

CITY OF WORCESTER, MASSACHUSETTS

Shrewsbury Street Sewer Rehabilitation Sewer Rehabilitation Project  
Contract S24-1-ARPA  
Bid No. 8180-W4

ADDENDUM NO. 1

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To be considered as part of the contract drawings and specifications for the Shrewsbury Street Sewer Rehabilitation Sewer Rehabilitation Project, dated April 2024:

**PLANS**

**Sheet C101 and C102**

1. General Note 5 is revised. See SK-2 for the revision.

**Sheet C102**

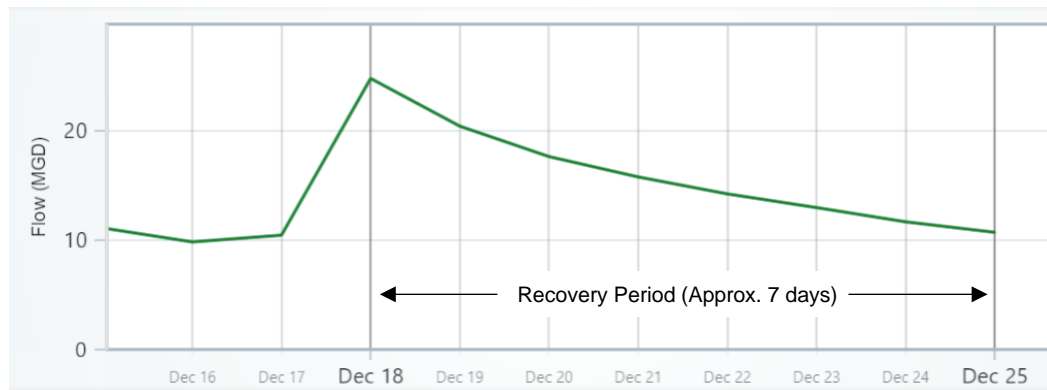
1. Geopolymer Lining of Sewers is changed to Epoxy Lining of Sewer. See SK-2 for the revision.
2. The overflow pipe at manhole SS07502 is 24-inch in diameter. See SK-1 for a sketch of the revision.

**QUESTIONS**

- Q1. The capacity of the system and the dry weather flows have a large variance - what are the flows that the bypass system should be designed for?
- A1. **The design, installation, and operation of the temporary bypass pumping system shall be the Contractor's responsibility. It should be noted that the sewers in the project area are part of a combined system. Flow volumes are dependent on weather events and may take several days to subside following an event. Bypass pumping systems shall have sufficient capacity to pump all sanitary and combined sewer flows during liner installation and other related work. The Contractor may elect to release plugs during non-work hours.**

A rain gauge in the City recorded a peak hourly rainfall of 0.95-in on July 14, 2023, which was the highest recorded hourly intensity during the metering period. The peak flow recorded during the storm was approximately 61.5 MGD.

The largest 24-hour (1-day) storm occurred on December 18, 2023. A total of approximately 2.75 inches of rain was recorded. The peak flow recorded during that storm was 44.4 MGD. Prior to the storm, the average daily flow was approximately 10 MGD; however, the average daily flow did not subside after several days after the storm as seen in the graph on the following page. It should be noted that the graph on the following page shows the average daily flow each day, not the maximum instant peak, which is 44.4 MGD as stated above.



Graph 1 - Average Daily Flow From 12/15/23 to 12/25/23

**As indicated on Appendix B of the Contract documents, available flow monitoring data can be provided.**

Q2. Please confirm the contractor is allowed to release filtered water removed during the pipe vacuuming process (known as “decant water”) into the sanitary or storm system.”

A2. **See responses for Q2 below.**

- a. **Contractor is allowed to release the decant water to the sanitary sewer system.**
- b. **The dash lines, labeled “48” CS, 60” CS, 84”CS, and 96” CS” on Contract Drawings sheet C101 and C102, are part of the City’s combined sewer overflow (CSO) collector, not a separated storm system. Contractor is allowed to release the decant water to the CSO collector. Contractor shall confirm with the Engineer prior to releasing the decant water into the overflow collector.**

Q3. Please confirm that the water introduced for the pipe jetting process is allowed to remain in the sanitary and combined sewer system.

A3. **Yes.**

Q4. Are there any well water areas, wetland areas, ground water or other sensitive environments proximate to the work area? If so, are there specific controls required to protect these areas such as “pre-liners”

A4. **No.**

Q5. Can the Engineer and the City provide an extended GIS map for the surrounding area of the scope of work, so the Contractor can work on building a bypass route?

A5. **Bypass work shall be limited to the area shown on the Contract Drawings. According to the General Notes 5 on the Contract Drawings sheet C101 and C102, “Contractor may elect to utilize the overflow pipes to divert flows into the 48-, 60-, 84-, and 96-in combined sewer by installing plugs...” Location of the overflow pipes is indicated on the Contract Drawings.**

Q6. General Note 5 on C101 states that the 96” combined sewer may be used for to divert flows. Does this hold true upstream to where the combined sewer is only 48”?

A6. **Yes. See attached SK-2 for revised General Note.**

- Q7. Using the adjacent combined sewer pipe with plugs, rather than a pump system has the potential to tremendously impact the bid pricing, so it is crucial that the owner outline the parameters for the use of this pipe:
- a. Can the cross connections be used to divert flow to the combined sewer instead of a pump system?
  - b. Does this combined sewer surcharge/overflow in certain weather events or high use periods? Can the owner provide any information about weather events or other occasions that would render this combined sewer pipe unusable and cause a stoppage of work?
  - c. Since the owner included the combined sewer pipe on the plans and indicated that it may be used for diversion, will the owner reimburse contractors for periods of work shut down because the combo sewer is unusable due to high flows?
  - d. If the combined sewer does surcharge where does flow go, does it cause a surcharge in the sanitary sewer? Is there an outlet overflow?
  - e. If the combined sewer does surcharge back to the sanitary sewer resulting in the need to reclean the sanitary sewer, or perform re-work of any sort, will the City compensate the contractor for that work?
  - f. Can the owner provide invert elevations of both the cross connections and the combined sewer, including any overflows or outlets in relationship to the sanitary sewer to help assess the risk of total system surcharge?
  - g. Does the City have plans showing where flow from the combined sewer re-enters the sanitary sewer?
- A7. **See responses for Q7 a. thru g. below.**
- a. **Contractor may elect to utilize the cross connections. It should be noted that the design of the flow diversion plan shall be the Contractor's responsibility and Contractor shall submit a flow diversion plan for approval prior to any diversion of flows.**
  - b. **No additional information can be provided.**
  - c. **No.**
  - d. **No additional information can be provided.**
  - e. **No.**
  - f. **Limited invert elevations are provided in the attached SK-1. It should be noted that the invert elevations were obtained from available record drawings, the Contractor shall verify the elevations.**
  - g. **The 96" combined sewer pipe does not reenter the sanitary sewer. It enters the Combined Sewer Overflow Collector just upstream of manhole SS01712 on Front Street (shown on Contract Drawings Sheet C102), which discharges at the City's Combined Sewer Treatment Facility.**
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- Q8. Specification Section 01535 - Temporary Bypass Pumping System and Section 01575 - Handling Existing Flows regarding bypass of flows contradict each other. Section 01575 references to provide adequate bypass for "full pipe capacity ...times 1.25" and Section 01535 states "capacity to pump peak flow" (according to a Table provided in Appendix B). Please provide a required flow (gallons per minute) capacity for the bypass system, or at least clarify the contradiction
- A8. **See response to Q1 above.**
-

Q9. Are there any restrictions to where the bypass pumps or discharge piping can be located? Are there requirements for burying in certain locations?

A9. **Bypass pumps may occupy a portion of the roadway (up to one (1) lane closure may be permitted), median strip, and/or side walk. Bypass piping must be buried at street crossings, driveway crossings, and/or intersections. According to the General Notes 5 on the Contract Drawings sheet C101 and C102, "...Contractor shall submit a flow diversion plan for approval prior to any diversion of flows."**

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Q10. Will the City require individual bypass for any residents? Will the City assist with rights of entry to properties and coordination with residents? Since it is not cost or time effective to create a bypass system for each resident, will the City provide a list of addresses that they require bypassed during CIPP operations?

A10. **Contractor shall maintain service flows according to Specification Section 01535 – Temporary Bypass Pumping System, Section 2.02A. 5. and 6. The City may assist with rights of entry to properties and coordination with residents and businesses.**

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Q11. The plans seem to interchange the terms "epoxy lining" and Geopolymer lining", specifically SS00479 – SS01595, possibly some structures, etc. please clarify. Also, there is no specification section for Geopolymer.

A11. **See attached SK-2 for a sketch of a revision showing epoxy lining.**

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Q12. If the 96" CS is used for bypass will the contractor need to pre or post clean that pipe?

A12. **No.**

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Q13. Would you consider 1" GeoKrete Geopolymer an approved standalone protective coating system as an alternative to epoxy?

A13. **Bids shall be based on the performance of the finished product as specified within the Contract Documents. The contractor may elect to submit alternative products for review as an approved equal in lieu of epoxy lining.**

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Q14. Would you consider UV CIPPL in lieu of Steam/Water CIPPL?

A14. **Bids shall be based on the performance of the finished product as specified within the Contract Documents. Contractor may elect to submit alternative cured-in-place processes and/or products for review as an approved equal in lieu of curing the liner tube using hot water or steam.**

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Q15. When was the last time that the sewers in the project area was cleaned?

A15. **The sewers in the project area have not been cleaned previously, except for the following pipes, which is also stated on Contract Drawings sheet C012.**

- **From Asset ID SM07930 to SM06933 last cleaned in 2011.**
  - **Asset ID SM11043, which is a single barrel siphon, last cleaned in 2022.**
-



Q16. Will warranty CCTV inspection require bypass? Will warranty inspection and/or cleaning be required and to what degree?

A16. **Bypass will not be required for warranty inspection provided that all post-rehabilitation inspection is completed, except for inspection of the siphon. The Contractor shall provide needed flow control to perform warranty inspection and may utilize the overflow pipes for flow control during warranty inspection.**  
**Cleaning of the sewer is not expected for warranty inspection, except for the siphon.**

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Q17. Note 5 on the plans state that a plug can be used to divert flow to the adjacent 96" CSO, however section 01535 states that the contractor cannot surcharge or create significant level variations in the existing sewer. These are contradictory, please clarify.

A17. **Surcharge or significant level variations in the existing sewer shall not be permitted. As indicated on General Notes 5 on the Contract Drawings sheet C101 and C102, "...Contractor shall submit a flow diversion plan for approval prior to any diversion of flows."**

**The design, installation, and operation of the temporary bypass pumping system shall be the Contractor's responsibility. As part of the bypass design, the Contractor may elect to utilize plugs to divert flow into the adjacent CSO collector with pumps to minimize system surcharge.**

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Q18. Please provide a profile of the siphon to be lined.

A18. **Profile of the siphon in the project area is attached as Attachment C.**

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Q19. Will the owner accept traditional CIPP lining of pipe section MH SS00479 to MH SS01595 rather than the specified epoxy lining?

A19. **No. Traditional CIPP lining is not acceptable due to a utility crossing.**

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Q20. Due to the numerous restaurants on the street, are there certain days/time restrictions for any of the work beyond those spelled out in the specifications?

A20. **Restrictions regarding work hours and days are indicated on Contract Drawings sheet G001, Construction Notes.**

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Q21. Vacuum testing for the manhole rehab is not possible in with these size/shape pipe. Please provide an acceptable alternate testing method.

A21. **Warranty inspection shall be performed according to Specification Section 02435 - Sewer Manhole Rehabilitation, Section 3.06 A.**

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Q22. Does the city have a GIS/KMZ file of the pipes in the project area?

A22. **Yes.**

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Q23. When does the city expect to issue the NTP for this project?

A23. **The City expects to promptly review the bids and award the contract.**

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Q24. Will the city provide a place to dump the cleaning debris pulled from the pipes?

A24. **According to Specification Section 02440 – Cleaning and Inspection, Section 3.01 C., "...The Contractor shall not expect the Owner to provide a dump site."**

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Q25. Is the city looking to have this work completed during the day or at night due to the location of the work?

A25. **See response to Q20 above.**

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Q26. It appears most of the flow in the pipe is coming from a pump station. Can the City provide the location and details of the pump station and forcemain including discharge, size of the wet well, flow data? Can the pumps be set at lower pump rate to run continuously rather than on/off? Is any pump manipulation allowed?

A26. **The Lake Ave Pump Station is located at 83 Lake Avenue. The forcemain discharges at the intersection of Shrewsbury Street and Belmont Street. Available Record drawings of the Lake Ave Pump Station Forcemain area attached as Attachment D. No adjustment to the pump control shall be permitted.**

**For access to the pump station flow data, please contact:**

**Kara D. Keleher, PE, ENV SP**  
**Weston & Sampson**  
**Email: [keleherk@wseinc.com](mailto:keleherk@wseinc.com)**  
**Phone: 978-573-4060**

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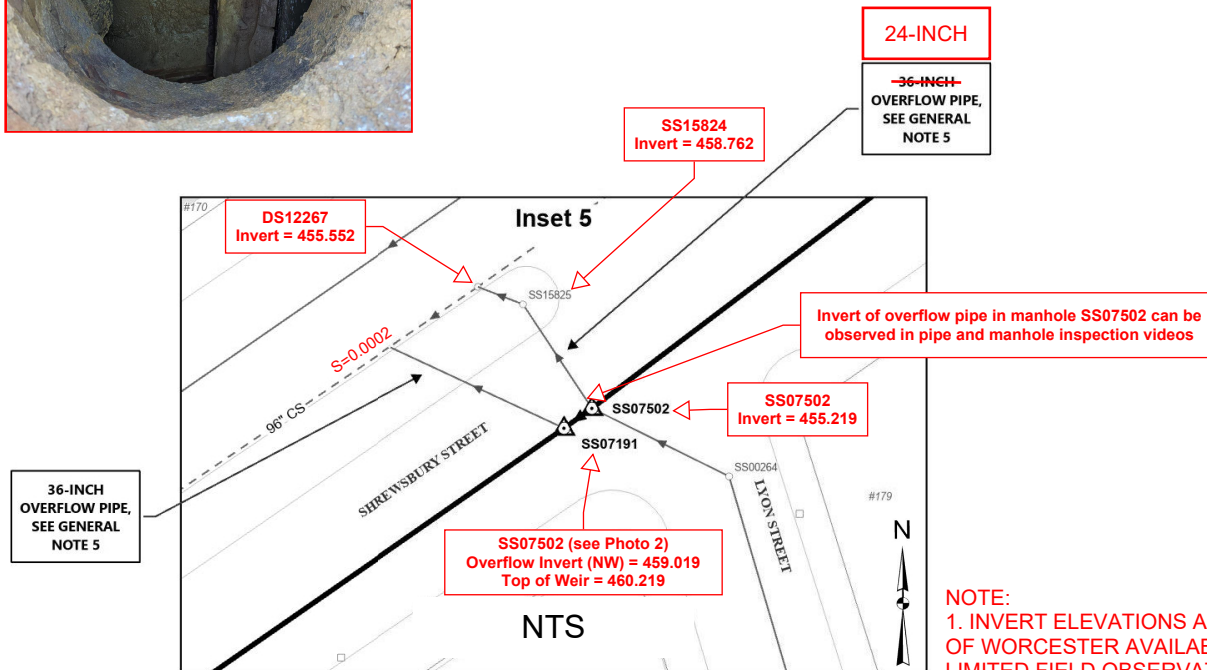
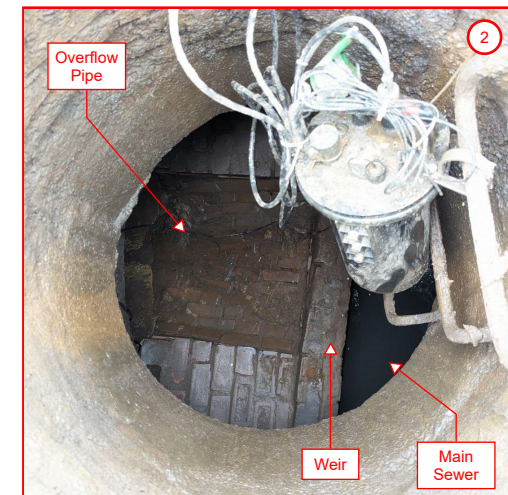
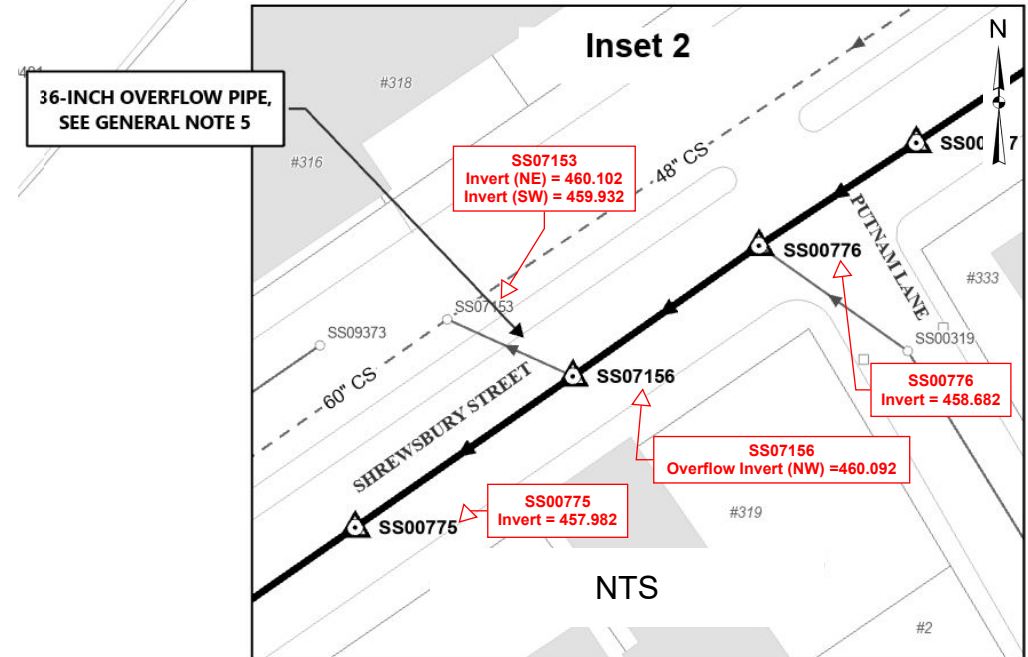
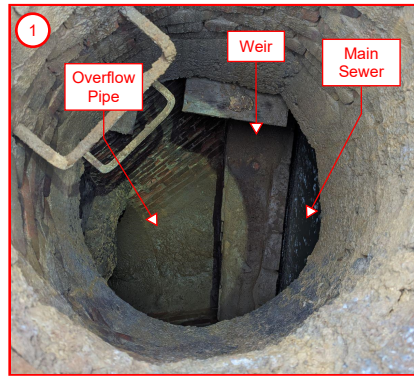
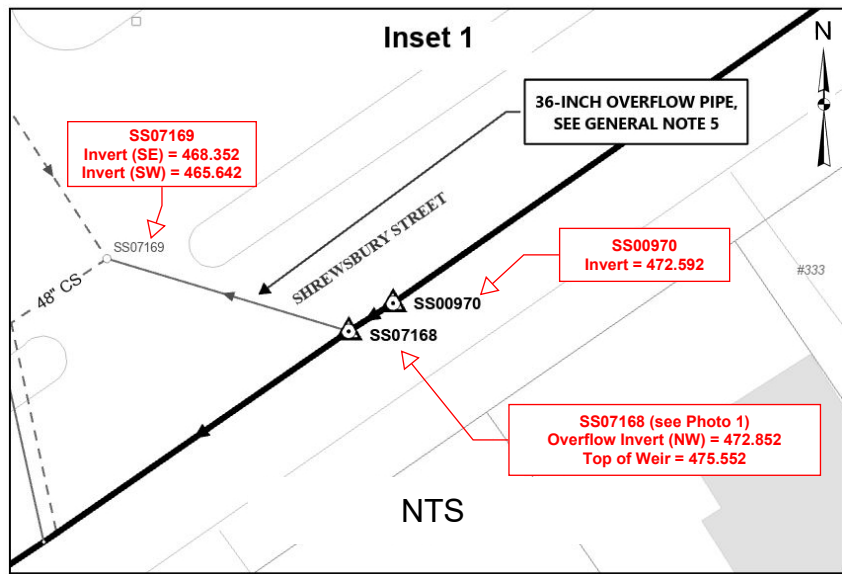
#### **ATTACHMENTS**

- A. SK-1
- B. SK-2
- C. Shrewsbury Street Siphon Profile
- D. Lake Ave Pump Station Forcemain Record Drawing

END OF ADDENDUM NO. 1

**Attachment A**

**SK-1**



**NOTE:**  
1. INVERT ELEVATIONS ARE OBTAINED FROM CITY OF WORCESTER AVAILABLE RECORD DRAWINGS, LIMITED FIELD OBSERVATIONS, AND OBSERVATIONS FROM CCTV INSPECTIONS.

**FIGURE**

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**CITY OF WORCESTER, MASSACHUSETTS  
CONTRACT S24-1-ARPA**

# SK-1

APRIL 2024

SCALE: NOTED

Weston & Sampson<sup>SM</sup>

**Attachment B**

**SK-2**

## GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY ALL ACTIVE SERVICE CONNECTION LOCATIONS DURING INITIAL TELEVISION INSPECTION WITH DYE TESTING. SERVICE CONNECTION LOCATIONS WERE OBTAINED FROM AVAILABLE TELEVISION INSPECTIONS AND MAY NOT BE ACCURATE.
  2. SEVERAL MANHOLE DEPTHS WERE OBTAINED FROM AVAILABLE RECORD INFORMATION.
  3. INFILTRATION WAS OBSERVED THROUGHOUT PROJECT AREA. CONTRACTOR SHALL INSTALL PRE-LINER AND/OR GROUT INFILTRATION SOURCES PRIOR TO INSTALLATION OF CURED-IN-PLACE PIPE ACCORDING TO SPECIFICATION SECTION 02428.
  4. SERVICE CONNECTION STATION LOCATIONS BEGIN FROM UPSTREAM MANHOLE TO DOWNSTREAM MANHOLE, UNLESS OTHERWISE NOTED.
  5. ~~CONTRACTOR MAY ELECT TO UTILIZE OVERFLOW PIPES TO DIVERT FLOWS INTO THE 96-IN COMBINED SEWER BY INSTALLING PLUGS. CONTRACTOR SHALL SUBMIT A FLOW DIVERSION PLAN FOR APPROVAL PRIOR TO ANY DIVERSION OF FLOWS.~~
  6. PAVEMENT REPLACEMENT SHALL BE PERFORMED ACCORDING TO THE CITY OF WORCESTER'S STANDARD SPECIFICATIONS AND DETAILS.
5. CONTRACTOR MAY ELECT TO UTILIZE OVERFLOW PIPES TO DIVERT FLOWS INTO THE 48-, 60-, 84-, AND 96-IN COMBINED SEWER BY INSTALLING PLUGS. CONTRACTOR SHALL SUBMIT A FLOW DIVERSION PLAN FOR APPROVAL PRIOR TO ANY DIVERSION OF FLOWS.

### EPOXY LINING OF SEWER

### ~~GEOPOLYMER LINING OF SEWERS~~

ASSET ID	MH	TO MH	STREET/LOCATION	PIPE DIA. (IN)	MATERIAL	APPROX. MH TO MH LENGTH (LF)	REINSTATE SERVICE(S) (APPROX. STA)	APPROX. DEBRIS VOLUME (CY) <sup>(1)</sup>
SM07912	SS00479	SS01595	PLUM STREET	48x72	BRICK	54	0+13, 0+20, 0+36, 0+37, 0+48	SEE NOTE 2

APPROX. TOTAL (LF) = 54

#### FIGURE

CITY OF WORCESTER, MASSACHUSETTS  
CONTRACT S24-1-ARPA

# SK-2

APRIL 2024

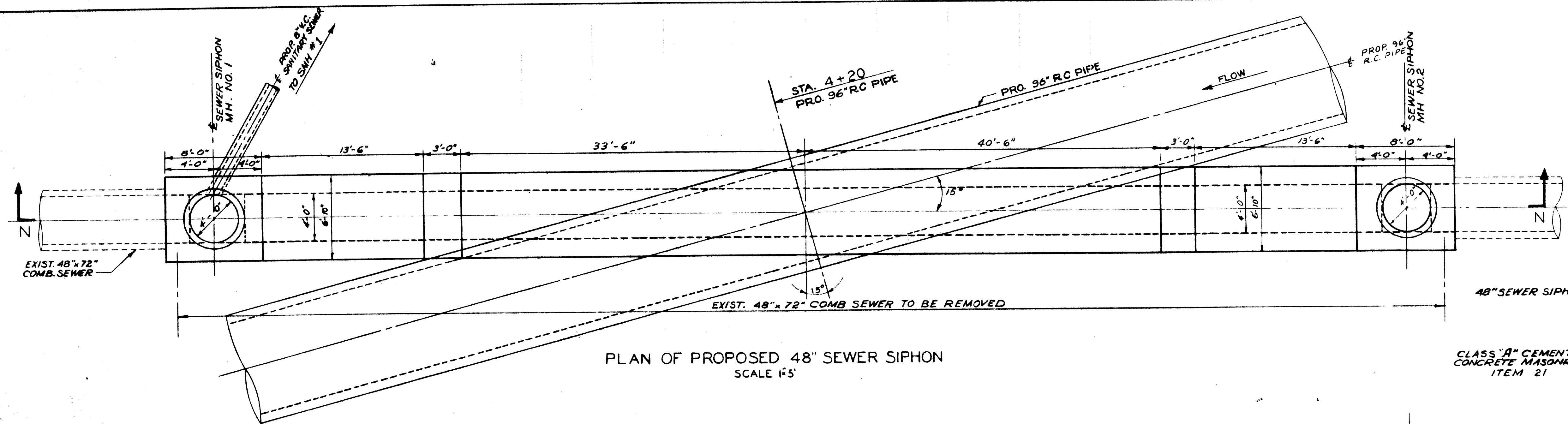
SCALE: NOTED

Weston & Sampson<sup>SM</sup>

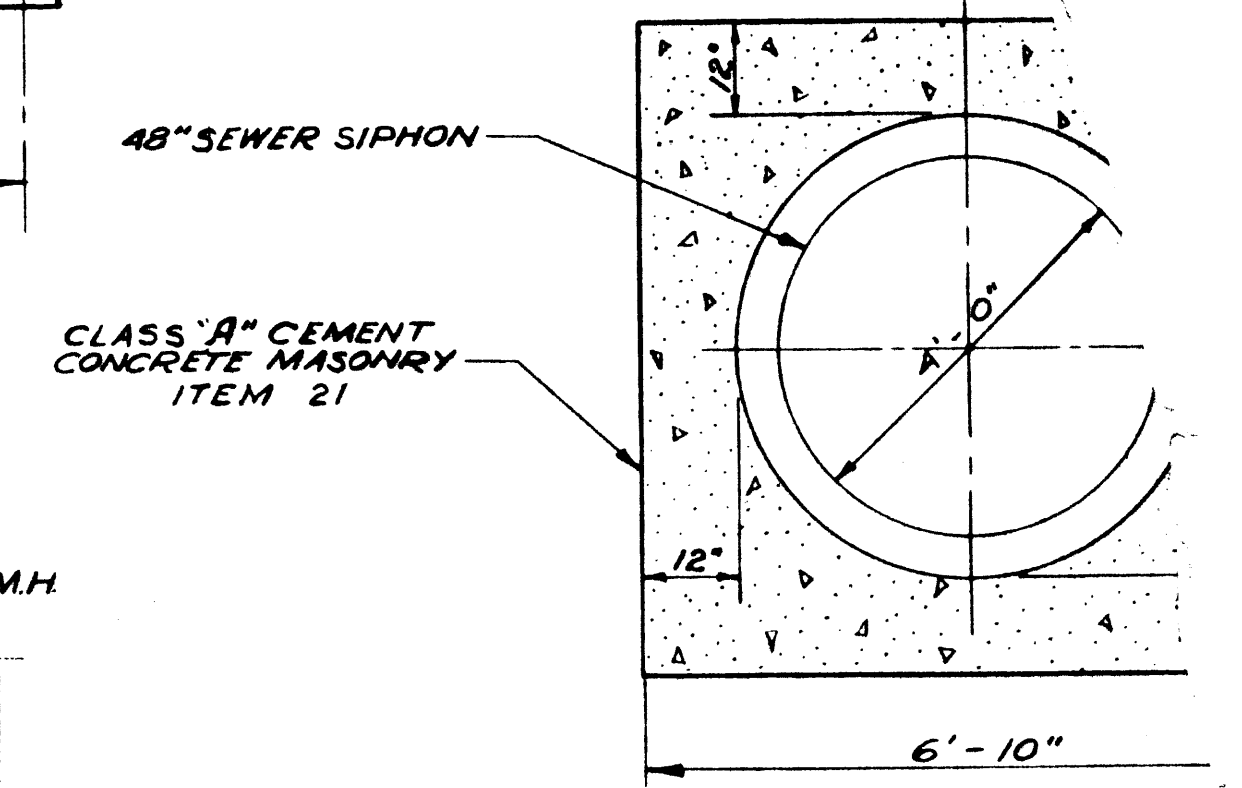
**Attachment C**

**Shrewsbury Street Siphon Profile**

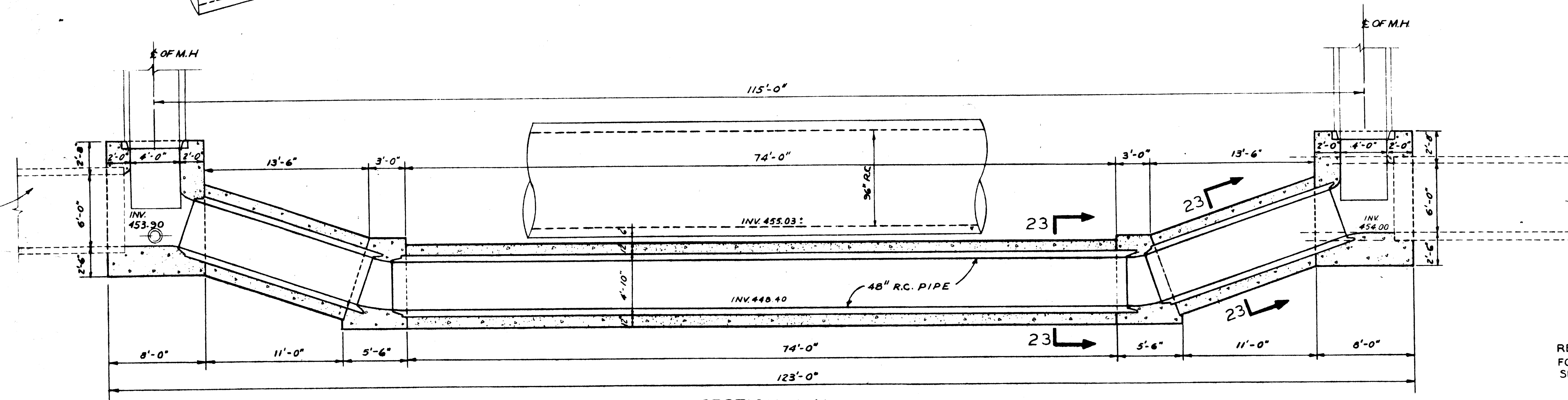




PLAN OF PROPOSED 48" SEWER SIPHON  
SCALE 1"=5'

