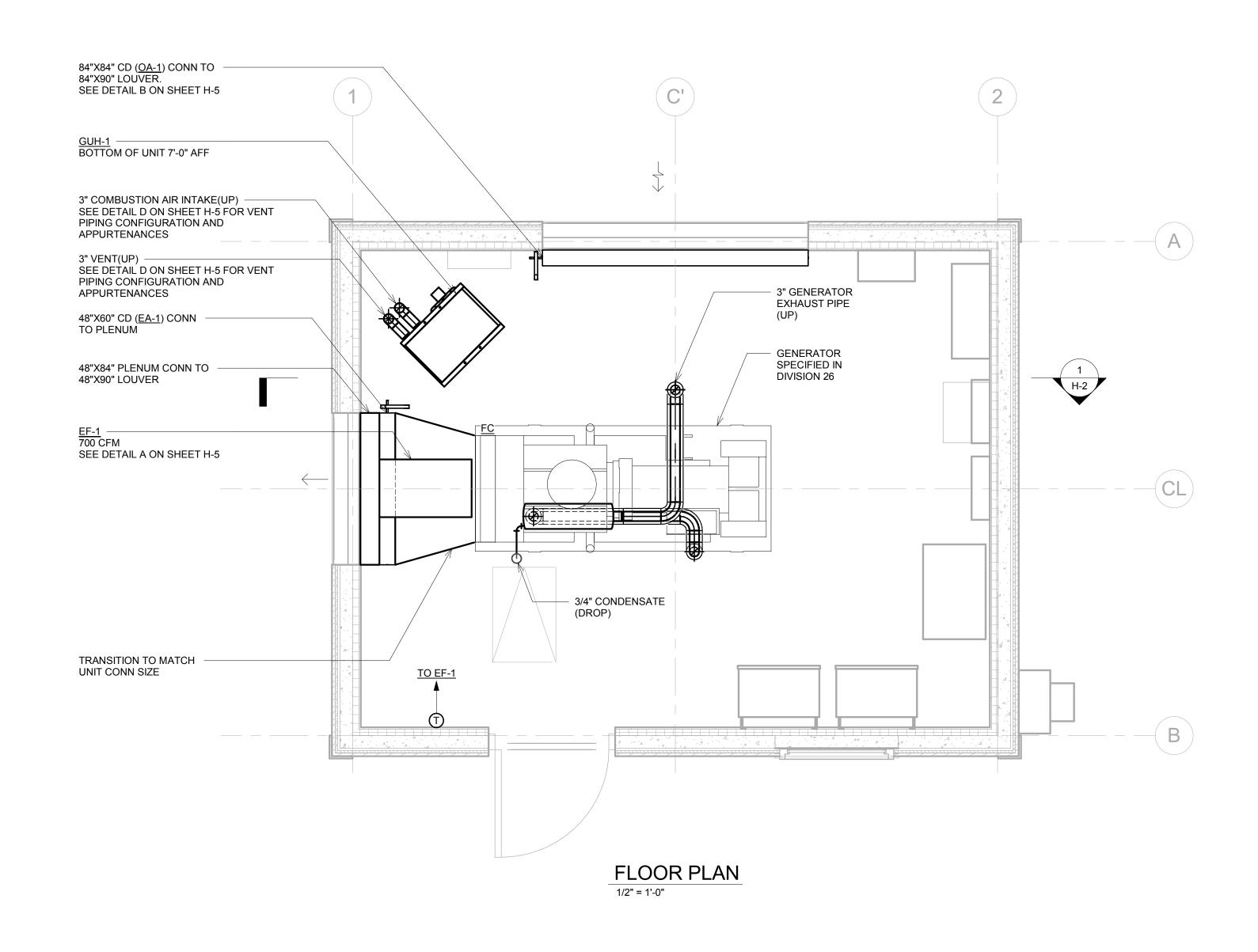
H-1

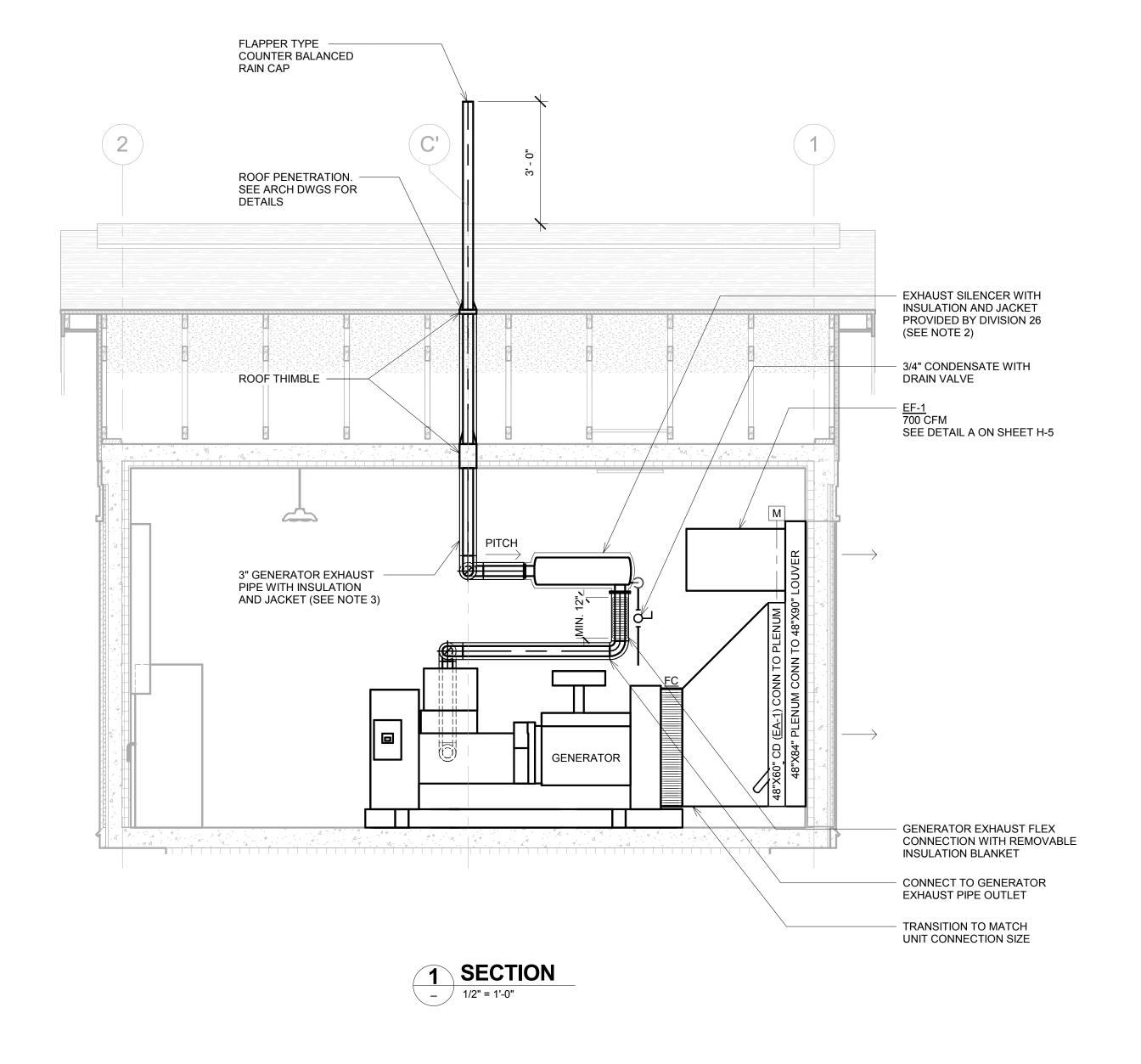
NOTES:

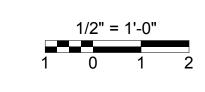
1. ELECTRICAL BUILDING LAYOUT TYPICAL FOR SUGAR HILL AND CHURCH STREET SOUTH SITES. REFER TO CIVIL DRAWINGS FOR SITE ORIENTATION OF EACH BUILDING.

- 2. SUPPORT SILENCER FROM PRECAST CONCRETE BUILDING ROOF WITH HANGER RODS AND TYPE 316 SS
- 3. GENERATOR EXHAUST INSULATION SHALL BE AS SPECIFIED IN SECTION 230719 OR SHALL BE REMOVABLE INSULATING BLANKET TYPE CONSISTING OF HIGH DENSITY FIBERGLASS AND TOTALLY ENCAPSULATED IN TYPE 304 STAINLESS STEEL MESH WITH A WEATHER BARRIER OF SILICONE RUBBER COATED FIBERGLASS
- CLOTH ON THE EXTERIOR SURFACE.

 4. ALL DUCTWORK SHALL BE CONSTRUCTED OF ALUMINUM, PRESSURE CLASS +/-2", LEAKAGE CLASS 16, AND CONFORM TO SMACNA STANDARD M&F. DUCTWORK SHALL BE INSULATED WITH 2-IN THICK MINERAL-FIBER BOARD TYPE INSULATION.









					DESIGNED BY:	B. BUCCHIA
					DRAWN BY:	B. BUCCHIA
					SHEET CHK'D BY:	D. FLAHI
					CROSS CHK'D BY:	D. MA
					APPROVED BY:	D. FLAHI
REV. NO.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY



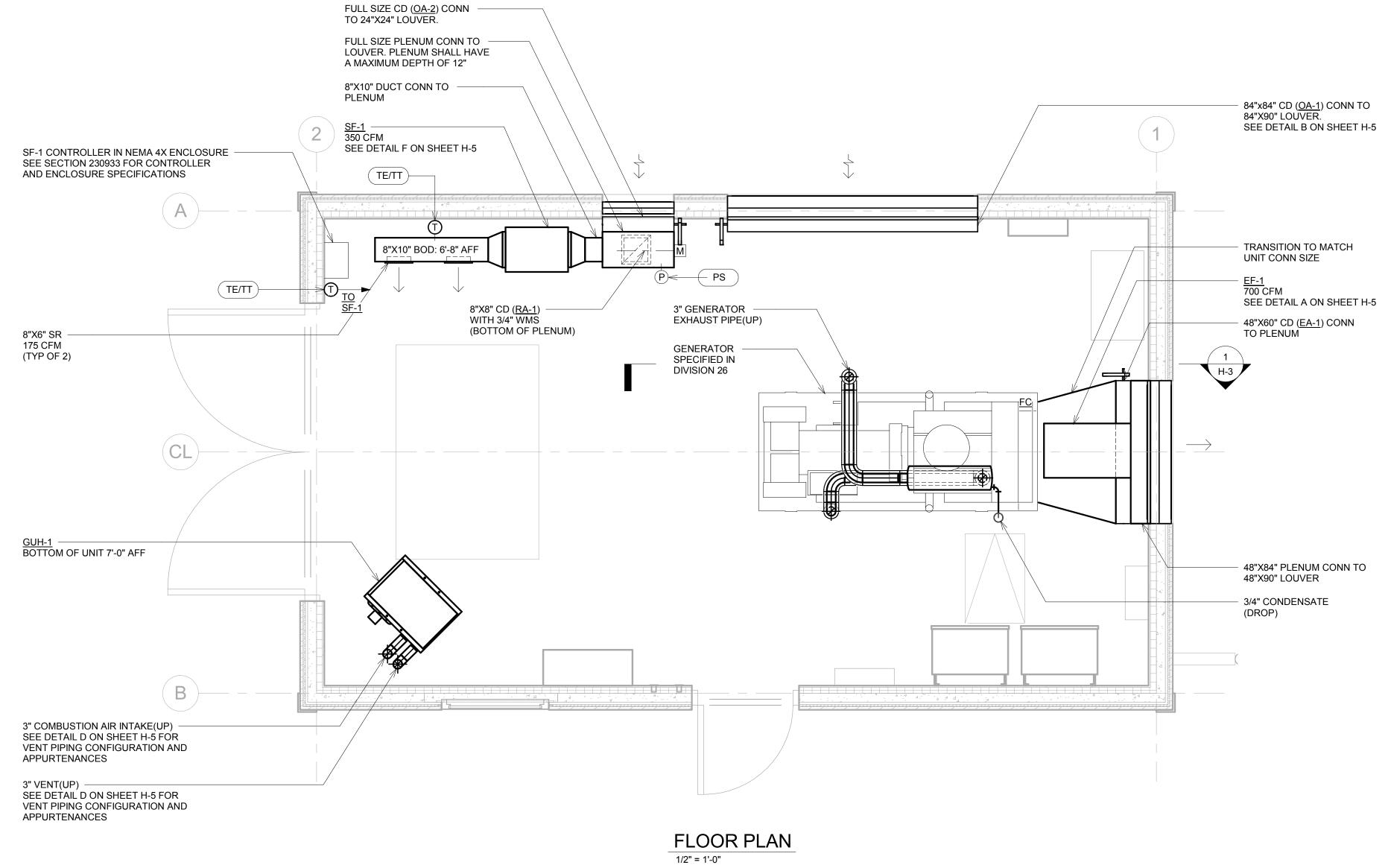
TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2

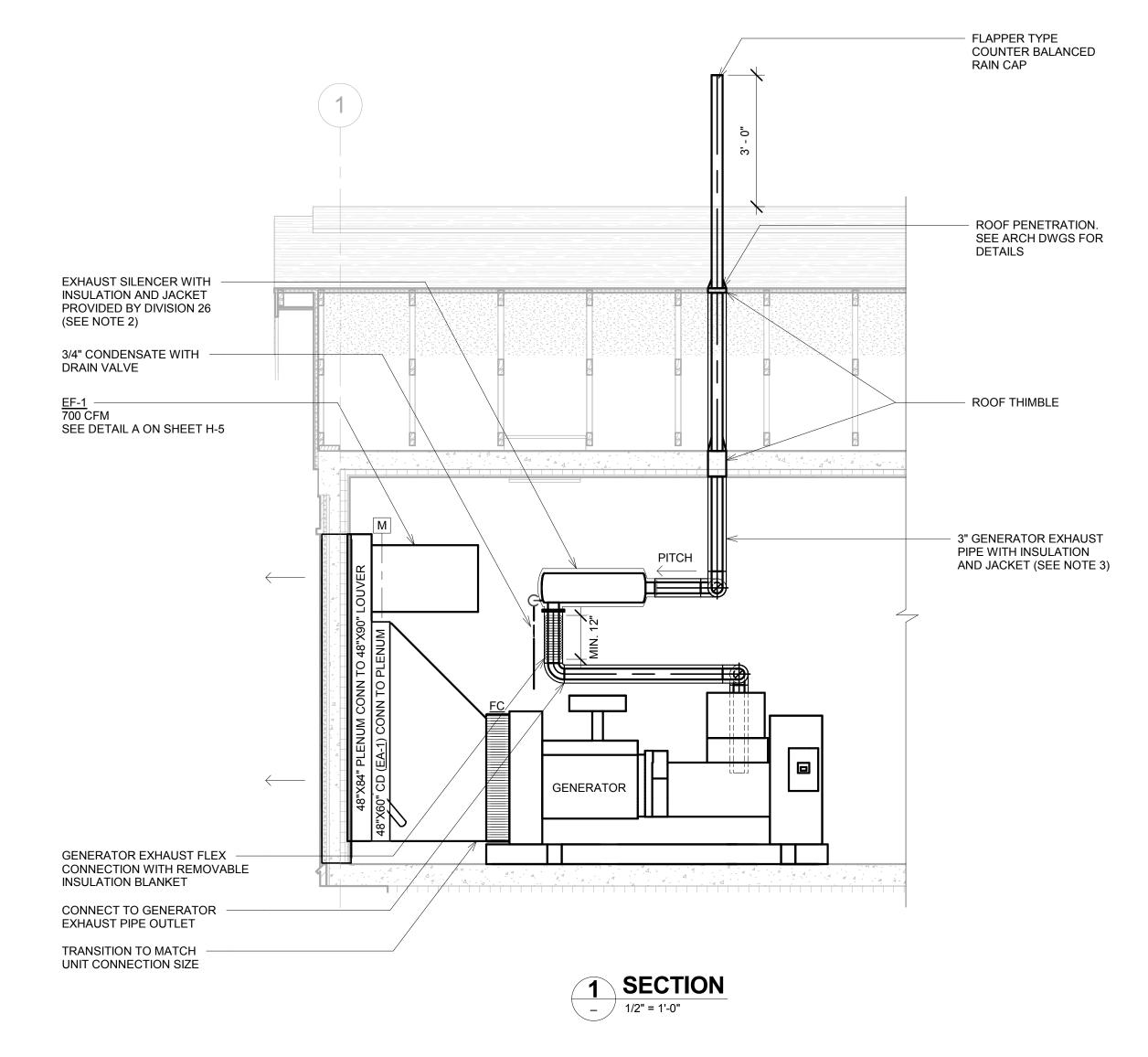
ELECTRICAL BUILDING FLOOR PLAN

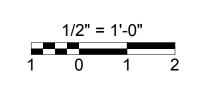
- WI I	. ,
PROJECT NO.	0324-22063
FILE NAME:	HWZ001P
SHEE	T NO.
H	-2

NOTES:
1. REFER TO CIVIL DRAWINGS FOR SITE ORIENTATION OF THE BUILDING.

- 2. SUPPORT SILENCER FROM PRECAST CONCRETE BUILDING ROOF WITH HANGER RODS AND TYPE 316 SS
- 3. GENERATOR EXHAUST INSULATION SHALL BE AS SPECIFIED IN SECTION 230719 OR SHALL BE REMOVABLE INSULATING BLANKET TYPE CONSISTING OF HIGH DENSITY FIBERGLASS AND TOTALLY ENCAPSULATED IN TYPE 304 STAINLESS STEEL MESH WITH A WEATHER BARRIER OF SILICONE RUBBER COATED FIBERGLASS CLOTH ON THE EXTERIOR SURFACE.
- 4. ALL DUCTWORK SHALL BE CONSTRUCTED OF ALUMINUM, PRESSURE CLASS +/-2", LEAKAGE CLASS 16, AND CONFORM TO SMACNA STANDARD IRT. DUCTWORK SHALL BE INSULATED WITH 2-IN THICK MINERAL-FIBER BOARD TYPE INSULATION. ALL DUCTWORK SERVING SF-1 SHALL NOT BE INSULATED.









					DESIGNED BY:	B. BUCCHIANERI
					DRAWN BY:	B. BUCCHIANERI
					SHEET CHK'D BY:	D. FLAHERTY
					CROSS CHK'D BY:	D. MARTIN
					APPROVED BY:	D. FLAHERTY
REV.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 2019

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TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2

PUMPING STATION BUILDING CHURCH STREET NORTH FLOOR PLAN

PROJECT NO.	0324-2206
FILE NAME:	HWZ002F
SHEI	ET NO.
Н	 -3

	GAS-FIRED UNIT HEATERS																						
						HEATING			FAN		FA	N MOTO)R			ELEC	CTRICAL	_					
UNIT	LOCATION	VENT TYPE	HEAT EXCHANGER	BURNER	GAS INPUT (MBH)	GAS OUTPUT (MBH)	AFUE (%)	TYPE	AIRFLOW (CFM)	APD (IN WC)	HP	RPM	ENCL.	V	Р	HZ	FLA	MCA	МОР	WEIGHT (LBS)	MFR	MODEL	NOTES
GUH-1	TYP OF ALL ELECTRICAL BUILDINGS	SEPARATED COMBUSTION	STAINLESS STEEL	STAINLESS STEEL	30,000	24,600	82	PROPELLER	505	-	1/15	1550	ODP	115	1	60	-	-	-	55	MODINE	HDS30	1,2,3

PROVIDE WITH INTEGRAL THERMOSTAT PROVIDE WITH CONCENTRIC VENT KIT

VIBRATION ISOLATOR SHALL BE SPRING MOUNT OR HANGER TYPE WITH MINIMUM DEFLECTION OF 0.75-IN. SEE SPECIFICATION SECTION 230548.13.

								FAI	NS											
				FAI	N PERFORI	MANCE				FAN			MOTOF	}						
UNIT	LOCATION	CONFIGURATION	TYPE	CFM	ESP	RPM	BHP	INLET dBA	DIA. (IN)	DRIVE	ENCL	RPM	HP	V	Р	HZ	WEIGHT (LBS)	MFR	MODEL	NOTES
EF-1	TYP OF ALL ELECTRICAL BUILDINGS	SIDEWALL	EXHAUST	700	0.25	1264	0.08	51	12	DIRECT	TEAO	1350	1/12	115	1	60	79	GREENHECK	SE1-12-432-G	1,2,3,4,5,6,
SF-1	CHURCH ST NORTH ELEC. BLDG	INLINE	SUPPLY	350	0.5	1221	0.09	55	-	DIRECT	ODP	1725	1/4	115	1	60	49	GREENHECK	SQ-99-VG	1,2

PROVIDE WITH OSHA APPROVED MOTOR SIDE GUARD.

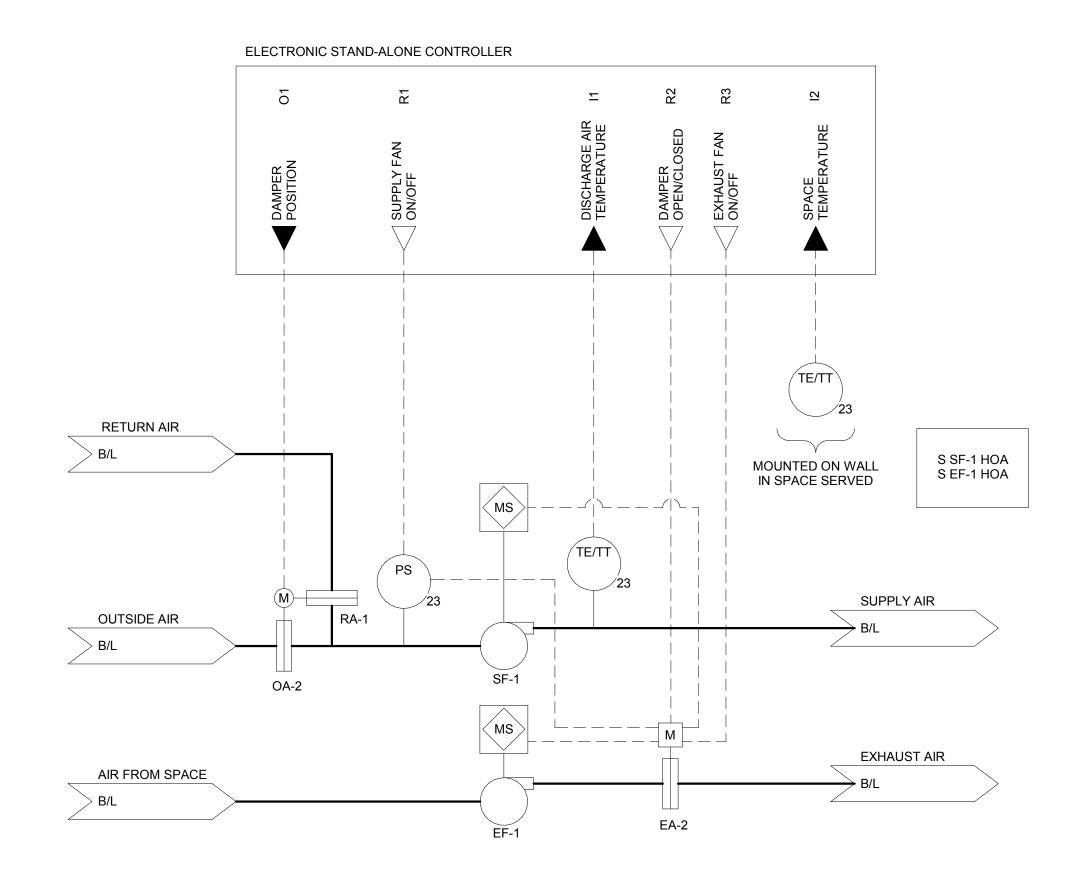
PROVIDE WITH FACTORY MOUNTED DISCONNECT SWITCH. PROVIDE WITH CONTROL DAMPER AND DAMPER ACTUATOR.

PROVIDE WITH WALL HOUSING.

PROVIDE WITH SPEED CONTROLLER. VIBRATION ISOLATOR SHALL BE NEOPRENE TYPE WITH MINIMUM DEFLECTION OF 0.25-IN. SEE SPECIFICATION SECTION 230548.13.

						CONTROL DA	MPERS										
			LINIT	DLADE	DIADE	DLADE	FDAME	AXLE AND	DIMENS	IONS		ACTU	IATOR				
UNIT	LOCATION	AIRFLOW	UNIT SERVED	BLADE TYPE	BLADE ACTION	BLADE MATERIAL	FRAME MATERIAL	LINKAGE MATERIAL	HEIGHT (IN)	WIDTH (IN)	TYPE	٧	NEMA ENCL	FAIL POSITION	MFR	MODEL	NOTES
OA-1	TYP OF ALL ELECTRICAL BUILDINGS	SUPPLY	GENERATOR	AIRFOIL	OPPOSED	ALUMINUM	ALUMINUM	PLATED STEEL	84	84	2 POSITION	120	12	OPEN	GREENHECK	ICD-45	-
OA-2	CHURCH ST NORTH ELEC. BLDG	SUPPLY	SF-1	AIRFOIL	OPPOSED	ALUMINUM	ALUMINUM	PLATED STEEL	24	24	2 POSITION	120	12	CLOSED	GREENHECK	ICD-45	-
EA-1	TYP OF ALL ELECTRICAL BUILDINGS	EXHAUST	GENERATOR	AIRFOIL	OPPOSED	ALUMINUM	ALUMINUM	PLATED STEEL	60	48	2 POSITION	120	12	OPEN	GREENHECK	ICD-45	-
EA-2	TYP OF ALL ELECTRICAL BUILDINGS	EXHAUST	EF-1	AIRFOIL	OPPOSED	ALUMINUM	ALUMINUM	PLATED STEEL	14	14	2 POSITION	120	12	CLOSED	GREENHECK	ICD-45	1
RA-1	CHURCH ST NORTH ELEC. BLDG	RETURN	SF-1	AIRFOIL	OPPOSED	ALUMINUM	ALUMINUM	PLATED STEEL	8	8	2 POSITION	120	12	CLOSED	GREENHECK	ICD-45	-

NOTES: 1. FURNISH WITH EF-1.



SF-1/EF-1 (CHURCH STREET NORTH PUMP STATION)



SEQUENCE OF OPERATIONS

SUPPLY FAN (SF-1)

IN THE "OFF" POSITION:

THE ELECTRONIC STAND-ALONE TEMPERATURE CONTROLLER SHALL NOT BE POWERED. SF-1 SHALL NOT RUN.

DAMPERS RA-1/OA-2 SHALL BE IN FULL RECIRCULATION POSITION.

IN THE "AUTO" POSITION:

THE ELECTRONIC STAND-ALONE TEMPERATURE CONTROLLER SHALL BE POWERED.
WHEN SPACE TEMPERATURE IS ABOVE SETPOINT (80F ADJ.) SF-1 SHALL RUN AND DAMPERS RA-1/OA-2 SHALL MODULATE TO MAINTAIN SUPPLY AIR TEMPERATURE (55F ADJ.). WHEN SPACE TEMPERATURE IS BELOW SETPOINT SF-1 SHALL BE OFF AND DAMPERS RA-1/OA-2 SHALL BE IN FULL

RECIRCULATION POSITION. IN THE "HAND" POSITION:

THE ELECTRONIC STAND-ALONE TEMPERATURE CONTROLLER SHALL NOT BE POWERED.

SF-1 SHALL BE RUN. DAMPERS RA-1/OA-2 SHALL BE IN FULL RECIRCULATION POSITION.

EXHAUST FAN (EF-1)

IN THE "OFF" POSITION: EF-1 SHALL NOT RUN.

IN THE "AUTO" POSITION:

WHEN SPACE TEMPERATURE IS ABOVE SETPOINT (90F ADJ.) EF-1 SHALL RUN. WHEN SPACE TEMPERATURE IS BELOW SETPOINT EF-1 SHALL BE OFF.

IN THE "HAND" POSITION. EF-1 SHALL RUN.

<u>SAFETIES</u>

ANY TIME SF-1 OR EF-1 ARE CALLED TO OPERATE DAMPER EA-1 SHALL BE OPEN, AND NEITHER FAN SHALL START UNTIL THE DAMPER END SWITCH IS PROVEN OPEN. SF-1 SHALL TURN OFF ANY TIME THE PRESSURE SWITCH SENSES A SUCTION PRESSURE EXCEEDING 1" WG.

ENGINE GENERATOR

ANY TIME THE ENGINE GENERATOR IS OPERATING, ALL SYSTEMS SHALL OPERATE IN THE "OFF" MODE.