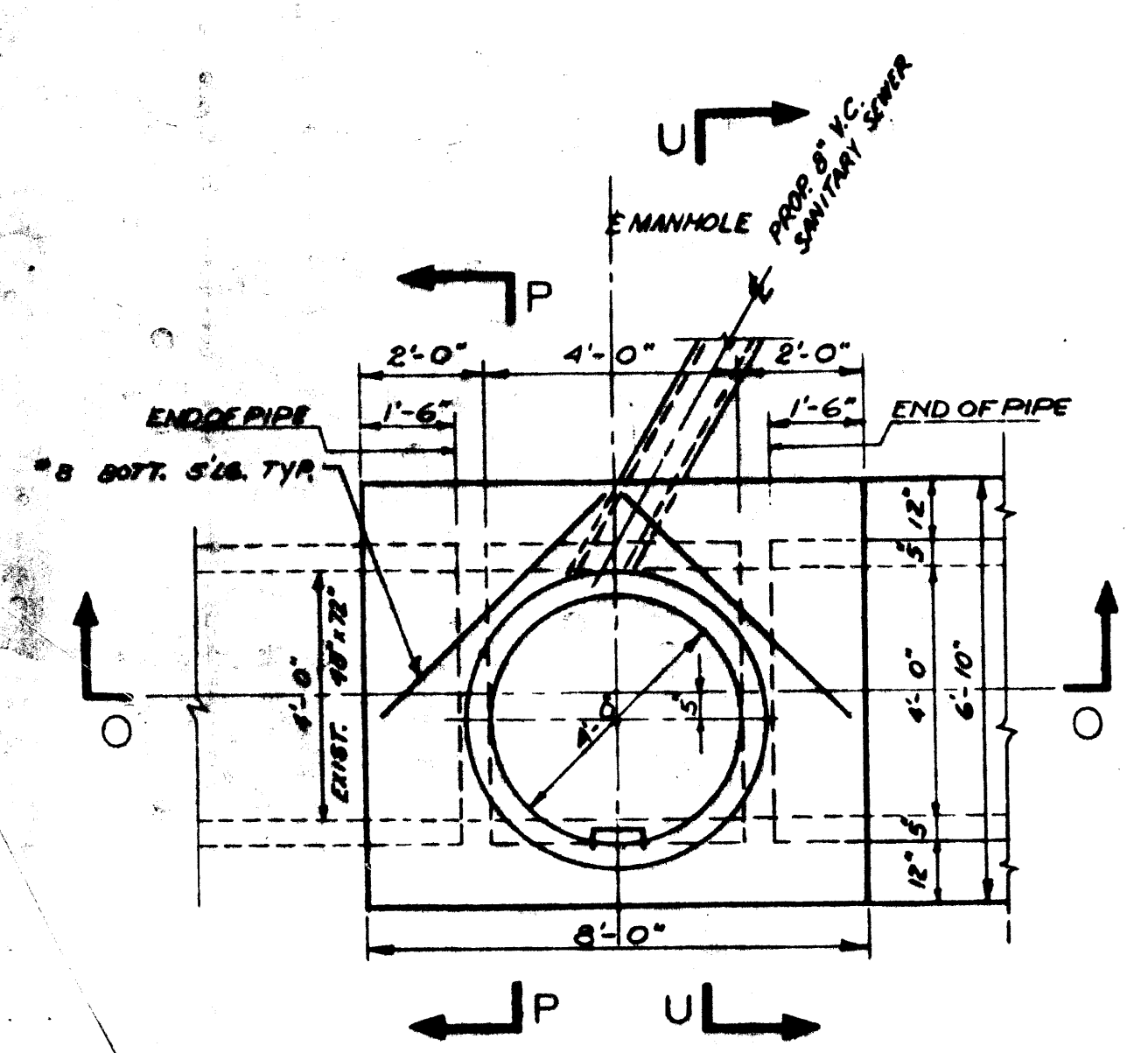


SECTION 23-2  
SCALE 1/2"=1'-0"

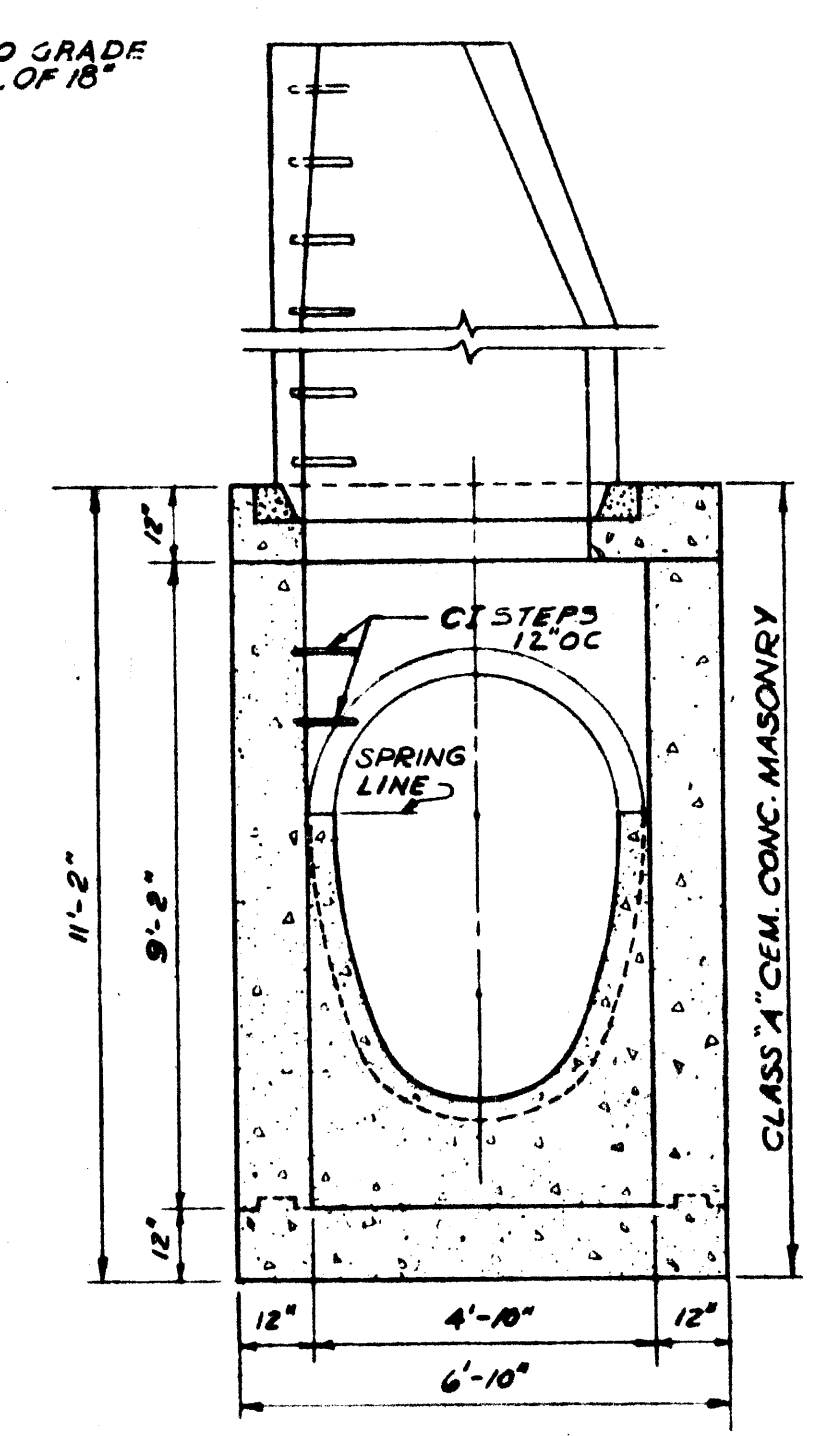
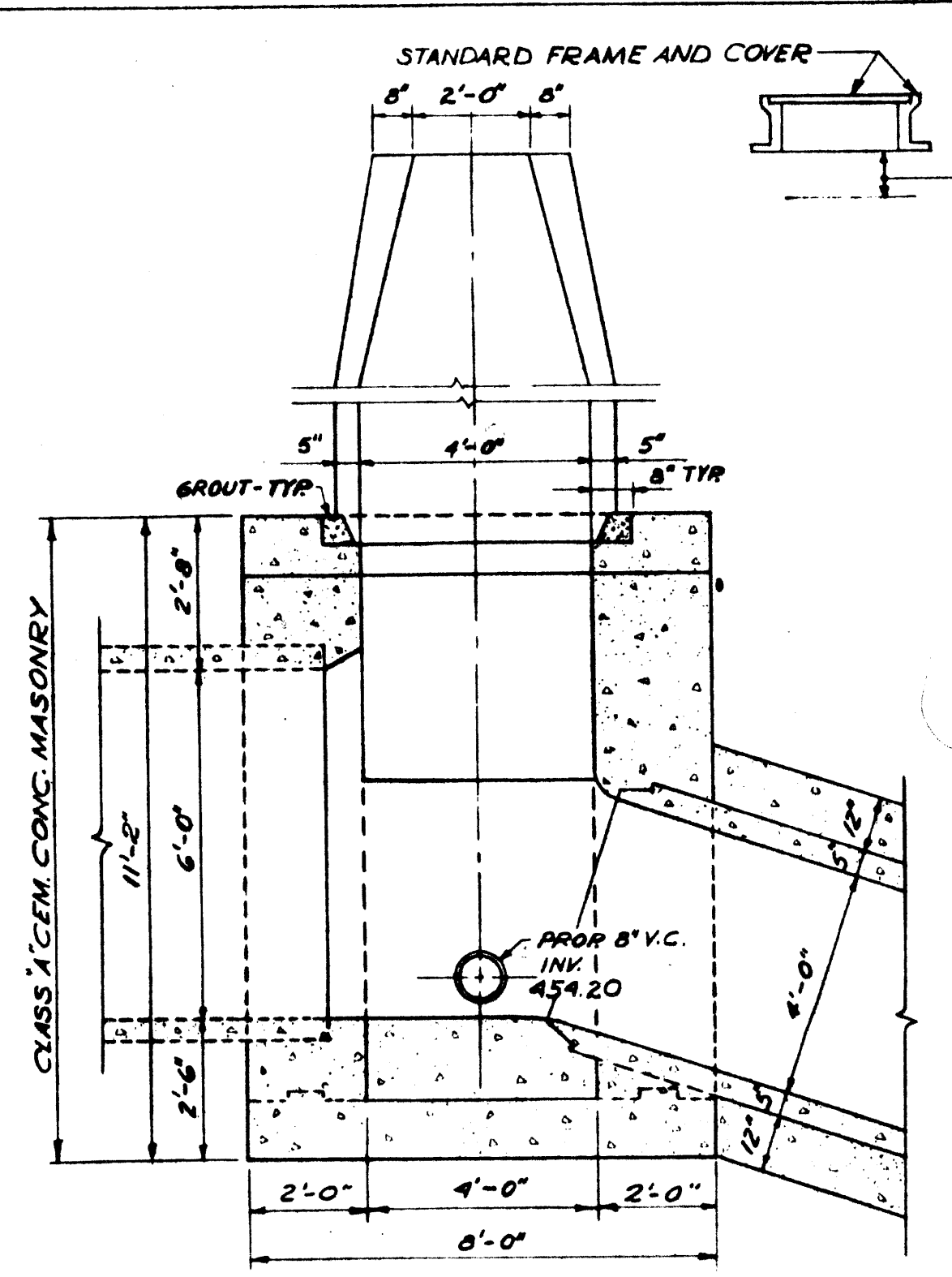


SECTION N-N  
SCALE 1"=5'

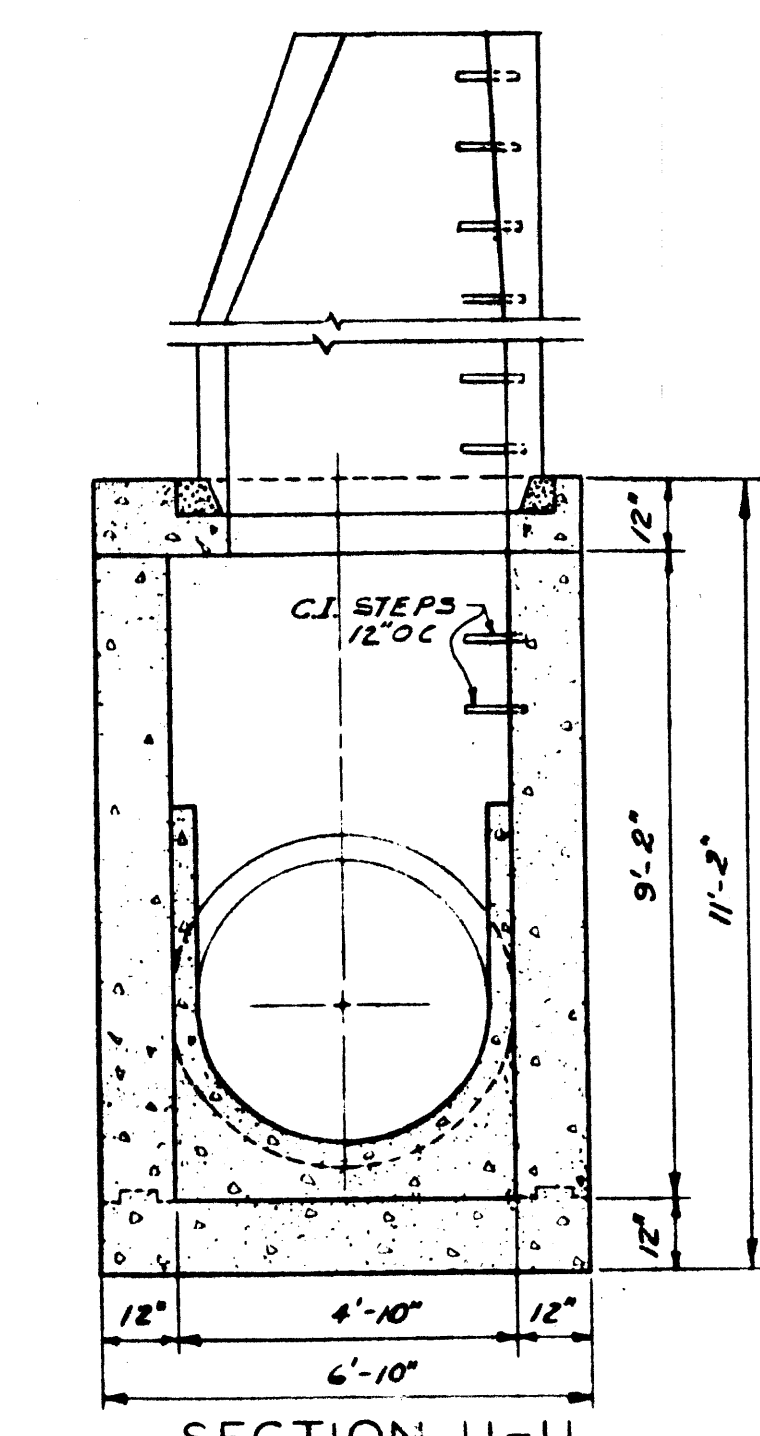
REFERENCE NOTES  
FOR LOCATION OF PROPOSED 48" SEWER  
SIPHON SEE SHEET 2



PLAN OF 48" SIPHON M.H. NO. 1  
SIPHON M.H. NO. 2-OPPOSITE HAND  
SCALE 3/8"=1'-0"



SECTION R-R



SECTION U-U

PROPOSED STORM DRAINAGE IMPROVEMENTS  
SHREWSBURY STREET AREA  
**WORCESTER**  
DEPARTMENT OF PUBLIC WORKS OF MASSACHUSETTS  
DIVISION OF WATERWAYS

APRIL 1958.

SCALES AS SHOWN

PREPARED BY  
DUFFILL ASSOCIATES INC.  
CONSULTING ENGINEERS

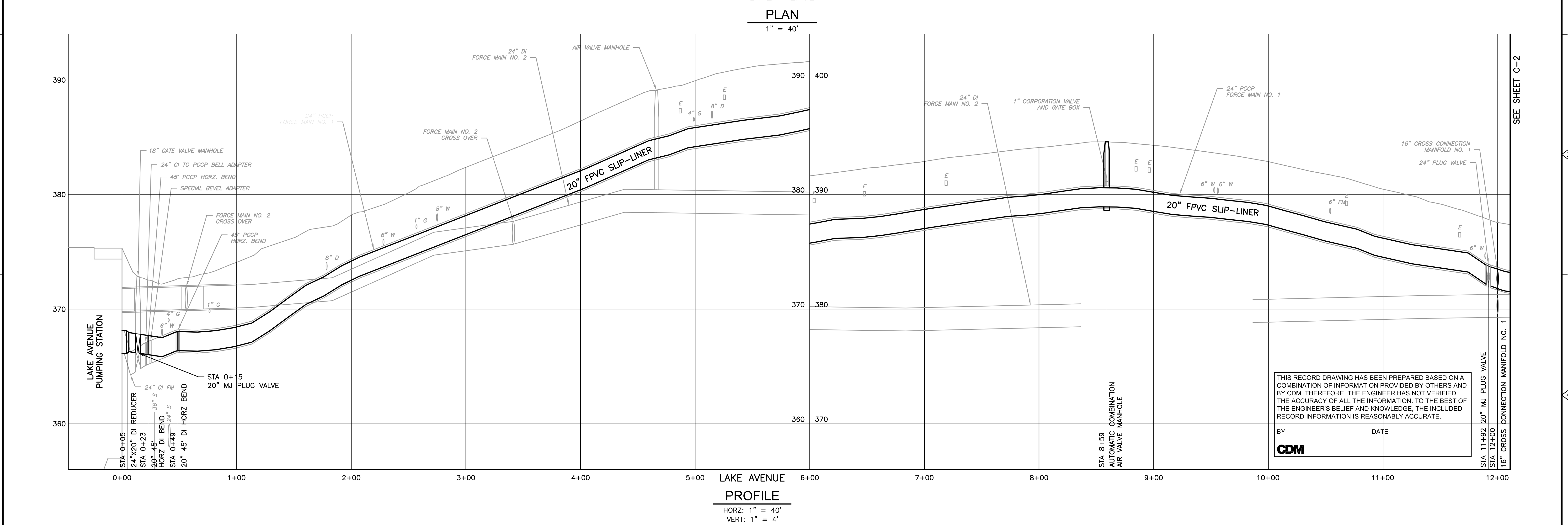
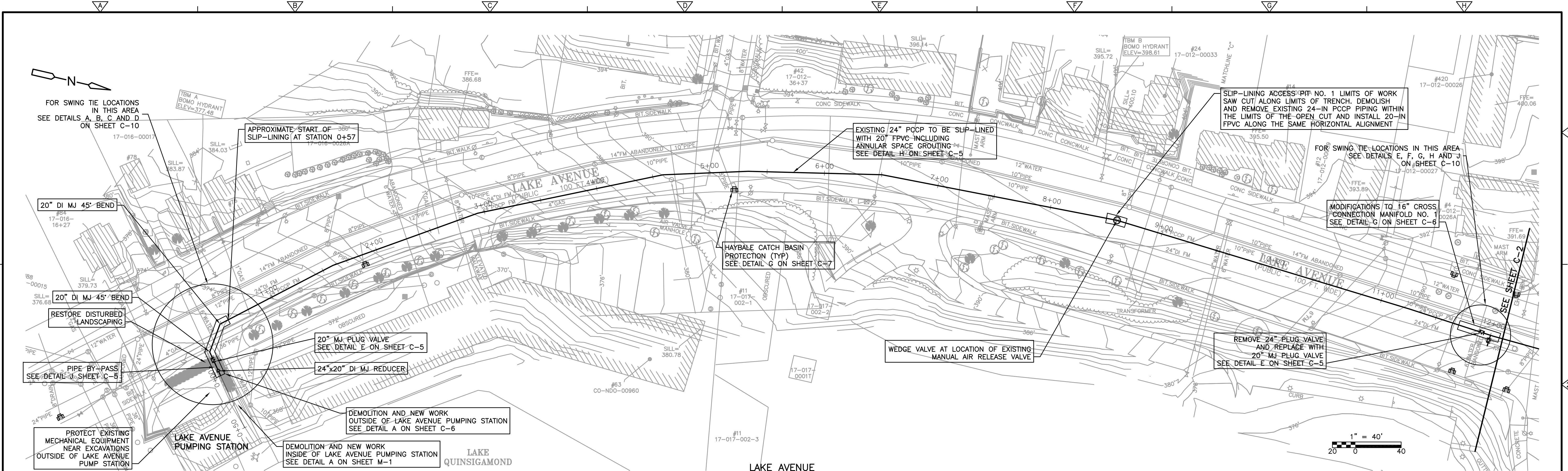
CHIEF WATERWAYS ENGINEER



**Attachment D**

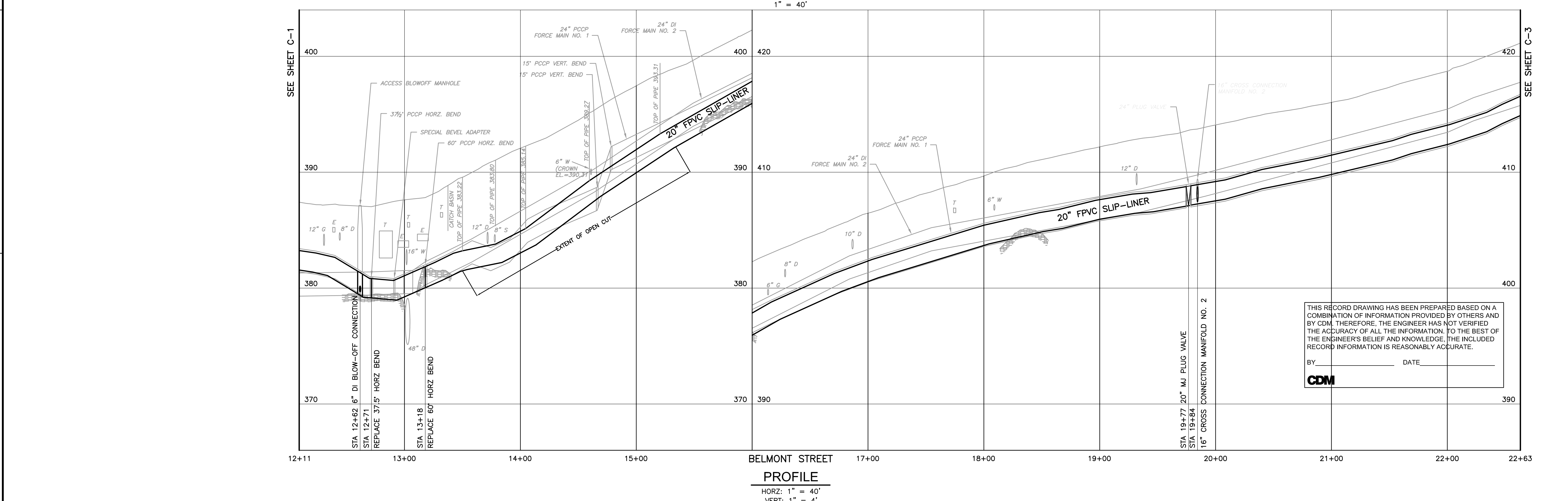
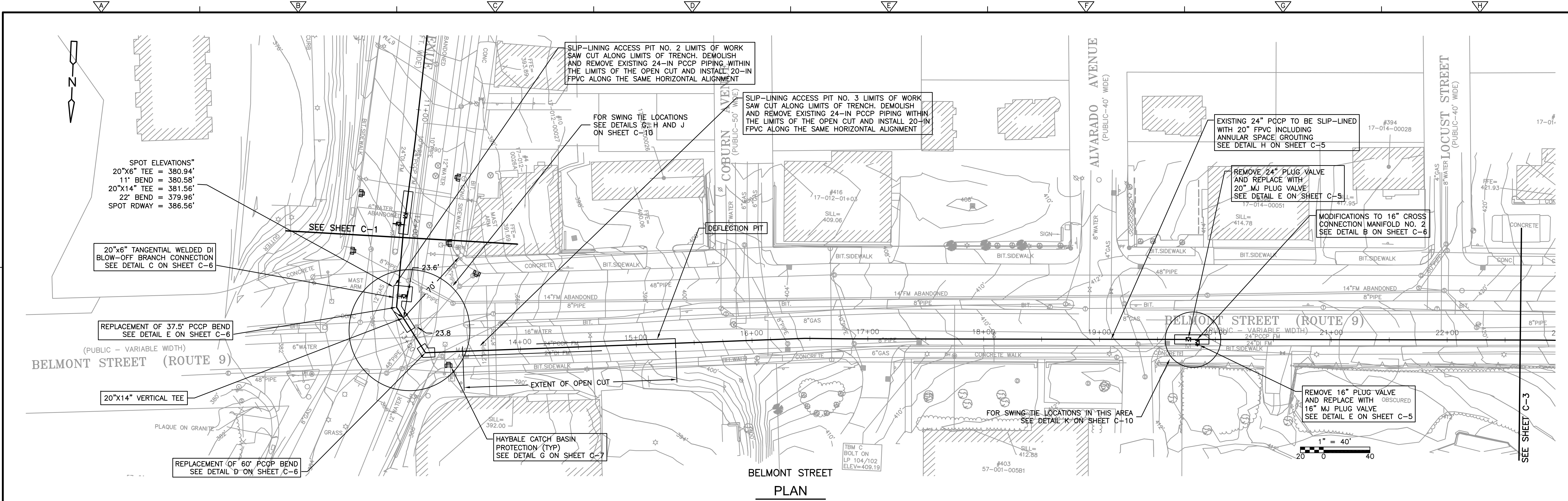
**Lake Ave Pump Station Forcemain Record Drawings**