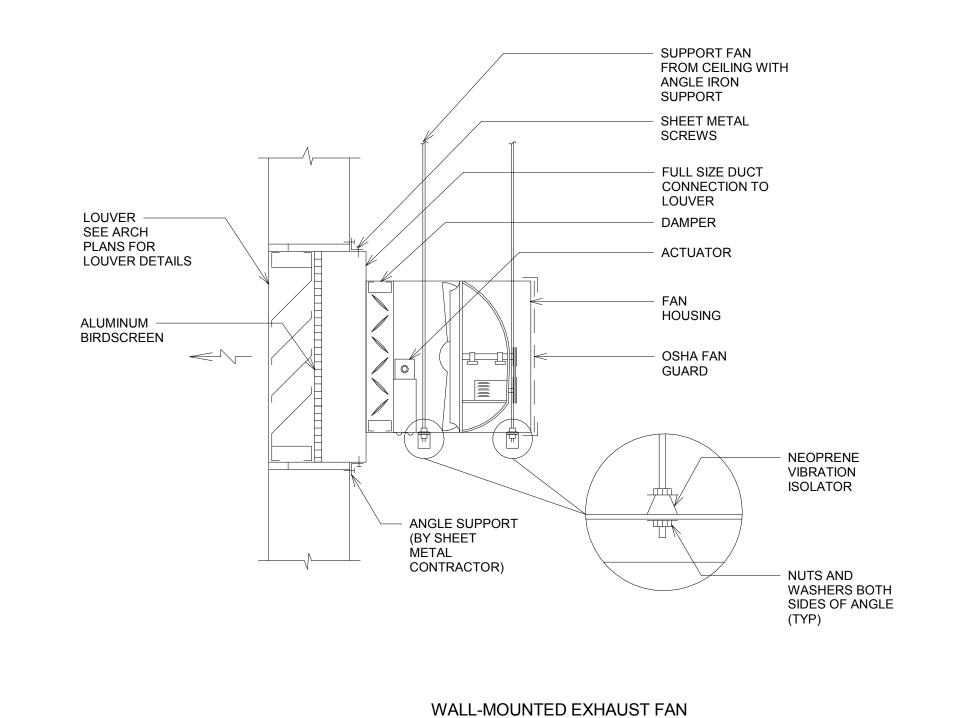


					DESIGNED BY:	B. BUCCHIANERI
					DRAWN BY:	B. BUCCHIANERI
					SHEET CHK'D BY:	D. FLAHERTY
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REV. NO.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 2019

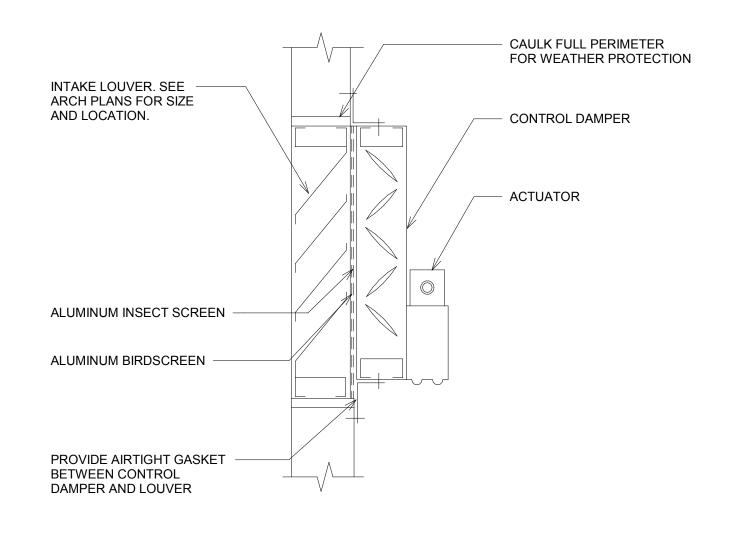


TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2

SCHEDULES AND SF-1/EF-1 CONTROL DIAGRAM PROJECT NO. 0324-220630 FILE NAME: HWZ001PS SHEET NO.

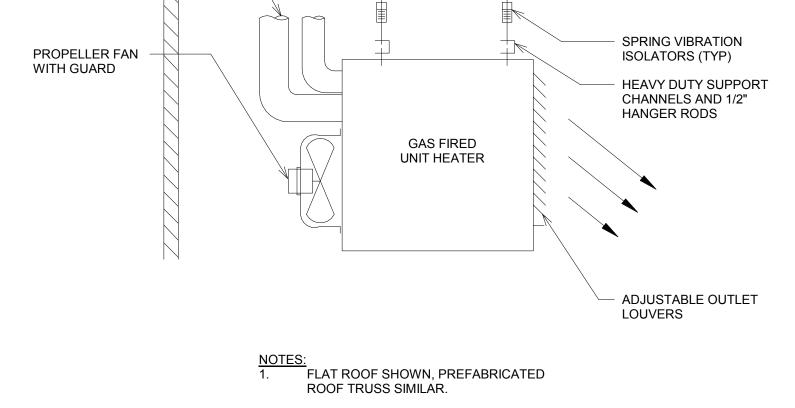


A DETAIL



LOUVER WITH MOTORIZED DAMPER MOUNTING

B DETAIL

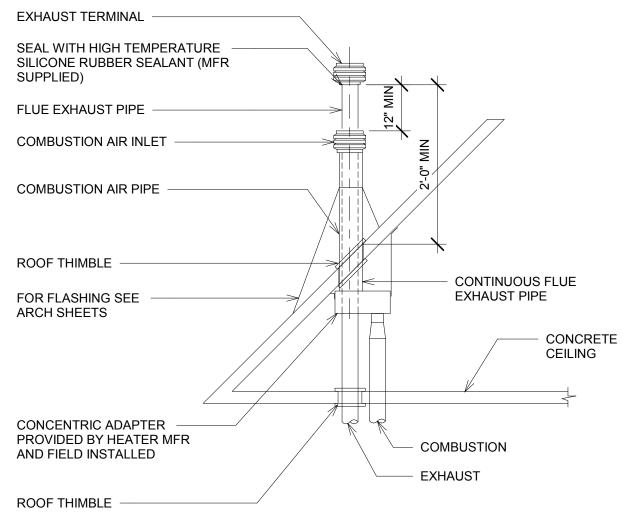


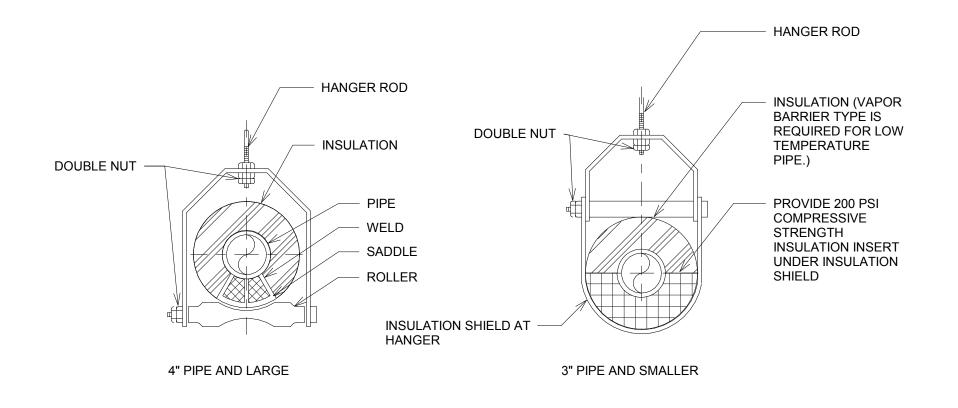
PRECAST CONCRETE

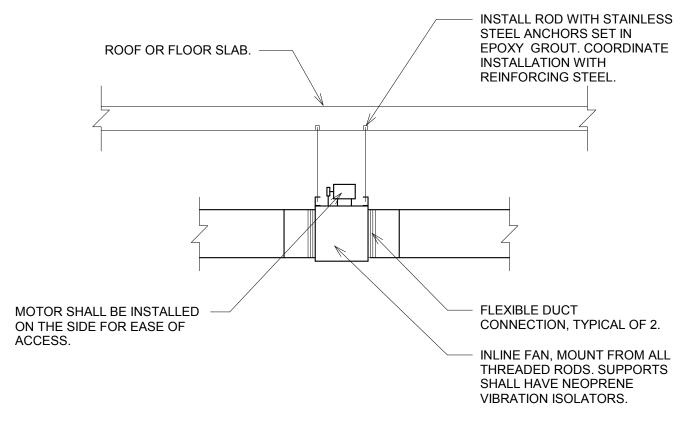
ROOF SLAB SHOWN

GAS FIRED UNIT HEATER

C DETAIL







PIPE HANGER WITH INSULATION

E DETAIL

INLINE FAN F DETAIL

					DESIGNED BY:	B. BUCCHIANE
					DRAWN BY:	B. BUCCHIANE
					SHEET CHK'D BY:	D. FLAHER
					CROSS CHK'D BY:	D. MART
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REV. NO.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 20

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TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2 PROJECT NO. 0324-220630 FILE NAME: HWZ001PS SHEET NO. H-5

DETAILS

CONCENTRIC VENT **D** DETAIL

SEE DETAIL D FOR CONCENTRIC VENT PIPING DETAIL

<u>SYMBO</u>	<u>LS</u>
	DEMOLITION
	NEW WORK
	COLD WATER (POTABLE)
	HOT WATER (POTABLE)
	HOT WATER RETURN (POTABLE)
	SOIL OR WASTE ABOVE (BELOW GRADE)
	SOIL OR WASTE BELOW (BELOW GRADE)
	VENT
——ATF——	AUTOMATIC TRANSMISSION FLUID
——CG——	CHASSIS GREASE
CA	COMPRESSED AIR
D	DRAIN PIPING
——Е——	EMERGENCY WATER
——EC——	ENGINE COOLANT
——ЕО——	ENGINE MOTOR OIL
——F——	FIRE SERVICE
—FOS/FOR—	FUEL OIL SUPPLY/RETURN
GO	GEAR OIL
P	PROTECTED WATER (NON-POTABLE)

STORM

WASTE OIL

WASHER FLUID

LOCKABLE BALL VALVE

FLOW ALARM SWITCH

BOTTOM CONNECTION

TOP CONNECTION

ELBOW UP OR RISE

ELBOW DOWN OR DROP

REDUCER-CONCENTRIC

REDUCER-ECCENTRIC STRAIGHT INVERT REDUCER-ECCENTRIC STRAIGHT CROWN

PRESSURE GAGE AND COCK

PRESSURE REDUCING VALVE

AUTOMATIC AIR RELEASE VENT

AUTOMATIC SAFETY SHUTOFF VALVE

BALL VALVE

CHECK VALVE

CLEANOUT

45° DROP

TEE UP

TEE DOWN

UNION - SCREWED

WYE STRAINER

THERMOMETER

GENERAL NOTES

EMERGENCY SHOWER/ EYEWASH UNIT

FLOOR CLEANOUT

FLOOR DRAIN

TRENCH DRAIN

OPEN END DRAIN

PLUMBING SECTION

EQUIPMENT PROVIDED UNDER

AREA OF DEMOLITION: AREA

OF SPRINKLER COVERAGE

SUPERVISORY SWITCH

TRANSFORMER

EQUIPMENT PROVIDED BY OTHERS REQUIRING PLUMBING CONNECTIONS

WATER PROOF SLEEVE

- EQUIPMENT AND PIPING SYSTEM LAYOUTS ARE DIAGRAMMATIC AND INTENDED TO SHOW PIPING AND DUCT BASIS OF DESIGN. IF THE PC PROPOSES TO FURNISH EQUIPMENT THAT REQUIRES AN ARRANGEMENT OR SPACE DIFFERING FROM THAT INDICATED ON THE DRAWINGS OR SPECIFIED, THE PC SHALL PREPARE AND SUBMIT TO THE ENGINEER FOR APPROVAL, DETAILED ARCHITECTURAL, STRUCTURAL, PLUMBING, HVAC AND ELECTRICAL DRAWINGS AND EQUIPMENT LISTS SHOWING ALL NECESSARY CHANGES AND EMBODYING ALL FEATURES OF THE EQUIPMENT HE PROPOSES TO FURNISH. THIS INFORMATION SHALL INCLUDE BUT NOT BE LIMITED TO PLANS, SECTIONS, DETAILS, AND SCHEMATICS OF ALL APPURTENANCES REQUIRED. SUCH CHANGES IF APPROVED BY THE ENGINEER SHALL BE AT NO EXTRA COST TO THE OWNER. THE PC SHALL ASSUME THE COST OF, AND THE RESPONSIBILITY FOR SATISFACTORILY ACCOMPLISHING ALL THE NECESSARY CHANGES CORRESPONDING TO THE DIMENSIONS AND CHARACTERISTICS OF THE EQUIPMENT SUBMITTED INCLUDING CHANGES TO ALL OTHER TRADES TO SATISFACTION OF ENGINEER. REFER TO SPECIFICATIONS FOR FURTHER DETAILS.
- THE PC SHALL PROVIDE A METHOD OF PROCEDURE AND A SCHEDULE PER THE
- REQUIREMENTS OF DIVISION 1 SPECIFICATIONS. THE PC SHALL REMOVE CONSTRUCTION DEBRIS AND ALL OTHER DEBRIS MADE DURING THE WORK THEY HAVE COMPLETED, AT THE END OF EACH WORK DAY.
- EQUIPMENT, PIPING, ETC. SHALL NOT BE LOCATED ABOVE ELECTRICAL PANELS OR WHERE PIPING PENETRATES A RATED PARTITION THE PC SHALL MAINTAIN
- INTEGRITY OF THE PARTITIONS USING U.L. APPROVED SEALING METHODS TO MATCH THE PARTITION RATING. 6. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

Α	AD AFF	ACCESS DOOR ABOVE FINISHED FLOOR	M	M MAX	MOTOR MAXIMUM	
	AP	ACCESS PANEL		MBH	THOUSAND BTU PER HOUR	
	@ AV	AT AUTOMATIC AIR RELEASE VENT		MCA MFG	MINIMUM CIRCUIT AMPACITY MANUFACTURER	
	ATC ATF	AUTOMATIC TEMPERATURE CONTROL CONTRACTOR AUTOMATIC TRANSMISSION FLUID		MIN MISC	MINIMUM MISCELLANEOUS	
	7			MO MR	MASONRY OPENING MOP RECEPTOR	
_	BFP	BACK FLOW PREVENTER		IVIR	MOP RECEPTOR	
В	BTM BLDG	BOTTOM BUILDING	N	NO	NUMBER	
	BLDG	BOILDING	0	ORL	OVERFLOW ROOF LEADER	
	CL	CENTER LINE	O	ORD OED	OVERFLOW ROOF DRAIN OPEN EQUIPMENT DRAIN	
С	CA CI	COMPRESSED AIR CAST IRON		O.C. OD	ON CENTER OUTSIDE DIAMETER	
	CO	CLEAN OUT		OD	OUTSIDE DIAMETER	——ATF——
	COND CP	CONDENSATE DRAIN CONTROL PANEL	Р	Р	PROTECTED WATER	——CG——
	CONT CFH	CONTINUOUS CUBIC FEET PER HOUR	P	PC PG	PLUMBING CONTRACTOR PRESSURE GAUGE	
	CW CG	COLD WATER CHASSIS GREASE		PH PRV	PHASE PRESSURE REDUCING VALVE	——CA——
	00	or models of the total		PSI	POUNDS PER SQUARE INCH	——D——
_	DCVA	DOUBLE CHECK VALVE ASSEMBLY		PSIA PSIG	PSI ABSOLUTE PSI GAUGE	——E——
D	DCVA DIA	DIAMETER		PVC	POLYVINYL CHLORIDE	F0
	DI DN	DUCTILE IRON DOWN	R	RH RLA	RADIANT HEATER RUNNING LOAD AMPS	——EC——
	DO DWG	DIESEL OIL DRAWING		RPM	REVOLUTIONS PER MINUTE	——EO——
_				RPZ	REDUCED PRESSURE ZONE BACKFLOW PREVENTER	——F——
E	E EFF	EMERGENCY WATER EFFICIENCY		RTU RD	ROOF TOP UNIT ROOF DRAIN	FOS/FOR
	EC EWC	ELECTRICAL CONTRACTOR / ENGINE COOLANT ELECTRIC WATER COOLER		RWC	ROOF WATER CONDUCTOR	—FOS/FOR—
	EL. EO	ELEVATION ENGINE OIL	S	S	SOIL PIPING	——GO——
	EWT ES/EWU	ENTERING WATER TEMPERATURE EYE SHOWER/EYE WASH UNIT	3	SCO SH	SANITARY CLEAN OUT SHOWER	P
	LO/LVVO	ETE SHOWERETE WASH SINI		SQ SS	SQUARE SERVICE SINK	0.7
F	F FPM	FAHRENHEIT FEET PER MINUTE		SS ST	STAINLESS STEEL STORM	ST
	FIN FHC	FINISHED FIRE HOSE CABINET				WO
	FLEX	FLEX CONNECTION	T	T TD	THERMOMETER TRENCH DRAIN	WF
	FL FCO	FLOOR FLOOR CLEAN OUT		THK TYP	THICK(NESS) TYPICAL	
	FD FAS	FLOOR DRAIN FLOW ALARM SWITCH		TMV	THERMOSTATIC MIXING VALVE	U
	FLA	FULL LOAD AMPS		UH	UNIT HEATER	
	GPM	GALLONS PER MINUTE	U	UL UR	UNDERWRITERS LABORATORY URINAL	
G	G	GAS PIPING		OIX	ONIVAL	
	GUH GC	GAS FIRED UNIT HEATER GENERAL CONTRACTOR	V	V VB	VENT PIPING VACUUM BREAKER	
				VTR	VENT THROUGH ROOF	
Н	HZ HP	HERTZ HORSEPOWER	\A /	W	WASTE PIPING	AV
	HB	HOSE BIBB	W	W/ WC	WITH WATER CLOSET	<u> </u>
	HEV HWR	HOSE END VALVE HOT WATER RETURN		WH	WATER HEATER	ASSV
	HWS HC	HOT WATER SUPPLY HVAC CONTRACTOR		WCO WHS	WALL CLEAN OUT WASH HOSE STATION	
	HP HS	HEAT PUMP HOSE STATION		WM WOB	WASHING MACHINE WASTE OIL BURNER]
				WO WWS	WASTE OIL WINDSHIELD WASHER SOLVENT	 1
	IM IN. WC	ICE MAKER INCHES OF WATER COLUMN				\sim
	ID I.E.	INSIDE DIAMETER INVERT ELEVATION				Y
	IPS	IRON PIPE SIZE				
K	KW	KILOWATT				
	KS	KITCHEN SINK				
L	LAV LWT	LAVATORY LEAVING WATER TEMPERATURE				2
	LBV LRA	LOCKABLE BALL VALVE LOCKED ROTOR AMPS				
	2.01					
						<u> </u>
						
						

					DESIGNED BY: DRAWN BY: SHEET CHK'D BY: CROSS CHK'D BY:	B. BUCCHIANE B. BUCCHIANE J. SHEEHA
REV. NO.	DATE	DRWN	CHKD	REMARKS	APPROVED BY:	D. FLAHER
140.						



TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2

PROJECT NO.	0324-22063
FILE NAME:	PWZ001P
SHEE	T NO.

P-1

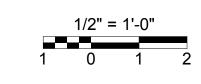
NOTES:

ELECTRICAL BUILDING LAYOUT TYPICAL FOR SUGAR HILL AND CHURCH STREET SOUTH SITES. REFER TO CIVIL DRAWINGS FOR SITE ORIENTATION OF EACH BUILDING.
 LOCATION OF GAS SERVICE TO BE COORDINATED WITH UTILITIES.
 GAS PRESSURE REGULATING VALVE VENT SHALL BE SIZED IN ACCORDANCE WITH THE REGULATOR MANUFACTURER'S INSTRUCTIONS.

1-1/2" GAS SHUTOFF VALVE — (BY GAS COMPANY) SEE SHEET P-4 FOR GAS - 1/2" G(DROP) TO PIPING DIAGRAM GUH-1 (30 CFH) 1-1/2" GAS METER ——— (769 CFH @ 14 IN. WC) (BY GAS COMPANY) SEE SHEET P-4 FOR GAS PIPING DIAGRAM 1-1/2" PRV (14 IN. WC) -(BY GAS COMPANY) SEE SHEET P-4 FOR GAS CL. EL. 8'-6" AFF PIPING DIAGRAM 1-1/2"X1/2" REDUCER 1-1/2"— 1-1/2" G(DROP) -GAS PRESSURE REGULATING VALVE VENT (SEE NOTE 3) - 1-1/2" G(DROP) TO GENERATOR (739 CFH) SEE SHEET P-4 FOR GAS PIPING DIAGRAM VENT SHALL TERMINATE WITH INSECT SCREEN AND SHALL TERMINATE 9'-0" ABOVE FINISHED GRADE

FLOOR PLAN

1/2" = 1'-0"





					DESIGNED BY:	B. BUCCHIANE
					DRAWN BY:	B. BUCCHIANE
					SHEET CHK'D BY:	J. SHEEHA
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REV. NO.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 20

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TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2

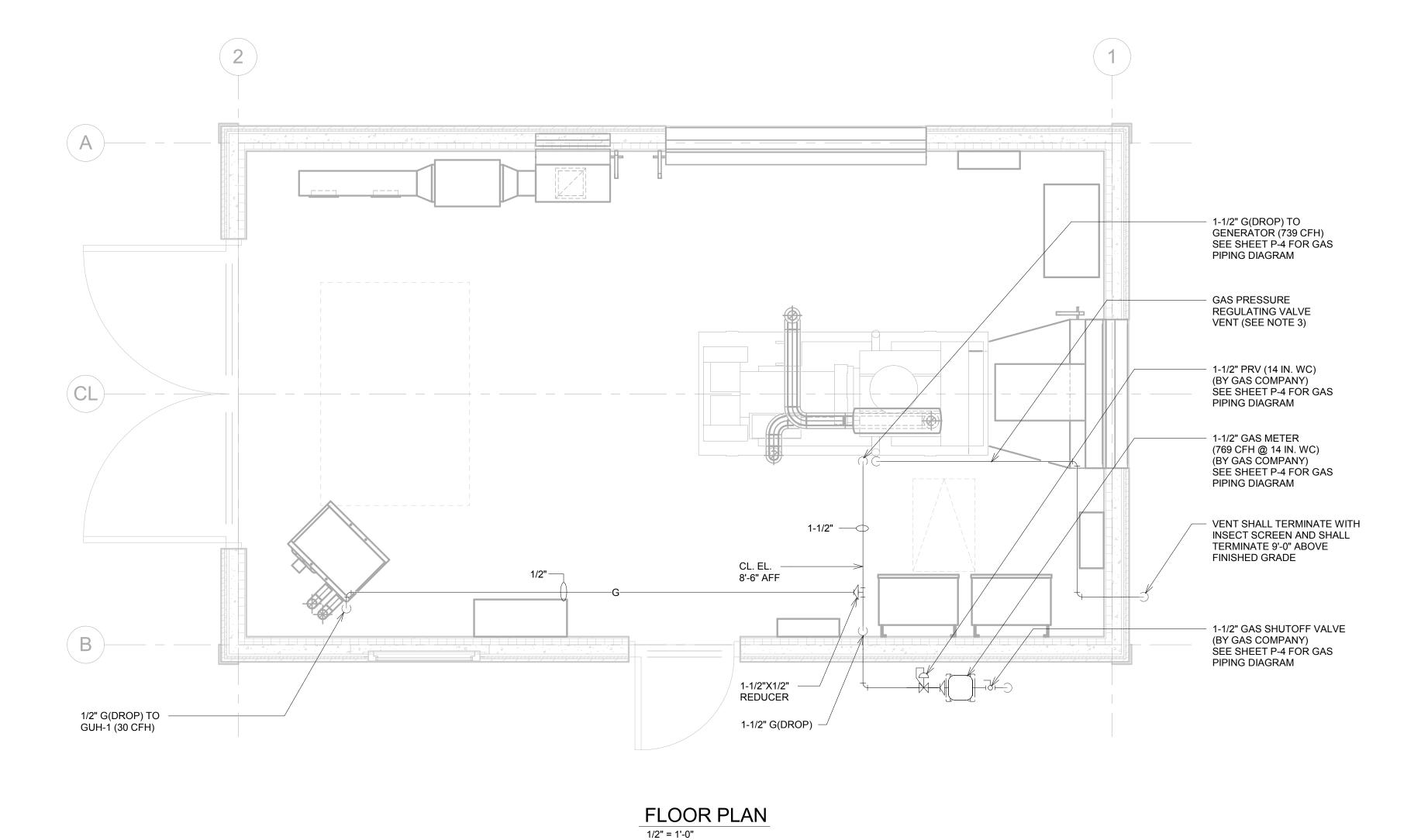
ELECTRICAL BUILDING FLOOR PLAN

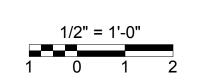
PROJECT NO. FILE NAME: PWZ001PS SHEET NO. P-2

NOTES:

1. REFER TO CIVIL DRAWINGS FOR SITE ORIENTATION OF THE BUILDING.
2. LOCATION OF GAS SERVICE TO BE COORDINATED WITH UTILITIES.
3. GAS PRESSURE REGULATING VALVE VENT SHALL BE SIZED IN ACCORDANCE WITH

THE REGULATOR MANUFACTURER'S INSTRUCTIONS.







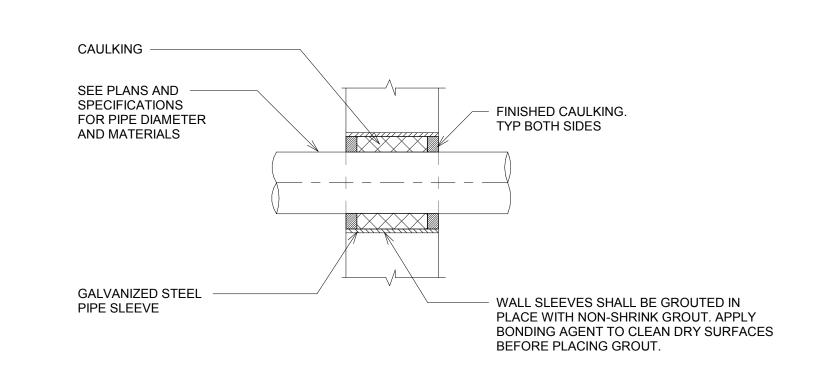
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					SHEET CHK'D BY:	J. SHEEH,
					CROSS CHK'D BY:	D. MART
					APPROVED BY:	D. FLAHER
REV. NO.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 20

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TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS
PHASE 2 - CONTRACT NO. 2
PROJECT NO. CWSRF - 4424/2

PUMPING STATION BUILDING CHURCH STREET NORTH FLOOR PLAN

PROJECT NO.	0324-2206
FILE NAME:	PWZ002
SHEET NO	
P-3	



A PIPE SLEEVE THROUGH WALL



HVAC

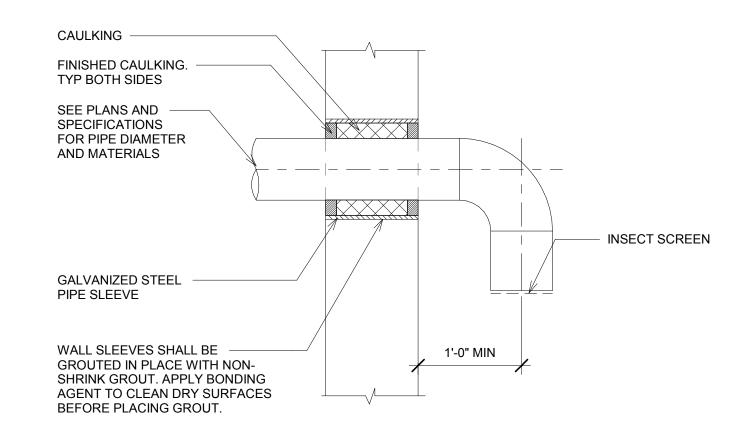
UNION -

GAS COCK

3" MIN DIRT LEG.