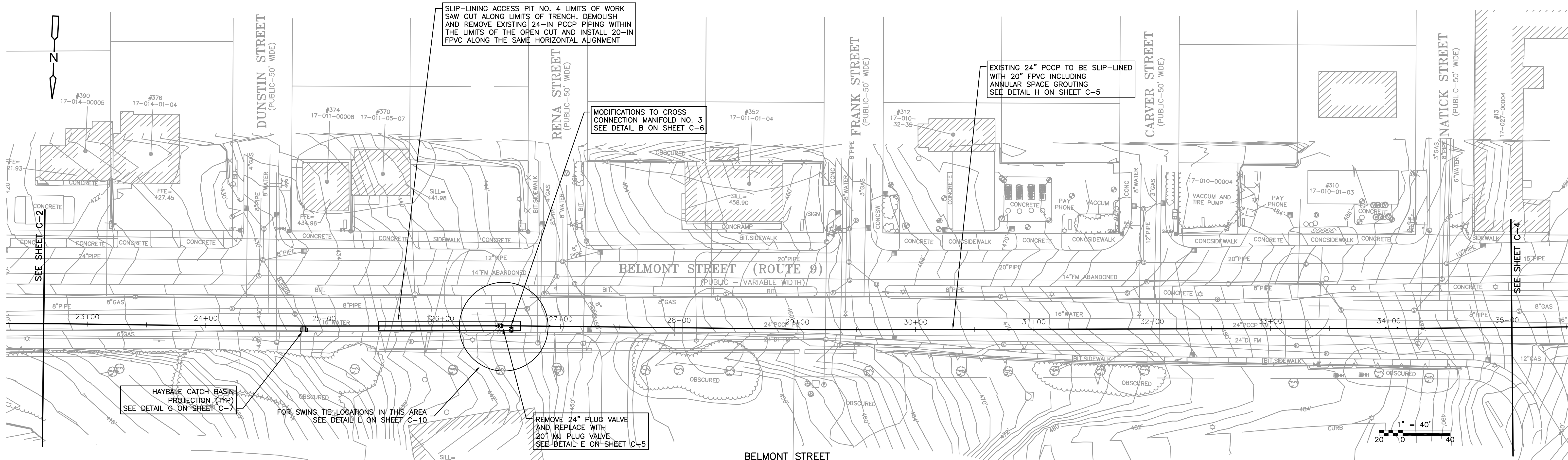
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					SHEET CHK'D BY: <u>N. HAMPTON</u>				SHEET NO.
					CROSS CHK'D BY: <u>T. CHARLES</u>				C-1
					APPROVED BY: <u>N. HAMPTON</u>				
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REV. NO.	DATE	DRWN	CHKD	REMARKS					



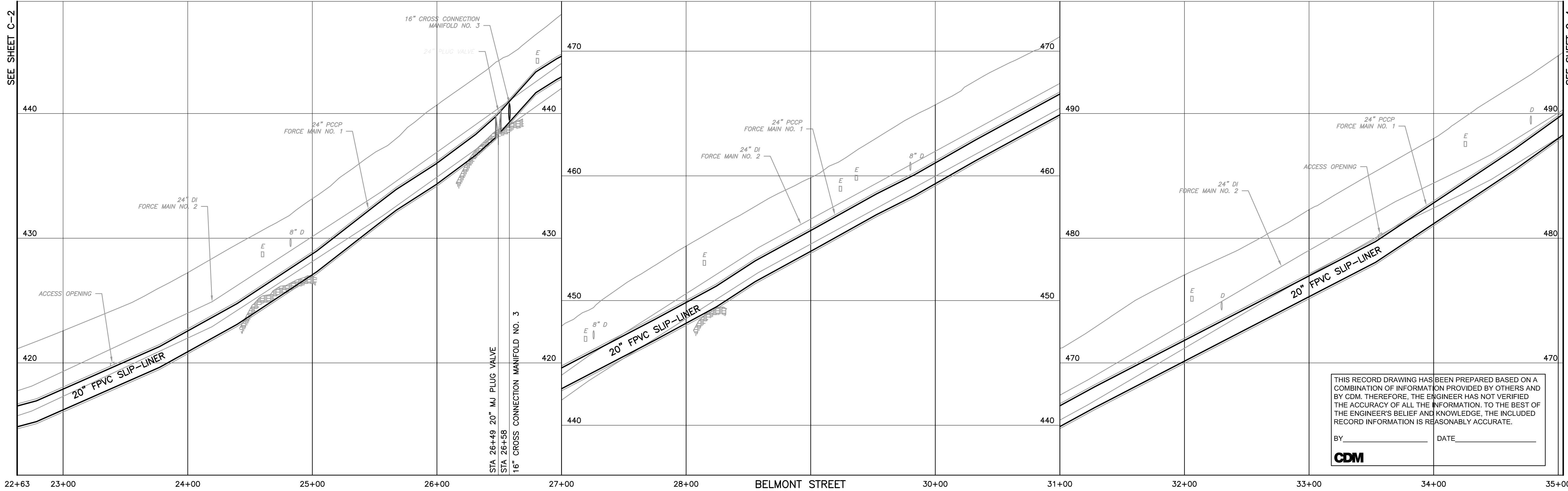


					DESIGNED BY: <u>D. REBELO</u>	 Camp Dresser & McKee Inc. Pulham Park 100 Great Meadow Road, Suite 104 Wethersfield, CT 06109  consulting • engineering • construction • operations	CITY OF WORCESTER, MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS AND PARKS  LAKE AVENUE PUMPING STATION FORCE MAIN NO. 1 REHABILITATION	BELMONT STREET STA. 12+11 TO STA. 22+63	PROJECT NO. 0198-65037
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1	07/10	SE	JV	REVISED FOR RECORD					
REV. NO.	DATE	DRWN	CHKD	REMARKS					





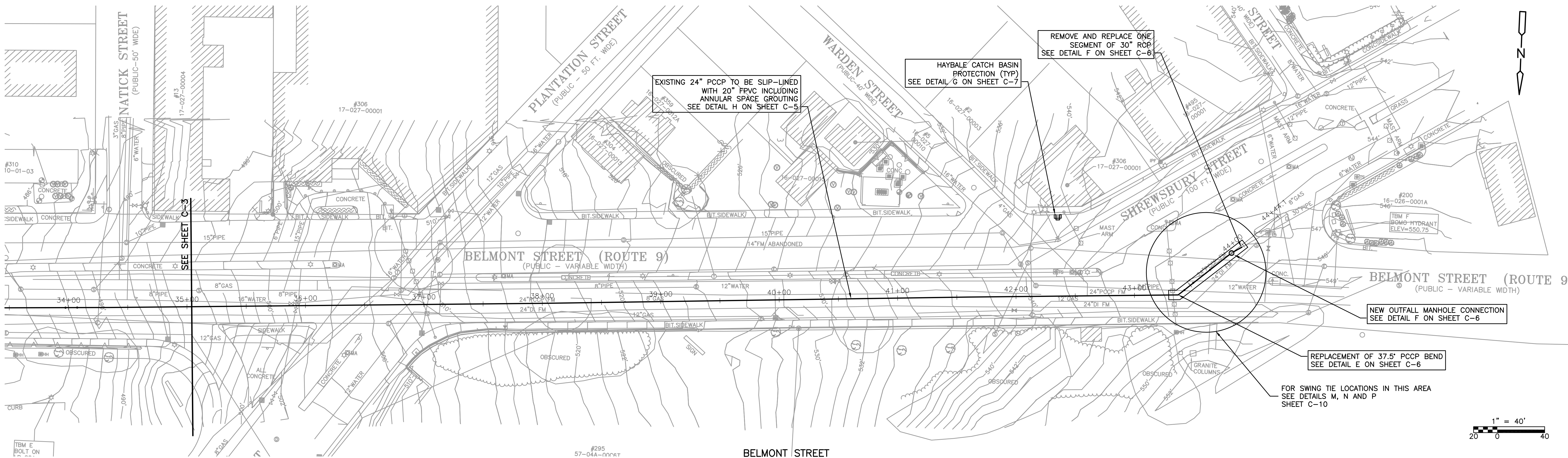
BELMONT STREET  
PLAN  
1" = 40'



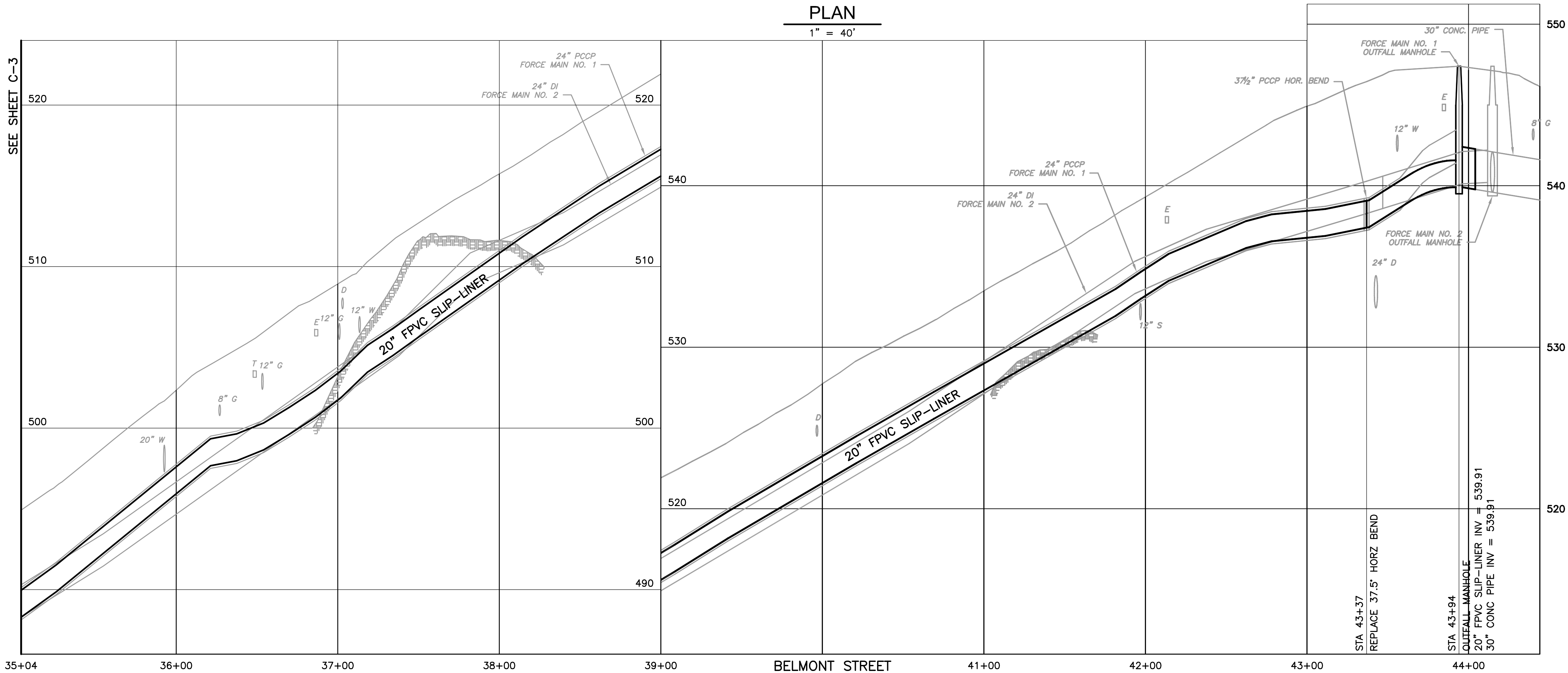
BELMONT STREET  
PROFILE  
HORZ: 1" = 40'  
VERT: 1" = 4'

					DESIGNED BY: <u>D. REBELO</u>	 Camp Dresser & McKee Inc. Putnam Park 100 Great Meadow Road, Suite 104 Wethersfield, CT 06109 consulting • engineering • construction • operations	CITY OF WORCESTER, MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS AND PARKS LAKE AVENUE PUMPING STATION FORCE MAIN NO. 1 REHABILITATION	BELMONT STREET STA. 22+63 TO STA. 35+04	PROJECT NO. 0198-65037 FILE NAME: CFMPL001 SHEET NO. C-3
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					APPROVED BY: <u>N. HAMPTON</u>				
					DATE: <u>JULY 2010</u>				
1	07/10	SE	JV	REVISED FOR RECORD					
REV. NO.	DATE	DRWN	CHKD	REMARKS					





BELMONT STREET  
PLAN  
1" = 40'



BELMONT STREET  
PROFILE  
HORIZ: 1" = 40'  
VERT: 1" = 4'

THIS RECORD DRAWING HAS BEEN PREPARED BASED ON A COMBINATION OF INFORMATION PROVIDED BY OTHERS AND BY CDM. THEREFORE, THE ENGINEER HAS NOT VERIFIED THE ACCURACY OF ALL THE INFORMATION. TO THE BEST OF THE ENGINEER'S BELIEF AND KNOWLEDGE, THE INCLUDED RECORD INFORMATION IS REASONABLY ACCURATE.

BY \_\_\_\_\_ DATE \_\_\_\_\_

CDM

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	07/10	SE	JV	REVISED FOR RECORD

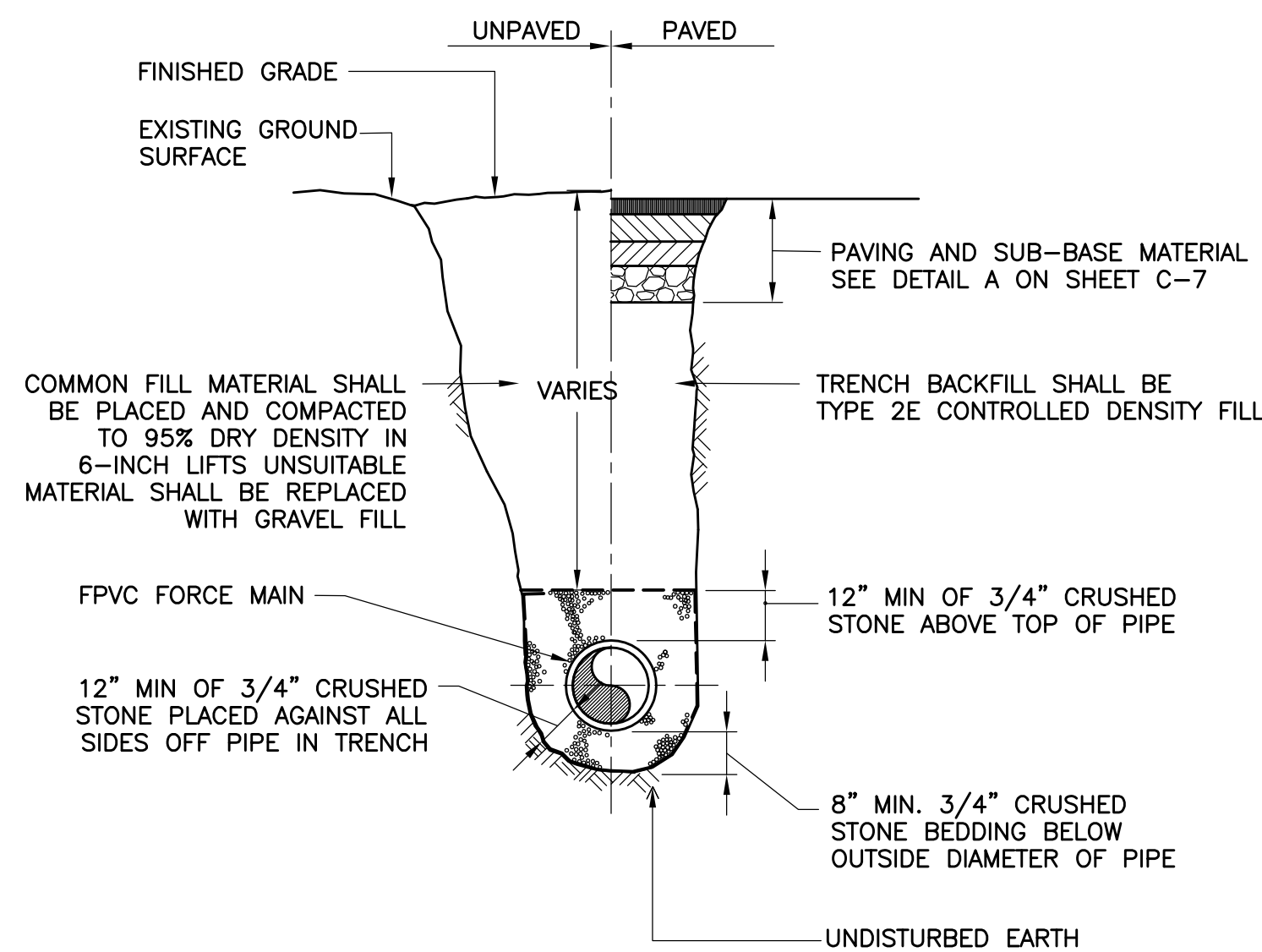
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DRAWN BY: <u>D. REBELO</u>	
SHEET CHK'D BY: <u>N. HAMPTON</u>	
CROSS CHK'D BY: <u>T. CHARLES</u>	
APPROVED BY: <u>N. HAMPTON</u>	
DATE: <u>JULY 2010</u>	

CITY OF WORCESTER, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS AND PARKS  
LAKE AVENUE PUMPING STATION  
FORCE MAIN NO. 1 REHABILITATION

BELMONT STREET  
STA. 35+04 TO STA. 43+94  
SHEET NO.  
C-4

PROJECT NO. 0198-65037  
FILE NAME: OFMPL001  
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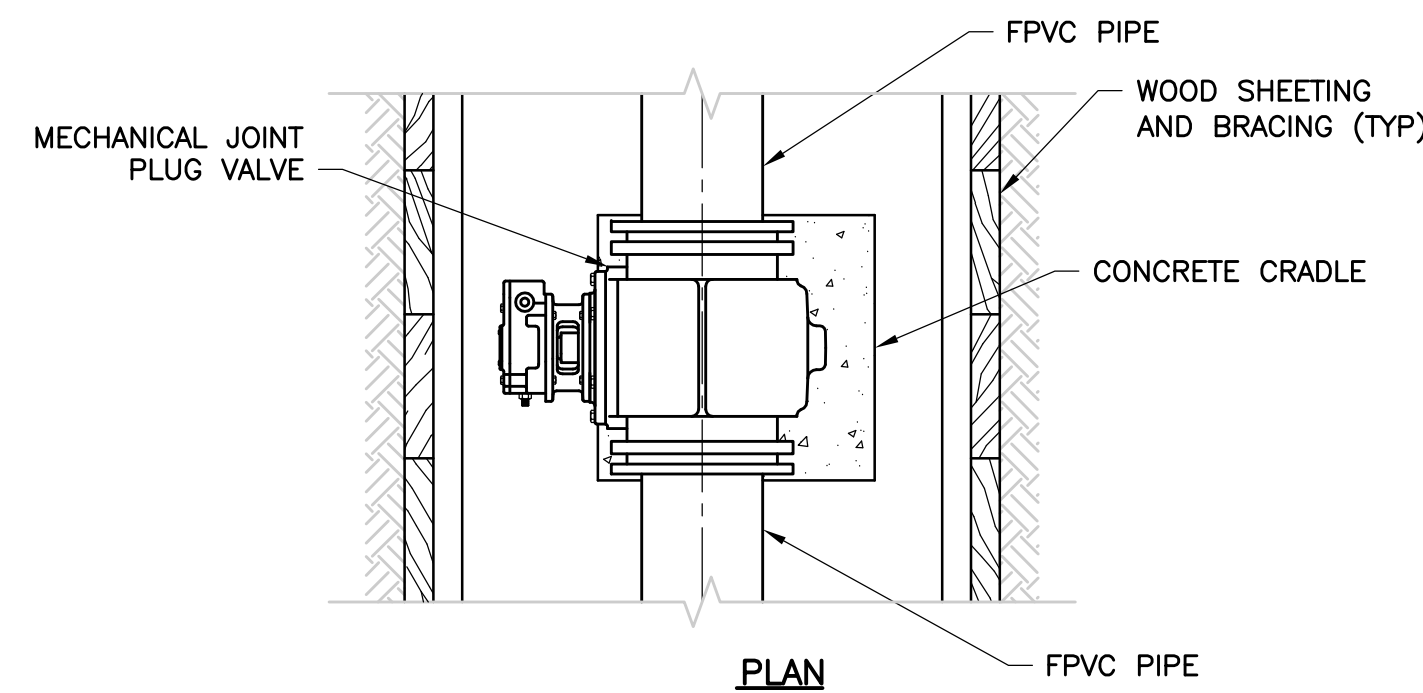
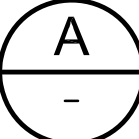
**NOTES:**

1. ADD FILTER FABRIC AROUND CRUSHED STONE. SEE FILTER FABRIC SPECIFICATION IN SECTION 02221.

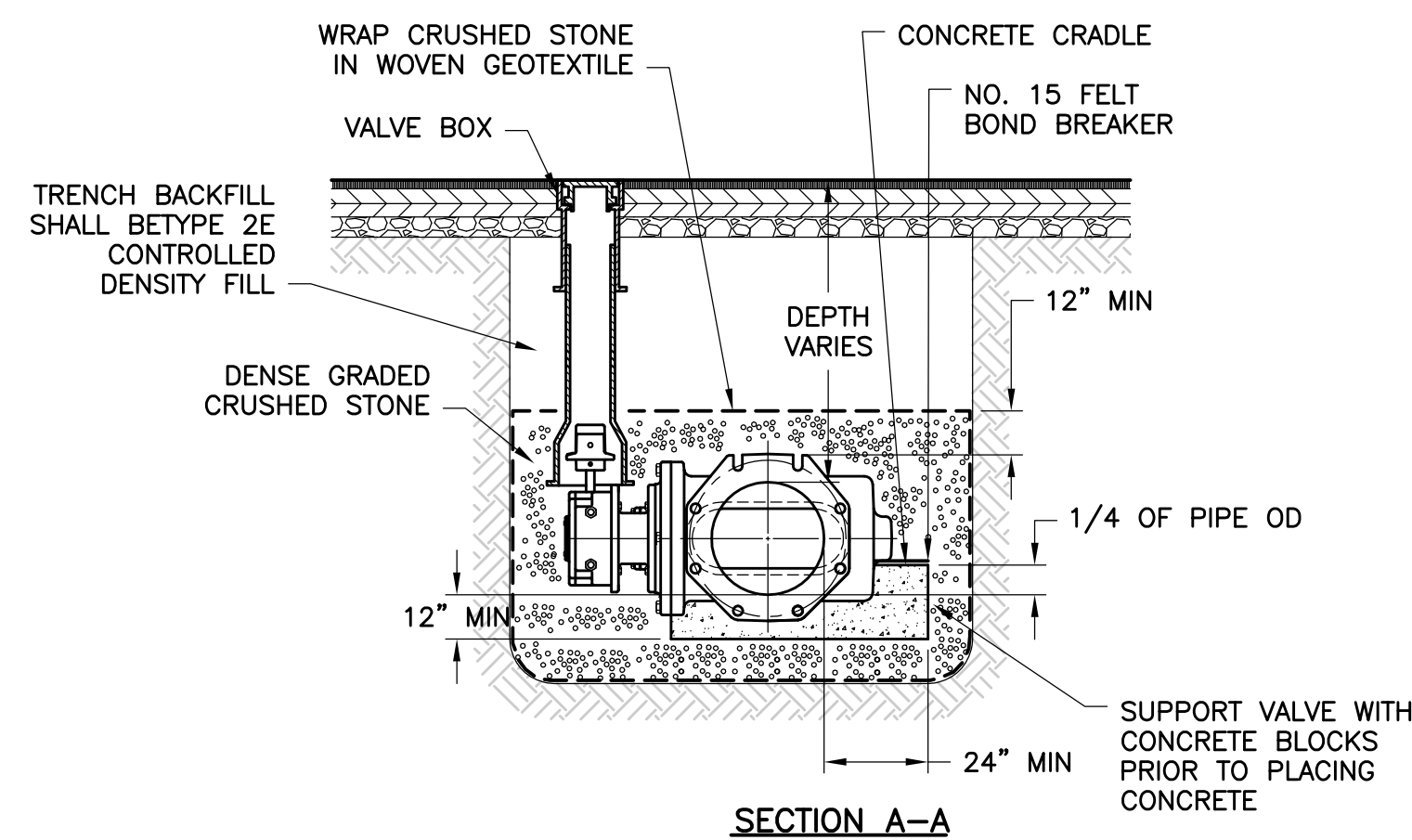
TYPICAL TRENCH FOR FPVC FORCE MAIN

DETAIL

NTS



PLAN



SECTION A-A

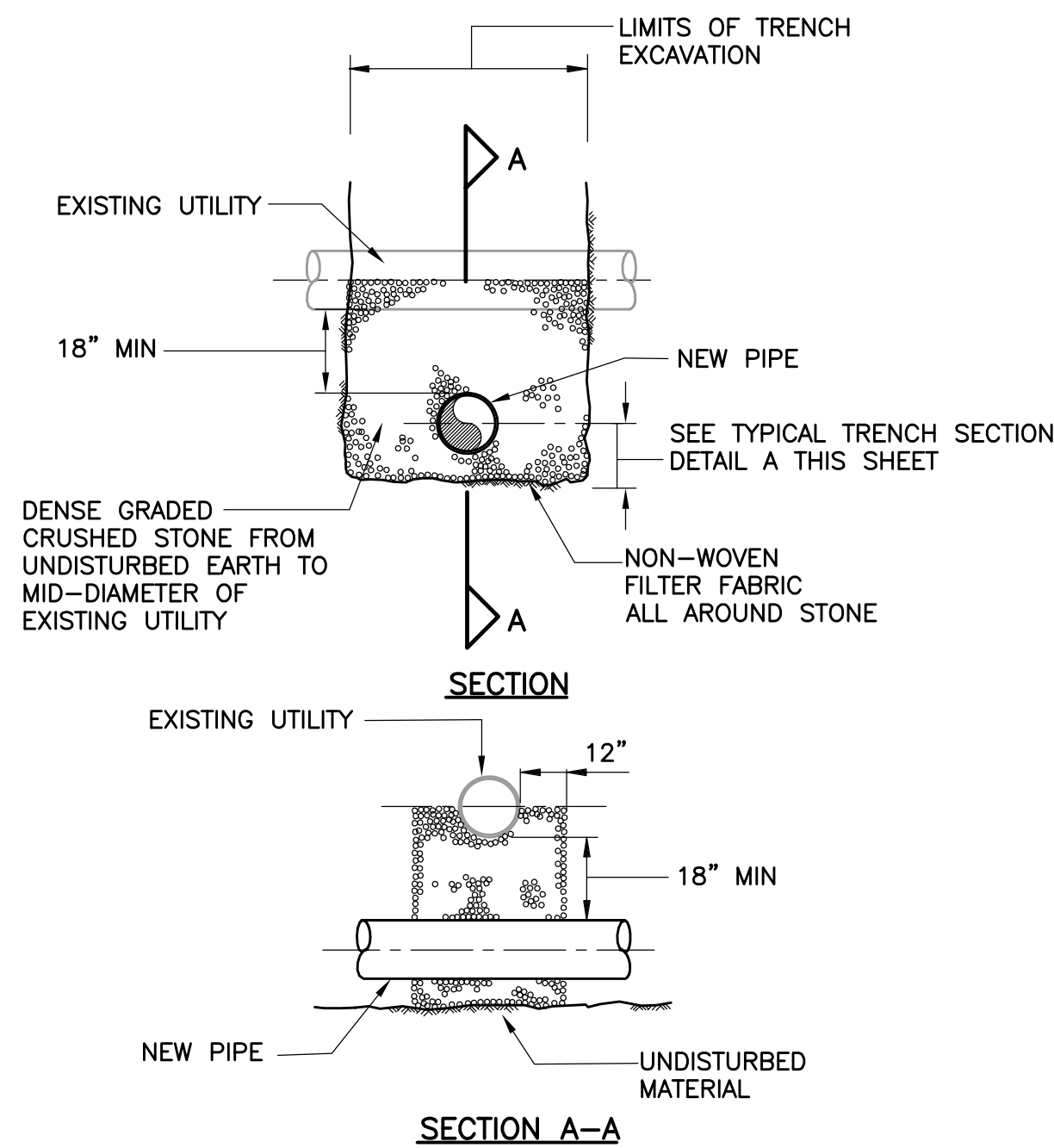
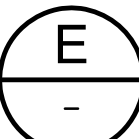
**NOTE:**

- 20" PLUG VALVES OPEN LEFT (COUNTER CLOCKWISE)

HORIZONTAL PLUG VALVE INSTALLATION

DETAIL

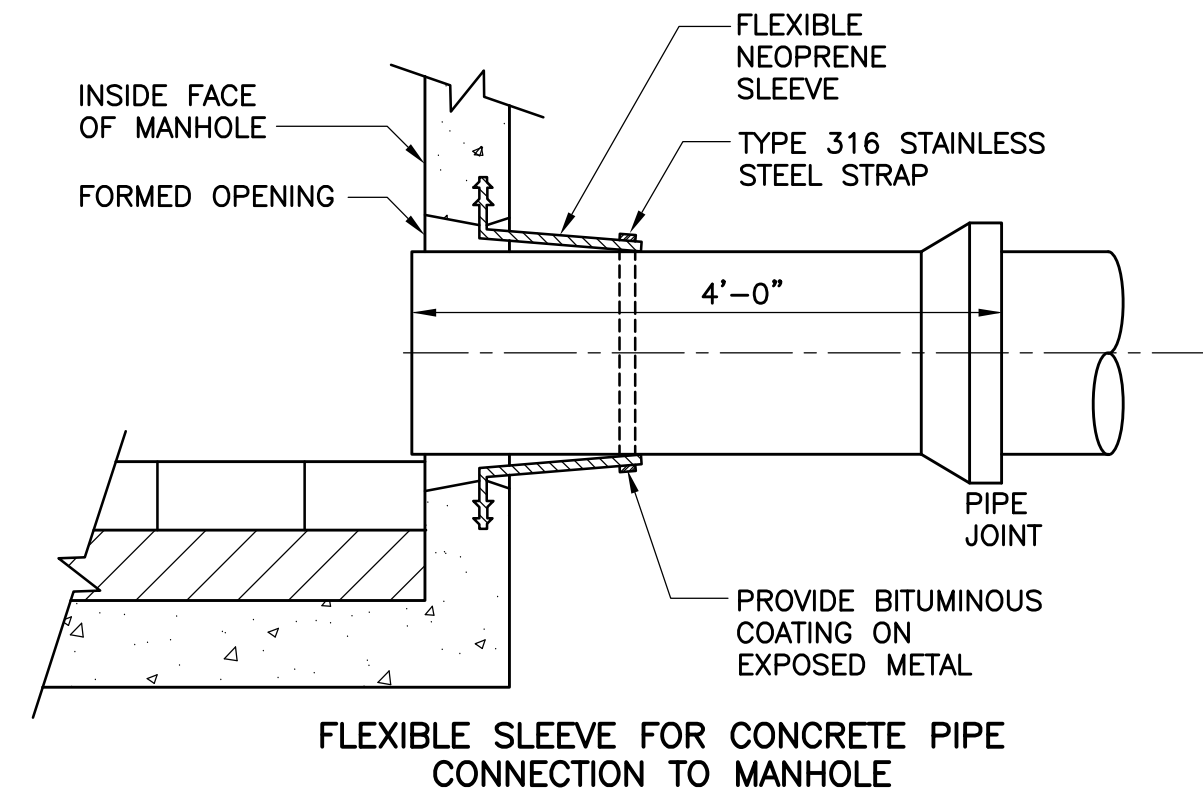
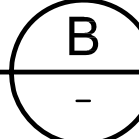
NTS



UTILITY CROSSING DETAIL

DETAIL

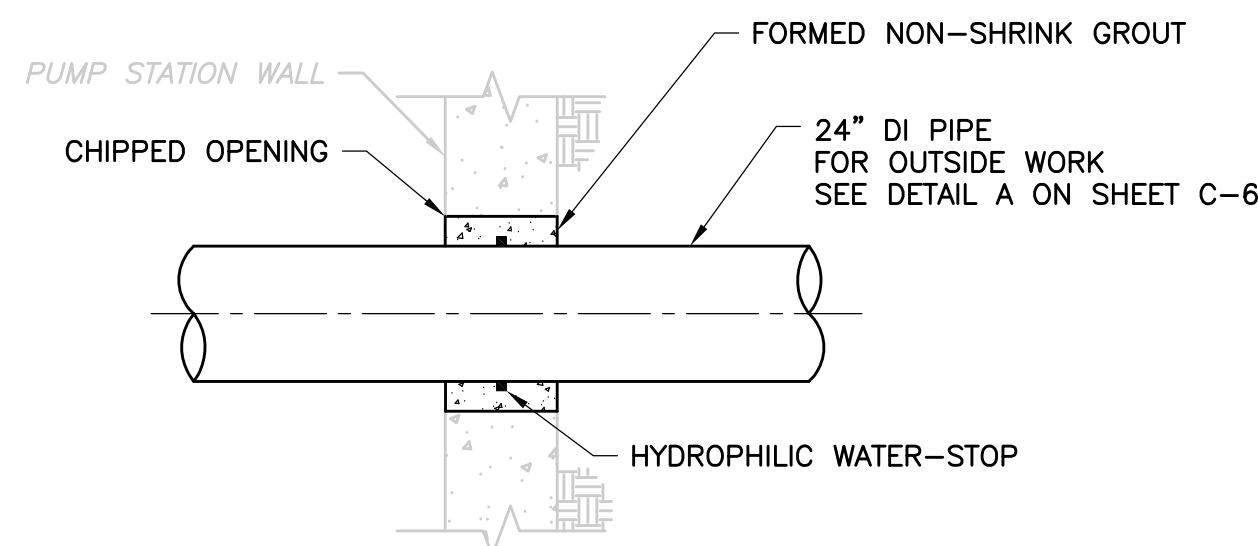
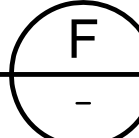
NTS



FLEXIBLE SLEEVE FOR CONCRETE PIPE CONNECTION TO MANHOLE

DETAIL

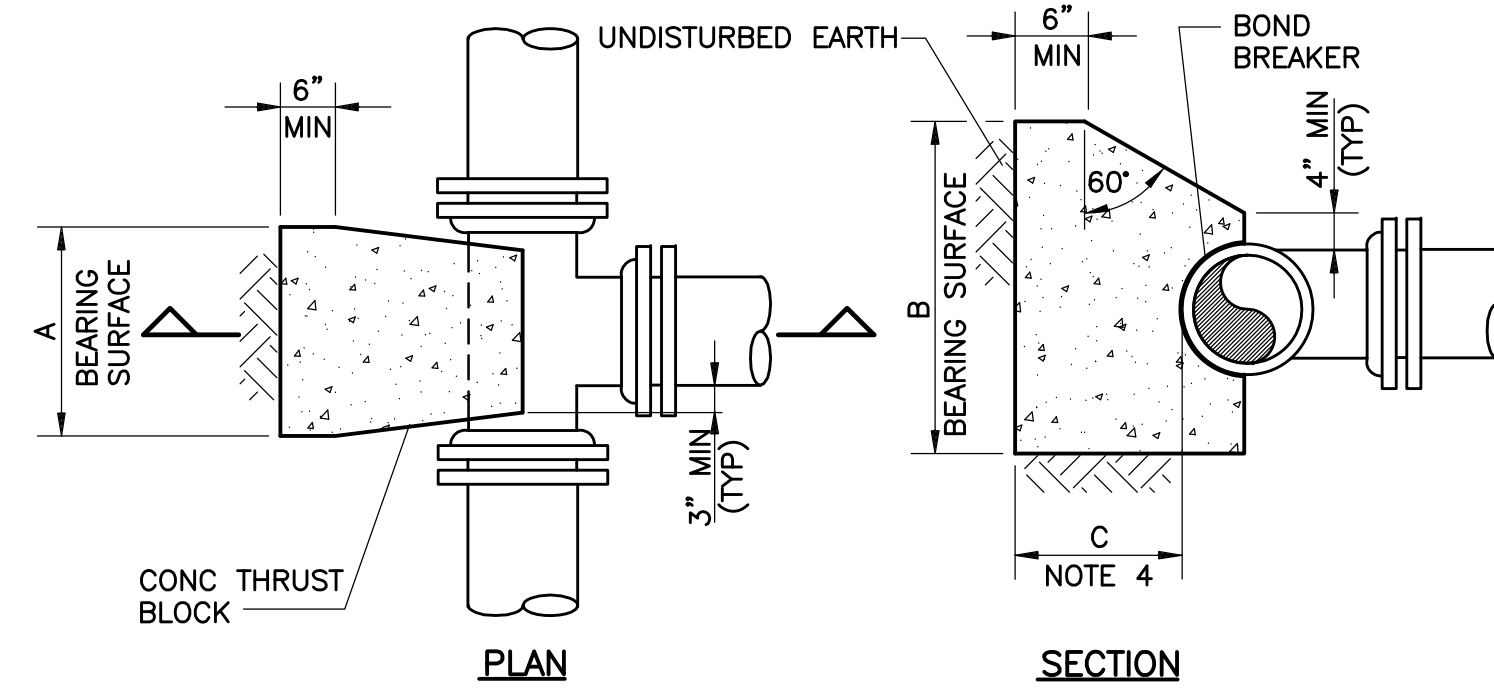
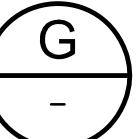
NTS



GROUTED PUMP STATION WALL CONNECTION

DETAIL

NTS



PLAN

SECTION

NOMINAL PIPE SIZE (IN)	MAXIMUM PIPE OD (IN)	REQUIRED BEARING AREA (SQ FT)
6	6.5	4
16	17.40	27
20	21.60	41

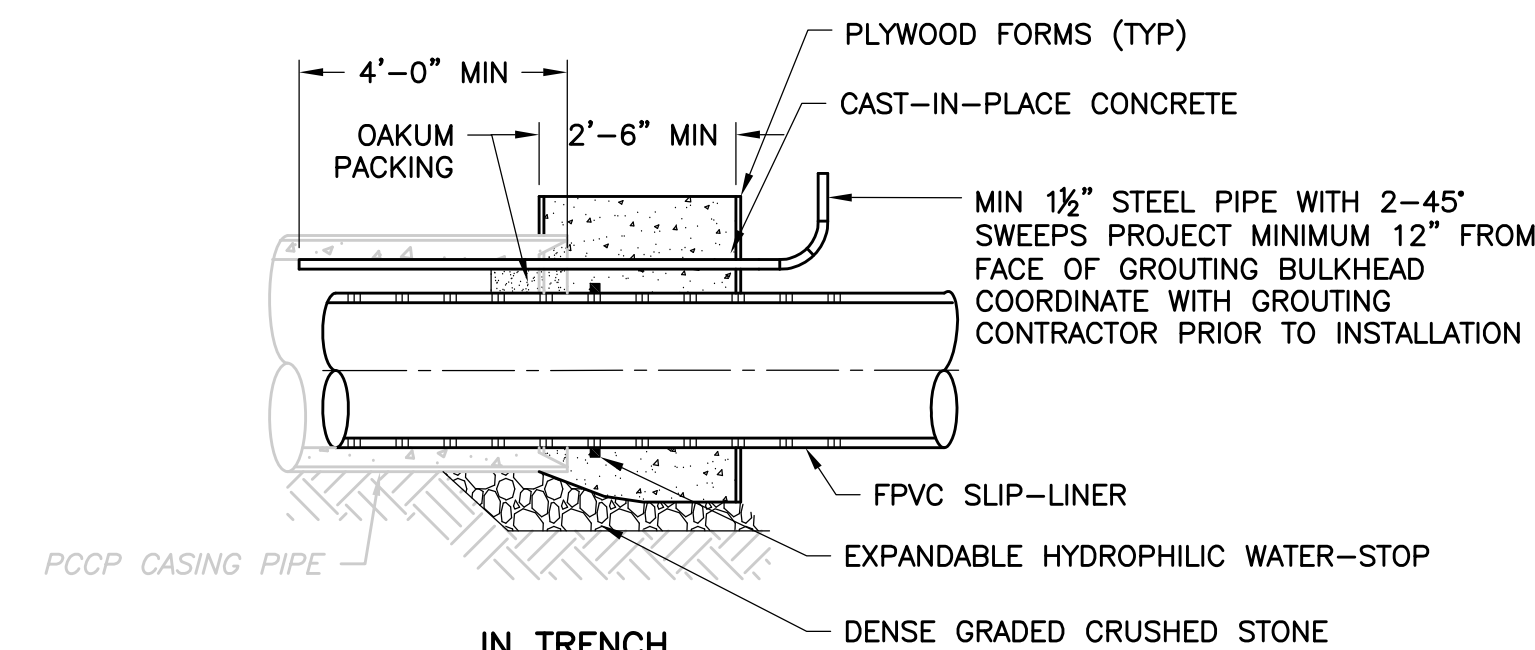
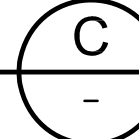
**NOTES:**

1. MAXIMUM TEST PRESSURE = 200 PSI
2. MINIMUM ALLOWABLE SOIL BEARING PRESSURE = 2000 PSF
3. BEARING AREA = A x B
4. C SHALL BE GREATER THAN A/2 AND B/2
5. BOND BREAKER SHALL BE #15 FELT PAPER

THRUST BLOCK FOR TEES

DETAIL

NTS



IN TRENCH

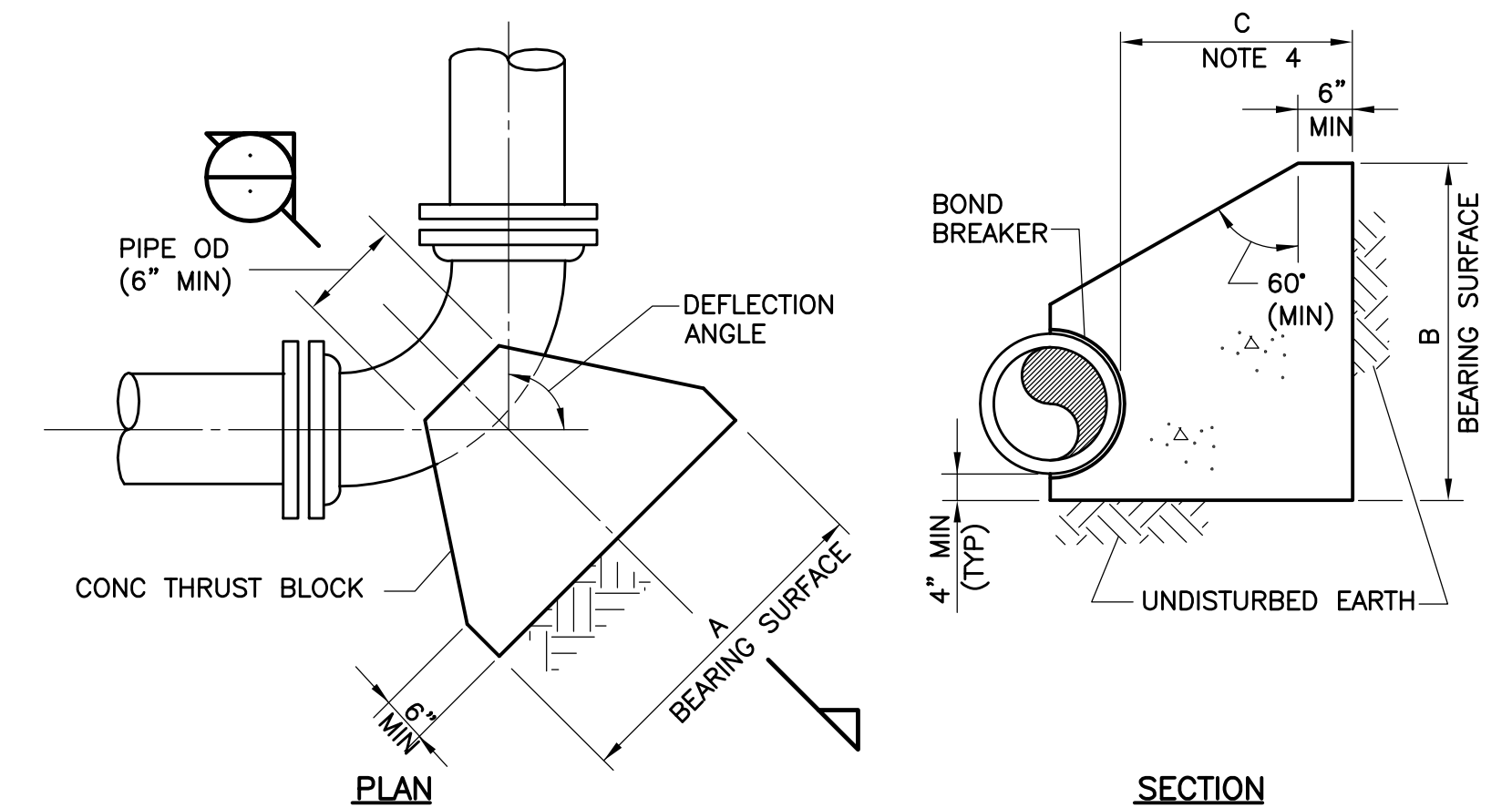
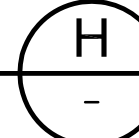
**NOTES:**

1. BULKHEAD SHALL BE WATERTIGHT AS REQUIRED TO PUMP AND INJECT GROUT
2. CONTRACTOR MAY PURSUE ALTERNATE MEANS AND METHODS WITH APPROVAL BY ENGINEER. CONTRACTOR RESPONSIBLE FOR CONSTRUCTING BULKHEAD FOR PUMPING AND INJECTING GROUT.
3. BULKHEADS SHALL BE PLACED AT END OF EACH SECTION SHALL BE GROUTED WITH FILL PIPE INSERTED AT ONE END AND PRESSURE RELIEF AT OTHER END. ANNULAR SPACE SHALL BE DEWATERED PRIOR TO GROUTING. CONTRACTOR SHALL SUBMIT FOR REVIEW GROUT MIX DESIGN, EXPECTED GROUT PRESSURES, METHOD OF PLACEMENT, AND PROPOSED BULKHEAD DETAILS.

ANNULAR SPACE GROUTING BULKHEAD

DETAIL

NTS



PLAN

SECTION

NOMINAL PIPE SIZE (INCHES)	MAXIMUM PIPE OD (INCHES)	REQUIRED BEARING AREA (SQ FT)					
		90 DEG	60 DEG	45 DEG	30 DEG	22.50 DEG	11.25 DEG
6	6.90	6	4	3	2.2	1.6	0.8

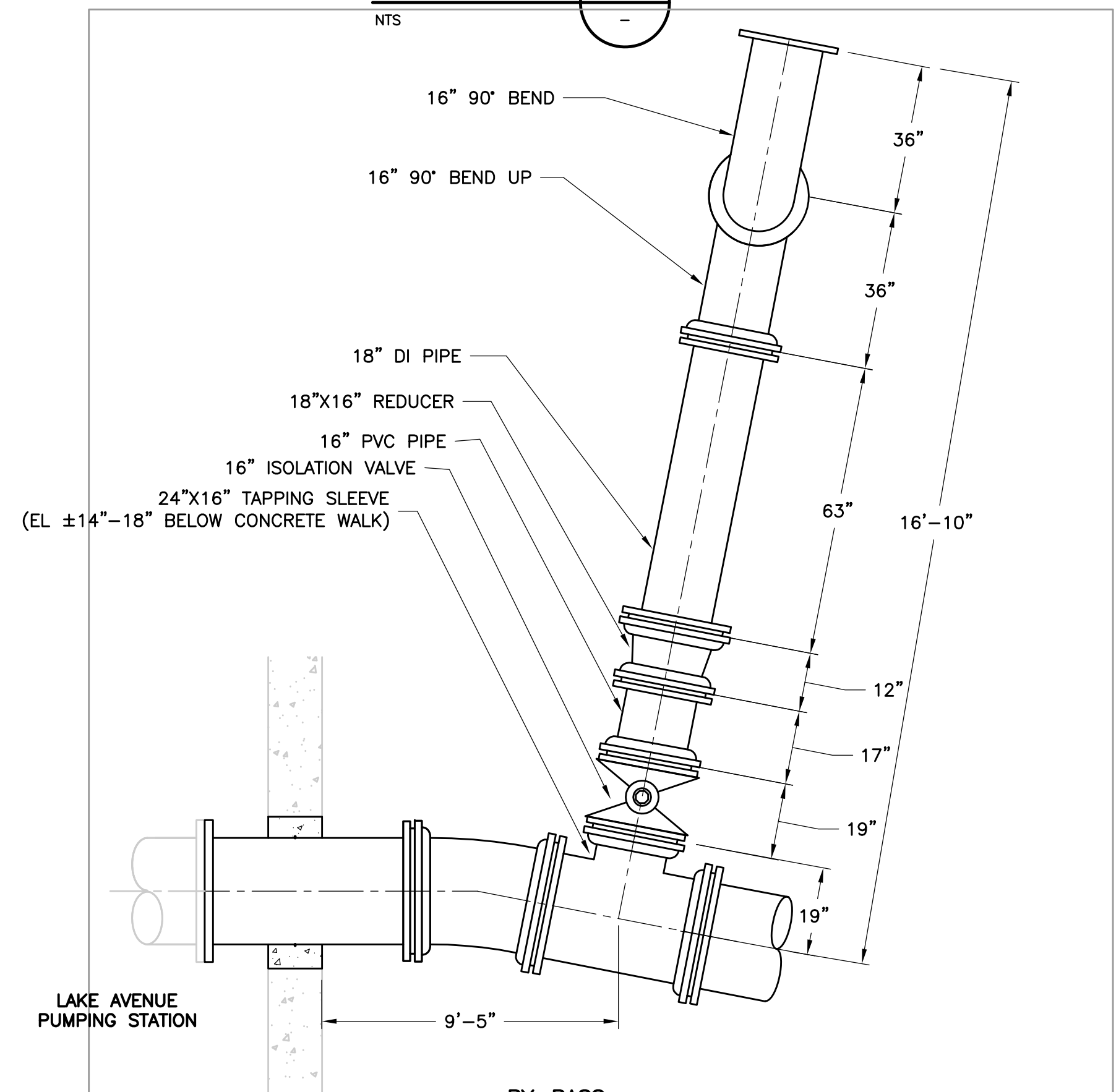
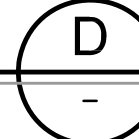
**NOTES:**

1. MAXIMUM TEST PRESSURE = 200 PSI
2. MINIMUM ALLOWABLE SOIL BEARING PRESSURE = 2000 PSF
3. BEARING AREA = A x B
4. C SHALL BE GREATER THAN A/2 AND B/2
5. BOND BREAKER SHALL BE #15 FELT PAPER

THRUST BLOCK FOR HORIZONTAL BEND

DETAIL

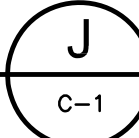
NTS



BY-PASS

DETAIL

NTS



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BY: \_\_\_\_\_ DATE: \_\_\_\_\_

**CDM**

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	07/10	SE	JV	REVISED FOR RECORD

DESIGNED BY: D. REBELO  
 DRAWN BY: D. REBELO  
 SHEET CHK'D BY: N. HAMPTON  
 CROSS CHK'D BY: T. CHARLES  
 APPROVED BY: N. HAMPTON  
 DATE: JULY 2010

**CDM**  
 Camp Dresser & McKee Inc.  
 Putnam Park  
 100 Great Meadow Road, Suite 104  
 Wethersfield, CT 06109  
 consulting • engineering • construction • operations

CITY OF WORCESTER, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND PARKS  
**LAKE AVENUE PUMPING STATION**  
**FORCE MAIN NO. 1 REHABILITATION**