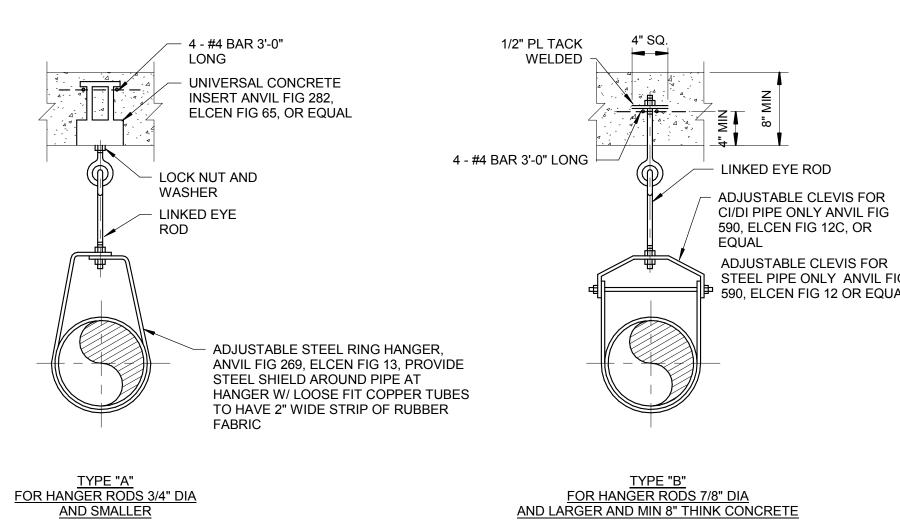
FULL LINE SIZE

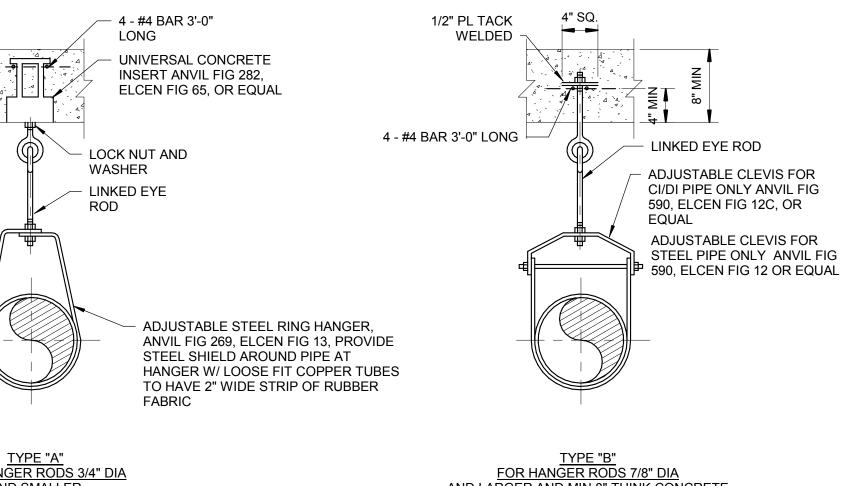
ISOLATION VALVE -

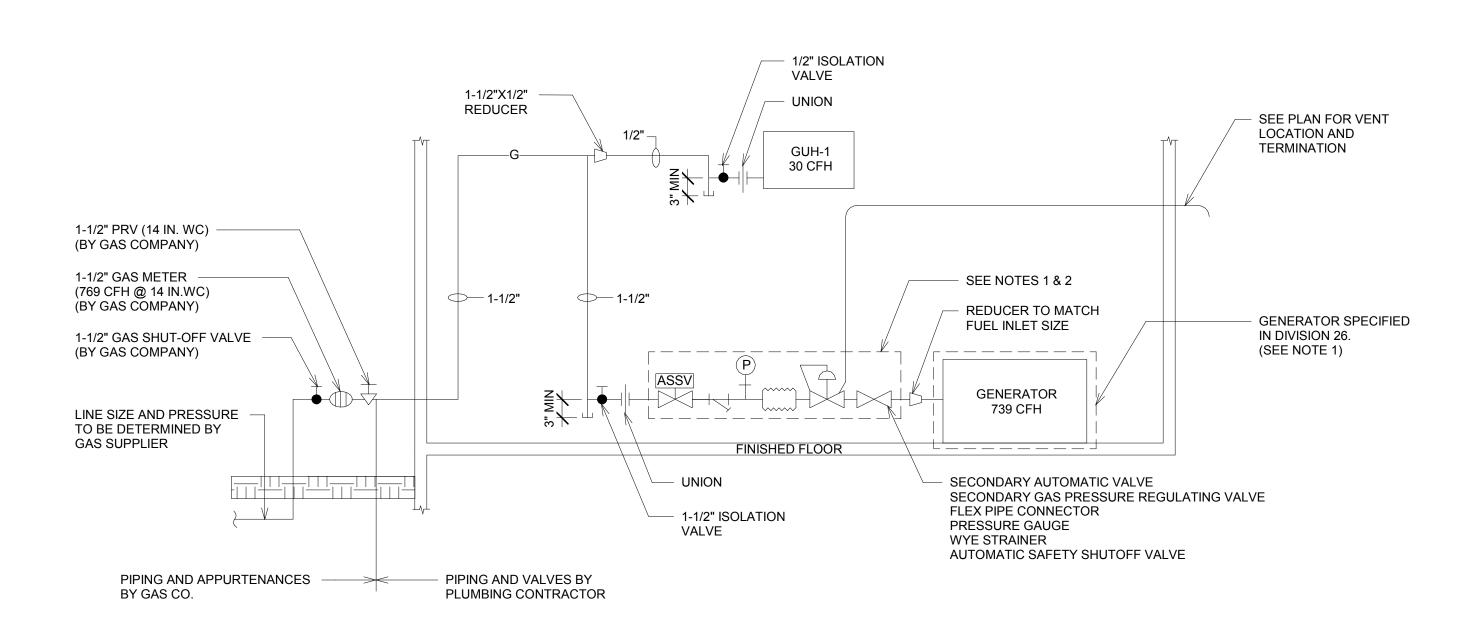


C VENT PIPE TERMINATION

NOTE:
GALVANIZE ALL PARTS AFTER FABRICATION







GAS PIPING DIAGRAM

- GENERATOR AND GAS TRAIN COMPONENTS SHALL BE APPROVED PRODUCTS BY THE MASSACHUSETTS BOARD

OF PLUMBERS AND GAS FITTERS.
GAS TRAIN COMPONENTS SHALL BE PROVIDED BY TH
GENERATOR MANUFACTURER AND INSTALLED BY TH
PLUMBING CONTRACTOR.

D	PIPE HANGERS	
	NTS	
	NTS	

					DESIGNED BY:	B. BUCCHIANER
					DRAWN BY:	B. BUCCHIANER
					SHEET CHK'D BY:	J. SHEEHA
					CROSS CHK'D BY:	D. MARTI
					APPROVED BY:	D. FLAHERT
REV. NO.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 201



TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2

DETAILS AND GAS PIPING DIAGRAM

PROJECT NO. 0324-220630 FILE NAME: PWZ001PS SHEET NO. P-4

DANIEL M. FLAHERTY MECHANICAL No. 46834

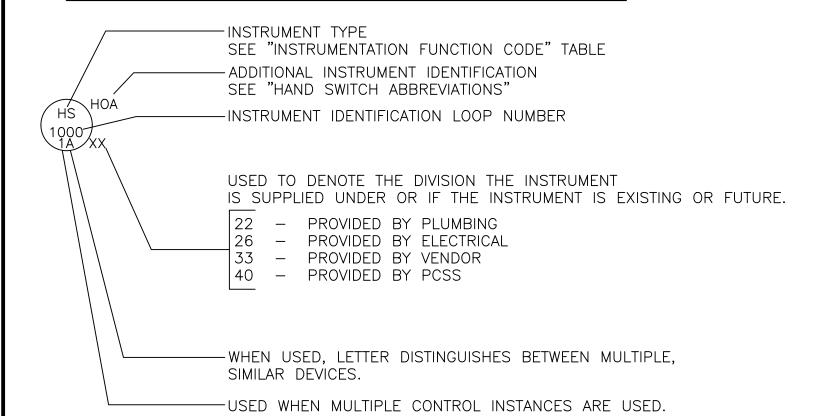
GENERAL INSTRUMENT OR FUNCTION SYMBOLS

	DISPLAY/ CONTROL						
PRIMARY CHOICE	SECONDARY CHOICE	COMPUTER SOFTWARE	DISCRETE	LOCATION AND ACCESSIBILITY			
				FIELD MOUNTED AND NORMALLY OPERATOR ACCESSIBLE			
				PRIMARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE			
				PRIMARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE			
				SECONDARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE			
				SECONDARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE			

INSTRUMENTS SHARING COMMON HOUSING

	PILOT LIGHT		FUTURE INSTRUMENTS
--	-------------	--	--------------------

TYPICAL TAG NUMBERS & DESIGNATION



HAND SWITCH ABBREVIATIONS

E-STOP = EMERGENCY STOPHOA = HAND/OFF/AUTOLOR = LOCAL/OFF/REMOTE

INSTRUMENT LINE SYMBOLS

	ELECTRICAL SIGNAL
	COMMUNICATION LINK - 220Mhz - RADIO
	FUTURE
	VENDOR SUPPLIED CABLE
	COMMUNICATION LINK - CAT6
	COAXIAL ANTENNA CABLE

INSTRUMENTATION FUNCTION CODE

	FIRST	LETTERS		SUCCEEDING LETTERS	
	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
	MEASURED/INITIATING VARIABLE	VARIABLE MODIFIER	READOUT/PASSIVE FUNCTION	OUTPUT/ACTIVE FUNCTION	FUNCTION MODIFIER
Α	ANALYSIS		ALARM		
В	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
С	USER'S CHOICE			CONTROL	CLOSED
D	USER'S CHOICE	DIFFERENCE, DIFFERENTIAL			DEVIATION
Ε	VOLTAGE		SENSOR, PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO			
G	USER'S CHOICE		GLASS, GAUGE, VIEWING DEVICE		
Н	HAND				HIGH
	CURRENT		INDICATE		
J	POWER		SCAN		
Κ	TIME, SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
М	MOISTURE				MIDDLE, INTERMEDIATE
Ν	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
0	USER'S CHOICE		ORIFICE, RESTRICTION		OPEN
Р	PRESSURE		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE, TOTALIZE	INTEGRATE, TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED, FREQUENCY	SAFETY		SWITCH	STOP
Т	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
٧	VIBRATION, MECHANICAL, ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL, PROBE		
	UNCLASSIFIED (1)	X-AXIS	ACCESSORY DEVICES, UNCLASSIFIED (1)	UNCLASSIFIED (1)	UNCLASSIFIED (1)
Υ	EVENT, STATE, PRESENCE	Y-AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z-AXIS, SAFETY INSTRUMENT SYSTEM		DRIVER, ACTUATOR, UNCLASSIFIED, FINAL CONTROL ELEMENT	
	-	TABLE NOTES:			

(1) WHEN USED SYMBOL OR SIGNAL LINE IS ANNOTATED.

MAGNETIC FLOW METER

ULTRASONIC LEVEL SENSOR

FLOAT SWITCH

→ H- HIGH LEVEL

TEMPERATURE SWITCH

MOISTURE SWITCH

PRESSURE GAUGE

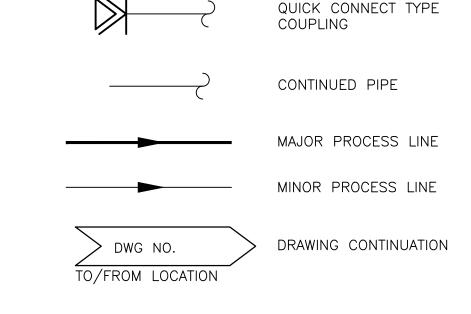
➤ H=HIGH

► H=HIGH

HH- HIGH HIGH LEVEL

LL- LOW LOW LEVEL

PIPE LINE SYMBOLS



MISCELLANEOUS SYMBOLS

M	MOTOR VARIABLE SPEED MOTOR HUMAN INTERFACE MODULE			
M	VARIABLE SPEED MOTOR			
HIM	HUMAN INTERFACE MODULE			

ISR

(VFD)

INTRINSIC SAFETY RELAY

VARIABLE FREQUENCY DRIVE WITH KEYPAD

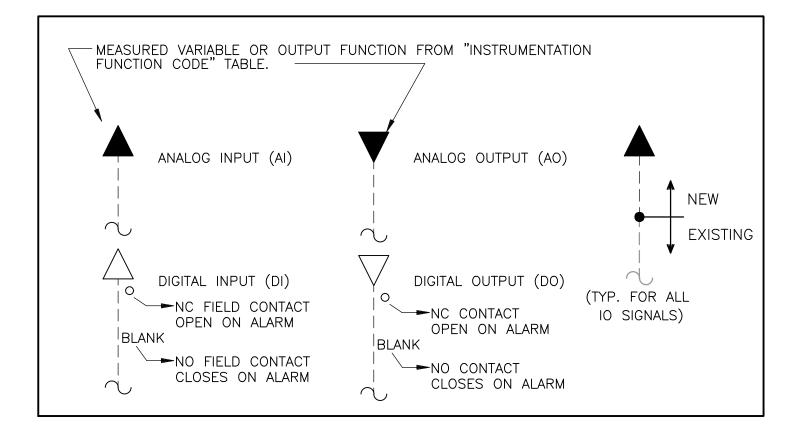
INDICATES GENERAL OR MISCELLANEOUS HARDWIRED INTERLOCK

VALVE SYMBOLS

PRIMARY ELEMENTS

$\frac{1}{2}$	PLUG VALVE (PV)
	CHECK VALVE (CV)

I/O SIGNALS



ELECTRICAL / AIR SOURCES

SYSTEM ARCHITECTURE SYMBOLS

OPERATOR INTERFACE TERMINAL

PROGRAMMABLE LOGIC CONTROLLER

UNINTERRUPTED POWER SUPPLY

ETHERNET SWITCH

UPS — → 120 VAC UPS SOURCE

المستقات

 $^{'}(ullet)^{'}$

GENERAL NOTES

1. THIS LEGEND APPLIES TO P&IDS ONLY AND MAY DIFFER FROM LEGENDS FOR OTHER SHEETS.

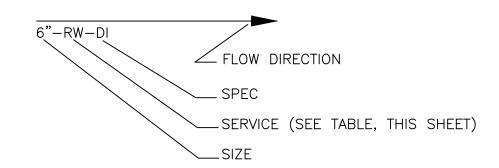
2. IN GENERAL THIS LEGEND SHEET AND THE P&IDS ARE BASED ON THE INTERNATIONAL SOCIETY OF AUTOMATION (ISA) STANDARDS FOR PRACTICES FOR INSTRUMENTATION. SOME MODIFICATIONS, ADDITIONS AND ALTERATIONS HAVE BEEN MADE AS REQUIRED TO ACCOMODATE PROJECT REQUIREMENTS.

3. SOME PROCESS ITEMS SUCH AS EQUIPMENT ISOLATION VALVES, BYPASS LINES, ETC., WHICH ARE NOT CRITICAL FOR AN UNDERSTANDING OF THE INSTRUMENTATION FUNCTIONS ARE NOT SHOWN ON THE P&IDS.

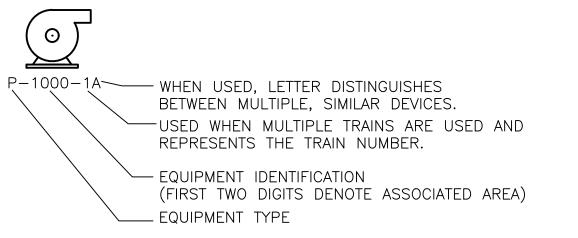
4. SEE ELECTRICAL AND MECHANICAL SHEETS AND SPECIFICATIONS FOR ADDITIONAL CONTROL AND INTERLOCK REQUIREMENTS.

5. LIGHTER WEIGHT LINES, SHOWN AS — , INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE EXISTING. WEIGHTED LINES, SHOWN AS -----OR HEAVIER _____ , INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE NEW. DASHED WEIGHTED LINES, SHOWN AS ---- , INDICATED EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE GROUPED AS A PACKAGE.

TYPICAL PIPE TAG NUMBERS & DESIGNATION



ES — ► NON-UPS ELECTRICAL SOURCE (VOLTAGE AS NOTED) TYPICAL EQUIPMENT TAG NUMBERS & DESIGNATION



GENERAL ABBREVIATIONS

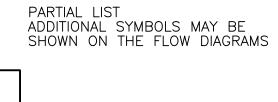
Αl	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
ISR	INTRINSIC SAFETY RELAY
HIM	HUMAN INTERFACE MODULE
PLC	PROGRAMMABLE LOGIC CONTROLLER
OIT	OPERATOR INTERFACE TERMINAL
RTU	REMOTE TERMINAL UNIT
VFD	VARIABLE FREQUENCY DRIVE
UPS	UNINTERRUPTIBLE POWER SUPPLY

PIPE SERVICE IDENTIFICATION

SS	SANITARY SEWER
DR	DRAIN
BYP	BYPASS

PIPE SPECIFICATION IDENTIFICATION

SDR35PVC	STANDARD DIMENSION RATIO 35 POLY-VINYL CHLORIDE
DI	DUCTILE IRON
304SS	304 STAINLESS STEEL
PVC	POLY-VINYL CHLORIDE



YAGI ANTENNA



PROCESS EQUIPMENT SYMBOLS

R. SANDER M. POPTAN DATE DRWN CHKD REMARKS

260 West Exchange Street, Suite 300 Tel: (401) 751-5360

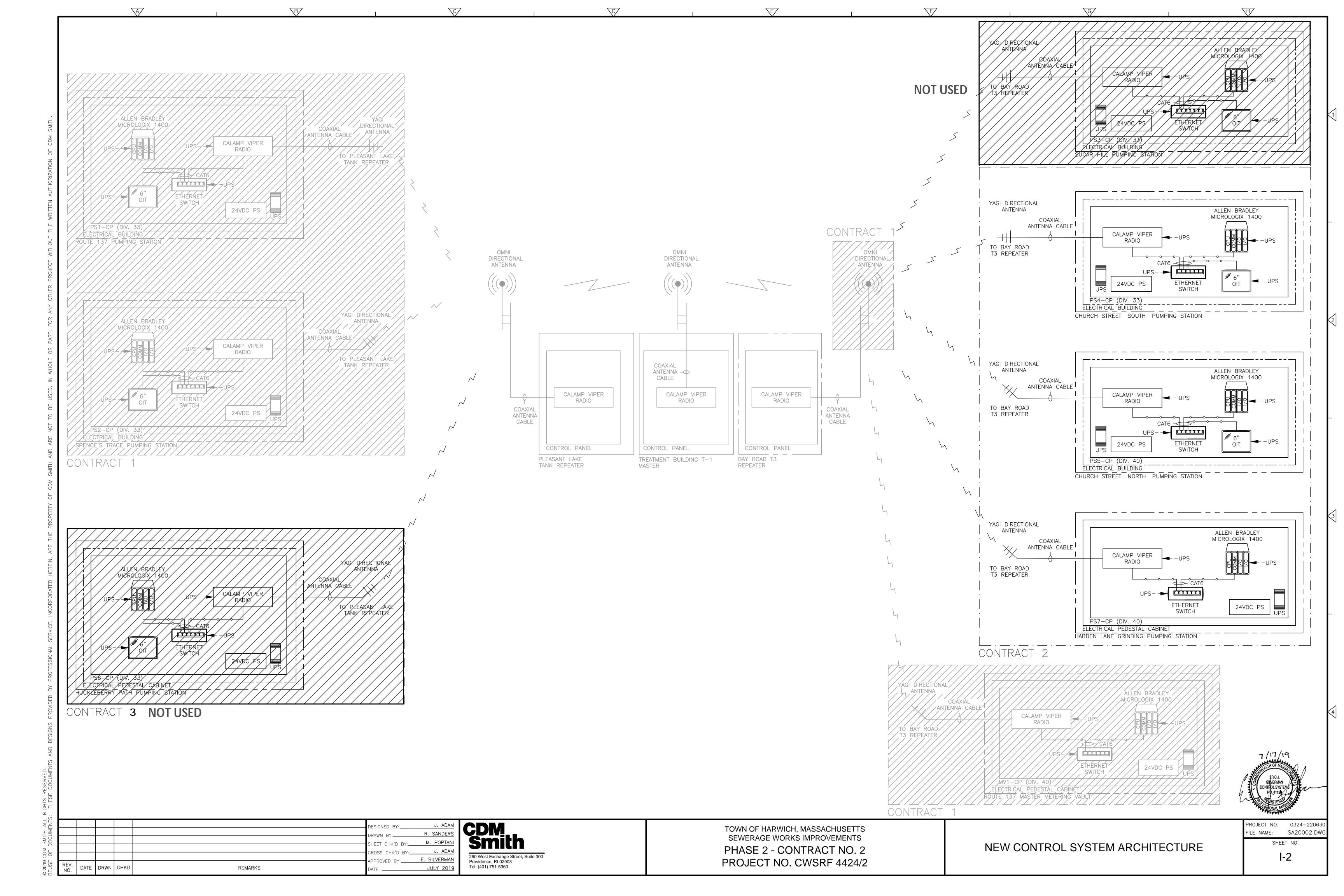
TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF 4424/2

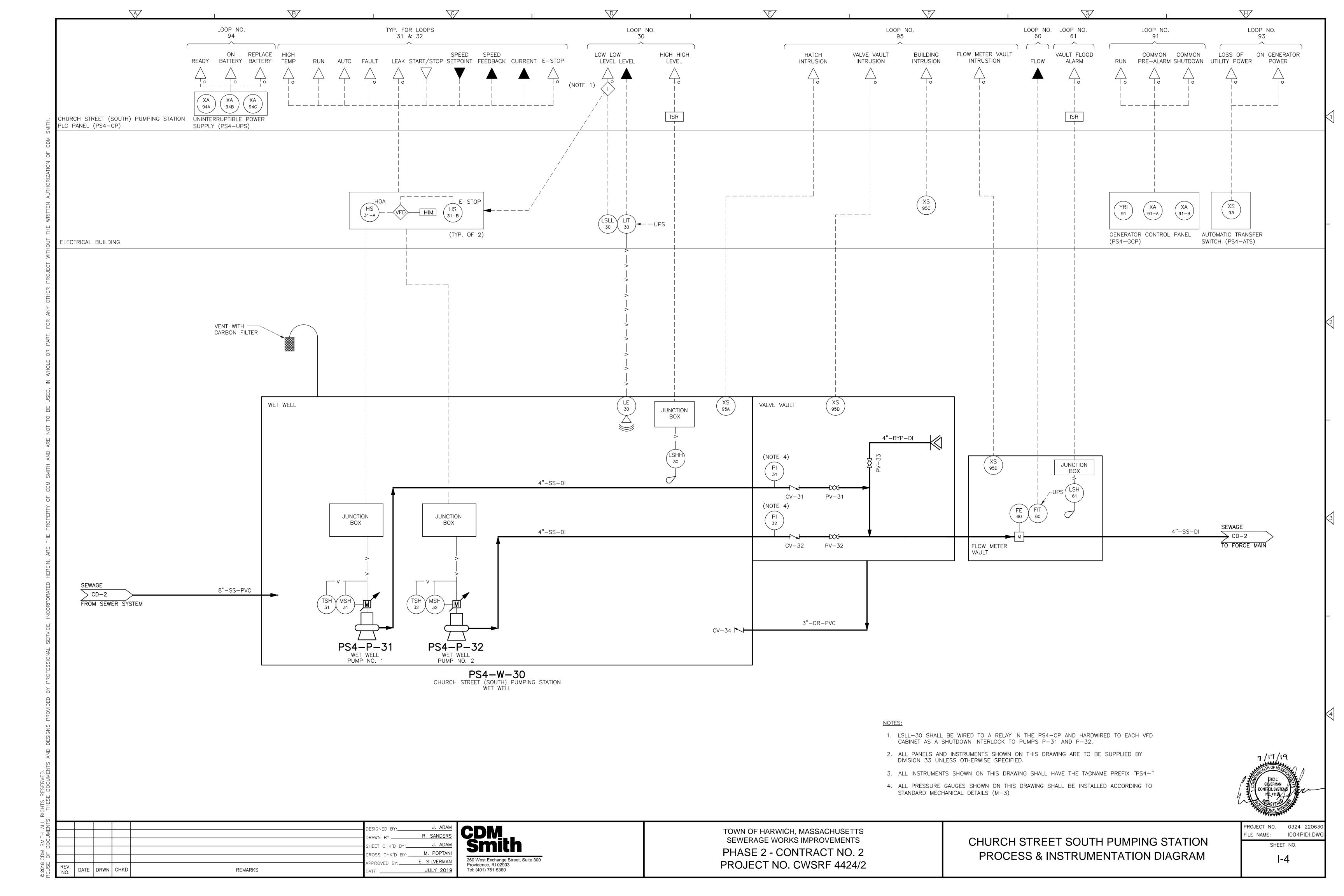
INSTRUMENTATION LEGEND SHEET

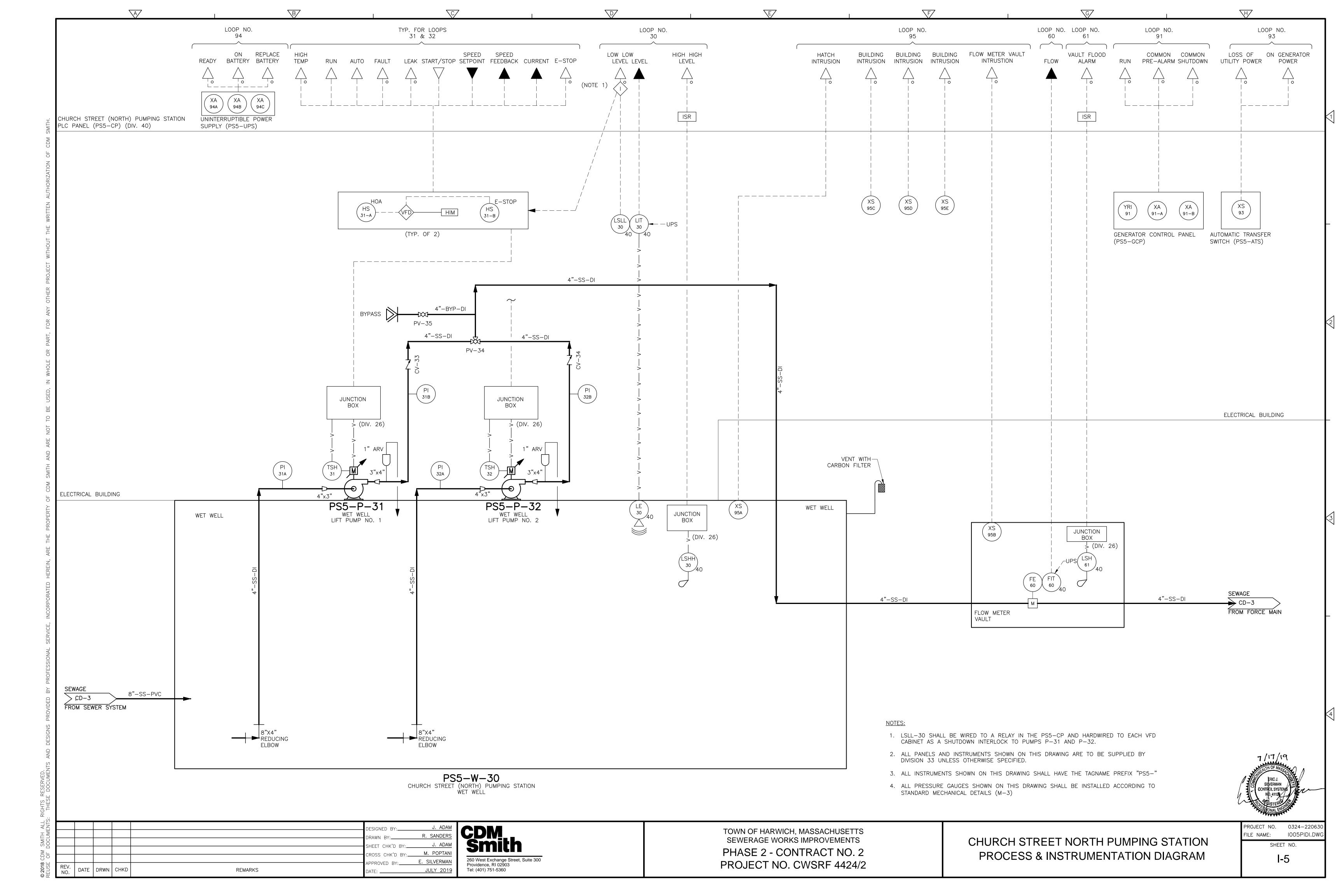
FILE NAME: IOO1SYMB.DW SHEET NO.