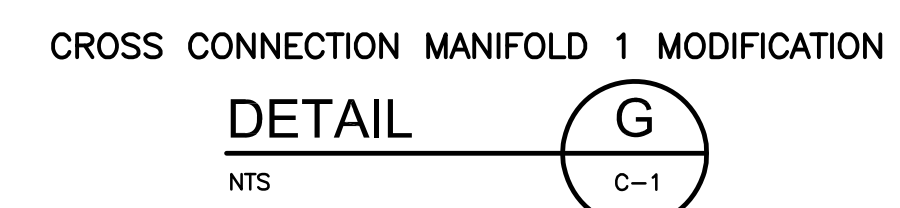
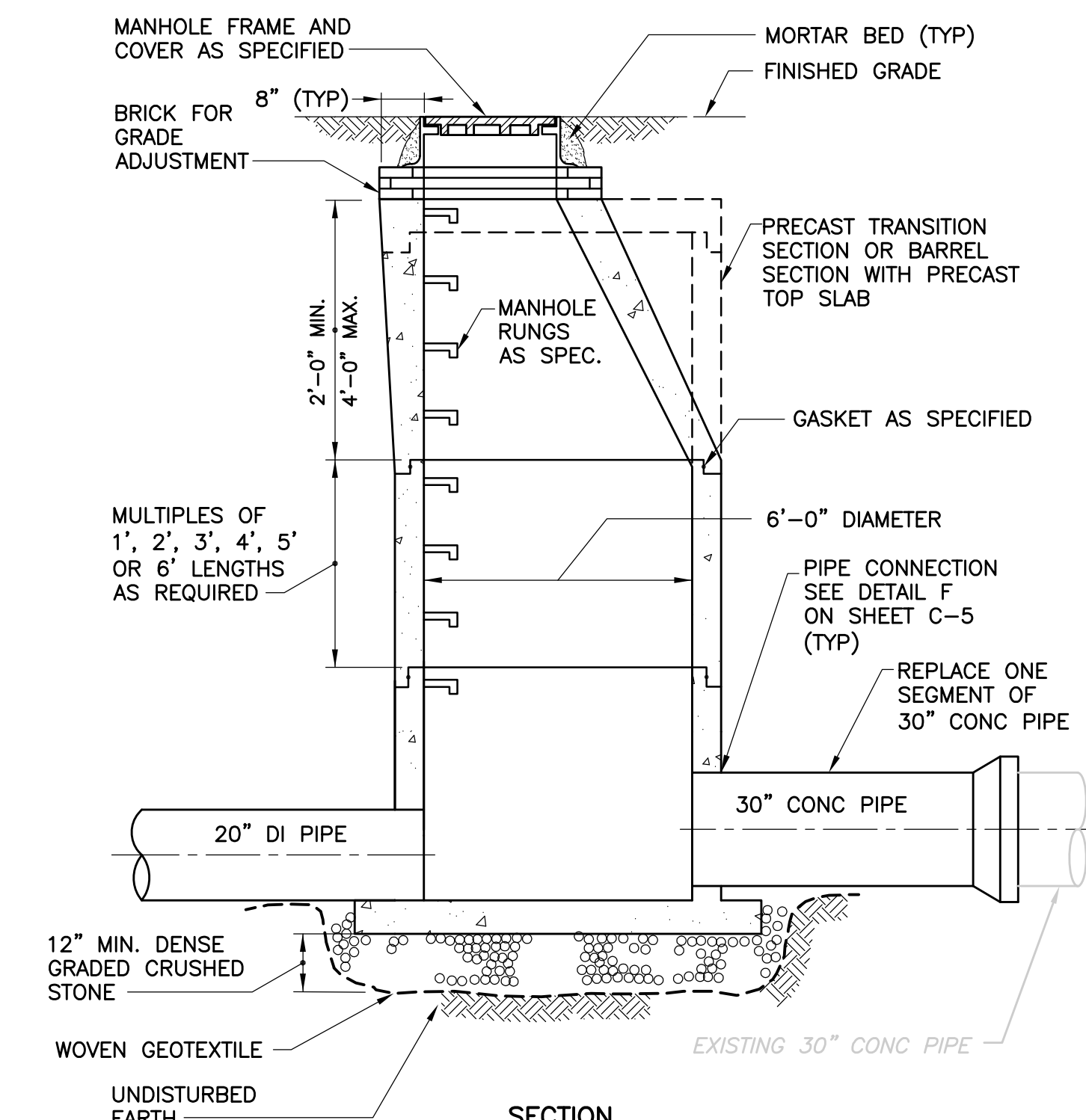
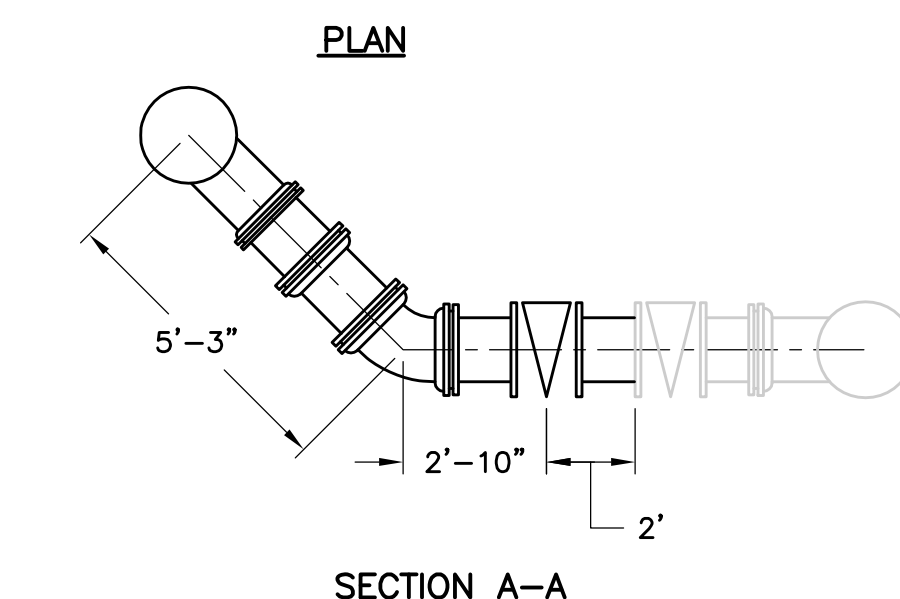
CIVIL DETAILS I

PROJECT NO. 0198-65037  
 FILE NAME: CFMDT001

SHEET NO.

C-5





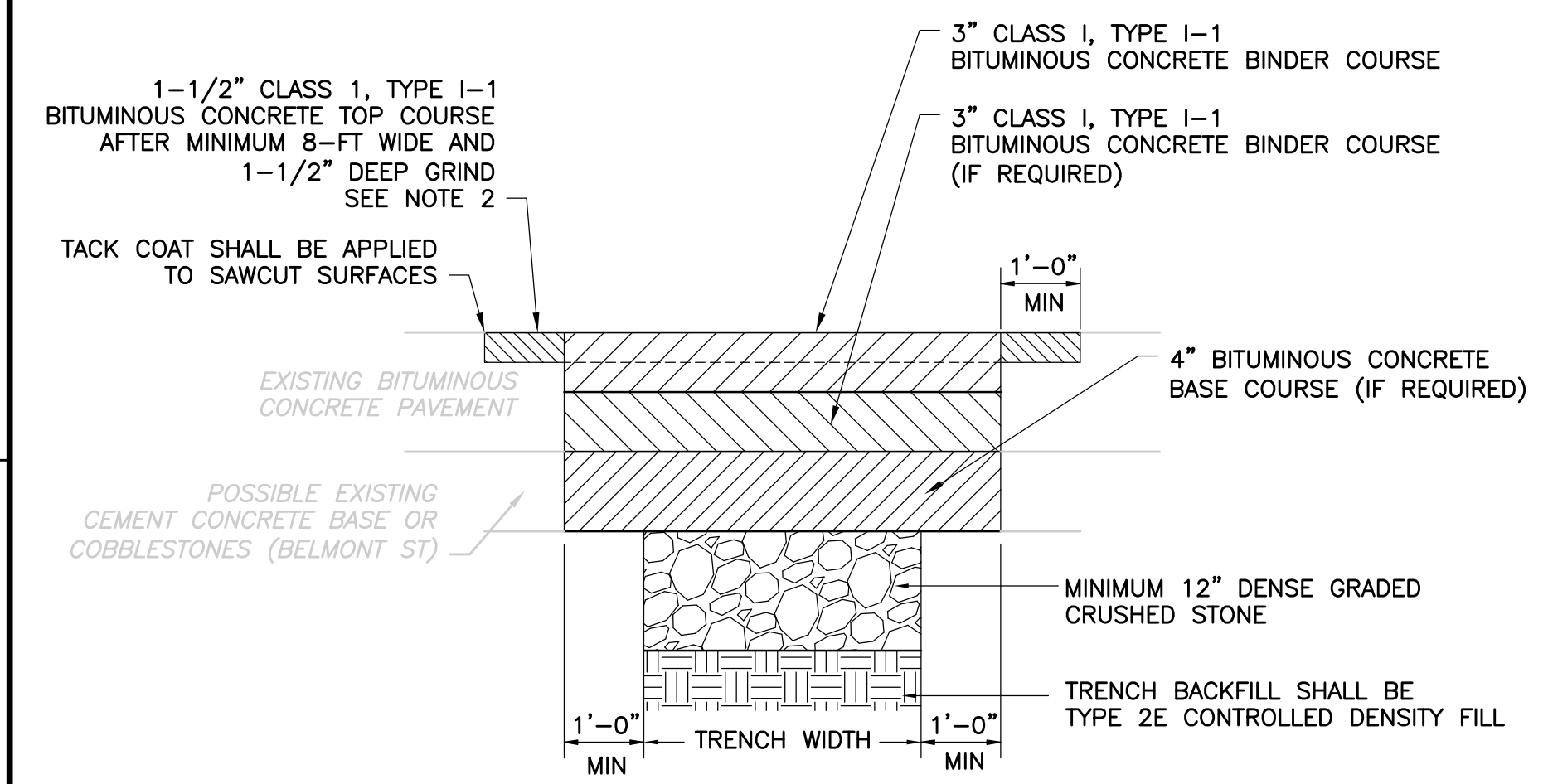
THIS RECORD DRAWING HAS BEEN PREPARED BASED ON A COMBINATION OF INFORMATION PROVIDED BY OTHERS AND BY CDM. THEREFORE, THE ENGINEER HAS NOT VERIFIED THE ACCURACY OF ALL THE INFORMATION. TO THE BEST OF THE ENGINEER'S BELIEF AND KNOWLEDGE, THE INCLUDED RECORD INFORMATION IS REASONABLY ACCURATE.

BY \_\_\_\_\_ DATE \_\_\_\_\_

**CDM**

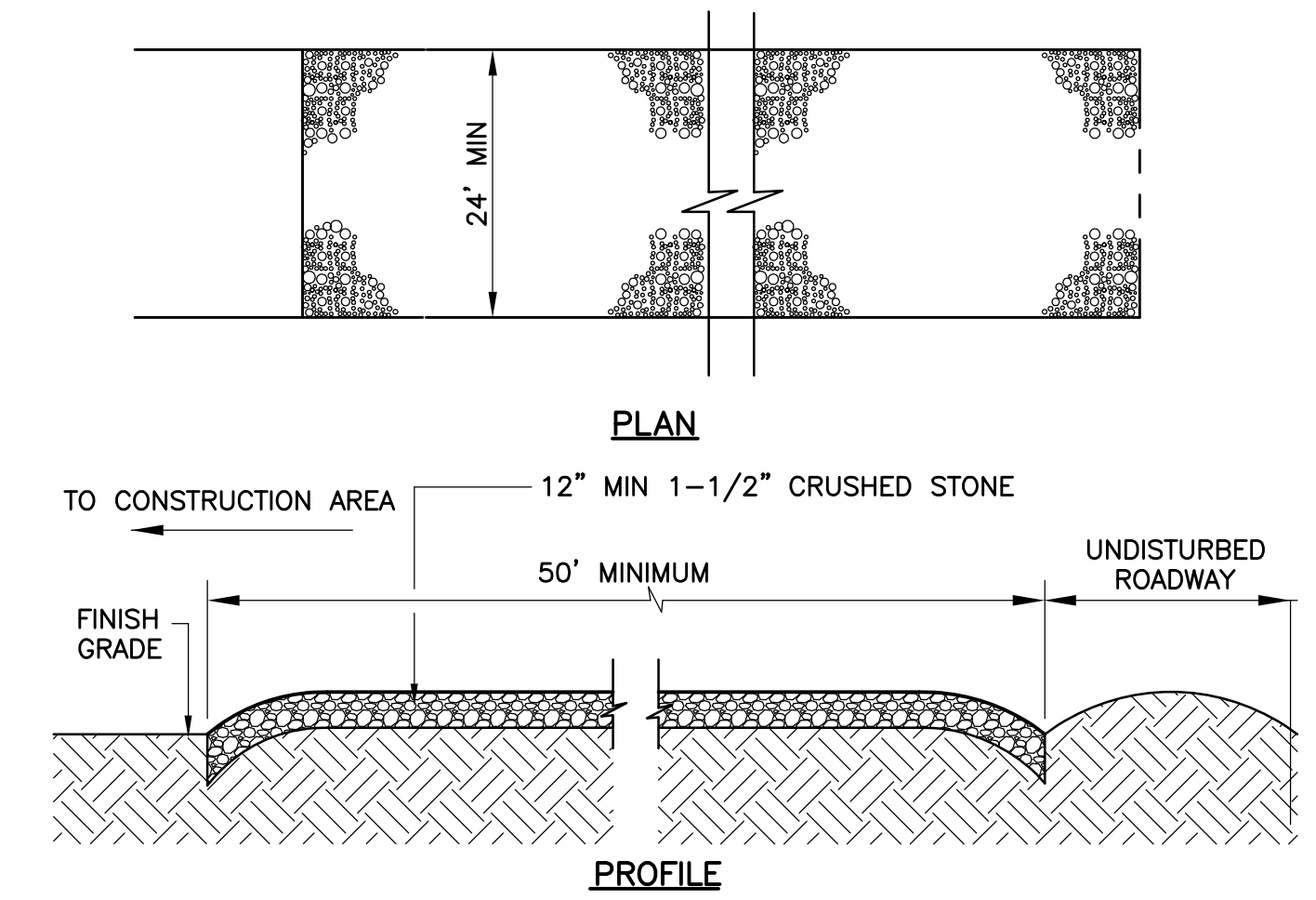
					DESIGNED BY: <u>D. REBELO</u>	 Camp Dresser & McKee Inc. Putnam Park 100 Great Meadow Road, Suite 104 Wethersfield, CT 06109  consulting • engineering • construction • operations	CITY OF WORCESTER, MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS AND PARKS  LAKE AVENUE PUMPING STATION  FORCE MAIN NO. 1 REHABILITATION	CIVIL DETAILS II	PROJECT NO. 0198-65037
					DRAWN BY: <u>D. REBELO</u>				FILE NAME: CFMDT001
					SHEET CHK'D BY: <u>N. HAMPTON</u>				SHEET NO.
					CROSS CHK'D BY: <u>T. CHARLES</u>				C-6
					APPROVED BY: <u>N. HAMPTON</u>				
					DATE: <u>JULY 2010</u>				
1	07/10	SE	JV	REVISED FOR RECORD					
REV. NO.	DATE	DRWN	CHKD	REMARKS					





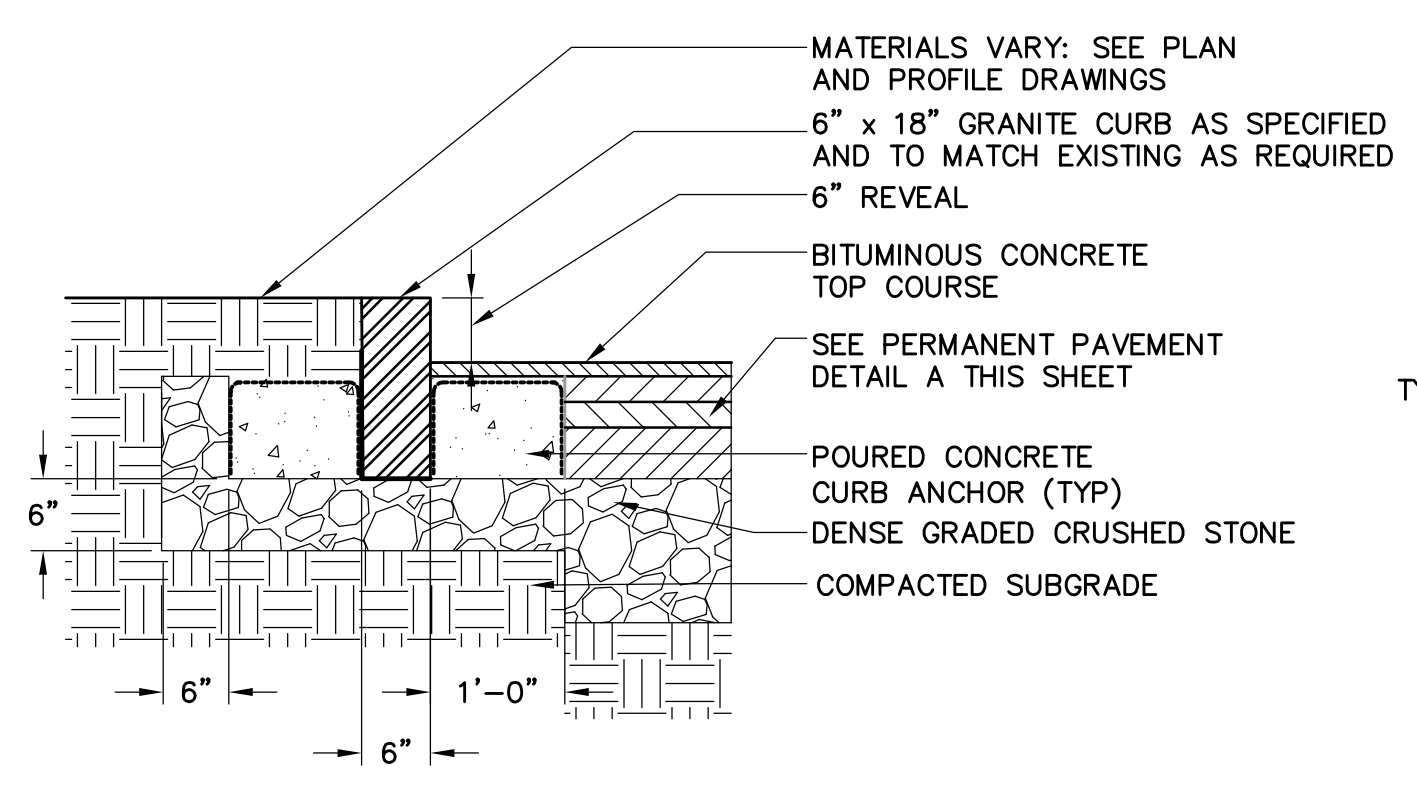
- NOTES:
- BINDER AND BASE COURSES SHALL BE INCREASED WHERE NECESSARY TO MEET EXISTING PAVEMENT THICKNESS.
  - WHERE GRIND ENCLOSED TO WITHIN 3-FT OF THE CURB LINE, THE GRIND SHALL EXTEND TO THE CURB LINE.

TEMPORARY AND PERMANENT PAVEMENT RESTORATION

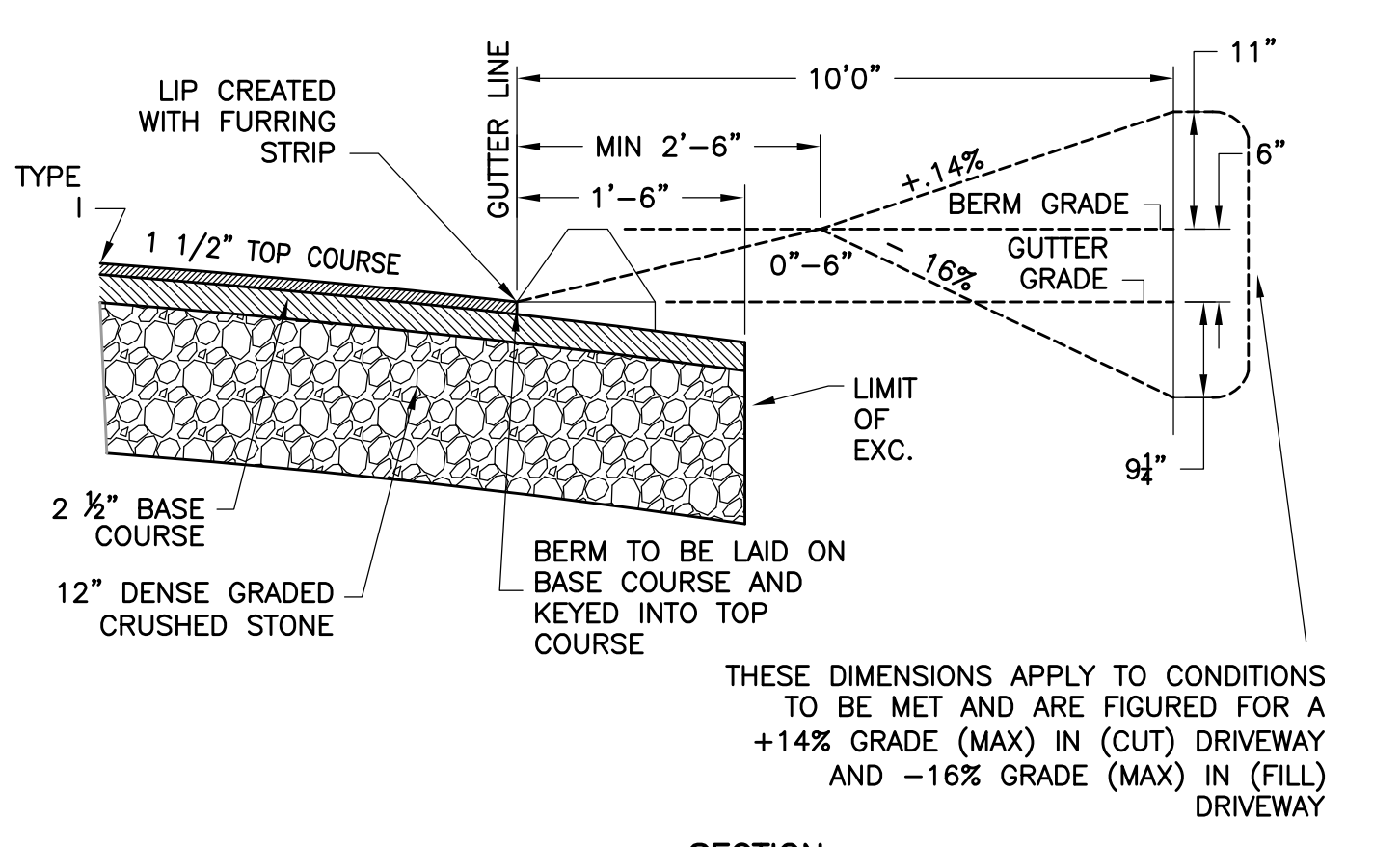
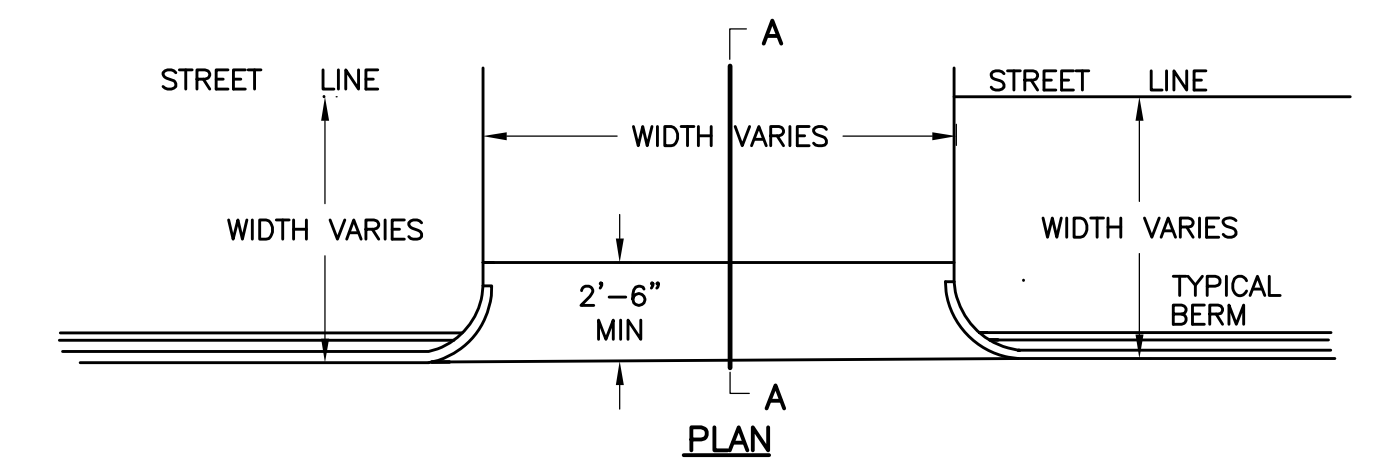
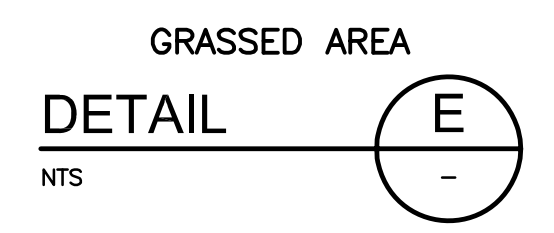
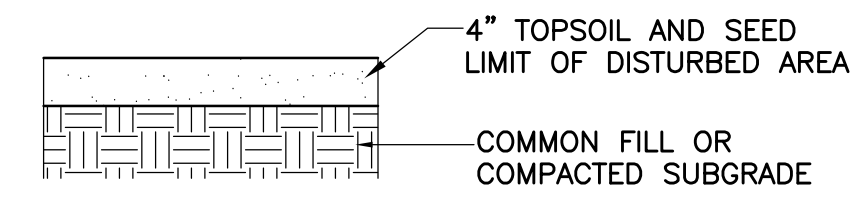
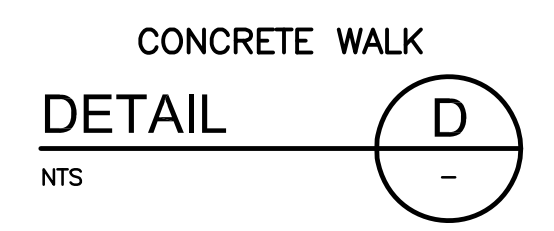
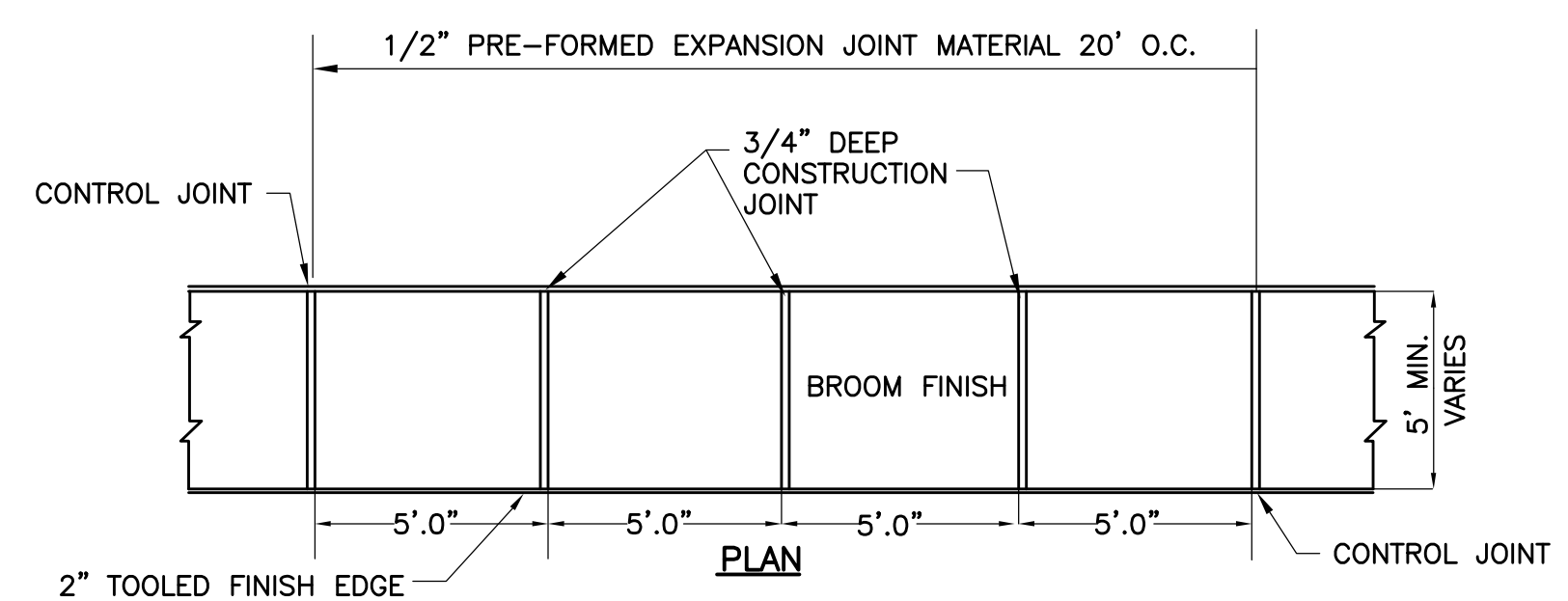
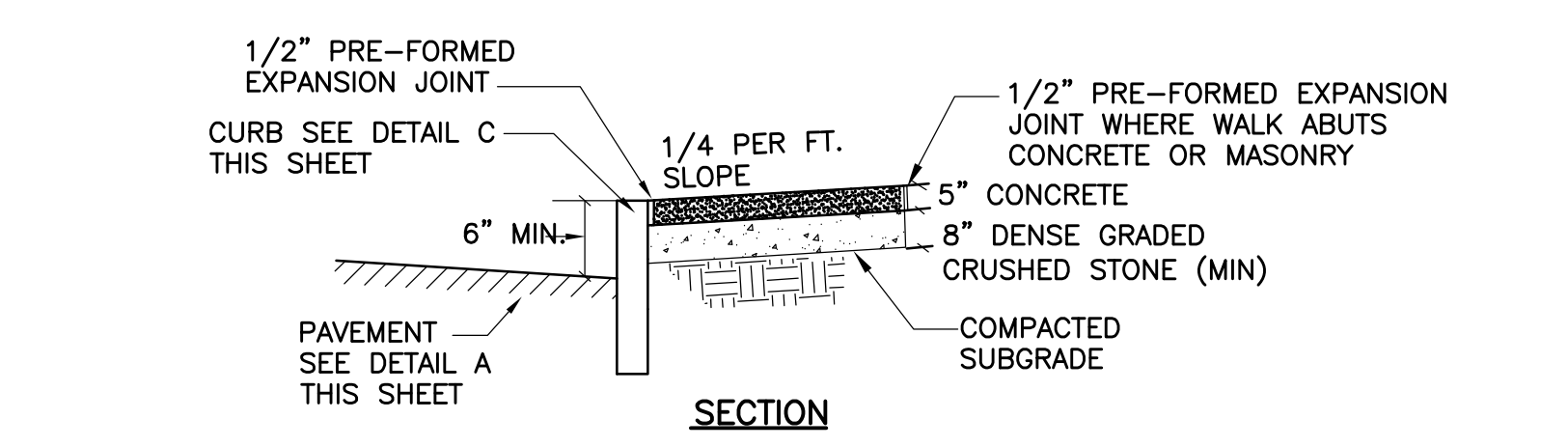
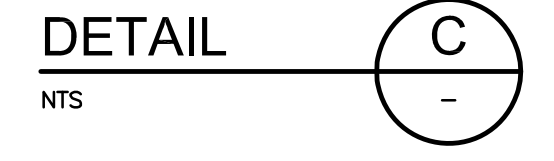


- NOTES:
- PROVIDE SMOOTH, CONTINUOUS TRANSITION BETWEEN STABILIZED CONSTRUCTION ENTRANCE AND UNDISTURBED ROADWAY.
  - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO UNDISTURBED ROADWAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR ADDING STONE TO THE LENGTH OF THE ENTRANCE.
  - REPAIR AND CLEANOUT ANY MEASURES USED TO TRAP SEDIMENT.
  - ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO UNDISTURBED ROADWAY MUST BE REMOVED IMMEDIATELY.