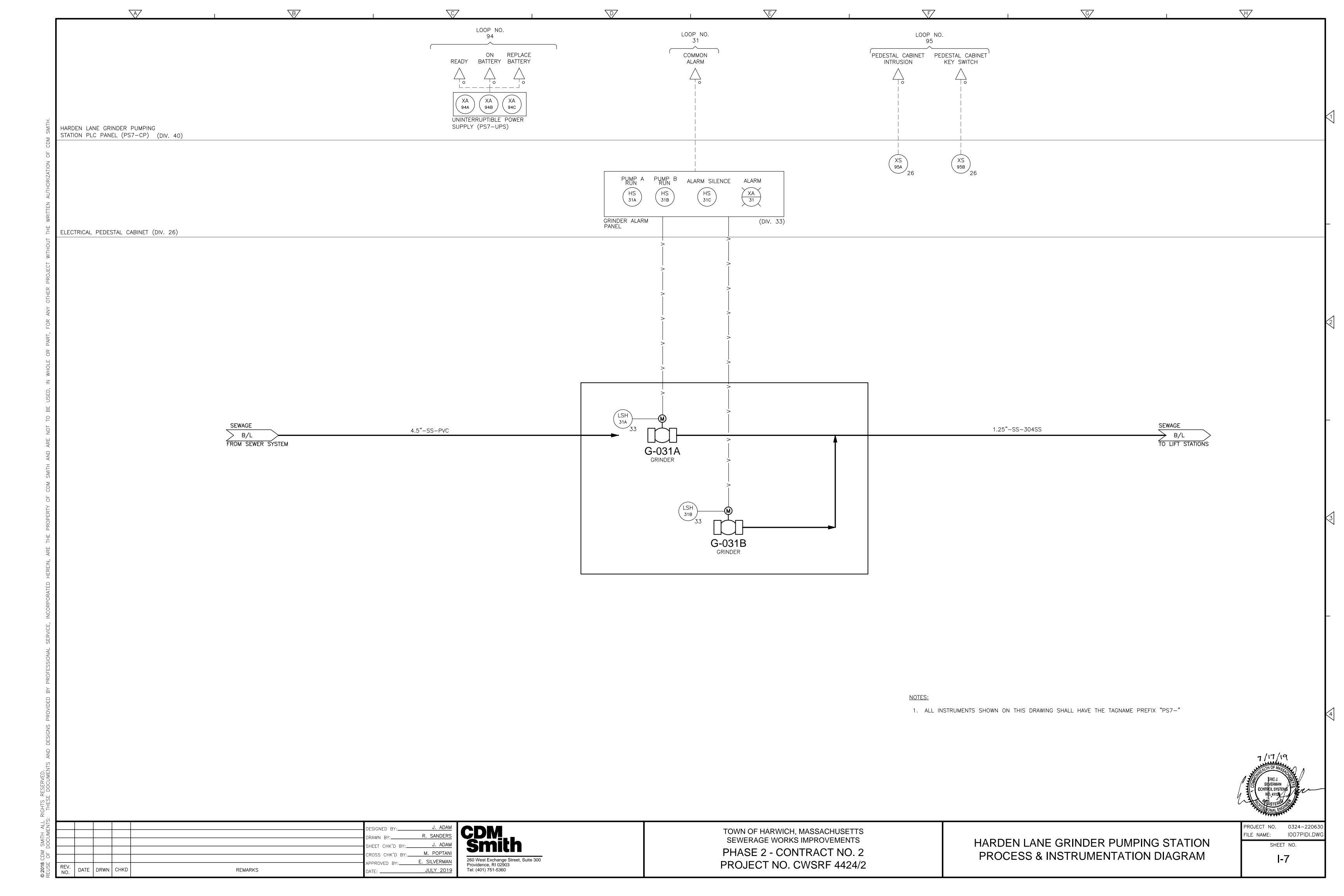
I-1

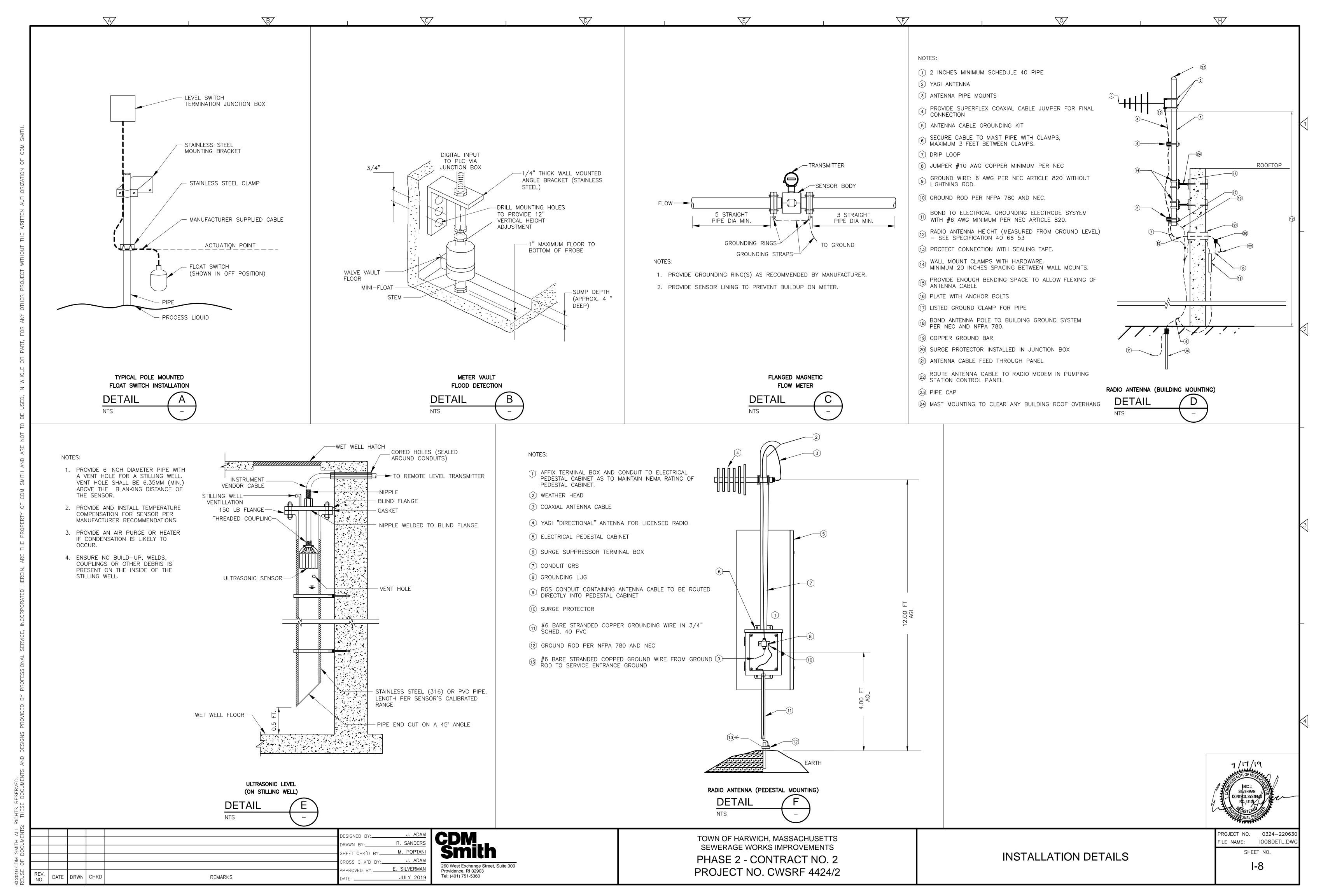
OMNI DIRECTIONAL ANTENNA











- 1. PROJECT PROVIDES NEW PUMPING STATIONS FOR THE TOWN OF HARWICH, MA.
- 2. PROVIDE POWER SYSTEM ANALYSIS IN ACCORDANCE WITH 26 05 73.

GENERAL NOTES:

- 1. ELECTRICAL DRAWINGS ARE INTENDED TO SHOW THE GENERAL LAYOUT OF WORK TO BE INSTALLED UNDER THIS CONTRACT WITHOUT ATTEMPTING TO SHOW ALL DETAILS. FURNISH LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED FOR A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM AS SHOWN ON THE CONTRACT DOCUMENTS.
- 2. COORDINATE WORK WITH OTHER TRADES AND THE OWNER.
- 3. FIELD VERIFY EXISTING UNDERGROUND ELECTRICAL CONDUIT, CONCRETE DUCT BANKS, MANHOLES, PULL BOXES, ETC. AND MECHANICAL PIPING. CONTRACTOR SHALL INCLUDE IN BID COSTS ASSOCIATED WITH RELOCATION OR REMOVAL OF UNDERGROUND EQUIPMENT AS REQUIRED BY THIS CONTRACT. USE DUE CARE IN CONGESTED AREAS TO AVOID DAMAGE TO EXISTING UNDERGROUND UTILITIES.
- 4. CONTRACTOR'S WORK SHALL INCLUDE COMPLETE TESTING OF EQUIPMENT AND WIRING INCLUDING MAKING MINOR CORRECTIONS, CHANGES, OR ADJUSTMENTS NECESSARY FOR THE PROPER FUNCTIONING OF THE SYSTEM AND EQUIPMENT. WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY; SUBSTANDARD WORK WILL BE REJECTED.
- 5. DO NOT SCALE ELECTRICAL DRAWINGS. REFER TO MECHANICAL, STRUCTURAL DRAWINGS, AND APPROVED MANUFACTURER'S SHOP DRAWINGS FOR EXACT LOCATION OF EQUIPMENT. EXCEPT WHERE DIMENSIONS ARE SHOWN, LOCATIONS OF EQUIPMENT, FIXTURES, OUTLETS, AND SIMILAR DEVICES ARE APPROXIMATE.
- 6. WORK SHALL COMPLY WITH NEC AND LOCAL AND STATE CODES.
- 7. DO NOT SPLICE CONDUCTORS EXCEPT AS NOTED.
- 8. POWER AND CONTROL CONDUITS SHALL HAVE AN EQUIPMENT GROUNDING CONDUCTOR WIRE SIZED PER TABLE 250.122 OF THE NEC (UON).
- 9. COORDINATE SEQUENCE OF CONSTRUCTION WITH CIVIL, MECHANICAL, AND STRUCTURAL DISCIPLINES. VERIFY EXISTING UTILITIES IN AREA OF CONSTRUCTION. REFER TO CIVIL DRAWINGS FOR ADDITIONAL UNDERGROUND INFORMATION.
- 10. REPAIR, IN ACCORDANCE WITH SPECIFICATIONS, SIDEWALKS, WALLS, ROADWAYS, ETC. DISTURBED BY CONSTRUCTION ACTIVITIES WHETHER OR NOT SHOWN FOR REPAIR/REPAVING ON CIVIL DRAWINGS.
- 11. CONCEAL CONDUITS TO GREATEST EXTENT PRACTICABLE.
- 12. WHERE LOCAL DISCONNECTS AND CONTROL PANELS ARE SHOWN ON PLAN VIEWS, LOCATIONS ARE APPROXIMATE. ADJUST LOCATION AS REQUIRED TO COMPLY WITH NEC ARTICLE 110 FOR WORKING CLEARANCES.

SUBMITTALS:

- 1. SUBMIT SHOP DRAWINGS FOR EQUIPMENT, MATERIALS AND OTHER ITEMS FURNISHED UNDER DIVISION 26.
- 2. SUBMIT CONDUIT SHOP DRAWINGS FOR YARD ELECTRICAL, WITHIN AND UNDER ROADS, BUILDINGS AND STRUCTURES PRIOR TO COMMENCING WORK. DO NOT POUR CONCRETE UNTIL ENGINEER HAS APPROVED THE ASSOCIATED SHOP
- 3. SUBMIT POWER SYSTEM STUDY IN ACCORDANCE WITH SECTION 26 05 73.
- 4. SUBMIT OPERATION AND MAINTENANCE MANUALS FOR EQUIPMENT FURNISHED UNDER DIVISION 26.
- 5. SUBMIT STARTUP/COMMISSIONING PLANS FOR EQUIPMENT FURNISHED UNDER DIVISION 26.
- 6. SUBMIT TESTING AND SERVICE REPORTS FOR EQUIPMENT AND MATERIALS FURNISHED UNDER DIVISION 26.
- 7. SUBMIT TRAINING PLANS FOR EQUIPMENT FURNISHED UNDER DIVISION 26.
- 8. SUBMIT RECORD DOCUMENTATION TO ACCURATELY SHOW COMPLETED INSTALLATION. INCLUDE MODIFICATIONS TO CONTRACT DOCUMENTS (ONE LINE POWER DIAGRAMS, EQUIPMENT ELEVATIONS, PANEL SCHEDULES, ELEMENTARY CONTROL DIAGRAMS, RISER DIAGRAMS, PLANS, CONDUIT AND DUCTBANK ROUTING, ETC) ALONG WITH ADDITIONAL DRAWINGS OR SKETCHES CREATED TO CONVEY COMPLETED INSTALLATION.

INTERPRETATION OF CONTRACT DOCUMENTS:

- 1. IF DURING PERFORMANCE OF WORK, THERE IS A CONFLICT, ERROR, OR DISCREPANCY BETWEEN OR AMONG CONTRACT DOCUMENTS AND LAWS AND REGULATIONS, PROVIDE THE HIGHER PERFORMANCE STANDARD UNLESS OTHERWISE DIRECTED BY ENGINEER.
- 2. PRIORITY OF DOCUMENTS: FIGURED DIMENSIONS GOVERN OVER SCALED DIMENSIONS, DETAILED DRAWINGS GOVERN OVER GENERAL DRAWINGS, LARGER SCALE DRAWINGS TAKE PRECEDENCE OVER SMALLER SCALE DRAWINGS, CHANGE ORDER DRAWINGS SUPERCEDE ORIGINAL CONTRACT DRAWINGS, AND CONTRACT DRAWINGS GOVERN SHOP DRAWINGS.
- 3. IN GENERAL, DRAWINGS DO NOT SHOW CONDUIT ROUTING. PLAN AND ROUTE CONDUITS IN COMPLIANCE WITH SPECIFICATIONS AND DRAWING DETAILS. COORDINATE INSTALLATION WITH OTHER TRADES AND ACTUAL SUPPLIED EQUIPMENT.
- 4. DUCTBANK ROUTING SHOWN ON ELECTRICAL SITE PLANS IS DIAGRAMMATIC IN NATURE AND MAY NOT INCLUDE INTERFERENCES THAT MAY BE PRESENT.
- 5. SEE ADDITIONAL NOTES ON ELECTRICAL LEGEND SHEET E-2.

ENCLOSURE TYPES:

PROVIDE THE FOLLOWING NEMA TYPE ELECTRICAL ENCLOSURES, UNLESS OTHERWISE NOTED:

- 1. NEMA 12 IN DRY, NON-PROCESS INDOOR LOCATIONS.
- 2. NEMA 4X IN OUTDOOR LOCATIONS, ROOMS BELOW GRADE INCLUDING BASEMENTS AND BURIED VAULTS AND "DAMP" OR "WET" LOCATIONS SHOWN ON THE DRAWINGS.
- 3. NEMA 7 AND LISTED FOR THE SPECIFIC NEC HAZARDOUS AREA CLASSIFICATION AS SHOWN ON THE DRAWINGS.
- 3.1. CLASS I, DIVISION 1 LOCATIONS
- 3.2. CLASS I, DIVISION 2 LOCATIONS

NEC CLASSIFIED HAZARDOUS AREAS:

- 1. THIS PROJECT INCLUDES NEC CLASSIFIED HAZARDOUS AREAS. THE FOLLOWING NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS APPLY:
- NFPA 820 STANDARD FOR FIRE PROTECTION IN WASTEWATER TREATMENT AND COLLECTION FACILITIES
- 2. REFER TO SHEETS E-4, E-8, E-12 & E-16 FOR ADDITIONAL INFORMATION ON CLASSIFICATION BOUNDARIES.
- 3. EQUIPMENT, MATERIALS, AND INSTALLATION SHALL COMPLY WITH NEC ARTICLES 500, 501, 502, AND 503.

MATERIALS AND EQUIPMENT:

- 1. PROVIDE NEW MATERIALS AND EQUIPMENT UNLESS SPECIFICALLY NOTED OTHERWISE.
- 2. ELECTRICAL EQUIPMENT AND MATERIALS SHALL BE LISTED BY UNDERWRITER'S LABORATORIES, INC., AND SHALL BEAR APPROPRIATE UL LISTING MARK OR CLASSIFICATION MARKING. EQUIPMENT, MATERIALS, ETC. UTILIZED NOT BEARING A UL CERTIFICATION SHALL BE FIELD OR FACTORY UL CERTIFIED PRIOR TO EQUIPMENT ACCEPTANCE AND USE.
- 3. PROVIDE MAJOR ELECTRICAL EQUIPMENT BY A SINGLE MANUFACTURER: I.E. UNIT SUBSTATIONS, SWITCHGEAR, MOTOR CONTROL CENTERS, DISCONNECT SWITCHES, TRANSFORMERS, PANELBOARDS, ETC.

EQUIPMENT SIZE, HANDLING AND STORAGE:

- 1. COORDINATE WITH EQUIPMENT MANUFACTURER SHIPPING SPLITS TO PERMIT SAFE HANDLING AND PASSAGE OF EQUIPMENT TO FINAL INSTALLATION LOCATION.
- 2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS FOR UPRIGHT EQUIPMENT ORIENTATION DURING TRANSPORTATION.
- 3. PROTECT EQUIPMENT FROM MECHANICAL INJURY, OR EXPOSURE TO MOISTURE, CHEMICALS, OR CORROSIVE GASES. DO NOT STORE ELECTRICAL EQUIPMENT OUTDOORS.
- 4. PROVIDE AND ENERGIZE TEMPORARY SPACE HEATERS IF REQUIRED TO CONTROL MOISTURE DURING STORAGE.

CUTTING AND PATCHING:

- 1. CUT AND PATCH IN A WORKMANLIKE MANNER AS REQUIRED TO INSTALL ELECTRICAL WORK.
- 2. CUTTING OF STRUCTURAL MEMBERS SUCH AS JOISTS, BEAMS, GIRDERS OR COLUMNS IS PROHIBITED.
- 3. PATCH SURFACES TO RESTORE TO ORIGINAL INTEGRITY (WATERPROOF OR FIREPROOF AS REQUIRED) AND APPEARANCE.

SERVICE AND METERING:

- 1. ELECTRIC POWER COMPANY SERVING THIS PROJECT IS EVERSOURCE. POWER COMPANY CONTACT IS KATHLEEN WHITE, TELEPHONE 508-790-9021, EMAIL KATHLEEN.WHITE@EVERSOURCE.COM. COMPLY WITH POWER COMPANY STANDARDS.
- 2. PAY FOR FEES AND CHARGES AS REQUIRED FOR TEMPORARY/CONSTRUCTION POWER FOR CONTRACTOR'S USE.
- 3. PAY FEES AND CHARGES FOR PERMANENT SERVICE VIA BID ALLOWANCE AND SUBMIT POWER COMPANY INVOICES TO OWNER FOR SUBSTANTIATION.
- 4. WORK REQUEST NUMBERS:
- SUGAR HILL PUMP STATION 2314432
- CHURCH ST. SOUTH PUMP STATION 2314413
 CHURCH ST. NORTH PUMP STATION 2314364
- HUCKLEBERRY PATH PUMP STATION 2314422
 HARDEN LANE GRINDER PUMP STATION 2314451
- 5. POWER COMPANY WORK:
- FURNISH CONDUIT MATERIALS FOR UNDERGROUND SERVICE TO UTILITY TRANSFORMER(S).
- PROVIDE PRIMARY CONDUCTORS (OVERHEAD AND UNDERGROUND) TO UTILITY TRANSFORMER(S).
- PROVIDE UTILITY TRANSFORMER(S).
- TERMINATE UNDERGROUND AND OVERHEAD PRIMARY CABLES AT THE UTILITY TRANSFORMER(S).

 TERMINATE UNDERGROUND SECONDARY CARLES AT THE UTILITY MANUAL ESC.

 TERMINATE UNDERGROUND SECONDARY CARLES AT THE UTILITY MANUAL ESC.
- TERMINATE UNDERGROUND SECONDARY CABLES AT THE UTILITY MANHOLES.
 PROVIDE METERING CURRENT TRANSFORMERS (CT'S), METER(S) AND METER WIRING.
- 6. CONTRACTOR WORK:
- ARRANGEMENTS WITH POWER COMPANY TO OBTAIN SERVICE AND PROVIDE LABOR AND MATERIALS REQUIRED FOR ELECTRICAL SERVICE.
- INSTALL PRIMARY UNDERGROUND CONDUITS.
- PROVIDE SECONDARY UNDERGROUND CONDUITS AND CABLE FROM UTILITY TRANSFORMER(S) TO SERVICE ENTRANCE
- EQUIPMENT.

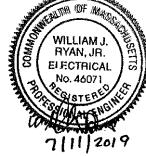
 PROVIDE POWER COMPANY APPROVED METERING CHRRENT TRANSFORMER (CT) ENCLOSES
- PROVIDE POWER COMPANY APPROVED METERING CURRENT TRANSFORMER (CT) ENCLOSURE.
 INSTALL METER BASE ENCLOSURE.
- PROVIDE EMPTY CONDUIT WITH PULL LINE FROM THE METERING CT ENCLOSURE TO THE METER BASE ENCLOSURE.
- 7. CONTRACTOR TO COORDINATE INSTALLATION OF NEW SERVICE WITH EVERSOURCE.

CLEANING:

- 1. REMOVE ALL RUBBISH AND DEBRIS FROM INSIDE AND AROUND ELECTRICAL EQUIPMENT AND ENCLOSURES.
- 2. REMOVE DIRT, DUST OR CONCRETE SPATTER FROM INTERIOR AND EXTERIOR OF EQUIPMENT USING BRUSHES, VACUUM CLEANER OR CLEAN LINT-FREE RAGS. DO NOT USE COMPRESSED AIR.

DELEGATED DESIGN / PROFESSIONAL ENGINEERING SERVICES:

- 1. WHEN ENGINEERING SERVICES ARE SPECIFIED TO BE PROVIDED BY CONTRACTOR, CONTRACTOR SHALL RETAIN A LICENSED PROFESSIONAL ENGINEER TO PERFORM THE SERVICES. ENGINEER SHALL BE LICENSED AT THE TIME SERVICES ARE PERFORMED AND LICENSED IN THE STATE IN WHICH PROJECT IS LOCATED. IF THE STATE ISSUES DISCIPLINE SPECIFIC LICENSES, ENGINEER SHALL BE LICENSED IN THE APPLICABLE DISCIPLINE. ENGINEER SHALL BE EXPERIENCED IN THE TYPE OF WORK BEING PERFORMED.
- 2. ENGINEERING WORK SHALL BE DONE ACCORDING TO THE APPLICABLE REGULATIONS FOR PROFESSIONAL ENGINEERS TO INCLUDE SIGNING, SEALING AND DATING DOCUMENTS.





TOWN OF HARWICH, MASSACHUSETTS
SEWERAGE WORKS IMPROVEMENTS
PHASE 2 - CONTRACT NO. 2
PROJECT NO. CWSRF 4424/2

ELECTRICAL GENERAL NOTES PROJECT NO. 0324-220630

FILE NAME: E001NFN

SHEET NO.