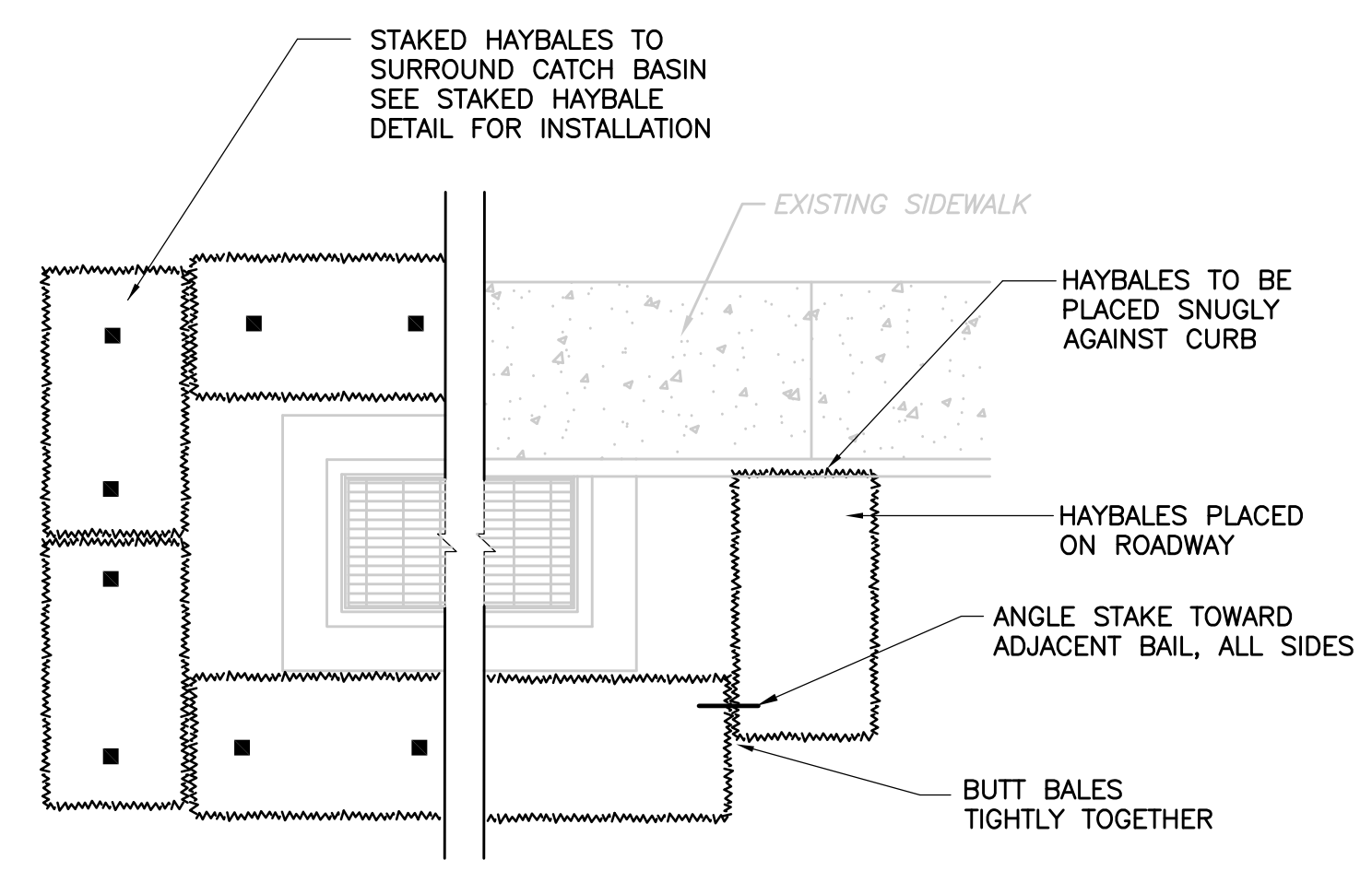
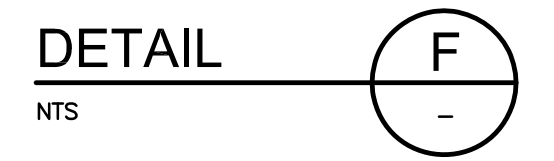
STABILIZED CONSTRUCTION ENTRANCE FOR STORAGE AND STOCK PILE AREAS



RESETTING OF VERTICAL GRANITE CURB



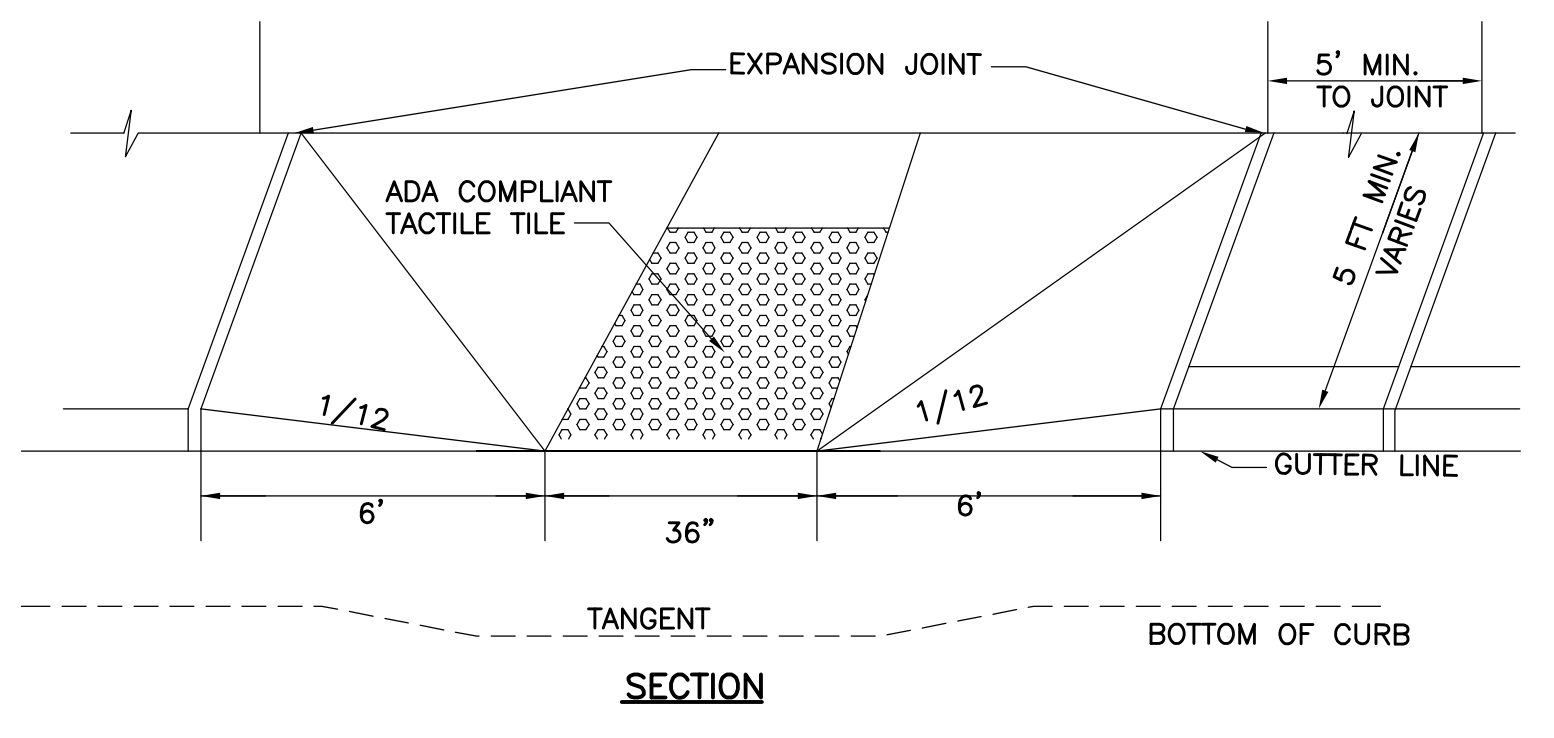
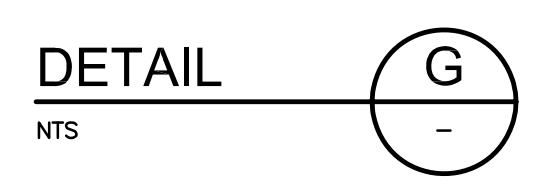
TYPICAL DRIVEWAY



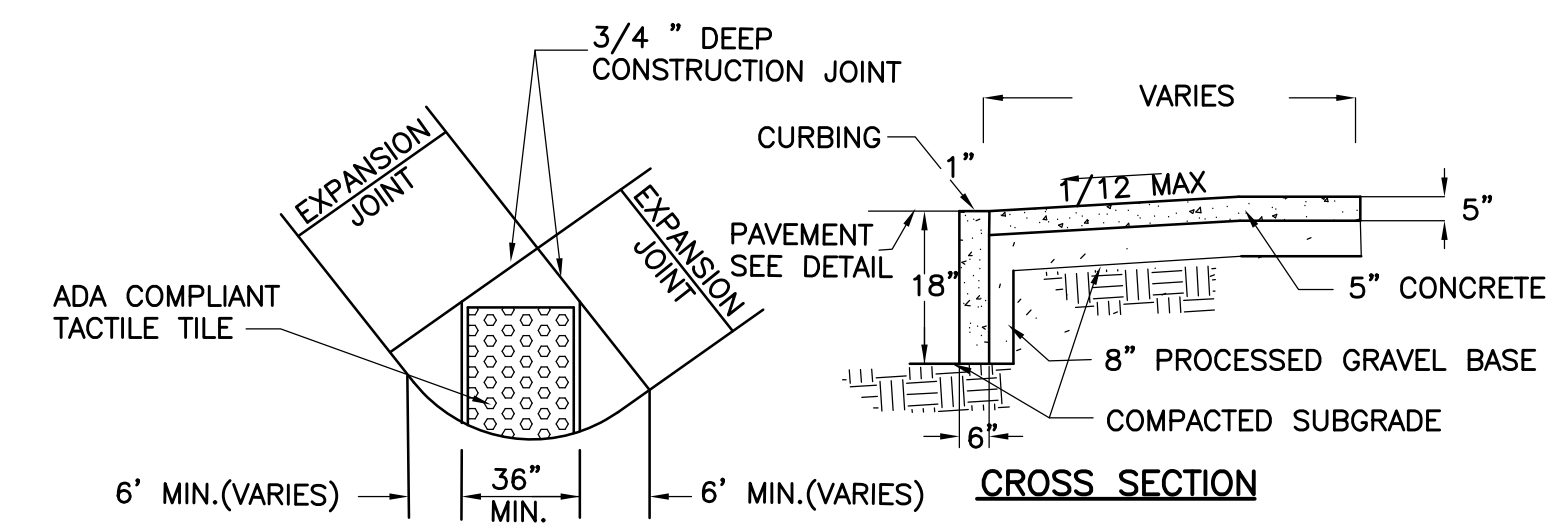
UNDEVELOPED AREAS DEVELOPED AREAS

NOTE: MAINTAIN SEDIMENTATION PROTECTION ON WEEKLY BASIS THROUGHOUT CONSTRUCTION AS REQUIRED

HAYBALE SEDIMENTATION PROTECTION AT CATCH BASIN



SECTION

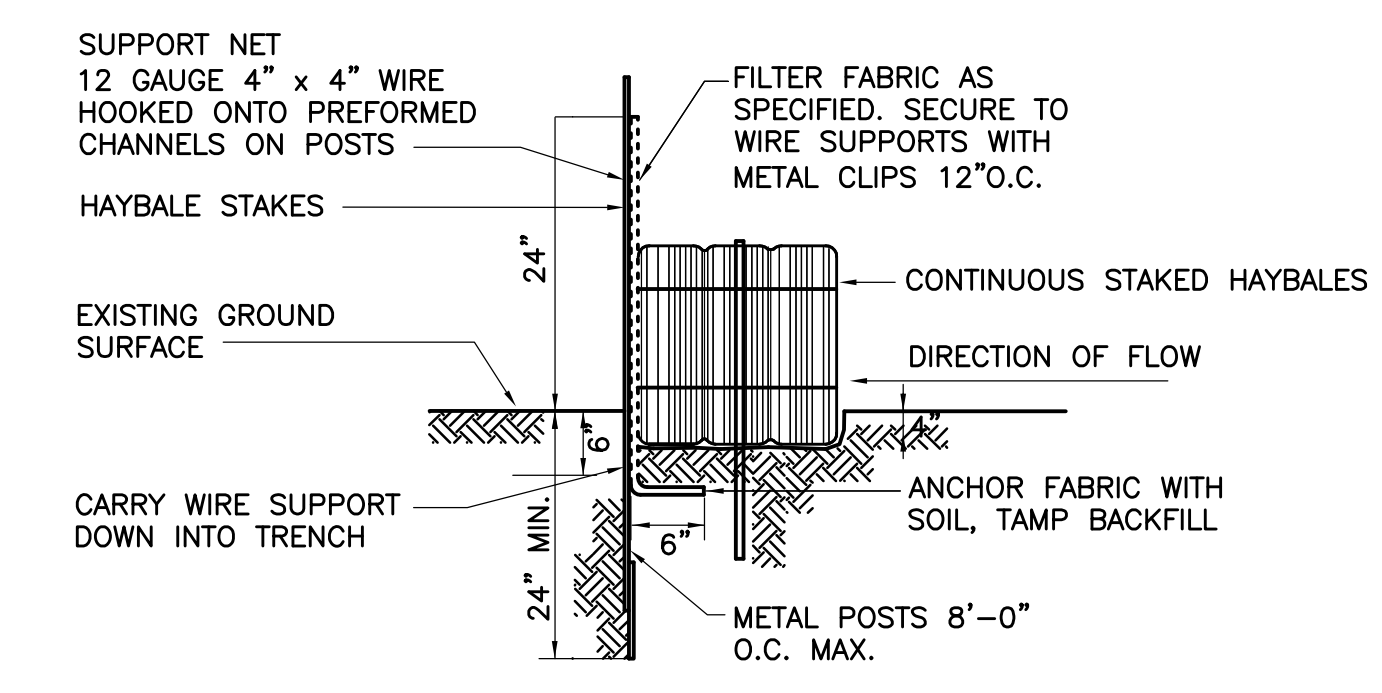
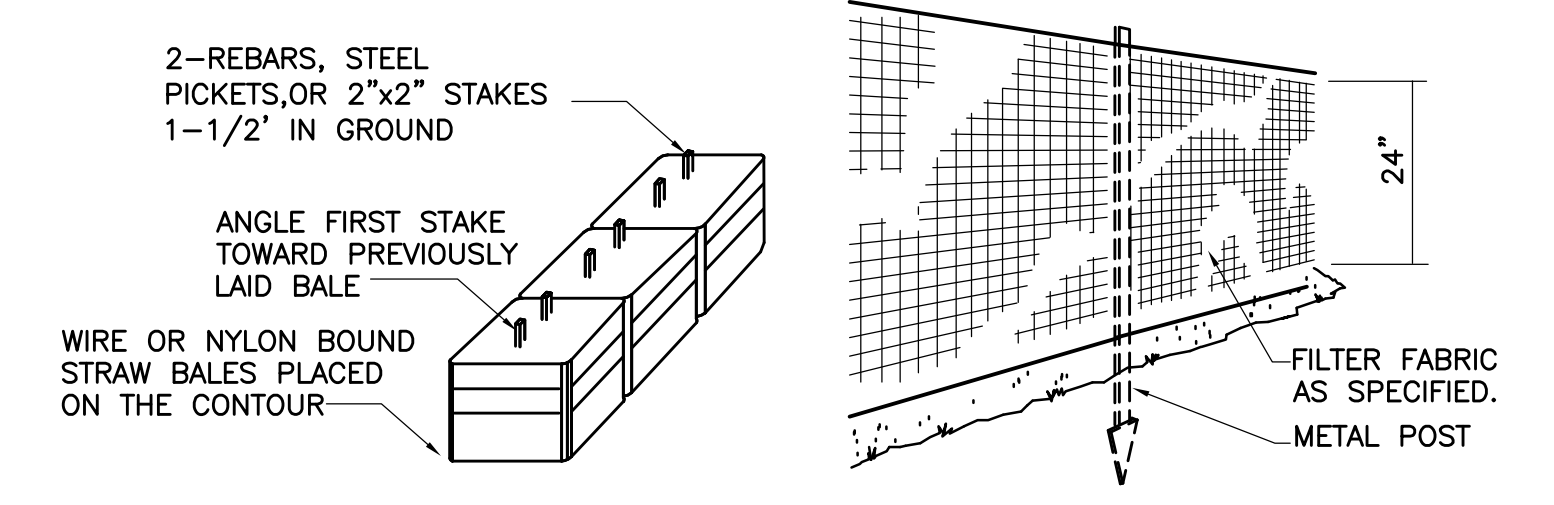


CROSS SECTION

RADIAL

- NOTES:
- WHEN COMBINED WITH CURB DETAIL, A MIN. 1" REVEAL IS REQUIRED AT GUTTER.
  - CURB AND WALK OR RAMP SHALL NOT BE POURED MONOLITHIC.

PEDESTRIAN RAMP



FENCE WITH HAYBALES



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CDM

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DESIGNED BY:	D. REBELO
DRAWN BY:	D. REBELO
SHEET CHK'D BY:	N. HAMPTON
CROSS CHK'D BY:	T. CHARLES
APPROVED BY:	N. HAMPTON
DATE:	JULY 2010

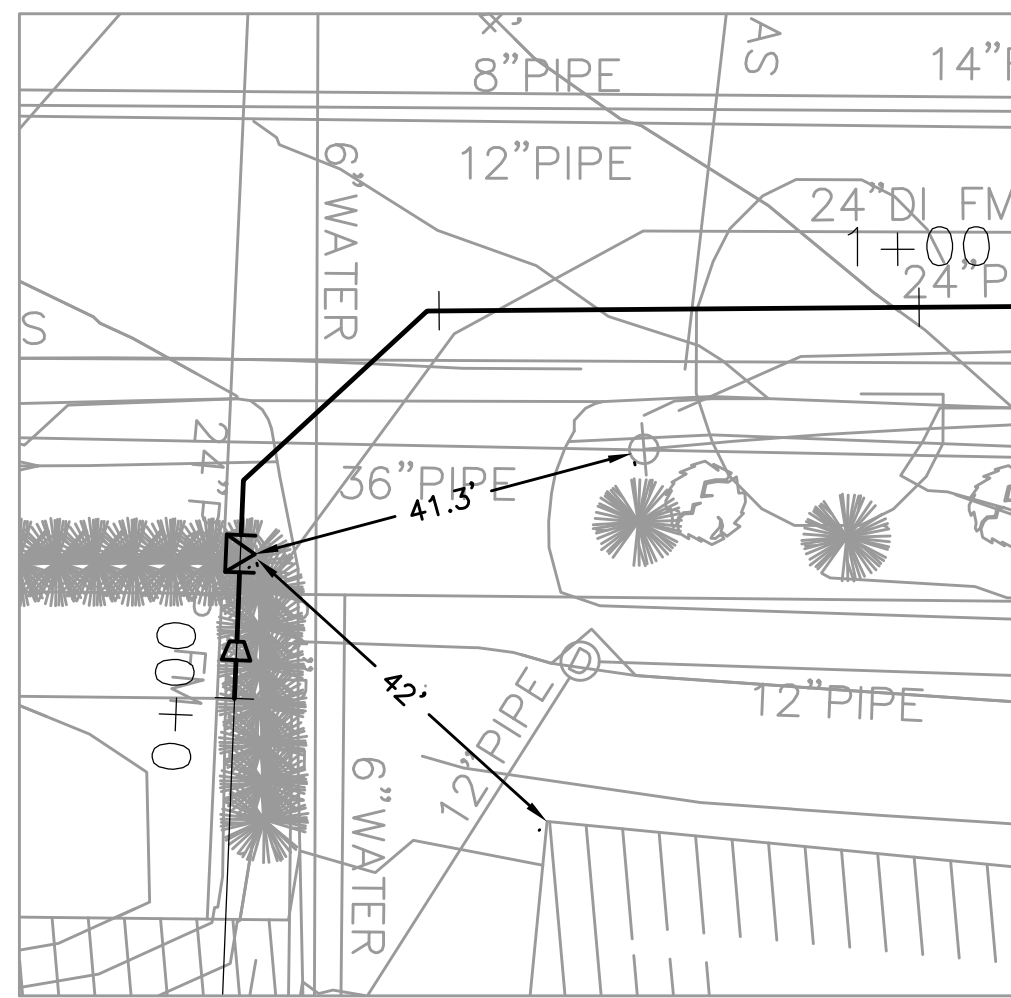
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DEPARTMENT OF PUBLIC WORKS AND PARKS  
LAKE AVENUE PUMPING STATION  
FORCE MAIN NO. 1 REHABILITATION

CIVIL DETAILS III

PROJECT NO.	0198-65037
FILE NAME:	OFMDT001
SHEET NO.	C-7





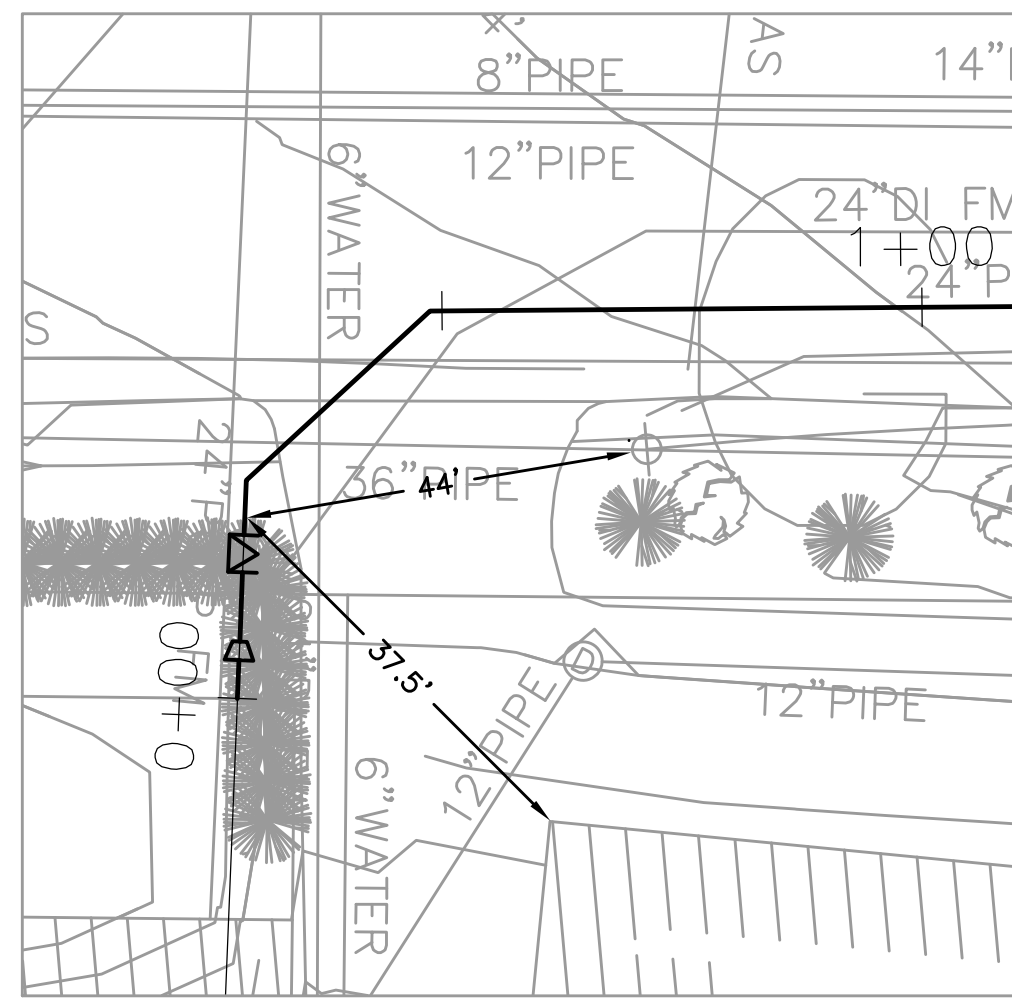
20" PLUG VALVE LOCATION

DETAIL

A

1"=20'

C-1



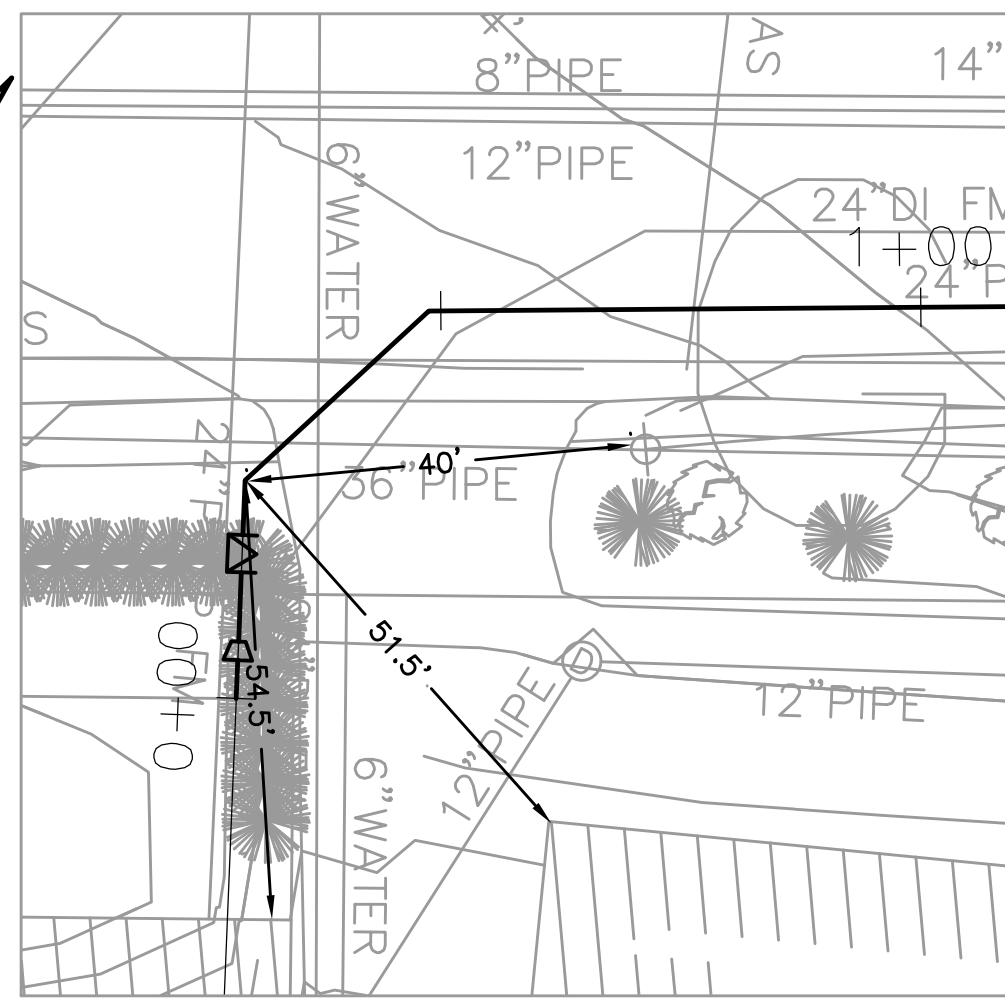
20"x18" VERTICAL TEE LOCATION

DETAIL

B

1"=20'

C-1



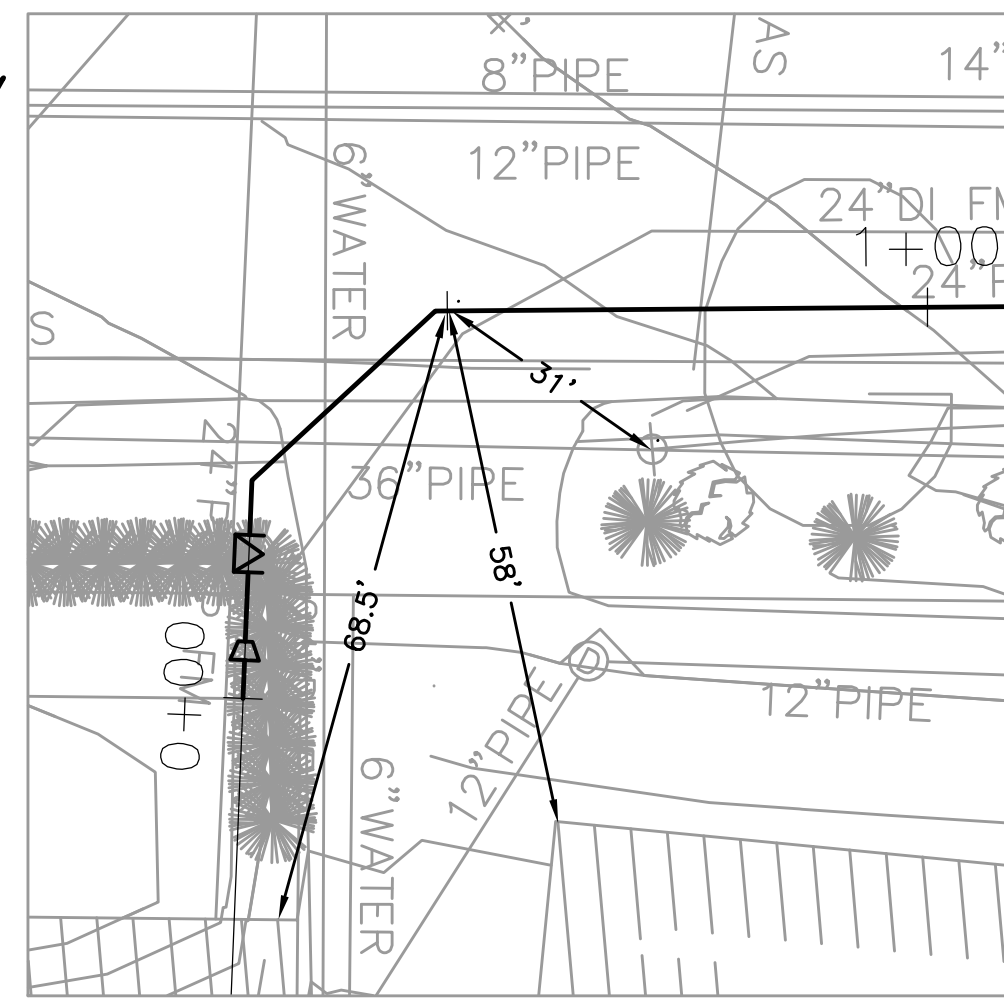
20" 45° BEND LOCATION

DETAIL

C

1"=20'

C-1



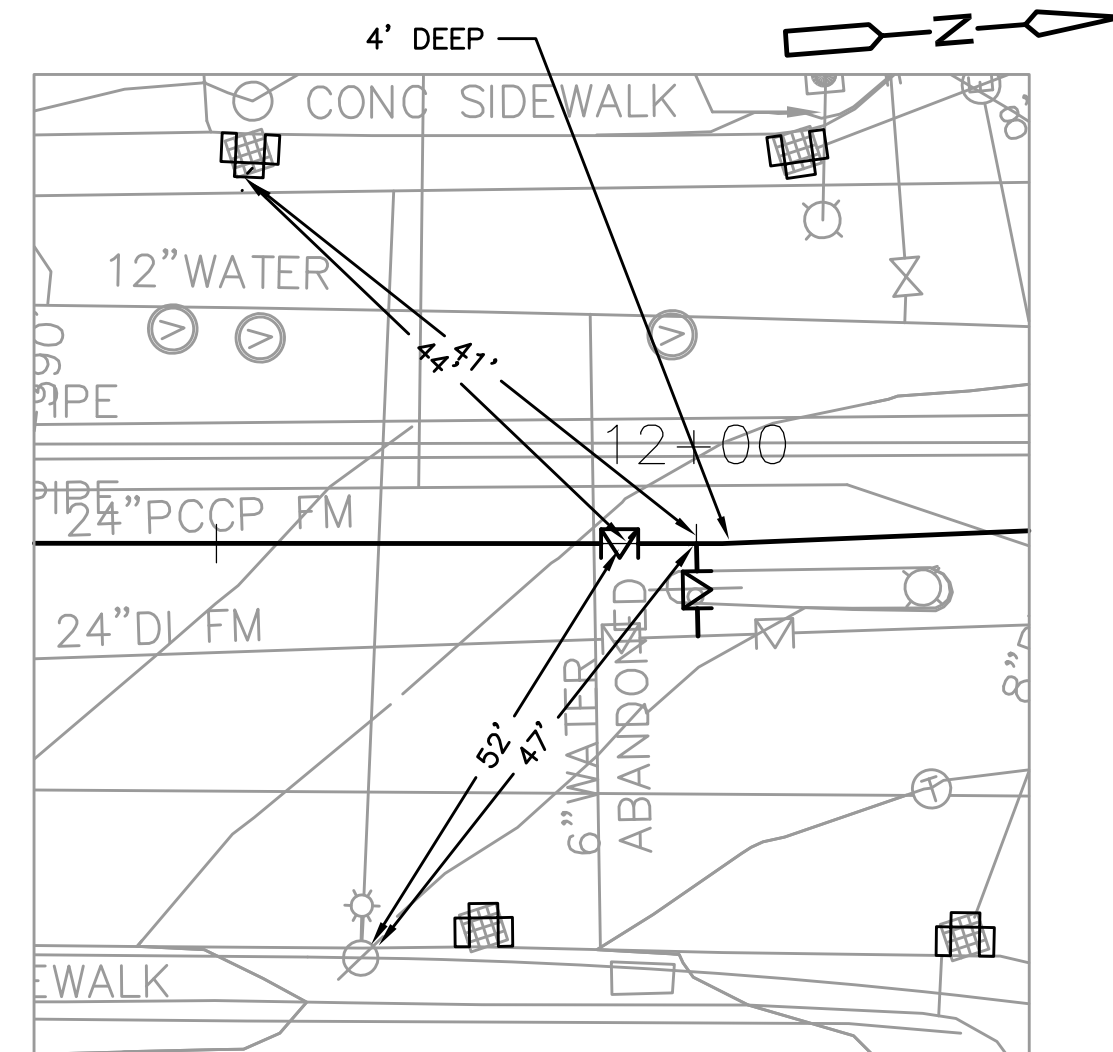
20" 45° BEND LOCATION

DETAIL

D

1"=20'

C-1



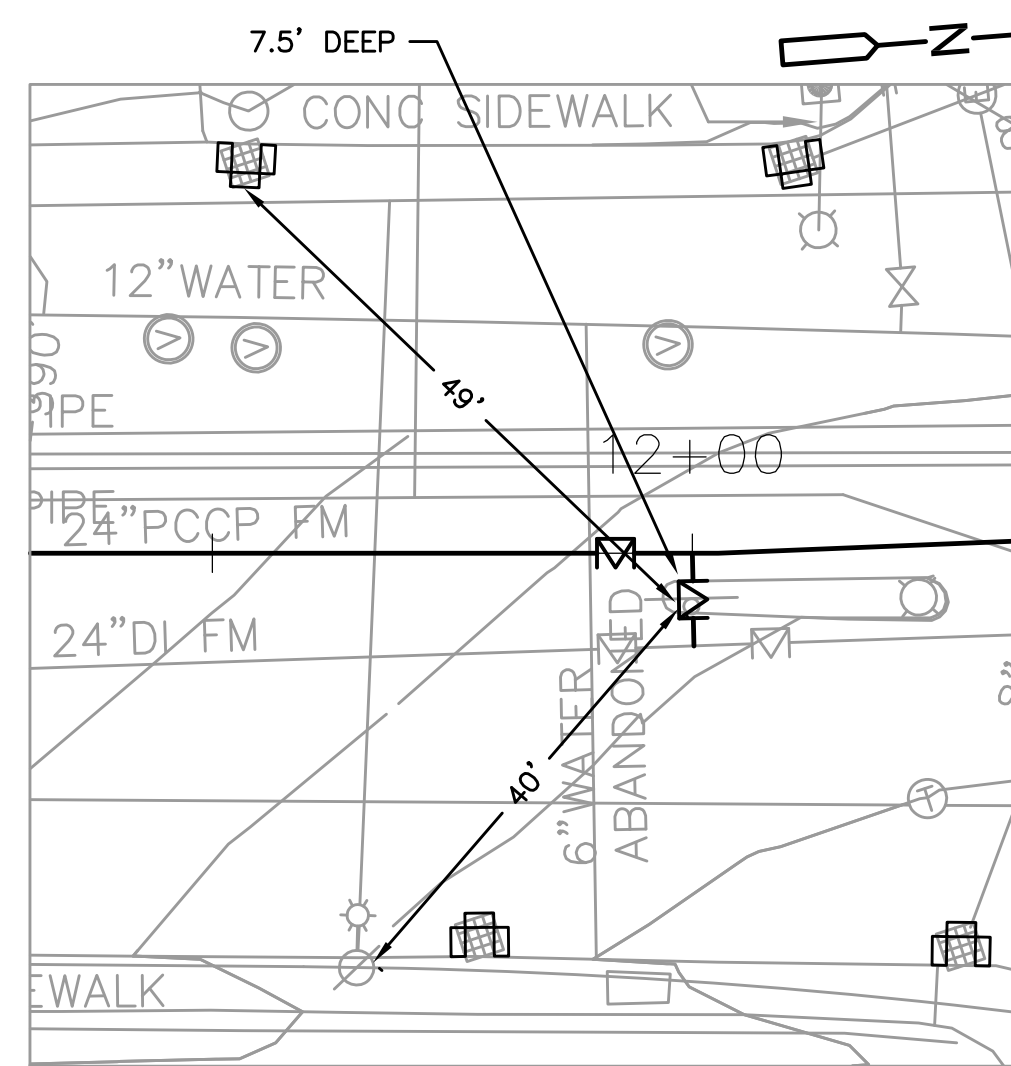
20" VALVE AND 20"x16" TEE LOCATION

DETAIL

E

1"=20'

C-1



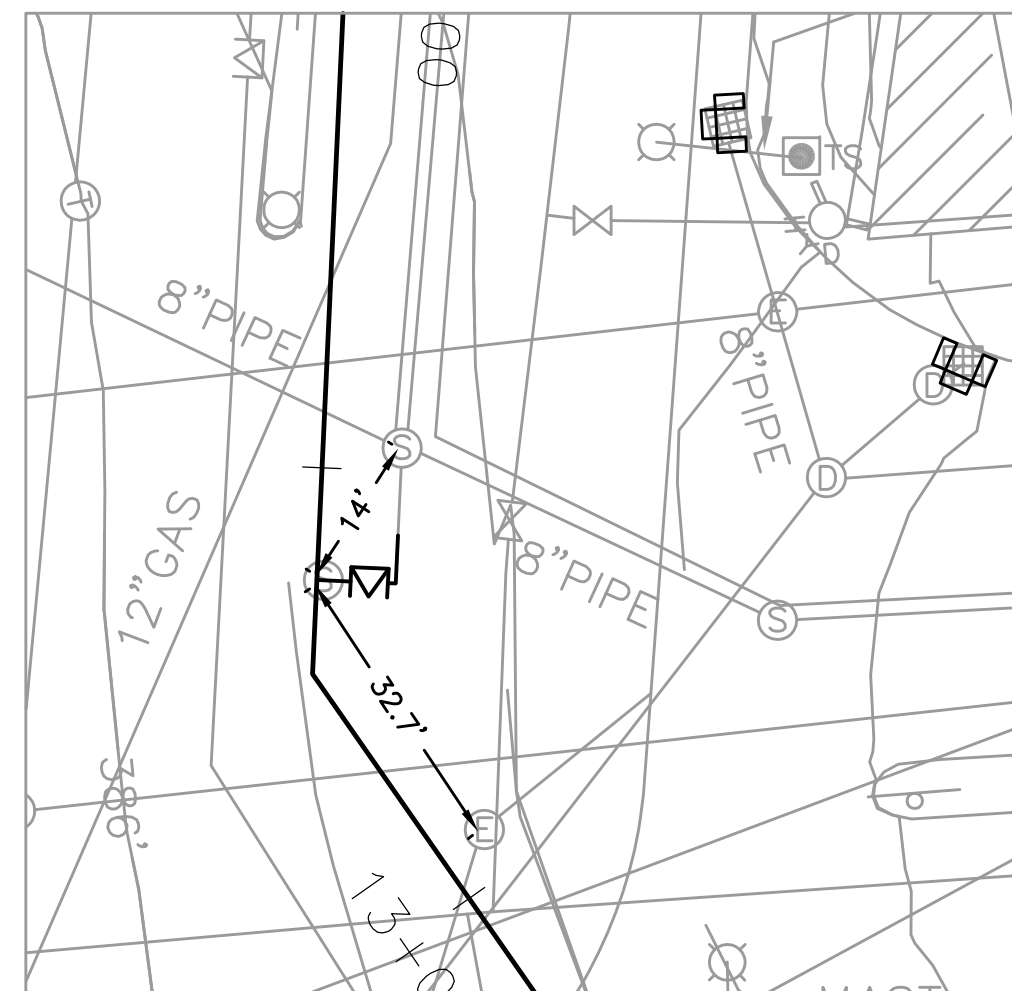
16" VALVE LOCATION

DETAIL

F

1"=20'

C-1



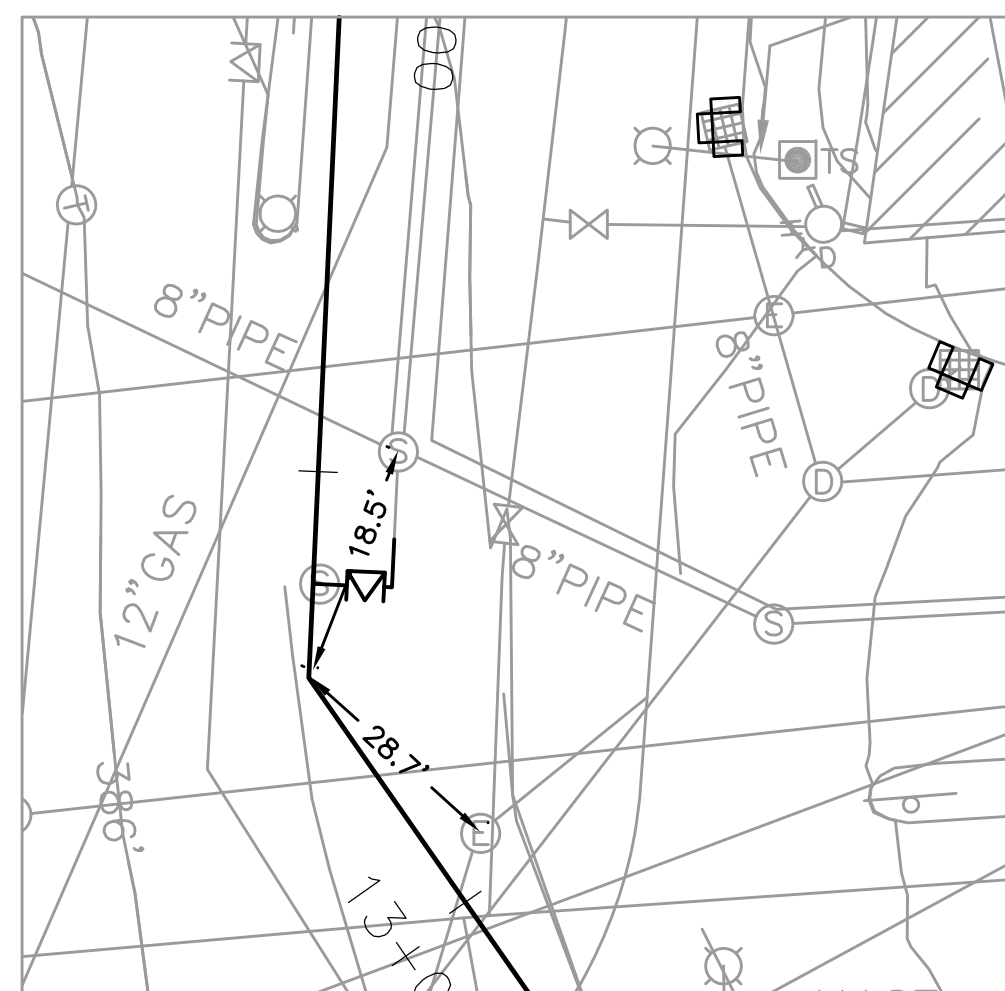
20"x6" TEE LOCATION

DETAIL

G

1"=20'

C-2



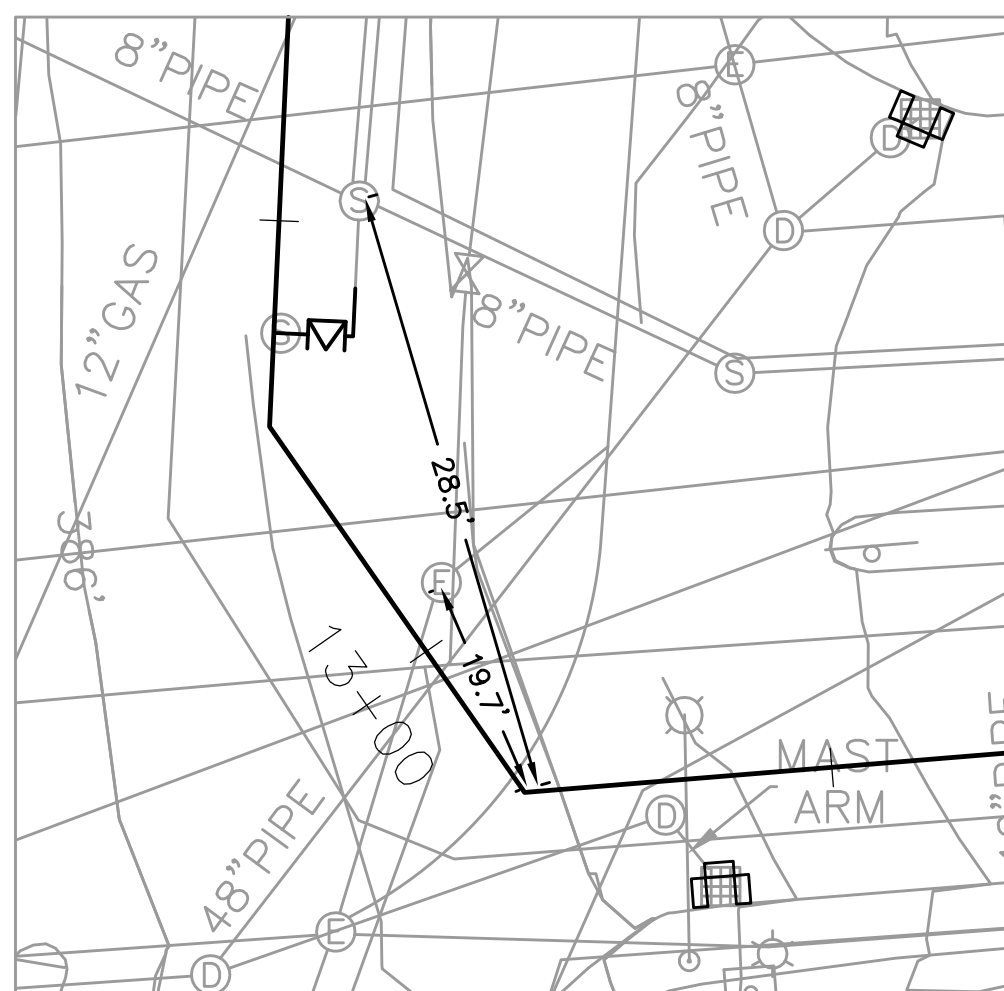
11" BEND LOCATION

DETAIL

H

1"=20'

C-2



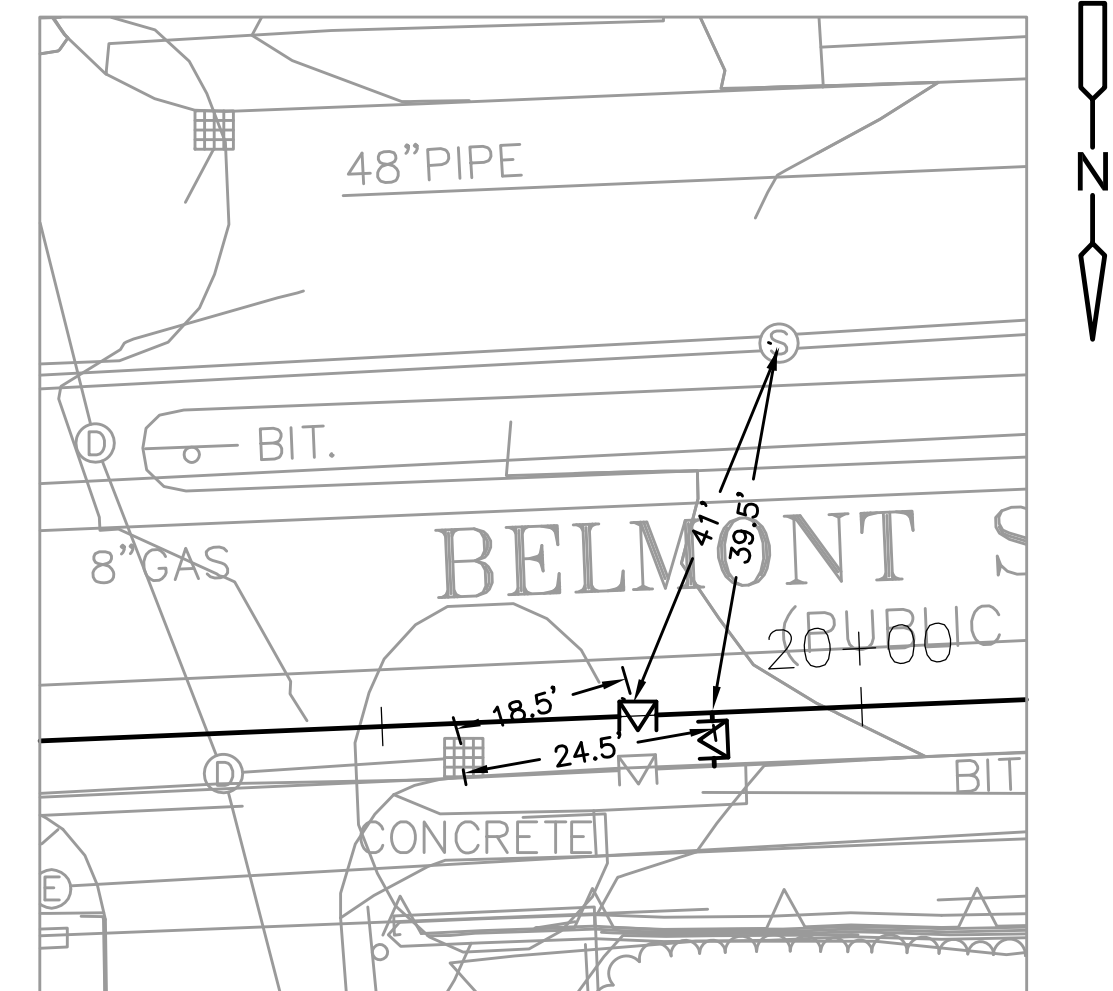
22" BEND LOCATION

DETAIL

J

1"=20'