E-1

	A.				<u> </u>	<u> </u>		E/	\r\ 		<u> </u>		<u>//</u>	–
ONE LINE OR CONTROL DIAGRAM	PLAN	DESCRIPTION	ONE LINE OR CONTROL DIAGRAM	PLAN	DESCRIPTION	ONE LINE OR CONTROL DIAGRAM	PLAN	DESCRIPTION	ONE LINE OR CONTROL DIAGRAM	PLAN	DESCRIPTION	AND DEVICES IS NOT	ROUTING FOR EQUIPMENT SHOWN ON THE PLANS. ALL BE RESPONSIBLE FOR	
52 CS		MEDIUM VOLTAGE DRAWOUT TYPE POWER CIRCUIT BREAKER CS=CONTROL SWITCH			METER * WM - WATTMETER WHM - WATTHOUR METER WHDM - WATTHOUR DEMAND METER WHDR - WATTHOUR DEMAND RECORDER	— <u>*</u>		PILOT LIGHT, COLOR AS NOTED * R - RED G - GREEN B - BLUE W - WHITE	—o LA o— II		LIGHTNING ARRESTER	ROUTING ALL CONDUITS CONDUITS SHOWN ON	FS WHICH SHALL INCLUDE ONE—LINE AND RISER -RUNS SHOWN ON PLAN D SPECIFICATIONS FOR	
Ÿ					PF — POWER FACTOR METER DMU — DIGITAL METERING UNIT			A - AMBER PILOT LIGHT, PUSH-TO-TEST TYPE, COLOR AS	<u> </u>	•	GROUND OR GROUND ROD	2. THE WIRING DIAGRAMS,	S, QUANTITY AND SIZE OF REPRESENT A SUGGESTE	2
FRAME TRIP	СВ	LOW VOLTAGE AIR OR MOLDED CASE CIRCUIT BREAKER, 3 POLE UNLESS OTHERWISE NOTED.			TRANSDUCER AX — CURRENT TRANSDUCER WX — WATT TRANSDUCER WHX — WATTHOUR TRANSDUCER			NOTED ABOVE. TIME DELAY RELAY	30A ——————		FUSE, AMPERE RATING AS NOTED	STANDARD COMPONENT	TS OF ELECTRICAL ATIONS ACCEPTABLE TO BE MADE BY THE	1
AMPS		COMBINATION MOTOR CIRCUIT PROTECTOR AND MAGNETIC MOTOR STARTER, FULL VOLTAGE NON-REVERSING UNLESS OTHERWISE NOTED: * FVR - FULL VOLTAGE REVERSING			RELAY, NO. AS INDICATED 25 — SYNCHRONISM CHECK RELAY 27 — UNDERVOLTAGE RELAY 32 — DIRECTIONAL POWER RELAY	* RANGE # SETPOINT		RANGE AS NOTED SETPOINT AS NOTED # NUMBER AS INDICATED ** TDE - TIME DELAY AFTER ENERGIZATION	~	HTR	STRIP HEATER OR HEATING ELEMENT	ACTUALLY PURCHASED. AND METHOD OF CON). THE BASIC SEQUENCE ITROL MUST BE TED ON THE DRAWINGS	
SIZE TYPE *	\boxtimes	RVNR — REDUCED VOLTAGE NON—REVERSING RVAT — REDUCED VOLTAGE AUTOTRANSFORMER			38 - BEARING PROTECTIVE DEVICE 40 - LOSS OF EXCITATION RELAY 42 - RUNNING CONTACTOR/PILOT RELAY 46 - REVERSE PHASE/PHASE BALANCE/CURRENT	N/z		ON DELAY TDD — TIME DELAY AFTER DE—ENERGIZATION OFF DELAY			INDUCTOR	3. SWITCHGEAR AND MOTO COMPARTMENT DESIGNABELOW:		
		RVSS — REDUCED VOLTAGE SOLID STATE 2S1W — TWO SPEED, ONE WINDING 2S2W — TWO SPEED, TWO WINDING (DIAGRAMMATICALLY SHOWN, CONTRACTOR SHALL			RELAY 47 — PHASE SEQUENCE VOLTAGE RELAY 49 — MACHINE OR TRANSFORMER THERMAL RELAY 50/51 — INSTANTANEOUS/TIME OVERCURRENT RELAY 50G — INSTANTANEOUS GROUND	NOTC NOTC		NOTC - NORMALLY OPEN, TIMED CLOSING WHEN ENERGIZED NCTO - NORMALLY CLOSED, TIMED OPENING WHEN ENERGIZED	(3)	TG	TACHOMETER GENERATOR	BLANK: NOT INTENE ONLY SPACE: EQUIPPED	DED FOR USE. PLATE WITH REQUIRED BUS WARE FOR THE FUTURE	
1,		FIELD LOCATE) NON-FUSIBLE DISCONNECT SWITCH, 600 VOLT, 3 POLE	1		51 — TIME OVERCURRENT RELAY 51G — TIME OVERCURRENT RELAY, GROUNDING RESISTOR TYPE 51N — TIME OVERCURRENT RELAY, RESIDUAL TYPE	— NOTO		NOTO - NORMALLY OPEN, TIMED OPENING WHEN DE-ENERGIZED			CONTACT, NORMALLY OPEN (NO)	ADDITION (STARTERS RANGE SHO	OF BREAKERS AND/OR WITHIN THE SIZE AND OWN	L
/*		* AMPERE RATING NOTED IF OTHER THAN 30A (DIAGRAMMATICALLY SHOWN, CONTRACTOR SHALL FIELD LOCATE)		*	51V — TIME OVERCURRENT RELAY WITH VOLTAGE RESTRAINT 51X — AUXILIARY RELAY (TRIPS CB AND ALARMS) 59 — OVERVOLTAGE RELAY 60 — NEGATIVE SEQUENCE VOLTAGE RELAY	NCTC NCTC	*- ##)	NCTC - NORMALLY CLOSED, TIMED CLOSING WHEN DE-ENERGIZED FIELD INSTRUMENT, TAG NO. AS INDICATED			CONTACT, NORMALLY CLOSED (NC)	INSTALLED STARTER O	A COMPLETELY BREAKER AND/OR DF SIZE AND TYPE FOR FUTURE USE.	
*/	F	FUSIBLE DISCONNECT SWITCH, 600 VOLT, 3 POLE, * AMPERE RATING AND FUSE SIZE AS NOTED * AMPERE RATING NOTED IF OTHER THAN 30A FUSE RATING			62 — TIME DELAY RELAY 63 — OVERPRESSURE RELAY 64 — GENERATOR FIELD GROUND RELAY 67 — AC DIRECTIONAL OVERCURRENT RELAY 74 — ALARM LATCHING RELAY			* INDICATES INSTRUMENT TYPE DEFINED ON LOOP SHEETS OR P & ID ## INDICATES LOOP NO. LIQUID LEVEL (FLOAT) SWITCH	x		OVERLOAD RELAY HEATER	4. INTERPRETATION OF EL CIRCUIT IDENTIFICATION SIZES OF CONDUITS A	N, ROUTING, AND AND WIRES ARE	
Ĭ		(DIAGRAMMATICALLY SHOWN, CONTRACTOR SHALL FIELD LOCATE) MANUAL MOTOR STARTER WITH THERMAL			 83 - AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY 86 - LOCKING-OUT RELAY 87 - DIFFERENTIAL PROTECTIVE RELAY 			NORMALLY OPEN, CLOSES ON RISING LEVEL	——————————————————————————————————————		* K = KEY INTERLOCK E = ELECTRICAL INTERLOCK	A. ONE LINE POWER DIAG	GRAMS: POWER, CONTRO	-
-\x-	P ₂	OVERLOAD HEATER, 1 POLE UNLESS OTHERWISE NOTED "P" INDICATES WITH PILOT LIGHT "2" INDICATES TWO POLE (DIAGRAMMATICALLY SHOWN, CONTRACTOR SHALL			B - SUFFIX INDICATES "BUS" G - SUFFIX INDICATES "GENERATOR" GF - GROUND FAULT ST - SHUNT TRIP T - SUFFIX INDICATES "TRANSFORMER"	Jo-		NORMALLY CLOSED, OPENS ON RISING LEVEL	ТВ		TERMINAL OR TEST BLOCK	ELECTRICAL DISTRIBUTION EQUIPMENTES SWITCHBOUTE AND MAJOR	TION EQUIPMENT AND IT POWERED FROM SOARDS, MOTOR CONTROL POWER DISTRIBUTION	2
│		FIELD LOCATE) DRAWOUT TYPE EQUIPMENT OR DEVICE	-		X — SUFFIX INDICATES "AUXILIARY" SPECIAL CAPACITOR		PS OR	PRESSURE OR VACUUM SWITCH NORMALLY OPEN, CLOSES ON RISING PRESSURE	RTD		RESISTANCE TEMPERATURE DETECTOR	ONE LINE DIAGRAMS. IDENTIFIED ON THE ON	PICALLY SHOWN ON THE THE PARAMETERS NE LINE DIAGRAMS ARE: N, CIRCUIT ORIGIN AND	
		MEDIUM VOLTAGE CABLE TERMINATION			* SC - SURGE CAPACITOR PF - POWER FACTOR CORRECTION CAPACITOR	-070-		NORMALLY OPEN, CLOSES ON DROPPING PRESSURE NORMALLY CLOSED, OPENS ON RISING	VE OR H		VIBRATION DETECTOR	QUANTITY FOR COMPLE AUXILIARY DEVICES AS CONTROL/PROTECTION	OF THE POWERED	
					TUNED POWER FACTOR CORRECTION CAPACITOR PUSHBUTTON, MOMENTARY CONTACT, SPRING			PRESSURE NORMALLY CLOSED, OPENS ON DROPPING PRESSURE	DM	DM	DAMPER MOTOR	EQUIPMENT, AND SIZE ELECTRODE CONDUCTO B. INSTRUMENTATION AND	DRS.	
		MEDIUM VOLTAGE AIR INTERRUPTER SWITCH MEDIUM VOLTAGE FUSED AIR INTERRUPTER			RETURN, NORMALLY CLOSED		TS OR T OR	TEMPERATURE SWITCH OR THERMOSTAT NORMALLY OPEN, CLOSES ON RISING	ETM		ELAPSED TIME METER	DIAGRAMS: POWER, C DATA HIGHWAY WIRING INSTRUMENTS AND COI CONTROLLED/MONITORI	CONTROL, SIGNAL AND REQUIREMENTS FOR ONTROL DEVICES	F
*		SWITCH ★ FUSE RATING	0 0		PUSHBUTTON, MOMENTARY CONTACT, SPRING RETURN, NORMALLY OPEN EMERGENCY STOP PUSHBUTTON WITH RED			TEMPERATURE NORMALLY OPEN, CLOSES ON DROPPING TEMPERATURE	M	I T	MOTOR OPERATED VALVE OR GATE	INSTRUMENTÁTION AND AS RTUS, PLCS, TERM REMOTE I/O PANELS A) CONTROL PANELS SUCH MINAL CABINETS, AND ARE TYPICALLY SHOWN OF	1
. XFMR NO. 1	·	MEDIUM VOLTAGE FUSED MOTOR CONTROLLER TRANSFORMER, RATINGS AND CONNECTIONS AS	مآه	ES	MUSHROOM HEAD OPERATOR (MAINTAINED CONTACT)			NORMALLY CLOSED, OPENS ON RISING TEMPERATURE			INDICATES LIMITS OF ELECTRICAL EQUIPMENT O WIRING ENCLOSURE	DIAGRAMS. THE PARA THE ONE LINE DIAGRA R IDENTIFICATION, CIRCUI	IT ORIGIN AND	
480V 2 KVA	Т	NOTED. UNLESS OTHERWISE NOTED ON THE SINGLE LINE DIAGRAMS, ALL DRY TYPE TRANSFORMERS SERVICING ADMINISTRATIVE AND LABORATORY SPACES SHALL HAVE A K FACTOR	STOP START	PBL	START-STOP PUSHBUTTON CONTROL STATION (MOMENTARY CONTACT) WITH LOCKOUT DEVICE ON STOP	<u> </u>	FS OR ■	NORMALLY CLOSED, OPENS ON DROPPING TEMPERATURE FLOW SWITCH (AIR, WATER, ETC.)			WIRING ENCLOSURE	QUANTITY AND TYPE F LENGTH, AND AUXILIAR WITH THE CONTROL/PI	RY DEVICES ASSOCIATED PROTECTION OF THE	
120/208V 3P, 4W		OF 4. ISOLATION TRANSFORMERS SHALL HAVE A K-20 RATING	a To J	РВМ	START-STOP PUSHBUTTON CONTROL STATION, MAINTAINED CONTACT WITH LOCKOUT DEVICE ON STOP			NORMALLY OPEN, CLOSES ON INCREASED FLOW		EXISTING WORK	NEW FUTURE EXPANSION	POWERED EQUIPMENT. C. FLOOR PLANS: FOR I OF CIRCUITS LOCATED	DETERMINING THE LENGTH	(3
* A TO 5		CURRENT TRANSFORMER * QUANTITY A = PRIMARY AMPERES	OFF ON			-0-[0-		NORMALLY CLOSED, OPENS ON INCREASED FLOW	FVISTII	NC NEW OR E	TUTURE CONDITION DESIGNATION	FLOOR PLANS SHOW T ELECTRICAL DISTRIBUTI PANELS, UTILIZATION E		
* X TO 120		POTENTIAL TRANSFORMER * QUANTITY V = PRIMARY VOLTAGE	مكم	S/S	OFF/ON SELECTOR SWITCH		ZS OR	POSITION (LIMIT) SWITCH NORMALLY OPEN			IATION (SEE MCC FRONT ELEVATION)	ANTICIPATED PENETRAT CONDUITS EXIT/ENTER HOMERUNS MAY ALSO	TION LOCATIONS WHERE THE STRUCTURE. BE SHOWN FROM	
	G	GENERATOR, RATINGS AND CONNECTIONS AS NOTED		LR	LOCAL/REMOTE SELECTOR SWITCH	-0-0-		NORMALLY OPEN — HELD CLOSED		Ψ PARTIALI CONDUI	ES CONDUIT IS ALL OR LY LOCATED UNDERGROUND. I SIZE SHOWN INDICATES THE	ONE LINE OR RISER D		
ATS		AUTOMATIC OR MANUAL TRANSFER SWITCH NO.1			3 POSITION SELECTOR SWITCH, MAINTAINED	—0 <u>—</u> 0—		NORMALLY CLOSED — HELD OPEN	SIZE AMPS MCP RVNR	UNDERG SHOWN	THIN STRUCTURE. ROUND CONDUIT SIZE IS ON DUCT BANK SECTIONS.	TO IDENTIFY THE SPEC THE UNDERGROUND CO	R TO STRUCTURES AND CIFIC REQUIREMENTS OF CONDUITS OR DUCT BANKS E GENERAL ROUTING OF	·,
N S		(ATS-1), (MTS-1) "N" INDICATES NORMAL OR PREFERRED SOURCE "S" INDICATES STANDBY OR ALTERNATE SOURCE 100A INDICATES CONTINUOUS CURRENT RATING			CONTACT O-OPEN X-CLOSED TOP MIDDLE BOTTOM CONTACT CONTACT		WS OR I	TORQUE SWITCH		A QUANTITY EACH CONT. CONDUCTOR	2) 3"C., 3#3/0, 1#2G DENOTES OF TWO (2) 3—INCH CONDUITS AINING THREE NO. 3/0 AWG S AND 1 NO. 2 AWG GROUND	UNDERGROUND CONDU WITH SECTIONS INDICA ARRANGEMENT AND CII	ATING THE CONDUIT SIZE,	
100A			A B C* (X00)	*	A X O O O B O X O	-070-		NORMALLY OPEN, CLOSES ON HIGH TORQUE		IN MCC-1	R, FROM NEMA SIZE 6 STARTER TO 250HP MOTOR LOAD. 3/4"C., 7#14, 1#14G DENOTES		TED ON ONE—LINE GROUND SIZE IS INDICATEI)
*	*	VARIABLE SPEED DRIVE CONTROLLER * D.C. = D.C. DRIVE CONTROLLER SCR = SILICON CONTROLLED RECTIFIER VFD = VARIABLE FREQUENCY DRIVE	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	<u></u>	NAMEPLATE (A/B/C) HOA — HAND/OFF/AUTO	-078-		NORMALLY CLOSED, OPENS ON HIGH TORQUE UTILIZED IN CONJUNCTION WITH OTHER CONTROL SCHEMATIC SYMBOLS TO DEPICT THE PHYSICAL	1#14G	ONE 3/4-I NO. 14 AW	NCH CONDUIT CONTAINING SEVEN G CONTROL CONDUCTORS AND 1 G GROUND CONDUCTOR. G GROUND CONDUCTOR.	ON DUCT BANK SECTION	ONIC.	
1	Ē	UNIT HEATER — ELECTRIC HEATING COIL AND FAN # — RATING			HOR - HAND/OFF/REMOTE LOR - LOCAL/OFF/REMOTE RSL - RAISE/STOP/LOWER TOA - TEST/OFF/AUTO	#		LOCATION OF THE DEVICE # REPRESENTS LOCATION SEE LOCATION LEGEND ON DRAWING	C., 3#3/0 2., 7#14, 1#14G	IDENTIFICATI <u>NOTES:</u>	ON (ID) (TYPICAL) SOME APPEAF	A STANDARD LEGEND. SYMBOLS MAY NOT ON THE DRAWINGS.		4
		UNIT HEATER — GAS FIRED, STEAM OR WATER HEATING COIL AND FAN	GD/VF #	GD/VF #	GAS DETECTOR / VENTILATION FAILURE ALARM # INDICATES TYPE OF UNIT 1=MASTER, 2=REMOTE	+ +		CONDUCTORS OR CONDUITS CROSSING PATHS BUT NOT CONNECTED	: (2) 3"C A: 3/4"C ., 3#14,	SHOWN. 2. CONTRO	TIVE/CONTROL DEVICE AS OL/AUXILIARY DEVICES AT OR			
5 VS-VM	M	MOTOR, NUMERAL INDICATES HORSEPOWER VOLTMETER WITH SWITCH, 3 PHASE	42 #		MOTOR STARTER COIL, NUMBER AS INDICATED TO DENOTE INTERLOCKING ONLY			CONDUCTORS ELECTRICALLY CONNECTED	MCC1-1 MCC1-1	INSTALL EQUIPMI	QUIPMENT. EQUIPMENT SHALL BE ED AND WIRED AS REQUIRED BY ENT FURNISHED AND/OR IL DIAGRAM.		WILLIAM J. RYAN, JR. EI FCTRICAL	
VS-VM * AS-AM		AMMETER WITH SWITCH, 3 PHASE	-CR		CONTROL RELAY COIL, NUMBER AS INDICATED	o-\-\o		SOLENOID VALVE	250 TS CS	TYPICAI	ONE LINE DIAGRAM		S ELECTRICAL CO NO. 46071 NO. 46071 7 [11] 2019	
*			DESIGNED BY:	J. ARNONE		L			<u>S</u>		AND CONTROL TO EQUIPMENT	I p	7 2019 PROJECT NO. 0324-22063	30
			DRAWN BY:	J. ARNONE	Smith		SI	WN OF HARWICH, MASSACHUSETTS EWERAGE WORKS IMPROVEMENTS HASE 2 - CONTRACT NO. 2			ELECTRICAL LEGEND I		FILE NAME: E002NFL SHEET NO. F-2	

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DATE DRWN CHKD

REMARKS

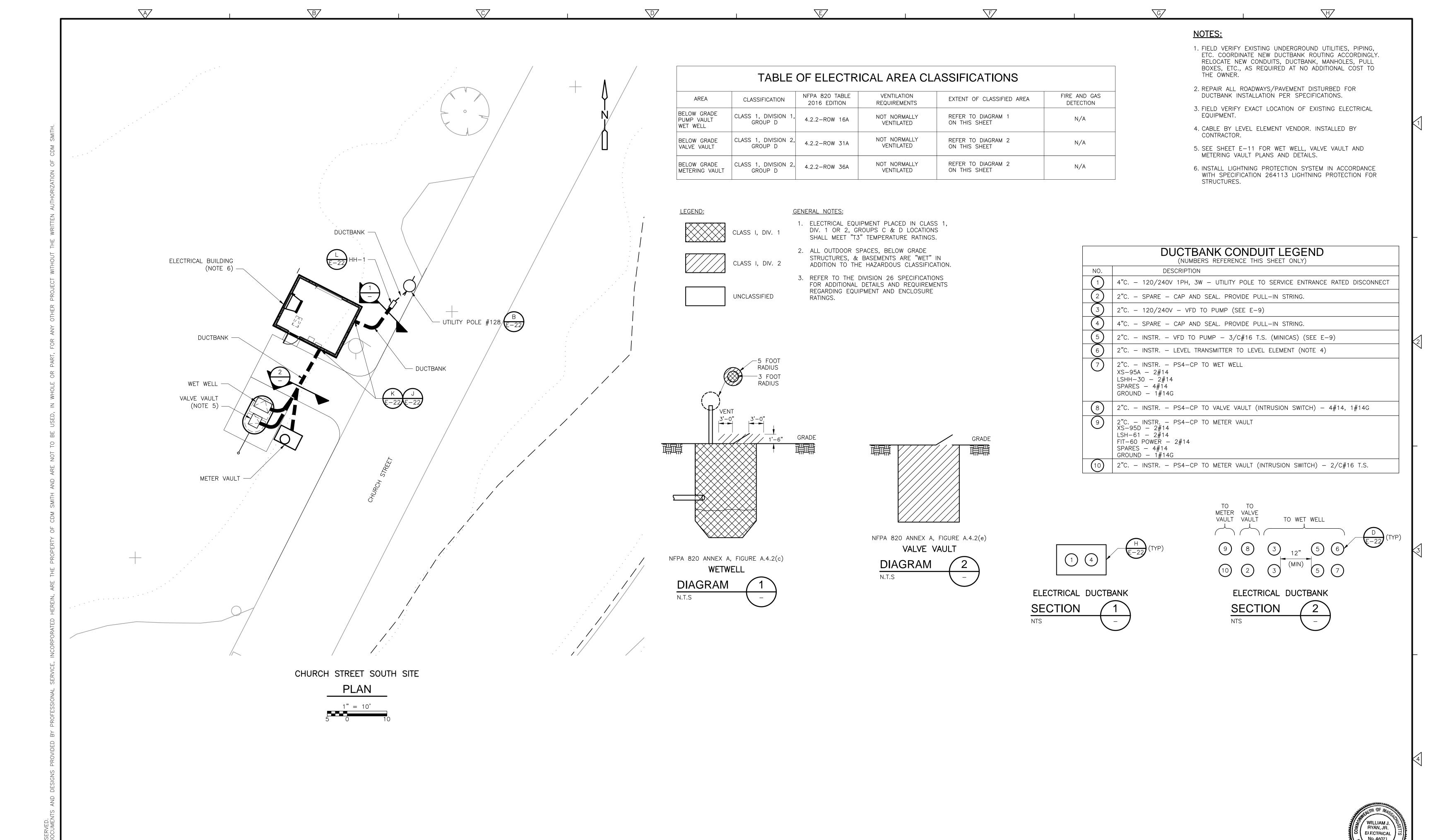
PROJECT NO. CWSRF 4424/2

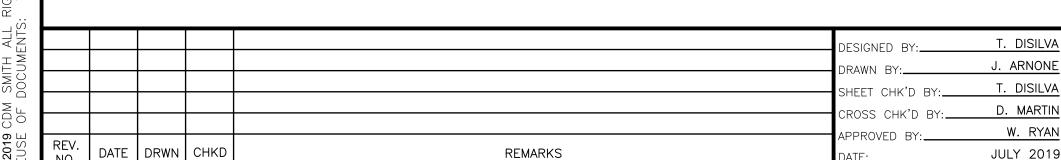
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	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION		ABBREVIATIONS (CONTINUED)	$\Box 1$
	A 3	LIGHTING FIXTURE	\$ _a	SINGLE POLE SWITCH "a" INDICATES FIXTURES CONTROLLED.		GROUND SYSTEM GRID OR LOOP, 36" BELOW FINISHED GRADE UNLESS OTHERWISE NOTED.	r fr	FIRE ALARM MASTER BOX	ELEV EM ENCL	ELEVATION EMERGENCY ENCLOSURE OR ENCLOSED	
	A \sum_{b}^{3}	"A" — FIXTURE TYPE (SEE LIGHTING FIXTURE SCHEDULE) "b" — CONTROLLED BY SWITCH "b" "3" — CIRCUIT NUMBER	\$ ²	DOUBLE POLE SWITCH "a" INDICATES FIXTURES CONTROLLED.		EXOTHERMIC WELD CONNECTION	F	FIRE ALARM HORN, MOUNT UP 7'-6"	EQUIP EWC	EQUIPMENT ELECTRIC WATER COOLER	
	A3	LIGHTING FIXTURE, NOTATIONS SAME AS ABOVE	\$ ³	THREE WAY SWITCH "c" INDICATES FIXTURES CONTROLLED.	•	3/4" x 10'-0" GROUND ROD. UNLESS SPECIFIED OTHERWISE.	15	FIRE ALARM STROBE, MOUNT UP 6'-8"	EWH EX	ELECTRIC WATER HEATER EXISTING FIBER OPTIC	
	b		\$ ⁴ _a	FOUR WAY SWITCH "a" INDICATES FIXTURES CONTROLLED.	•	GROUND ROD TEST WELL STATION (SEE DETAIL SHEET FOR REQUIREMENTS)	<u>F</u>	15 = CANDELA RATING FIRE ALARM HORN AND STROBE LIGHT COMBINATION, MOUNT UP	FU GCP	FUSE GENERATOR CONTROL PANEL	
SMITH.	A H b	WALL MOUNTED TYPE LIGHTING FIXTURE, NOTATIONS SAME AS ABOVE	\$ ^D	DIMMER SWITCH "a" INDICATES FIXTURES CONTROLLED		COMMUNICATION SYSTEMS	F	6'-8" 15 = CANDELA RATING	GEN G, GND	GENERATOR GROUND	
OF CDM	A ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ	CROSS HATCH INDICATES LIGHTING FIXTURE THAT IS UNSWITCHED AND	\$ os	SINGLE POLE SWITCH "OS" INDICATES A PASSIVE INFRARED OCCUPANCY SENSOR	▼ K	TELEPHONE OUTLET FOR DESK TYPE HANDSET K = KEY SYSTEM	F	FIRE ALARM MANUAL PULL STATION, MOUNT UP 4'-0"	GRS HACR	GROUND FAULT INTERRUPTER GALVANIZED RIGID STEEL HEATING & AIR CONDITIONING R	ATED
ATION	A	SHALL REMAIN ON AT ALL TIMES. NOTATIONS SAME AS ABOVE.	\$ ² _{OS}	DOUBLE POLE SWITCH "OS" INDICATES PROGRAMMABLE OCCUPANCY SENSOR CAPABLE OF	- ▼K	TELEPHONE OUTLET FOR WALL TYPE HANDSET (MOUNT UP 4'-6") K = KEY SYSTEM	VSS	SPRINKLER VALVE SUPERVISORY SWITCH	HH HT	HANDHOLE HEIGHT	
JTHORIZ	A_{b}^{3}	SHADED AREA INDICATES LIGHTING FIXTURE THAT IS EQUIPPED WITH	\$ DT	INBOARD/OUTBOARD SWITCHING SINGLE POLE SWITCH "DT" INDICATES DUAL TECHNOLOGY PROGRAMMABLE OCCUPANCY SENSOR	∇	PAGE/PARTY TELEPHONE OUTLET FOR DESK TYPE HANDSET	SFS	SPRINKLER FLOW ALARM SWITCH	HID HP H7	HIGH INTENSITY DISCHARGE HORSEPOWER HERTZ	
TEN AL	A OR 3	EMERGENCY BACKUP POWER SOURCE. NOTATIONS SAME AS ABOVE.	—	CAPABLE OF SENSING MOTION AND SOUND	$\overline{\forall}$	PAGE/PARTY TELEPHONE OUTLET FOR WALL TYPE HANDSET, MOUNT UP 4'-6"	EO	FIRE ALARM BELL	ID INSTR	IDENTIFICATION INSTRUMENT	
HE WRI	A 3	POLE MOUNTED AREA TYPE LIGHTING FIXTURE, NOTATIONS SAME AS ABOVE	C 3	LIGHTING CONTACTOR WITH NUMBER OF POLES AS INDICATED		PAGING SPEAKER, WALL MOUNTED H = HORN TYPE	<u> </u>	WEATHERPROOF HI-INTENSITY FIRE ALARM STROBE LIGHT WITH HORN	K kcmil	KILO (PREFIX) 1000 CIRCULAR MILS	
TUOH	3	POLE MOUNTED ROADWAY TYPE LIGHTING FIXTURE, NOTATIONS SAME	TM	TIME SWITCH PUSH BUTTON STATION		W = WIDE ANGLE TYPE PAGING SPEAKER, WALL MOUNTED, BI-DIRECTIONAL, HORN TYPE WIDE ANGLE TYPE	PIR	PASSIVE INFRARED DETECTOR	KVA KW LA	KILOVOLT AMPERES KILOWATTS LIGHTNING ARRESTER	
CT WITH	у Ц	AS ABOVE EMERGENCY LIGHTING BATTERY UNIT WITH TWO LAMP HEADS	TYPE A	INDICATES ALL LIGHTING FIXTURES WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION APPEARS SHALL BE TYPE "A" UNLESS	S	W = WIDE ANGLE TYPE PAGING SPEAKER, FLUSH MOUNTED CEILING TYPE	R	SMOKE BEAM DETECTOR (RECEIVER)	LTG LP	LIGHTING LIGHTING PANEL	
PROJE	EM 3 (*)	"EM" — FIXTURE TYPE (SEE LIGHTING FIXTURE SCHEDULE) "3" — SUPERVISORY CIRCUIT	[TIFL A]	OTHERWISE NOTED. SEE LIGHTING FIXTURE SCHEDULE FOR TYPES	<u> </u>	PAGING SPEAKER, SURFACE MOUNTED CEILING TYPE	T	SMOKE BEAM DETECTOR (TRANSMITTER)	LV MAX MCB	LOW VOLTAGE MAXIMUM MAIN CIRCUIT BREAKER	
OTHER		* - FIXTURE TAG # REMOTE EMERGENCY ADJUSTABLE WALL LIGHTING FIXTURE WITH TWO		LIGHTING PANELBOARD (LP-#) SHOWN ON PLAN PER ACTUAL PANEL DIMENSIONS	VC	REMOTE WALL MOUNTED VOLUME CONTROL FOR CEILING SPEAKER,	_	FIRE ALARM SMOKE DETECTOR REMOTE INDICATOR AND TEST SWITCH	MCC MCC MCP	MOTOR CONTROL CENTER MOTOR CIRCUIT PROTECTOR	
JR ANY	R-2 BU-1(*)			POWER PANELBOARD (PP-#) OR DISTRIBUTION PANELBOARD (DP-#) SHOWN ON PLAN PER ACTUAL PANEL DIMENSIONS	A	MOUNT UP 5'-0" PAGING SPEAKER AMPLIFIER ASSEMBLY		ABBREVIATIONS A AMPS	MDP MFR	MAIN DISTRIBUTION PANEL MANUALE	
ART, FC	, ,	SHALL BE 3/4" AND CONTAIN (2) NO. 12 AWG BRANCH CIRCUIT CONDUCTORS AND (1) NO. 12 AWG GROUND CONDUCTOR UNLESS OTHERWISE INDICATED.		LIGHTING CONTACTOR PANELBOARD (LCP-#) SHOWN ON PLAN PER ACTUAL PANEL DIMENSIONS	TM	TELEPHONE CABINET OR BACKBOARD AS NOTED		AC ALTERNATING CURRENT AFF ABOVE FINISHED FLOOR	MH MIN MLO	MANHOLE MINIMUM MAIN LUGS ONLY	
OR P	A 3 3	COMBINATION BATTERY UNIT AND EXIT SIGN. FILLED QUADRANT REPRESENTS FACE SIDE OF SIGN.		DUPLEX RECEPTACLE, 20A, 120V, 2P, 3W * GFCI — GROUND FAULT CIRCUIT INTERRUPTER TYPE	P C	"C" — DATA INPUT/OUTPUT CABLE OUTLET		AFG ABOVE FINISHED GRADE AL ALUMINUM AIC AMPERE INTERRUPTING CAPACITY	MTD MTS	MOUNTED MANUAL TRANSFER SWITCH	
MHOLF	A 3	CEILING MOUNTED EXIT SIGN, NOTATIONS SAME AS ABOVE. WHEN USED, ARROW INDICATES DIRECTION OF EGRESS. FILLED QUADRANT	* 4	WP — WEATHERPROOF XP — EXPLOSION PROOF T — TRANSIENT VOLTAGE SURGE SUPPRESSOR	GD/VF	"P" - PROCESS COMPUTER SYSTEM (CAT6 RJ-45 JACK) GAS DETECTOR/VENTILATION FAILURE ALARM,		AMP AMPERE ATS AUTOMATIC TRANSFER SWITCH	N N NC	MEDIUM VOLTAGE NEUTRAL NORMALLY CLOSED	
SED, IN	A	REPRESENTS FACE SIDE OF SIGN. (DOUBLE FACE DOUBLE CHEVRONS SHOWN)		IC - ISOLATED GROUND 4 - CIRCUIT NUMBER DUPLEX RECEPTACLE, 20A, 120V, 2P, 3W	# # GB	# INDICATES TYPE OF UNIT. 1 = MASTER, 2 = REMOTE GAS DETECTION/VENTILATION FAILURE WEATHERPROOF DUAL-LITE BEACON		AUTO AUTOMATIC AUX AUXILIARY AWG AMERICAN WIRE GAUGE	NO NTS	NORMALLY OPEN OR NUMBER NOT TO SCALE	
O BE C	$\stackrel{A}{\vdash}$	WALL MOUNTED EXIT SIGN, NOTATIONS SAME AS ABOVE. WHEN USED, ARROW INDICATES DIRECTION OF EGRESS. FILLED QUADRANT REPRESENTS FACE SIDE OF SIGN.	*	MOUNTED ABOVE COUNTER—TOP OR 42" AFF * NOTATIONS SAME AS ABOVE	15	MOUNT TOP OF DEVICE UP 6'-8" A.F.F. GAS DETECTION/VENTILATION FAILURE HORN/STROBE		BKR BREAKER BLDG BUILDING	OH OL	OVERHEAD OVERLOAD PULL BOX	
LON LON		REMOTE EMERGENCY CEILING LIGHTING FIXTURE. "RH-3" - FIXTURE TYPE (SEE LIGHTING FIXTURE SCHEDULE)	* • 3 60 4W	SPECIAL PURPOSE RECEPTACLE * — VOLT RATING "3" — NUMBER OF POLES	Ğ	MOUNT TOP OF DEVICE UP 6'-8" A.F.F. GAS DETECTION/VENTILATION FAILURE HORN,		C CONDUIT CB CIRCUIT BREAKER	PCP PH	PUMP CONTROL PANEL PHASE	
<u> </u>	$E = \frac{1}{3} BU - 1(*$	"3" — SUPERVISORY CIRCUIT		"60" — AMPERE RATING "4W" — 4 WIRES IN ADDITION TO GROUND		MOUNT TOP OF DEVICE UP 6'-8" A.F.F.		CGD COMBUSTIBLE GAS DETECTOR CKT CIRCUIT CLB CURRENT LIMITING BREAKER	PMH PNL	POWER MANHOLE PANEL OR PANELBOARD	
MITH A		CIRCUIT CONDUCTORS AND 1 NO. 12 AWG BRANCH CONDUCTOR UNLESS OTHERWISE INDICATED.		MULTI-OUTLET ASSEMBLY, SYMBOL DENOTES RECEPTACLE TYPE	<u> </u>	GAS DETECTION/VENTILATION FAILURE STROBE, MOUNT TOP OF DEVICE UP 6'-8" A.F.F.	CLF CURRENT LIMITING FUSE CP CONTROL PANEL CONTROL POWER TRANSFO		PR PRI PT	PAIR PRIMARY POTENTIAL TRANSFORMER	
CDM S		HOME RUN TO DESIGNATED EQUIPMENT. BRANCH CIRCUIT CONDUIT WITH 2 NO. 12 AWG BRANCH CIRCUIT CONDUCTORS AND 1 NO. 12		FLUSH FLOOR OUTLET BOX WITH TYPE OUTLET INDICATED		SECURITY SYSTEMS		CPT CONTROL POWER TRANSFORMER CR CONTROL RELAY CS CONTROL SWITCH/CONTROL STATION	PVC RECPT	POLYVINYL CHLORIDE RECEPTACLE	
STY OF		AWG GROUND CONDUCTOR UNLESS OTHERWISE NOTED. NUMBER OF ARROWS INDICATE NUMBER OF CIRCUITS. FOR MINIMUM SIZE CONDUIT PERMITTED REFER TO THE SPECIFICATIONS.	▼	UNDER FLOOR DUCT SYSTEM WITH TYPE OUTLETS INDICATED	SACP	SECURITY ALARM CONTROL PANEL		CT CURRENT TRANSFORMER CU COPPER	REQD QTY	REQUIRED QUANTITY SURGE ARRESTER	
PROPE		CONDUIT CONCEALED IN WALL, IN SLAB ABOVE, OR ABOVE CEILING.		THREE CELL UNDER FLOOR DUCT SYSTEM JUNCTION BOX	DS	SECURITY ALARM DOOR SWITCH		CWS CONDUIT WALL SEAL DC DIRECT CURRENT	SEC SH	SECONDS OR SECONDARY SHIELDED OR SPACE HEATER	
SE THE	/	CONDUIT CONCEALED IN OR BELOW FLOOR OR UNDERGROUND.	J OR (J	JUNCTION BOX	<u></u>	SECURITY ALARM KEY PAD		DIA DIAMETER DMU DIGITAL METERING UNIT DN DOWN	SHH SPD	SIGNAL HANDHOLE SURGE PROTECTIVE DEVICE	
KEIN, AF		CONDUIT RUN EXPOSED. RUN PARALLEL OR PERPENDICULAR TO STRUCTURE OR WALL.	P	PULL BOX	├	SECURITY SYSTEM CARD ACCESS READER		EC EMPTY CONDUIT ELEC ELECTRICAL	SS SV SW	STAINLESS STEEL SOLENOID VALVE SWITCH	
ED HE	/*\	'X' INDICATES EXPLOSION PROOF CONDUIT SEAL FITTING.	TC	TERMINAL CABINET	WS	SECURITY ALARM WINDOW SWITCH		A SHEET NO WHERE	SWBD SWGR	SWITCHBOARD SWITCHGEAR	
RPORAT		CONCRETE ENCASED DUCTBANK. WIDTH VARIES, SEE DUCTBANK SECTION/DETAILS FOR REQUIREMENTS AND WIDTH	<u>(S)</u>	OCCUPANCY SENSOR		SECURITY ALARM MOTION DETECTOR	0,4,50,	SHEET NO. WHERE DETAIL IS DRAWN	TC TEL	TIME TO CLOSE OR TRAY CABLE TELEPHONE TIME TO OPEN	
E, INCO	3	CONDUIT STUBBED OUT AND CAPPED	©	PHOTOCELL	CCTV	CLOSED CIRCUIT TV CAMERA	SYMBOL \	<u>WHERE THERE IS A DETAIL</u>	TS	TWISTED SHIELDED OR THERMAL SWITCH	
SERVIC	(2) 3"C.,	DENOTES A QUANTITY OF TWO (2) 3-INCH CONDUITS EACH CONTAINING THREE NO. 3/0 AWG CONDUCTORS AND 1 NO. 2 AWG GROUND CONDUCTOR.	ESA	EMERGENCY EYEWASH/SHOWER ALARM STATION WITH FLOW SWITCH(ES)	PTZ	PAN, TILT, ZOOM CAMERA LENS CONTROLS	DETAI	SHEET NO.	UG UPS	TYPICAL UNDERGROUND UNINTERRUPTIBLE POWER SUPPI	. _Y
SIONAL	<i>σπο/</i> ο, ιπ2	DENOTES A QUANTITY OF TWO INSTRUMENT CABLES. EACH CABLE TO	/////	INDICATED EQUIPMENT AND MATERIALS TO BE DEMOLISHED	GB	GLASS BREAK DETECTOR	1/4" = 1'	IS A DETAIL	V VA	VOLTS VOLT AMPS	
PROFES	2-2/C#16 SH	JACKET. REFER TO THE SPECIFICATIONS FOR THE EXACT CABLE TO		INDICATES THAT ALL ELECTRICAL EQUIPMENT AND MATERIALS INSTALLED WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION		FIRE ALARM SYSTEMS FIRE ALARM HEAT DETECTOR 135 FIXED TEMPERATURE UNLESS		WHERE DETAIL IS DRAWN GENERAL NOTE THIS IS A STANDARD LEGEND.	VFD W WP	VARIABLE FREQUENCY DRIVE WATTS, WIDTH, WITH, WIRE WEATHERPROOF	
50 BY		BE PROVIDED. SAME AS ABOVE EXCEPT CABLE TO CONSIST OF THREE NO. 16 AWG	DUST	APPEARS SHALL BE OF NEMA 12 CONSTRUCTION (OR GASKETED AND SUITABLE FOR USE IN A WET LOCATION WHERE NEMA STANDARDS DO NOT APPLY) UNLESS OTHERWISE NOTED.	H)200	OTHERWISE NOTED. "200" — 200 FIXED TEMPERATURE	<u>DLIM</u>	SOME SYMBOLS MAY NOT APPEAR ON THE DRAWINGS.	XP XFMR	EXPLOSION PROOF TRANSFORMER	
PROVIDE	2-3/C#16 SH	LOONDHOTODO TWICTED CHIELDED AND COVEDED WITH AN OVEDALL	DAMP	INDICATES THAT ALL ELECTRICAL EQUIPMENT AND MATERIALS INSTALLED WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION	(2)	"R" — FIXED TEMPERATURE RATE—OF—RISE TYPE FIRE ALARM SMOKE DETECTOR PHOTOELECTRIC TYPE UNLESS OTHERWISE NOTED.		SHEET NO. WHERE SECTION			
SIGNS	(3) 4°C.	THREE 4-INCH CONDUITS	OR WET	APPEARS SHALL BE OF NEMA 4X CONSTRUCTION (OR GASKETED AND SUITABLE FOR USE IN A WET LOCATION WHERE NEMA STANDARDS DO NOT APPLY) UNLESS OTHERWISE NOTED.		"I" — IONIZATION TYPE.	SYMBOL	WHERE IS A SECTION WHERE THERE IS A SECTION			
AND DE	\ \ \ !	FLEXIBLE METAL CONDUIT "WHIP" (3/4"C., 2#12, 1#12G UNLESS		INDICATES THAT ALL ELECTRICAL EQUIPMENT AND MATERIALS INSTALLED WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION	(D)	FIRE ALARM DUCT SMOKE DETECTOR					· Caraca
ED.		OTHERWISE NOTED) FOR LIQUID TIGHT MOTOR CONNECTIONS 'X' INDICATES CONDUIT SEAL FITTING IN OTHER THAN CODE REQUIRED	CORROSIVE	APPEARS SHALL BE OF NEMA 4X CONSTRUCTION (OR CORROSION RESISTANT CONSTRUCTION SUITABLE FOR USE IN A WET LOCATION WHERE NEMA STANDARDS DO NOT APPLY) UNLESS OTHERWISE NOTED.	FACP	FIRE ALARM CONTROL PANEL	$\frac{SECTI}{1/4" = 1}$	_ SHEET NO		WILLIAM	Section 1
RESERVI DOCUI	X	LOCATIONS. INDICATES MOTOR STARTER AND/OR MOTOR CONTROL EQUIPMENT	CLASS I, DIV. 1	INDICATES THAT ALL ELECTRICAL EQUIPMENT AND MATERIALS	FV	FIRE ALARM VENTILATION PANEL WITH GRAPHIC PANEL	,	WHERE SECTION IS TAKEN WHERE SECTION IS DRAWN		RYAN, JE ELECTRIC No. 4607	L SELLS
RIGHTS THESE	\boxtimes	WITHIN THE ENCLOSURE.	GROUP D	INSTALLED WITHIN THE ROOM OR AREA IN WHICH THIS NOTATION APPEARS SHALL CONFORM TO N.E.C. REQUIREMENTS FOR THE HAZARDOUS AREA CLASSIFICATION SHOWN.	FA	REMOTE FIRE ALARM ANNUNCIATOR PANEL		ON SYMBOL		WILLIAM RYAN, JE EI FCTRIC NO. 4607	019
MENTS:			DESIGNED BY	J. ARNONE J. ARNONE		TOWN OF HARWICH, MASSACHUSETTS				PROJECT NO. 0324	
M SMIT			DRAWN BY:	BY: T. DISILVA SMITH		SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2		ELECTRICAL LEGEND II		FILE NAME: EO	JOINT LG
2019 CDN :USE OF	/. DATE DRWN C	CHKD REMARKS	CROSS CHK'D APPROVED BY	260 West Exchange Street, Suite 300		PROJECT NO. CWSRF 4424/2				E-3	
® ₩ Linc	· 1 1 1	1									

E003NFLG SHEET NO. E-3





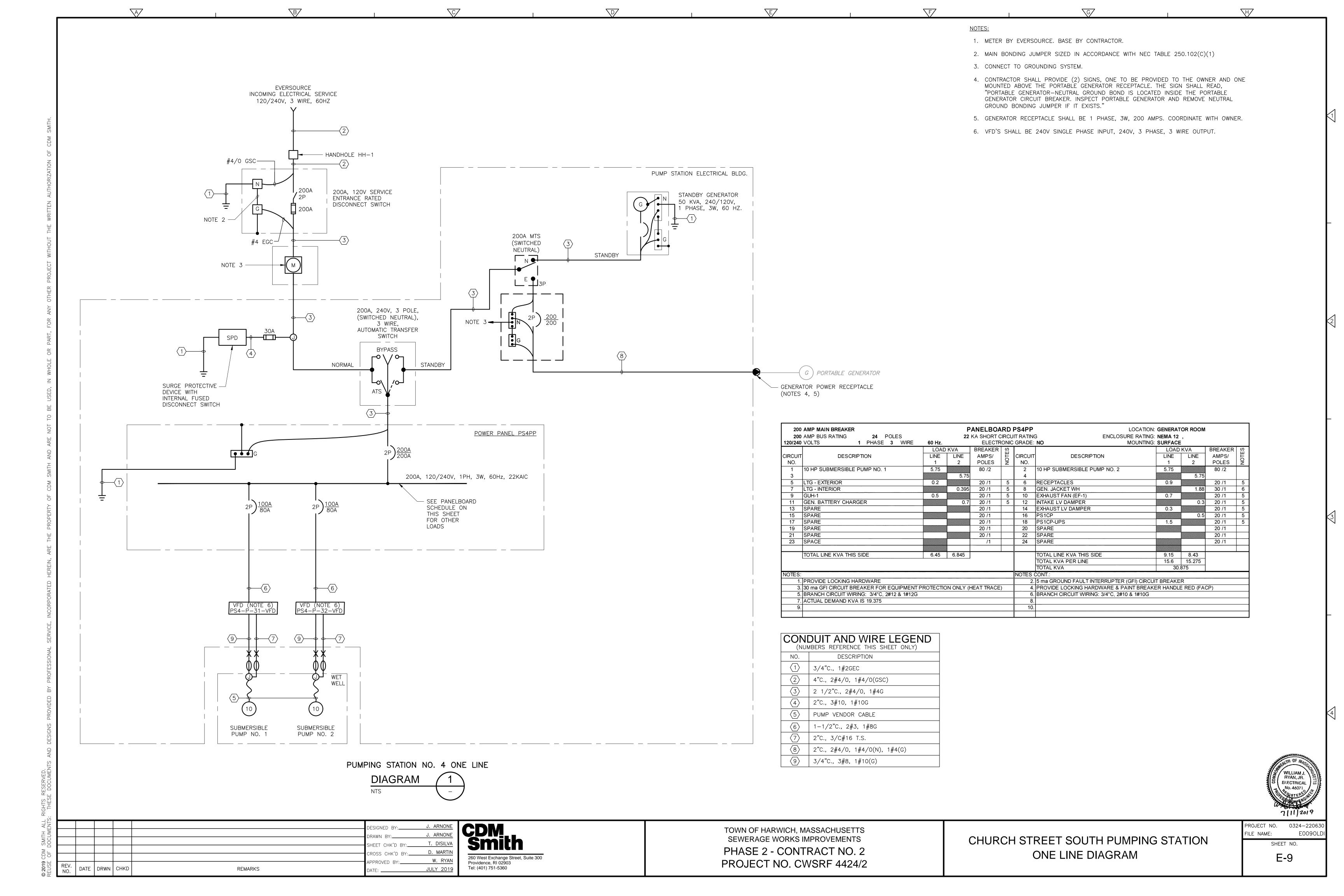


TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF 4424/2

CHURCH STREET SOUTH PUMPING STATION SITE PLAN AND AREA CLASSIFICATION

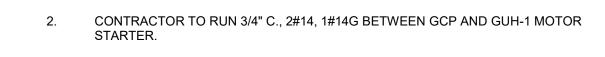
PROJECT NO. 0324-220630
FILE NAME: E008STPL
SHEET NO.

E-8

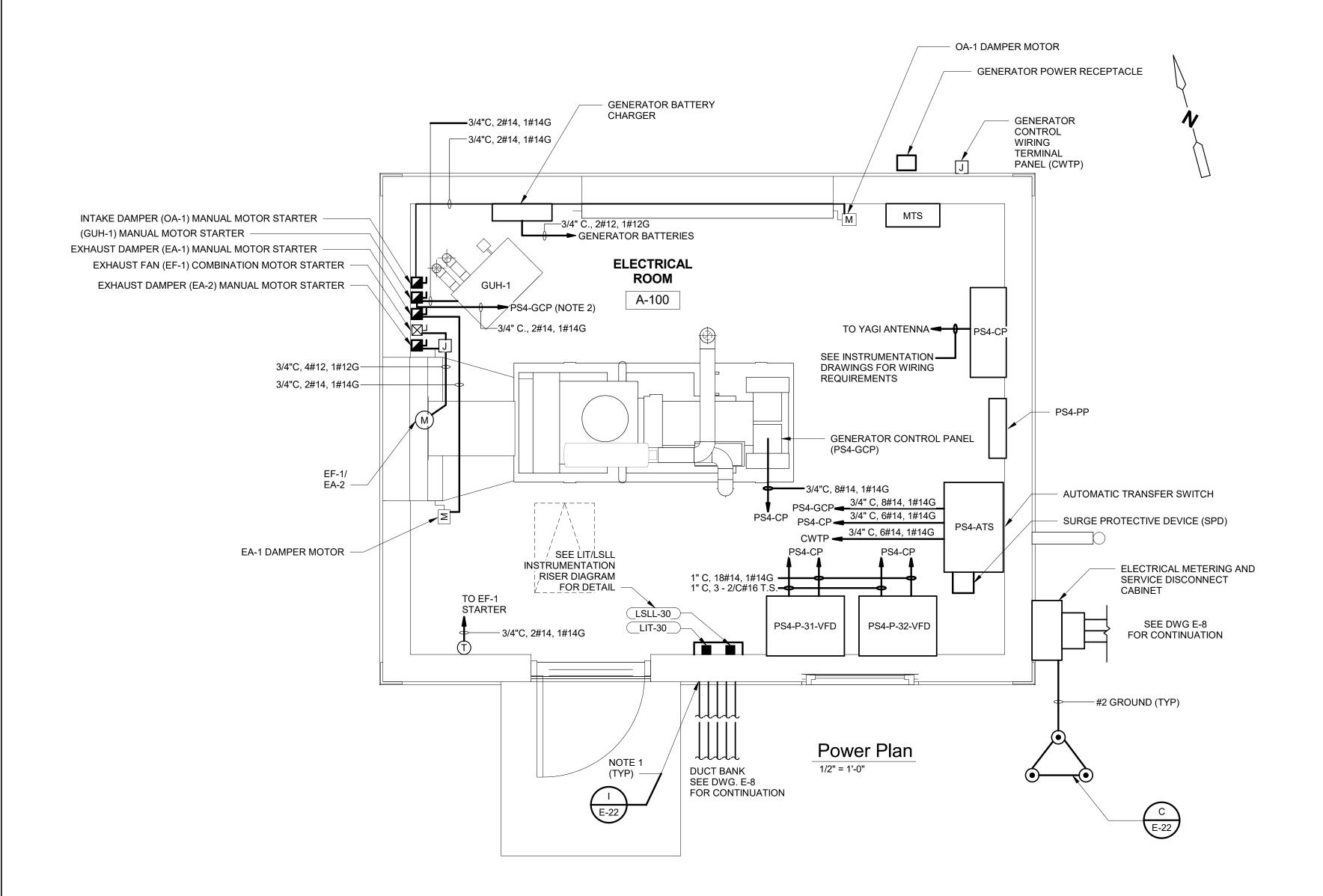


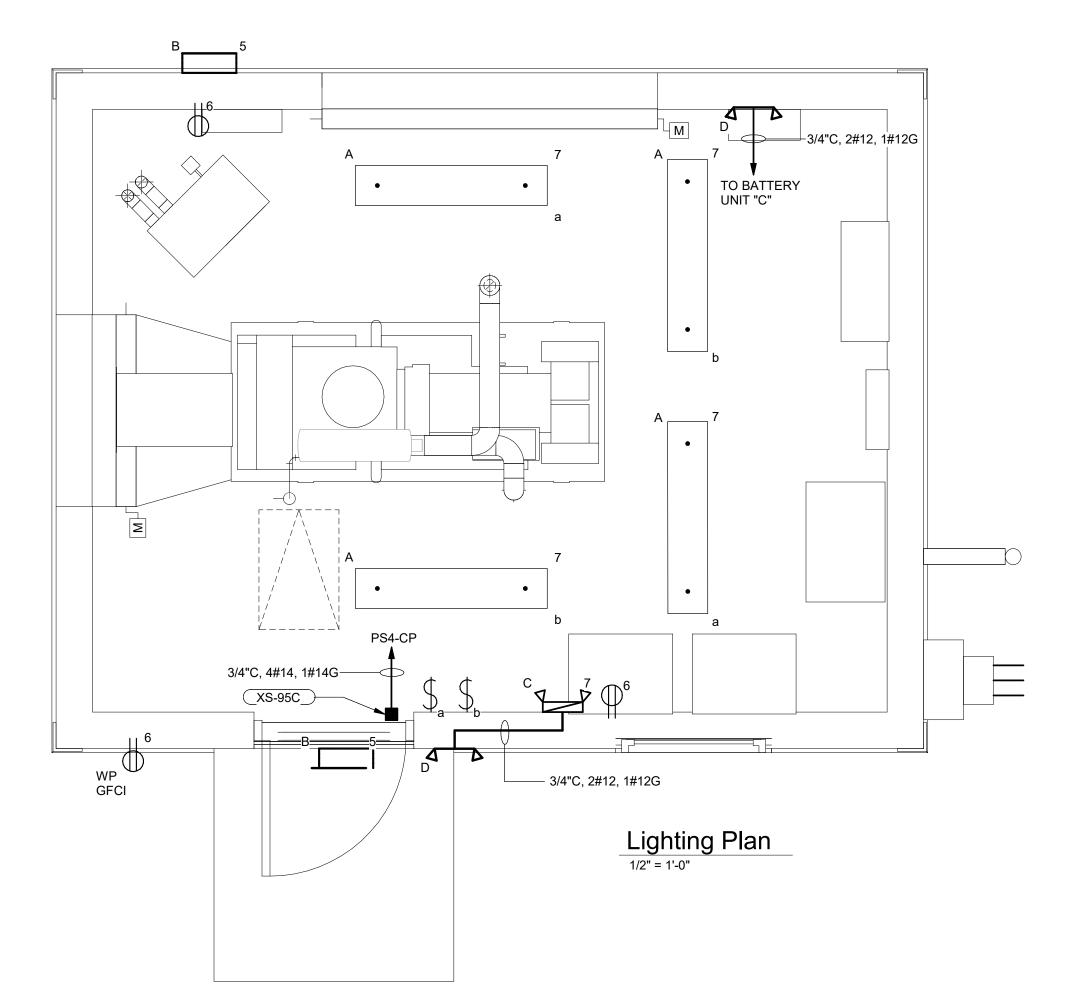
DIVISION 2 LOCATION.

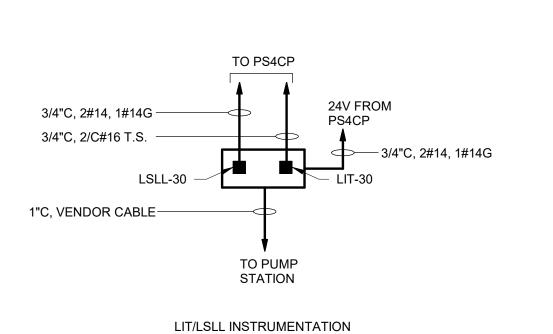




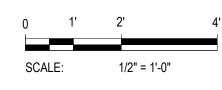


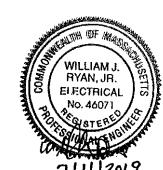






	LIGHTING FIXTURE SCHEDULE					
TYPE	WATT	DESCRIPTION	MFR (OR APPROVED EQUAL)			
А	75	LED, STRIP LIGHT, CEILING MOUNTED.	LITHONIA PART #: MSL-4000LM-SBL-120-GZ10-40K- 80CRI-WH			
В	36	LED, EXTERIOR WALL MOUNTED WITH INTEGRAL MOTION/AMBIENT LIGHT SENSOR.	LITHONIA PART #: DSXW1 LED-20C-530-50K-T3M- 120-DBLXD-PIR1FC3V			
С	24	POWER SUPPLY ASSEMBLY WITH TWO 3W LED LAMP HEADS. WALL MOUNTED.	CROUSE HINDS PART #: N2LPS12222			
D	6	REMOTE LUMINAIRE ASSEMBLY WITH TWO 3W LED LAMP HEADS. WALL MOUNTED.	CROUSE HINDS PART #: N2RF12222			





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'H ALL MENT						DESIGNED BY:	T. DISILVA
Ę						DRAWN BY:	J. ARNONE
M SMIT						SHEET CHK'D BY:	T. DISILVA
Ö.P						CROSS CHK'D BY:	D. MARTIN
14 (SE						APPROVED BY:	W. RYAN
© 2014 (REUSE	REV. NO.	DATE	DRWN	CHKD	REMARKS	DATE:	JULY 2019

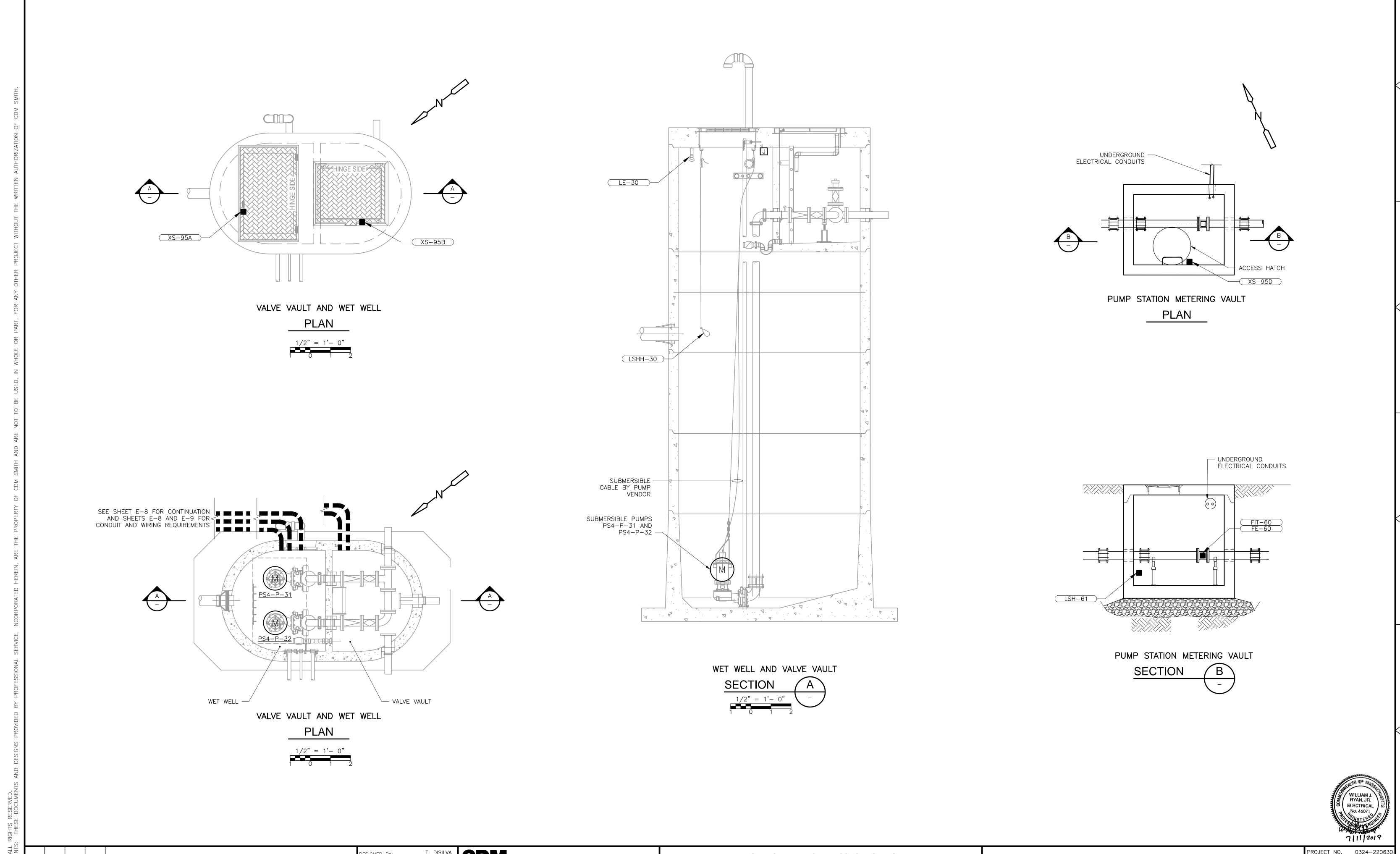
RISER DIAGRAM

<u>A</u> <u>E</u> <u>A</u>	CDM Smith
N	260 West Exchange Street, Suite 300 Providence, RI 02903
9	Tel: (401) 751-5360

TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF - 4424/2

CHURCH STREET SOUTH PUMPING STATION POWER PLAN

	() · / · · ·
PROJECT NO.	0324-22063
FILE NAME:	EWZ001P
SHE	ET NO.
E-	-10



J. ARNONE

T. DISILVA

D. MARTIN

260 West Exchange Street, Suite 300 Providence, RI 02903 Tel: (401) 751-5360

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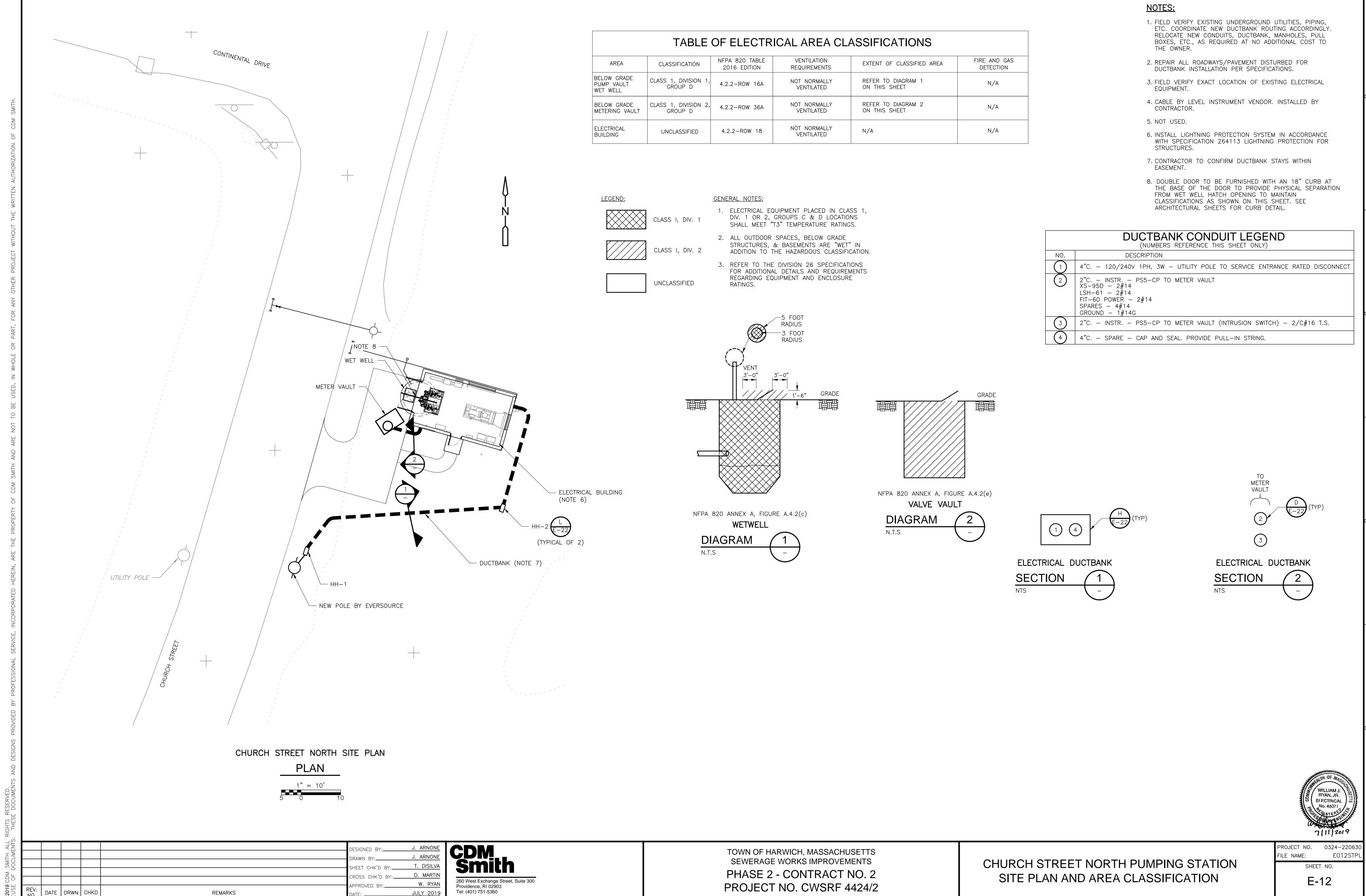
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REMARKS

TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF 4424/2

CHURCH STREET SOUTH PUMPING STATION
VALVE VAULT AND WET WELL
PLANS AND DETAILS

PROJECT NO. 0324-220630
FILE NAME: E011WWPL
SHEET NO.
E-11



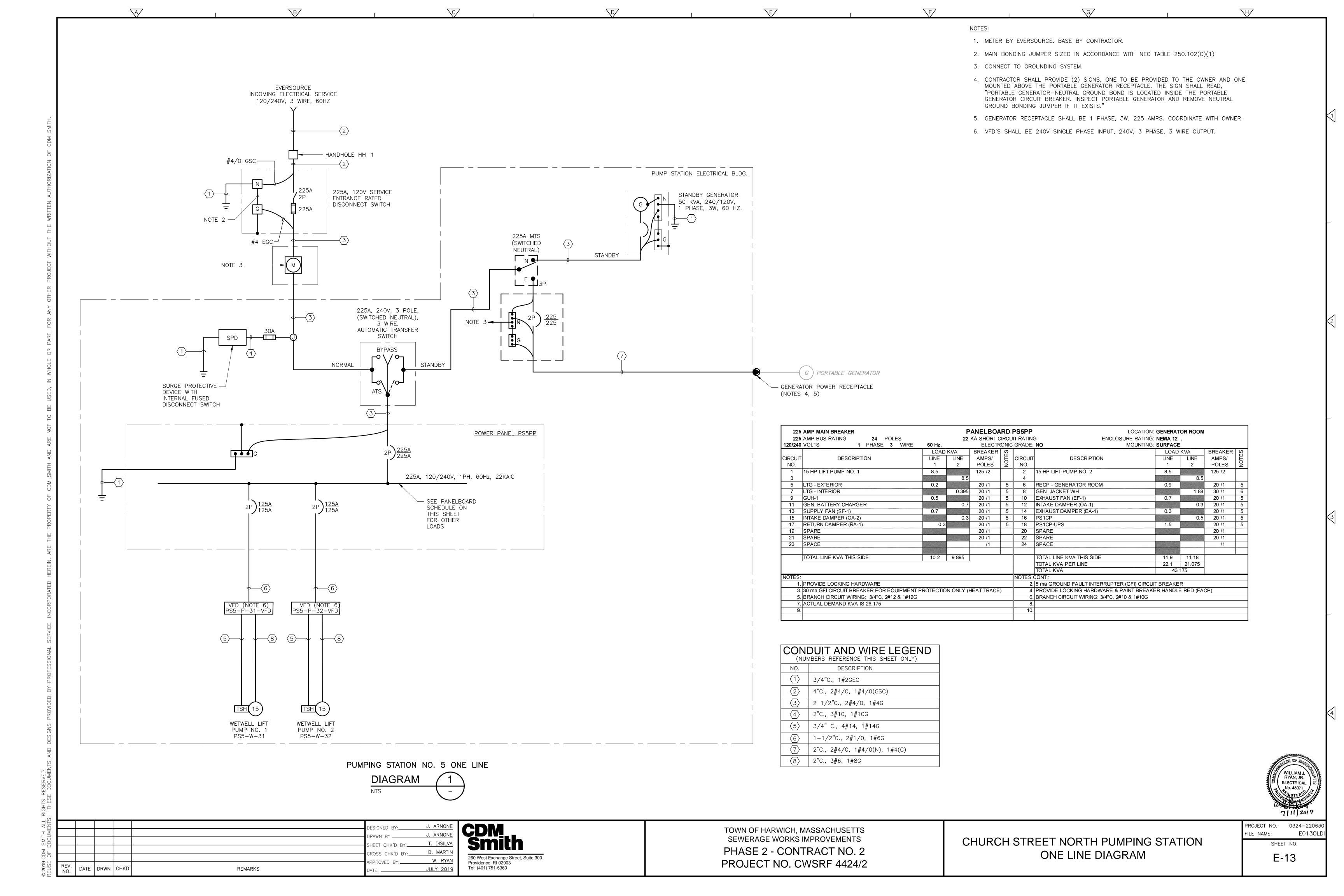
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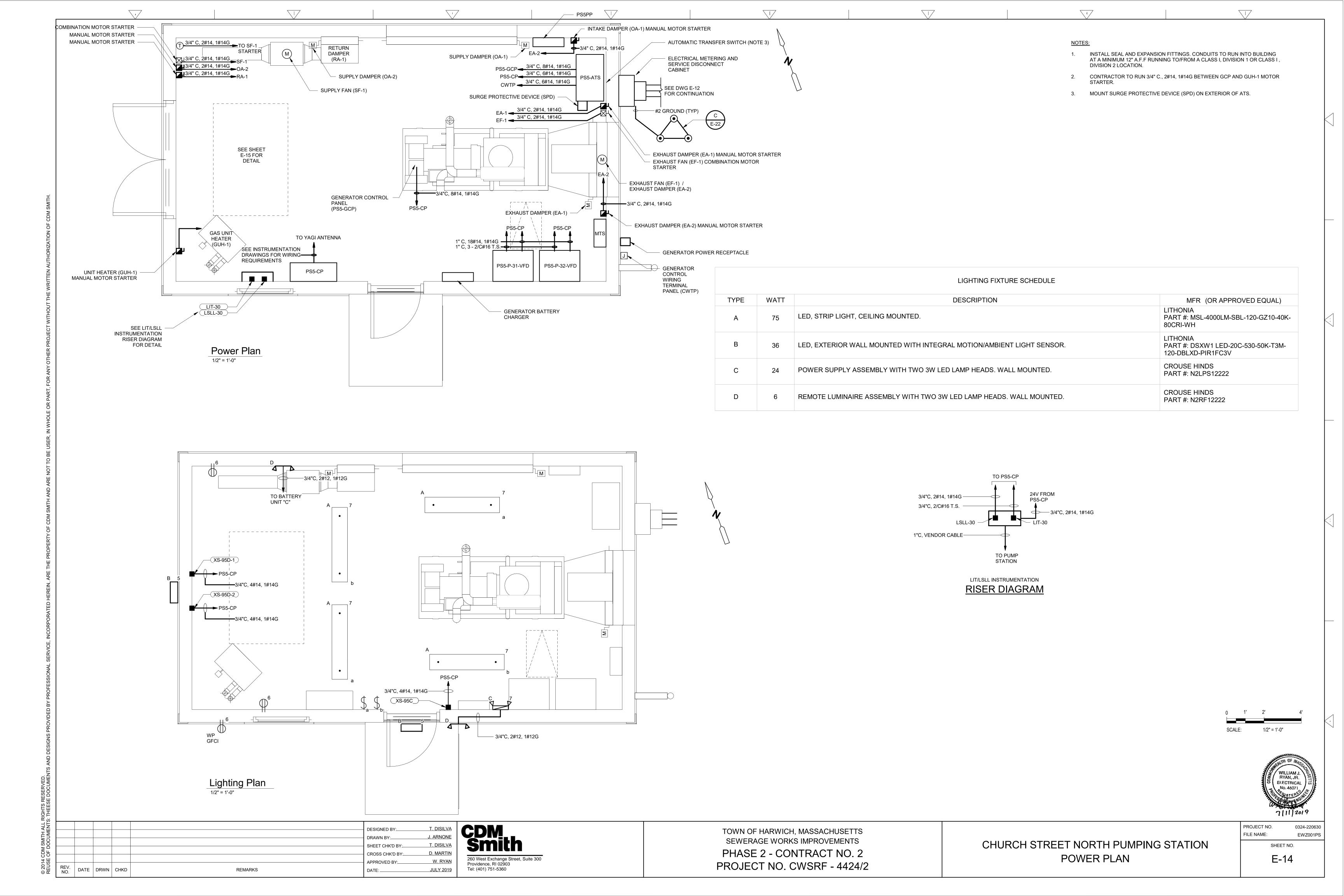
REMARKS

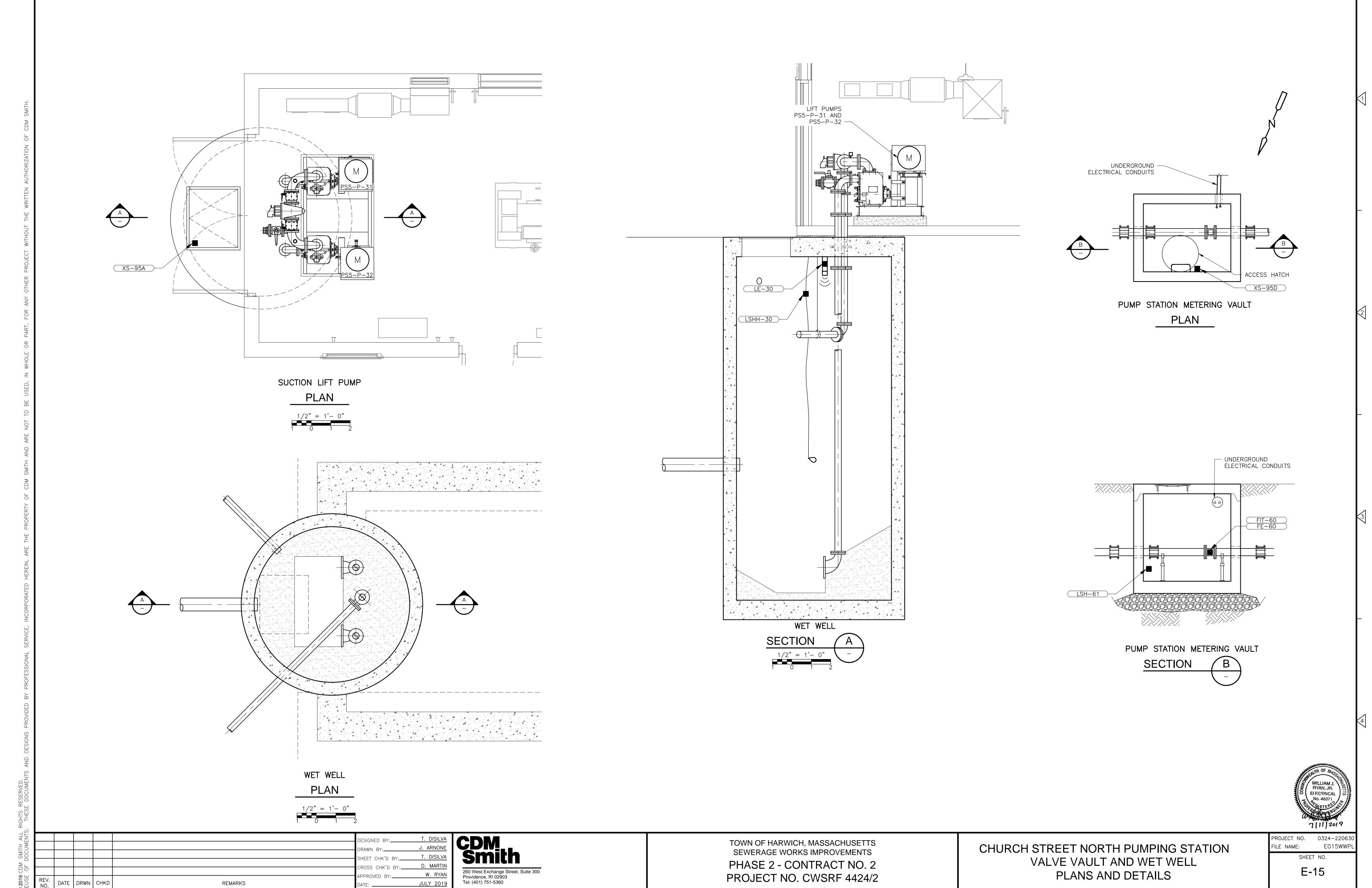
PROJECT NO. CWSRF 4424/2

E-12

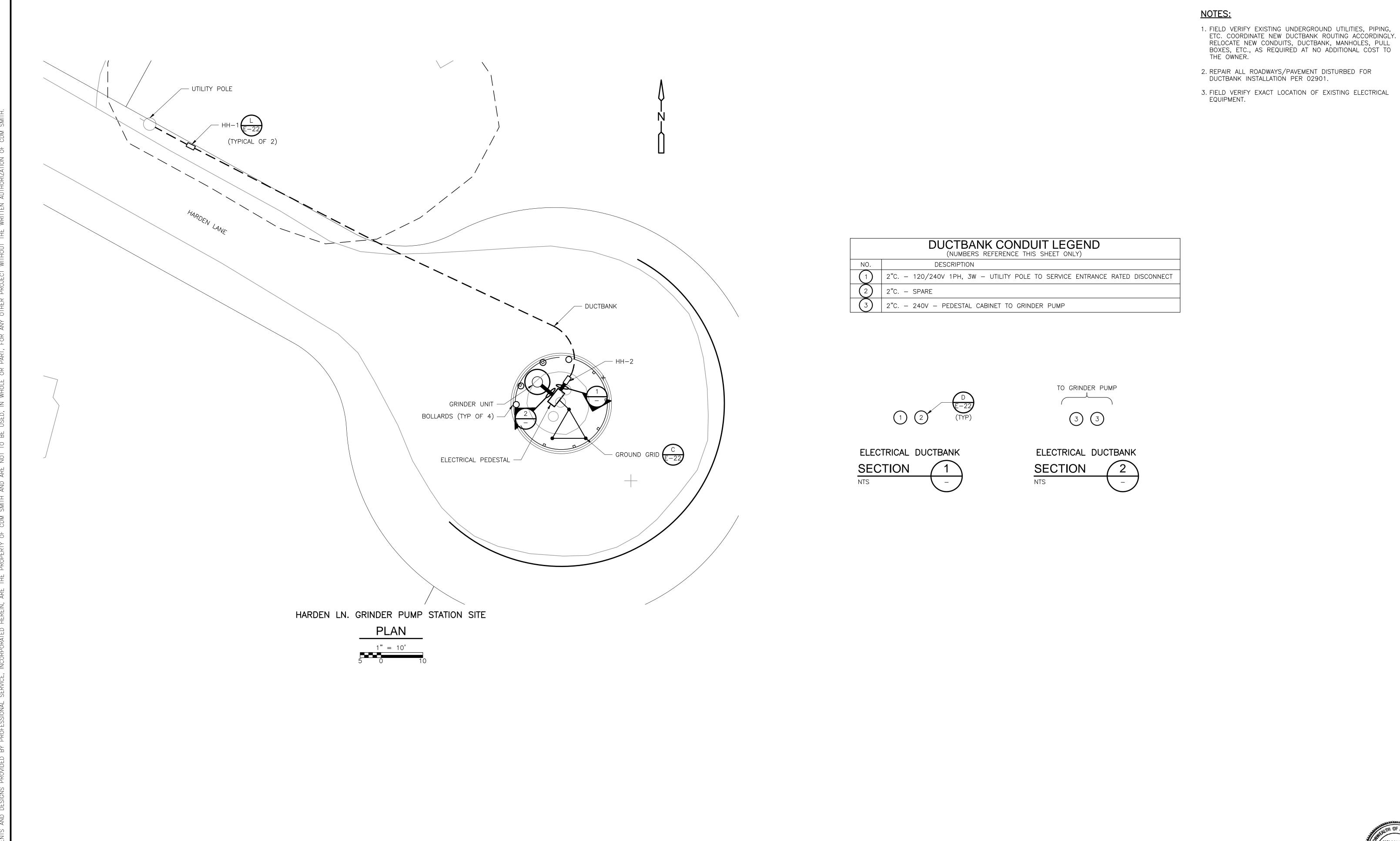
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REMARKS





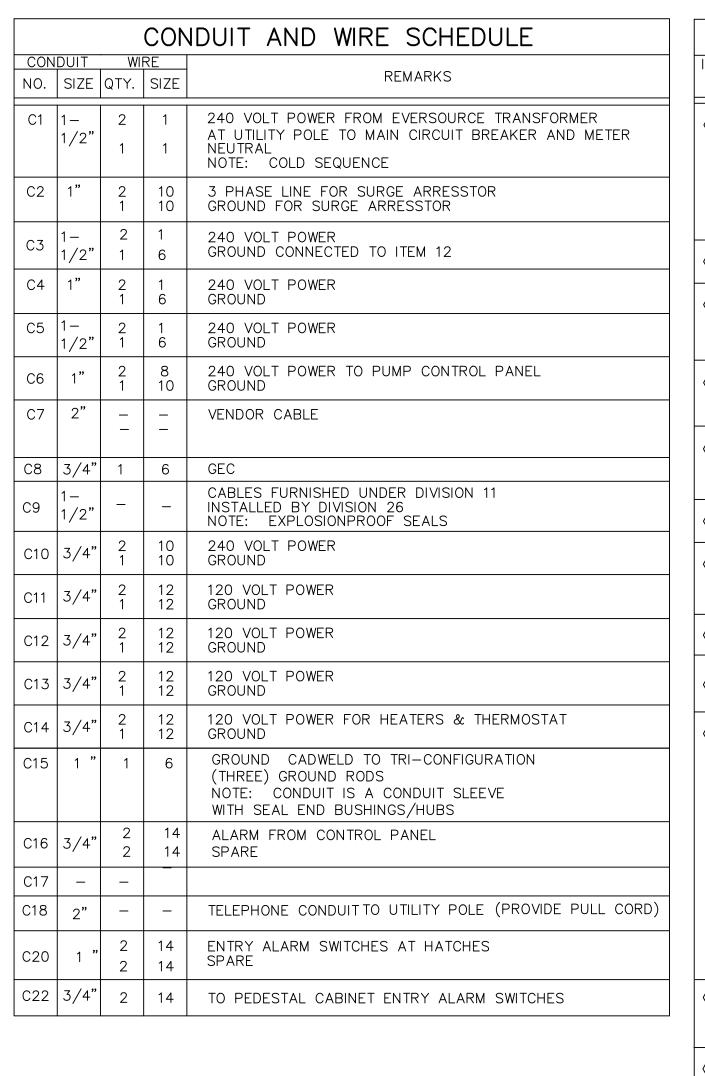


TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS
PHASE 2 - CONTRACT NO. 2
PROJECT NO. CWSRF 4424/2

HARDEN LANE GRINDER PUMPING STATION
SITE PLAN

PROJECT NO. 0324-220630
FILE NAME: E019GPPL
SHEET NO.

E-19

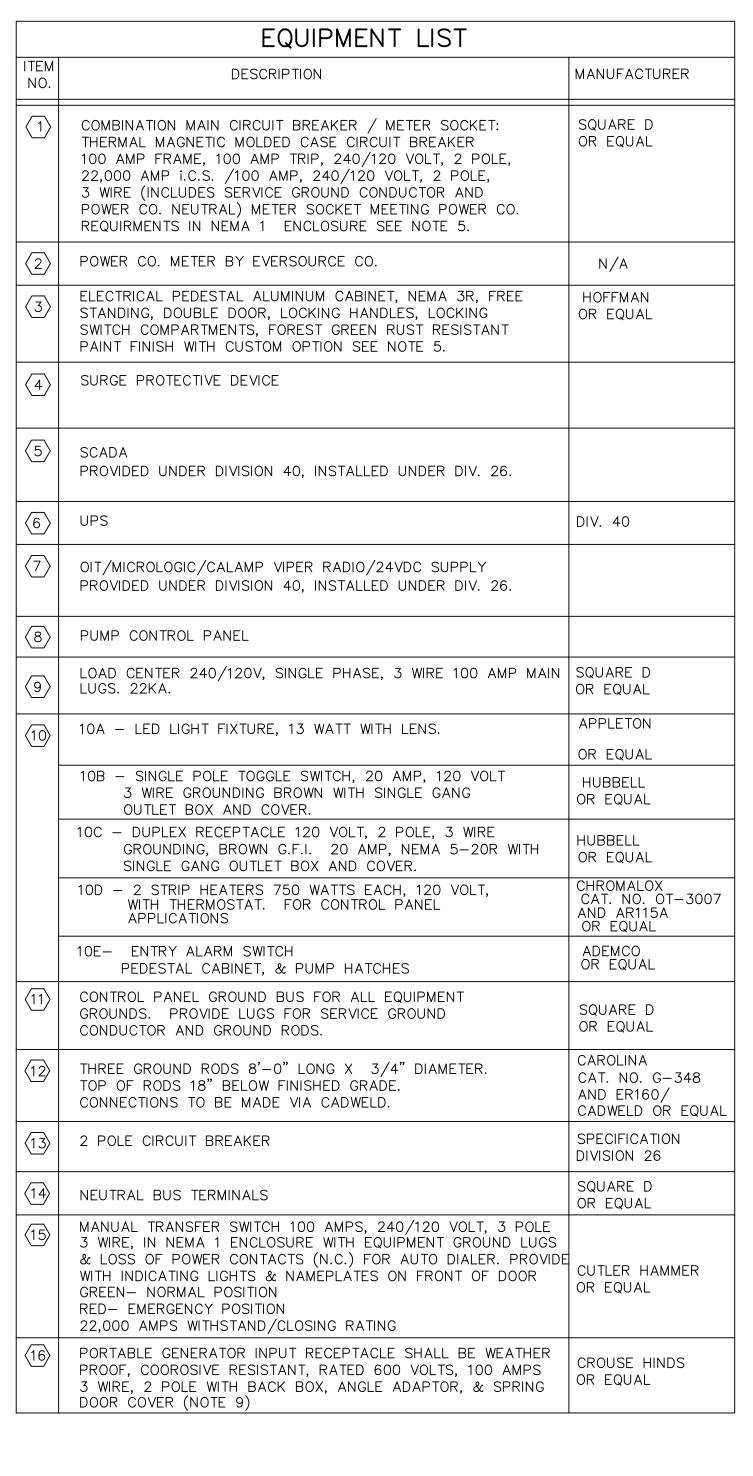


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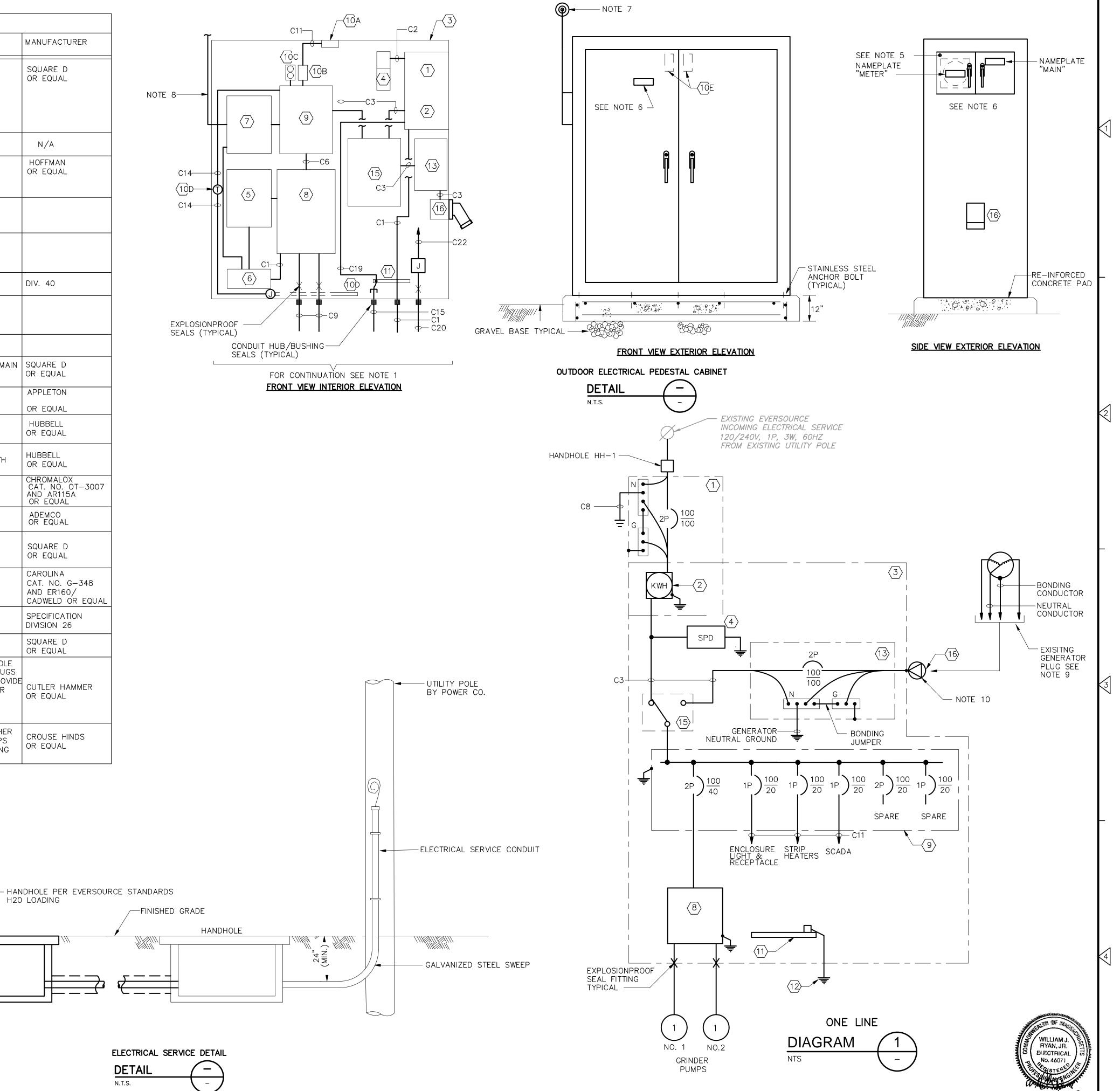
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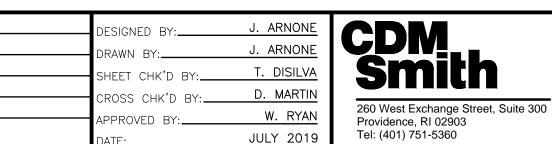
- 1. FOR PUMPING STATION SITE PLAN REFER TO E20GPPL
- 2. ALL WORK SHALL CONFORM TO THE LATEST EDITION OF THE MASSACHUSETTS ELECTRICAL CODE. PROVIDE ALL EQUIPMENT GROUNDS AS INDICATED.
- 3. SIZE AND/OR ARRANGEMENT OF PEDESTAL ENCLOSURE SHALL BE MODIFIED AS NECESSARY TO SUIT EQUIPMENT ACTUALLY FURNISHED.
- 4. THE LOCATION OF COMMON PULLBOX(ES) FOR ALL POWER AND CONTROL WIRING TERMINATIONS AT THE PUMPING STATION SHALL BE COORDINATED WITH PUMPING STATION MANUFACTURER.
- 5. PROVIDE CUSTOM OPTION FOR MAIN BREAKER AND METER. ACCESS BY SEPARATE HINGED DOORS AS SHOWN ON SIDE OF PANEL. DEVICES SHALL BE RECESSED IN PEDESTAL CABINET. MAINTAIN NEMA 3R WITHIN HINGED DOORS. THE HINGED DOOR FOR METER IS OPTIONAL. ALL DOORS SHALL HAVE HANDLE WITH LOCKING PADLOCK.
- 6. PROVIDE BLACK LAMINATED NAMEPLATES WITH WHITE LETTERING AS LABELED ON ELEVATIONS. ALSO PROVIDE "CAUTION", "WARNING" AND "KEEP OUT" SIGNS IDENTIFYING VOLTAGES, ETC.
- 7. BOND ALL ENCLOSURES LOCATED WITHIN PEDESTAL TO GROUND BUS.
- 8. SEE INSTRUMENT DRAWING I-7 FOR FURTHER INFORMATION ON THE RADIO ANTENNA AND SCADA EQUIPMENT.
- 9. PROVIDE SEPARATE GENERATOR BONDING AND GENERATOR NEUTRAL GROUNDING TO PEDESTAL GROUND BUS PER MEC ARTICLE 250-6. VERIFY COMPATIBILITY OF RECEPTACLE WITH EXISTING PLUG ON GENERATOR.
- 10. CONTRACTOR SHALL PROVIDE (2) SIGNS, ONE TO BE PROVIDED TO THE OWNER AND ONE MOUNTED ABOVE THE PORTABLE GENERATOR RECEPTACLE. THE SIGN SHALL READ, "PORTABLE GENERATOR-NEUTRAL GROUND BOND IS LOCATED INSIDE THE PORTABLE GENERATOR CIRCUIT BREAKER. INSPECT PORTABLE GENERATOR AND REMOVE NEUTRAL GROUND BONDING JUMPER IF IT EXISTS."

REMARKS



H20 LOADING



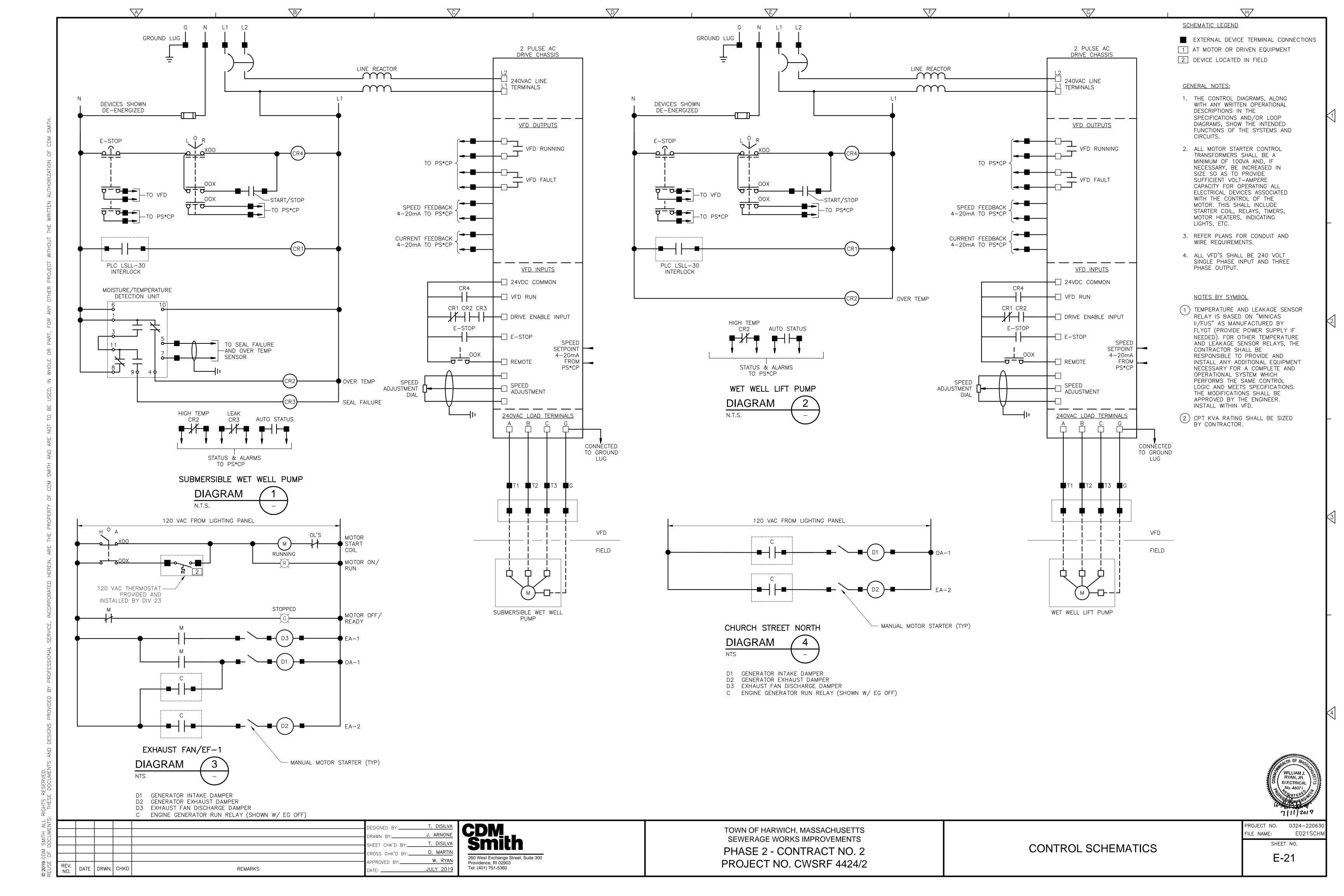


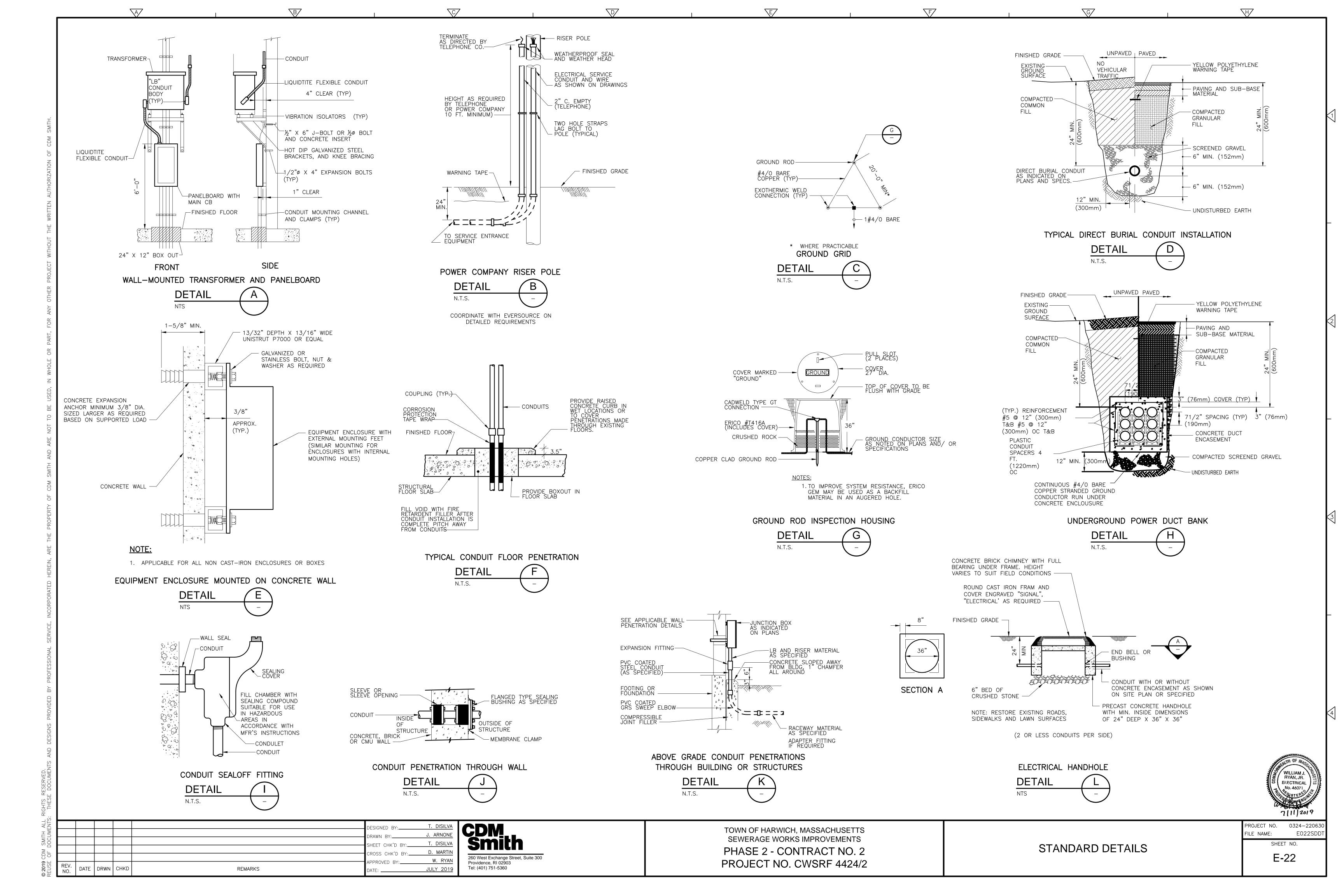
PEDESTAL CABINET

TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF 4424/2

HARDEN LANE GRINDER PUMPING STATION **ELEVATION AND DIAGRAMS**

0324-220630 PROJECT NO. E020GP FILE NAME: SHEET NO. E-20





GENERAL

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), ITS REVISIONS, AND THE MASSDOT STANDARD DETAILS AND DRAWINGS FOR THE DEVELOPMENT OF TRAFFIC MANAGEMENT PLANS.

2. THE TRAFFIC MANAGEMENT PLANS CONTAINED HEREIN ARE GIVEN AS A GUIDE FOR TYPICAL WORK ZONE TRAFFIC CONTROL APPLICATIONS FOR THE TYPES OF WORK ANTICIPATED FOR THIS PROJECT. THEY ARE NOT INTENDED TO COVER ALL POSSIBLE CONSTRUCTION OPERATIONS WHICH THE CONTRACTOR MAY CHOOSE TO EMPLOY. WORK ZONE TRAFFIC CONTROL FOR OTHER CONSTRUCTION OPERATIONS OR OTHER TRAFFIC SITUATIONS IF APPLICABLE SHALL BE IN ACCORDANCE WITH THE M.U.T.C.D. AND AS APPROVED OR REQUIRED BY THE ENGINEER. THE CONTRACTOR SHALL SUBMIT ALTERNATE TRAFFIC CONTROL PLANS FOR APPROVAL WHEN NECESSARY.

. WORK WITHIN THE TRAVELED WAY SHALL BE RESTRICTED TO 9AM TO 3PM MON. THROUGH FRI. OR AS OTHERWISE PERMITTED BY THE TOWN OF HARWICH UNLESS OTHERWISE APPROVED.

4. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.

5. TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.

6. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES."

7. CONTRACTOR SHALL MAINTAIN ABUTTER ACCESS AT ALL TIMES EXCEPT FOR VERY SHORT PERIODS APPROVED BY THE ENGINEER. CONTRACTORS SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.

8. THE FIRST TEN PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.

9. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE AS SHOWN ON THESE PLANS OR AS DETERMINED BY THE ENGINEER.

10. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.

11. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.

12. MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER. ONE (1) THROUGH TRAVEL LANE HAVING A MINIMUM WIDTH OF 11 FEET MAY BE PROVIDED FOR BOTH DIRECTIONS (LANE TO BE SHARED AND DIRECTION OF TRAVEL TO ALTERNATE IN SOME SITUATIONS UNDER POLICE CONTROL) DURING ALL PHASES OF CONSTRUCTION, UNLESS OTHERWISE REQUIRED BY THE ENGINEER.

13. LANE RESTRICTIONS MAY NOT REMAIN DURING NON-WORKING HOURS. AFTER EACH WORKING DAY, TRAFFIC CONTROL DEVICES THAT ARE NOT REQUIRED SHALL BE MOVED OFF THE ROADWAY OR FULL DEPTH CONSTRUCTION AREA AND PLACED SO AS NOT TO IMPEDE PEDESTRIAN AREAS, ABUTTER ACCESS OR CAUSE CONFUSION TO MOTORISTS.

14. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.

15. NIGHT WORK OPERATIONS (IF ALLOWED) SHALL INCLUDE PROPERLY LIT & PLACED LUMINAIRES MEETING THE REQUIREMENTS OF THE MUTCD.

16. ALL WORK ZONE AREAS SHALL BE PROTECTED APPROPRIATELY. ALL EXPOSED TRENCHES SHOULD BE STEEL PLATED OR BACKFILLED WHEN NO WORK IS UNDERWAY/PERFORMED AND APPROPRIATELY SIGNED.

17. ALL TEMPORARY SETUPS SHALL BE ADA/AAB COMPLIANT AND SHALL ACCOMMODATE PEDESTRIANS AND BICYCLISTS.

GRADE DIFFERENCES

. WHERE THERE IS A LONGITUDINAL DIFFERENCE IN ELEVATION BETWEEN THE EXISTING PAVEMENT AND COLD PLANED OR NEW PAVEMENT, THE CONTRACTOR SHALL PATCH A TEMPORARY HOT MIX ASPHALT WEDGE WITH A 12:1 (OR FLATTER) SLOPE FOR SMOOTH TRANSITION. SEE DETAIL THIS SHEET.

. CROSS-SECTIONAL GRADE DIFFERENCES IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF REFLECTORIZED DRUMS.

3. CROSS-SECTIONAL GRADE DIFFERENCES IN EXCESS OF 4" DURING NON-WORKING HOURS SHALL BE PROTECTED BY BACKFILLING WITH A WEDGE OF EARTHWORK TO BE COMPACTED AT 4:1 SLOPE AND WILL ALSO REQUIRE DELINEATION BY USE OF DRUMS.

4. A MINIMUM SLOPE OF 4:1 MUST BE MAINTAINED AFTER WORKING HOURS DURING SUBBASE AND BASE COURSE INSTALLATION ALONG EDGE OF THE TRAVELWAY. A MINIMUM SLOPE OF 8:1 MUST BE MAINTAINED ON ALL ABUTTED ACCESS DRIVES AND A MINIMUM SLOPE OF 12:1 MUST BE MAINTAINED ON ALL SIDEWALKS.

CONSTRUCTION SIGNING:

SHALL BE ALLOWED.

TO REMAIN OVERNIGHT AS REQUIRED BY THE ENGINEER.

1. THE FIRST CONSTRUCTION SIGN IN A SERIES ON EACH APPROACH TO THE PROJECT SHALL BE FLUORESCENT ORANGE, HIGH PERFORMANCE (OR HIGH DENSITY) SHEETING. FLAGS MAY BE MOUNTED WITH THE FIRST SIGN.

2. ALL CONSTRUCTION SIGNS SHALL BE BLACK LEGEND ON A REFLECTORIZED ORANGE BACKGROUND UNLESS OTHERWISE NOTED AND SHALL CONFORM TO THE MUTCD.

3. EXISTING GUIDE SIGNS SHALL BE TEMPORARILY RESET AS REQUIRED BY THE ENGINEER.

4. ALL SIGNS, INCLUDING EXISTING, THAT ARE NOT REPRESENTATIVE OF ACTUAL WORK CONDITIONS SHALL BE EITHER COVERED OR REMOVED WHEN NOT APPLICABLE.

5. IF USED, W20-4 AND W20-5 SIGNS SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH WORK DAY.

6. USE W20-8 SIGNS ONLY WHILE POLICE ARE DIRECTING TRAFFIC. THEY SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH WORK DAY.

7. SIGNS MUST BE PROFESSIONALLY LETTERED. NO HANDWRITTEN, PAINTED, OR OTHERWISE MODIFIED SIGNS

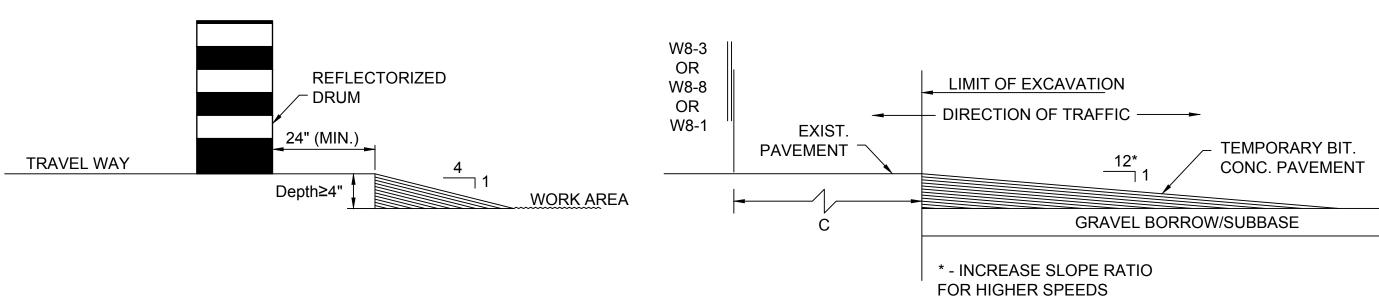
8. WHERE LANE SHIFTS, WORK ZONES, OR OTHER CONSTRUCTION ACTIVITIES INFRINGE UPON ON-STREET PARKING AREAS, THE CONTRACTOR SHALL INSTALL TEMPORARY 'NO PARKING/TOW AWAY ZONE' SIGNS (R8-3/R7-201) AS APPROPRIATE AT LEAST 24 HOURS IN ADVANCE. THE R8-3/R7-201 SIGNS SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH DAY UNLESS PARKING RESTRICTIONS ARE PERMITTED

9. PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL CONFORM TO THE 2003 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) AS AMENDED AND SHOULD BE PLACED ON THE SHOULDER OF THE ROADWAY OR IF PRACTICAL SET WELL AWAY FROM THE TRAVEL LANE. MESSAGE SIGNS SHOULD BE PROTECTED WITH RETROREFLECTIVE TEMPORARY TRAFFIC CONTROL DEVICES WHEN PLACED WITHIN THE AVAILABLE CLEAR ZONE OR ELSE SHIELDED WITH A BARRIER OR CRASH CUSHION. THE LOCATION AND USE OF THE PCMS SHALL BE DETERMINED DURING THE PRE-CONSTRUCTION MEETING OR AS DIRECTED BY THE ENGINEER IN THE FIELD.

PAVEMENT MARKINGS

1. PAVEMENT MARKINGS WHICH ARE NO LONGER APPLICABLE SHALL BE REMOVED. APPLY TEMPORARY MARKINGS WHERE SHOWN ON THE TRAFFIC MANAGEMENT PLANS AND AS REQUIRED BY THE ENGINEER.

2. ON PROJECTS WHERE PAVEMENT OVERLAY IS NOT DESIGNATED, EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH TEMPORARY TRAFFIC CONTROLS SHOULD BE COVERED TEMPORARILY WITH BLACKOUT TAPE, AS REQUIRED BY THE ENGINEER FOR THE FULL DURATION OF THE PHASE IN PROGRESS. TEMPORARY PAINTED OR REMOVABLE TAPE MARKINGS SHALL BE USED AS NECESSARY FOR ALL PHASES OF CONSTRUCTION.



LONGITUDINAL DROP-OFF DETAIL

N.T.S.

WORK ZONE

P POLICE DETAIL DIRECTION OF TRAFFIC IMPACT ATTENUATOR F FLAGGER DETAIL TYPE III BARRICADE MEDIAN BARRIER

> MEDIAN BARRIER WITH WARNING LIGHTS WORK VEHICLE

TRUCK MOUNTED ATTENUATOR

ACTIVITY AREA:

WHERE WORK

TAKES PLACE

TRANSITION AREA

MOVES TRAFFIC

OUT OF ITS

NORMAL PATH

ADVANCE WARNING

AREA: TELLS

→ TRAFFIC OR PEDESTRIAN SIGNAL LEGEND → SIGN DIRECTION OF TRAVEL

CHANNELIZING DEVICE WORK AREA END ROAD SIGN WORK DOUBLE FINES END **TERMINATION AREA:** MERGING LETS TRAFFIC DOWNSTREAM TAPER: GUIDES TAPER **RESUME NORMAL** TRAFFIC BACK TO ITS OPERATIONS ORIGINAL TRAVEL PATH LOGITUDINAL BUFFER (TRAFFIC SPACE: ALLOWS LONGITUDINAL SPACE (OPT.) TRAFFIC TO PASS THROUGH **BUFFER SPACE** THE ACTIVITY AREA

WORK SPACE: SET ASIDE FOR WORKERS, EQUIPMENT, AND LATERAL BUFFER SPACE: MATERIAL STORAGE PROVIDES PROTECTION FOR TRAFFIC AND WORKERS

LEGEND:

REFLECTORIZED PLASTIC DRUM

PORTABLE CHANGEABLE MESSAGE SIGN

MEASURED FROM THE START OF THE TRAVEL LANE RESTRICTION OR THE SHOULDER/BREAKDOWN LANE RESTRICTION (IF SHOULDER/BREAKDOWN LANE IS ONLY LANE BEING CLOSED)

THE "A" DISTANCE CAN BE

SHOULDER TAPER: GUIDES TRAFFIC AWAY FROM SHOULDER/ BREAK-DOWN LANE SPEEDING FINES DOUBLED

> R2-10a TRAFFIC WHAT TO EXPECT AHEAD WORK NEXT XX MILES XXX G20-1 W20-SERIES

LONGITUDINAL BUFFER SPACE: PROVIDES PROTECTION FOR TRAFFIC

AND WORKERS = STOPPING SIGHT

DISTANCE. NOTHING SHALL BE

PLACED/STORED IN BUFFER SPACE

USE "G20-1" SIGN AT PROJECT LIMIT IF WORK OCCURS **OVER A DISTANCE** OF MORE THAN 2 MILES (3.2 KM)

PORTABLE CHANGEABLE MESSAGE SIGNS LEGEND

THE SUGGESTED MESSAGE 2 WEEKS IN ADVANCE:

XX ST ROAD WORK

BEGINS X/XX/XX

LEGEND

WORK AREA

DOWNSTREAM

TAPER (OPT.)

LONGITUDINAL

BUFFER

SPACE (OPT.)

L/3

SHIFTING

TAPER

LONGITUDINAL BUFFER

SHOULDER

TAPER

SPACE (OPT.)

SIGN

DIRECTION OF TRAVEL CHANNELIZING DEVICE

FORMULAS FOR DETERMINING TAPER LENGTHS

SPEED LIMIT (S) TAPER LENGTH (L) FEET 40 MPH OR LESS 45 MPH OR MORE L= WS

SPEED LIMIT (S)	TAPER LENGTH (L) Meters
60 KM/H OR LESS	$L = \frac{WS^2}{155}$
70 KM/H OR MORE	L= <u>WS</u> 1.6

WHERE: L = TAPER LENGTH IN FEET (METERS)

W = WIDTH OF OFFSET IN FEET (METERS)

S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICAPATED OPERATING SPEED IN MPH (KM/H)

Source: Table 6C-4 MUTCD LATEST EDITION

TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

TYPE OF TAPER	TAPER LENGTH (L)*		
MERGING TAPER	AT LEAST L		
SHIFTING TAPER	AT LEAST 0.5L		
SHOULDER TAPER	AT LEAST 0.33L		
ONE-LANE, TWO-WAY TRAFFIC TAPER	50 FT MIN.(15 m) 100 FT(30 m) MAX.		
DOWNSTREAM TAPER	50 FT MIN.(15 m) 100 FT MAX.(30 m) PER LANE		

Source: Table 6C-3 MUTCD LATEST EDITION

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED* (km/h)	DISTANCE (m)		SPEED* (mph)	DISTANCE (ft)
30	35		20	115
40	50		25	155
50	65		30	200
60	85		35	250
70	105		40	305
80	130		45	360
90	160		50	425
100	185		55	495
110	220		60	570
120	250		65	645
		1	70	730
			75	820

*POSTED SPEED, OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

THESE VALUES MAY BE USED TO DETERMINE THE LENGTH OF LONGITUDINAL BUFFER SPACES.

THE DISTANCES IN THE ABOVE CHART REPRESENT THE MINIMAL VALUES FOR

BUFFFR SPACING.

Source: Table 6C-2 MUTCD LATEST EDITION

SUGGESTED WORK ZONE WARNING SIGN SPACING

ROAD TYPE	DISTANCE BETWEEN SIGNS **			
ROAD TIPE	Α	В	С	
LOCAL OR LOW VOLUME ROADWAYS*	350 (100)	350 (100)	350 (100)	
MOST OTHER ROADWAYS*	500 (150)	500 (150)	500 (150)	
FREEWAYS AND EXPRESSWAYS*	1,000 (300)	1,500 (450)	2,640 (800)	

* ROAD TYPE TO BE DETERMINED BY MASSDOT OFFICE OF TRANSPORTATION PLANNING.

** DISTANCES ARE SHOWN IN FEET (METERS). THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS TYPICALLY REFERRED TO AS AN "ADVANCE WARNING" SIGN ON THE TTCP SETUPS. THESE ADVANCE WARNING SIGNS ARE LOCATED PRIOR TO THE PROJECT LIMITS ON ALL APPROACHES (i.e. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT. ADDITIONAL SIGNS (i.e. "RIGHT LANE CLOSED 1 MILE" AND "LEFT LANE CLOSED 1 MILE") HAVE BEEN SHOWN IN SOME FIGURES ÀS EXAMPLES OF REINFORCEMENT SIGN PLACEMENT BUT ARE USED IN RARE OCCASIONS.

THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED.

R2-10a SIGNS SHALL BE PLACED BETWEEN THE SECOND AND THIRD SIGNS AS DESCRIBED ABOVE.

R2-10a, R2-10e, AND W20-1 SERIES SIGNS ARE TO BE INCLUDED ON ALL DETAILS/ TYPICAL SETUPS.

Based on: Table 6C-1 MUTCD LATEST EDITION

DANIEL L. MURPHY, JR. No. 41049 CIVIL

ROJECT NO. 0324-2206 FILE NAME: TSTM001.DV SHEET NO.

C. VALENCIA D. MURPH D. MURPH DATE DRWN CHKD REMARKS

260 West Exchange Street, Suite 300 Providence, RI 02903 Tel: (401) 751-5360

TEMPORARY TRAFFIC CONTROL ZONE

COMPONENT PARTS OF A

TOWN OF HARWICH, MASSACHUSETTS SEWERAGE WORKS IMPROVEMENTS PHASE 2 - CONTRACT NO. 2 PROJECT NO. CWSRF 4424/2

TYPES OF TAPERS AND

BUFFER SPACES

SHIFTING

TAPER

LATERAL BUFFER

SPACE (OPT.)

SHIFTING

TAPER

4S ft IF S IS IN MPH

(0.8S m IF S IS KM/H)

TRAFFIC MANAGEMENT PLANS I

TM-1