C-2



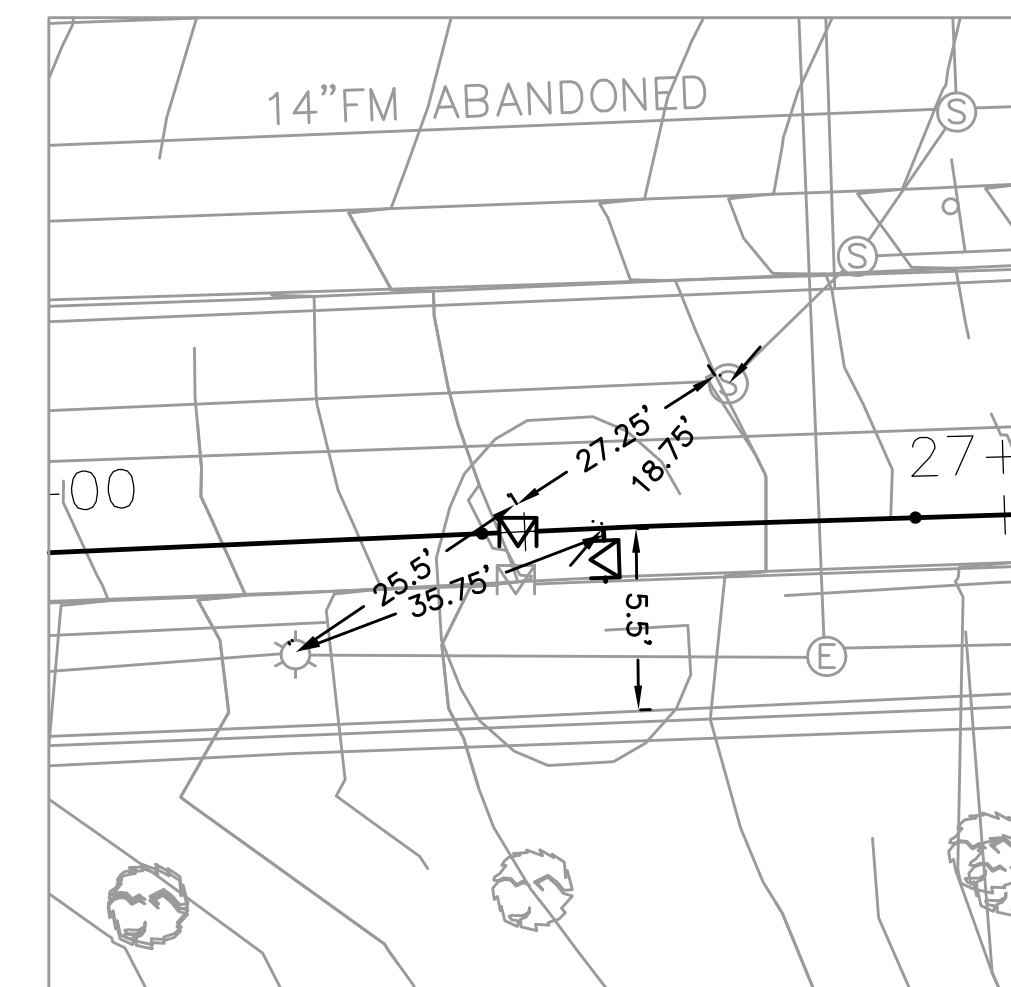
20" PLUG VALVE AND 20"x16" TEE LOCATIONS

DETAIL

K

1"=20'

C-2



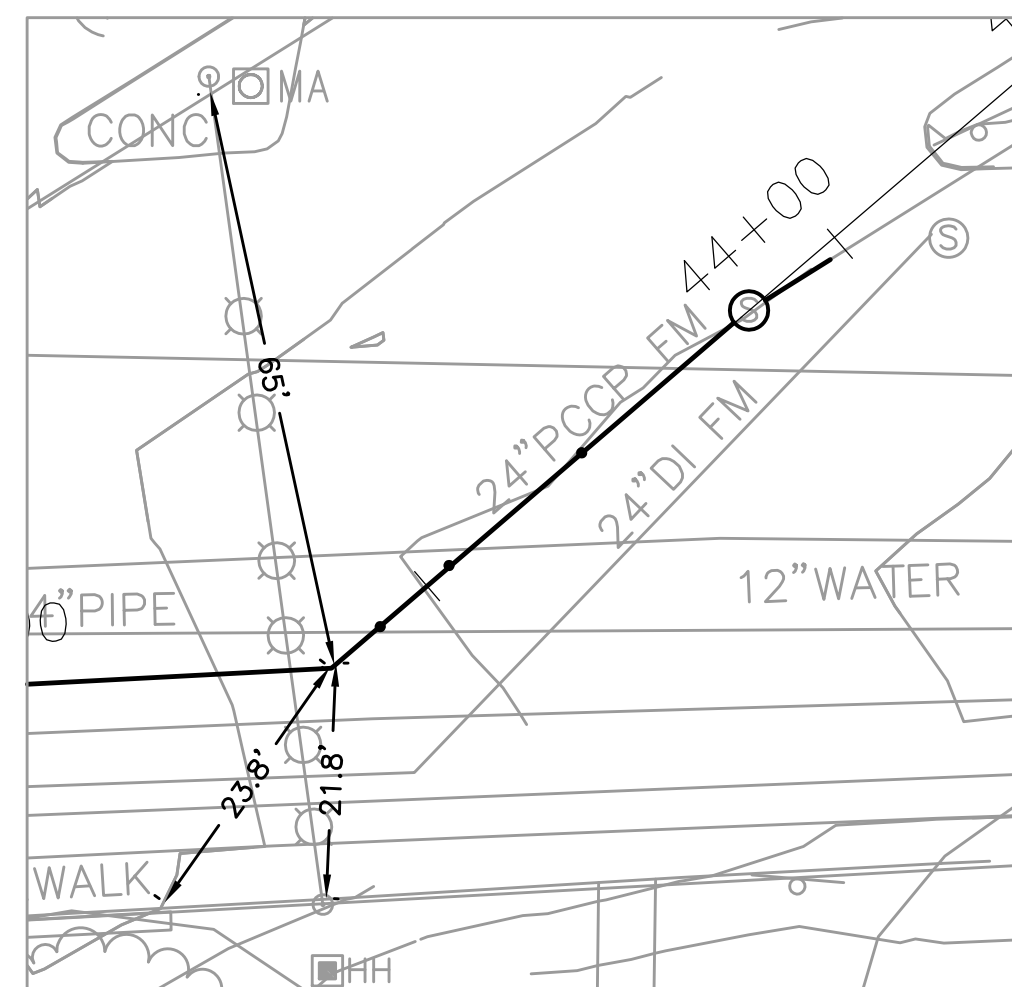
20" PLUG VALVE AND 20"x16" TEE LOCATIONS

DETAIL

L

1"=20'

C-3



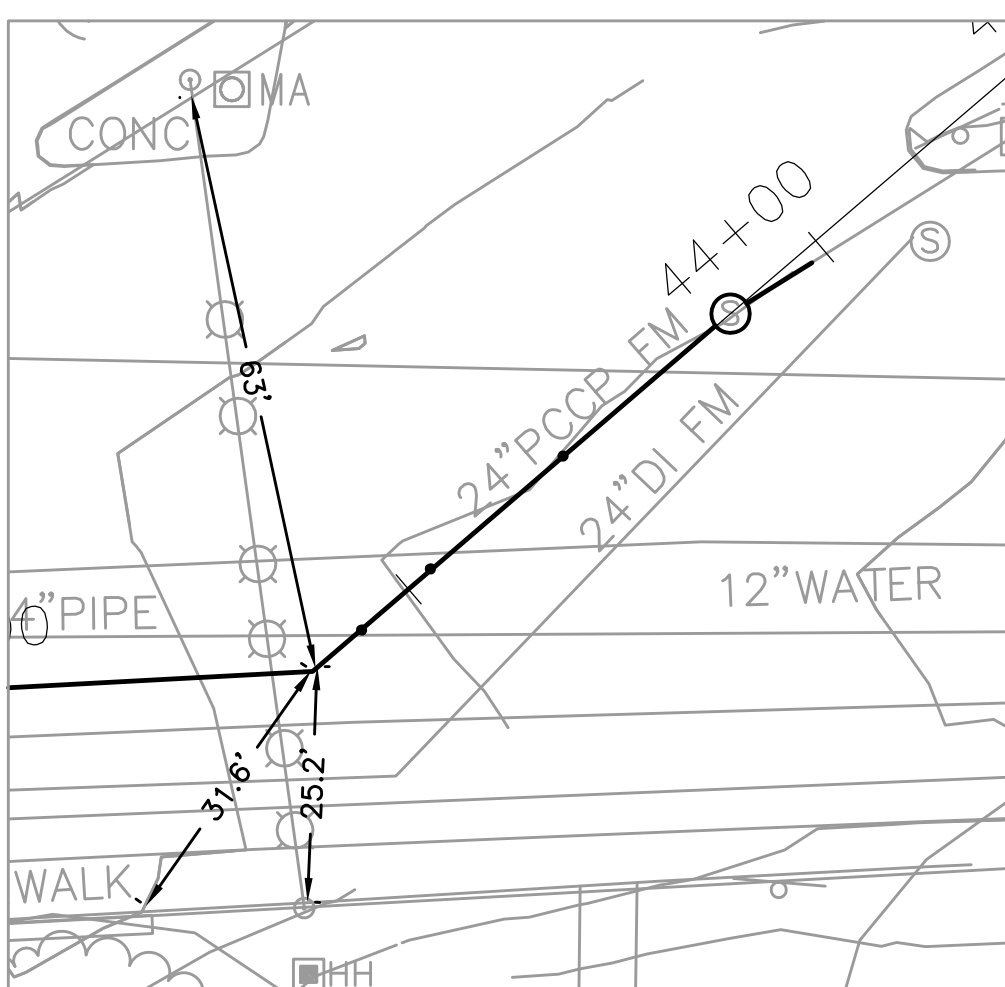
22" BEND LOCATION

DETAIL

M

1"=20'

C-4



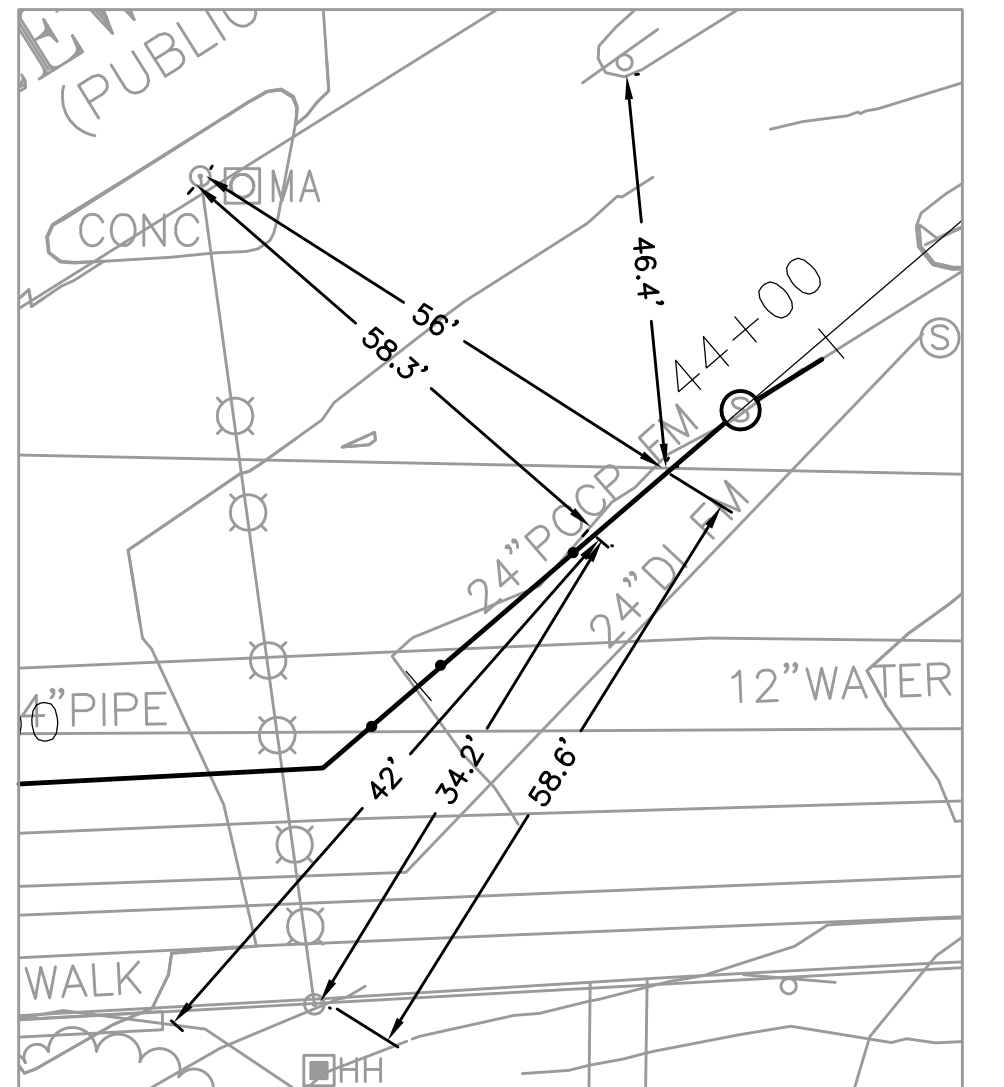
11 1/4" BEND LOCATION

DETAIL

N

1"=20'

C-4



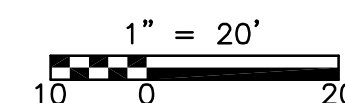
TWO SOLID SLEEVE LOCATIONS

DETAIL

P

1"=20'

C-4



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DESIGNED BY: D. REBELO  
 DRAWN BY: D. REBELO  
 SHEET CHK'D BY: N. HAMPTON  
 CROSS CHK'D BY: T. CHARLES  
 APPROVED BY: N. HAMPTON  
 DATE: JULY 2010

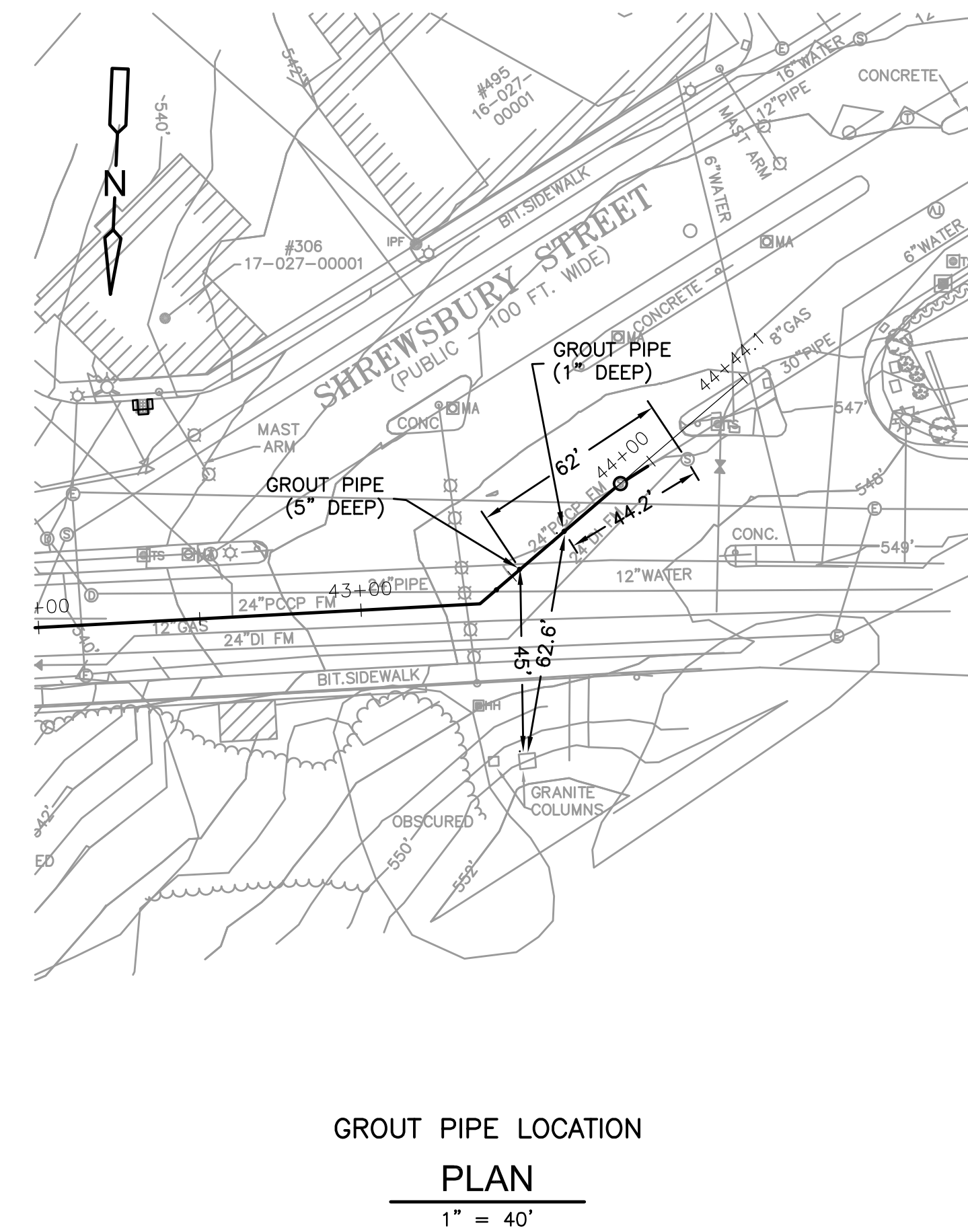
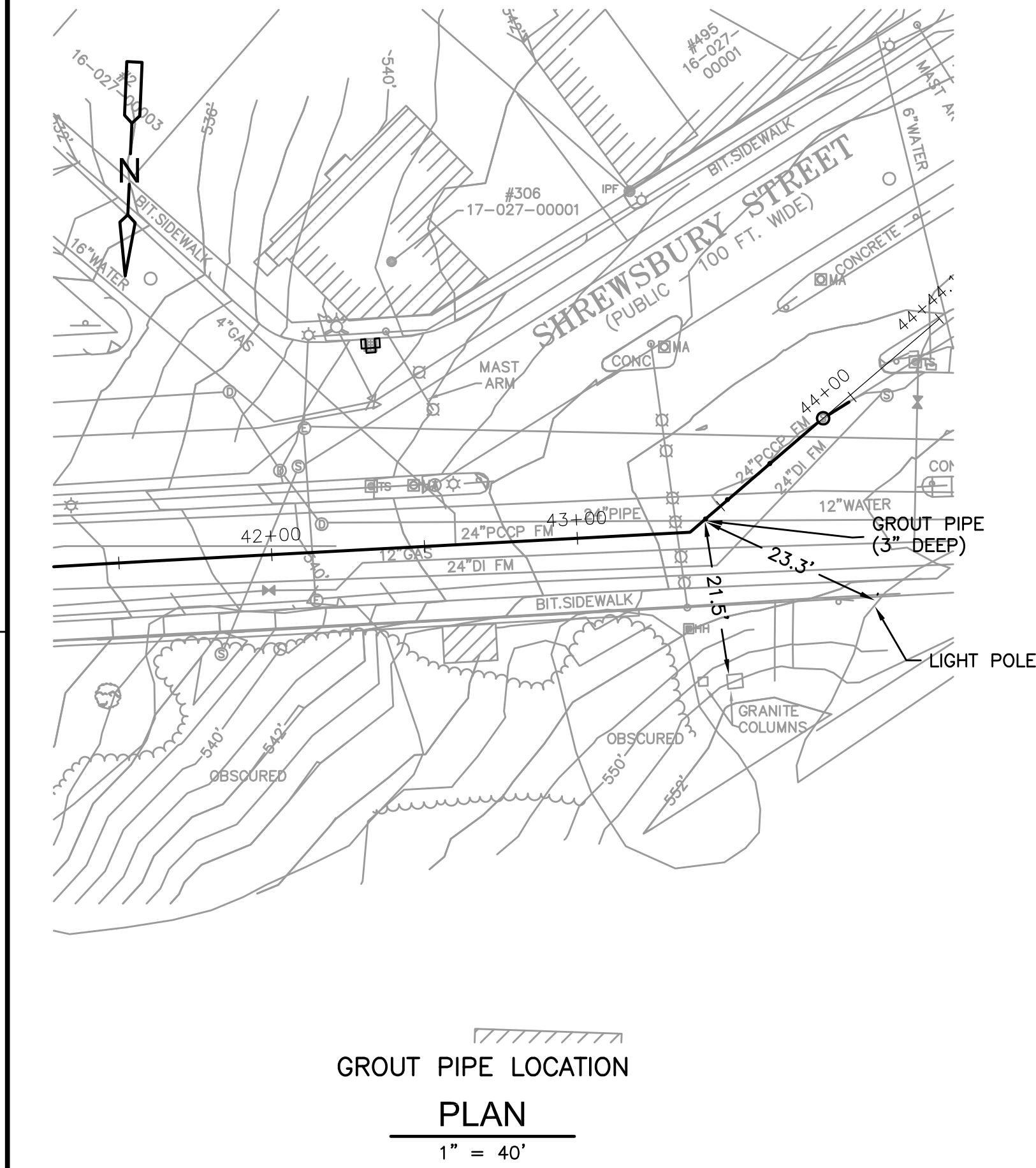
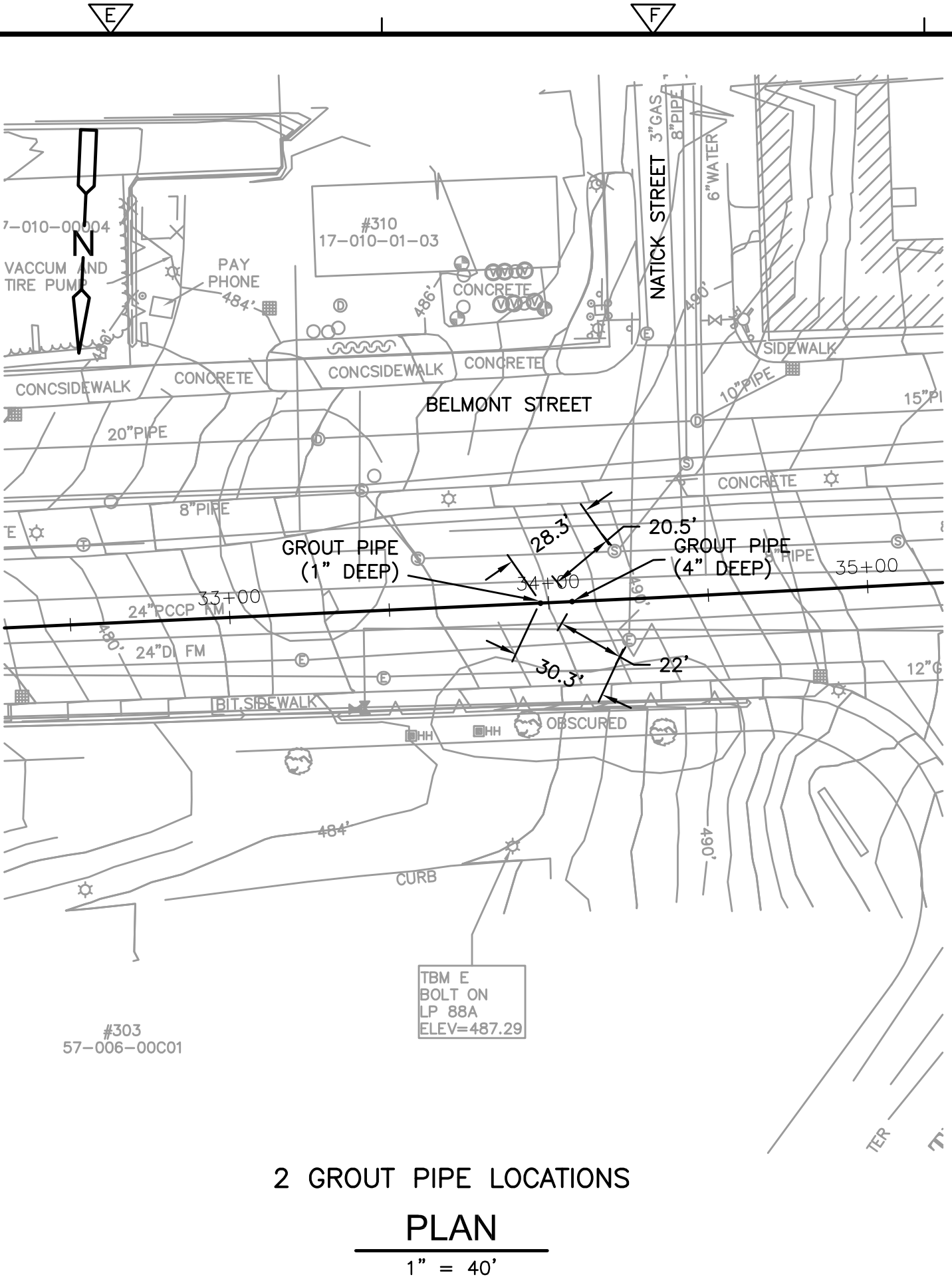
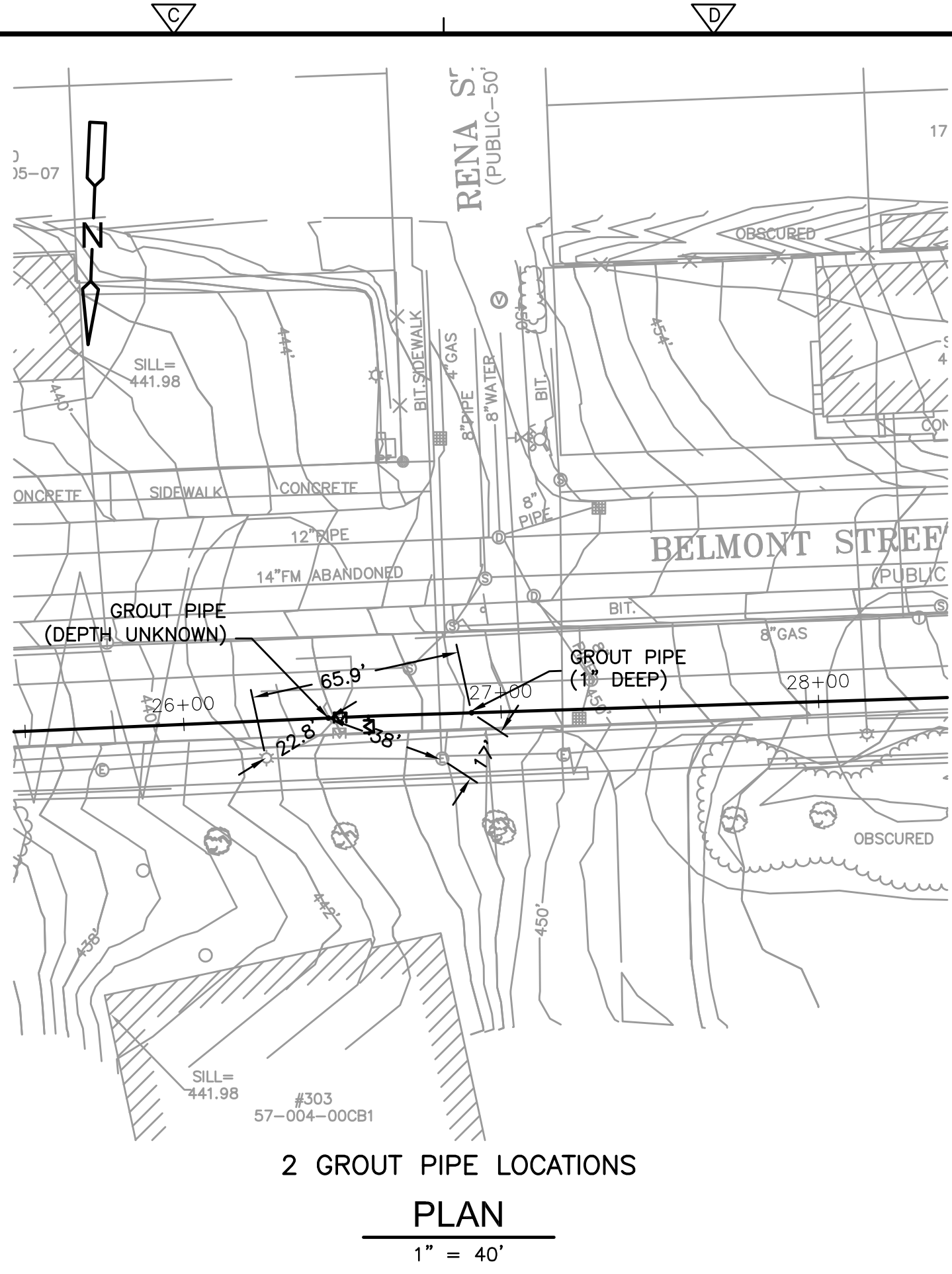
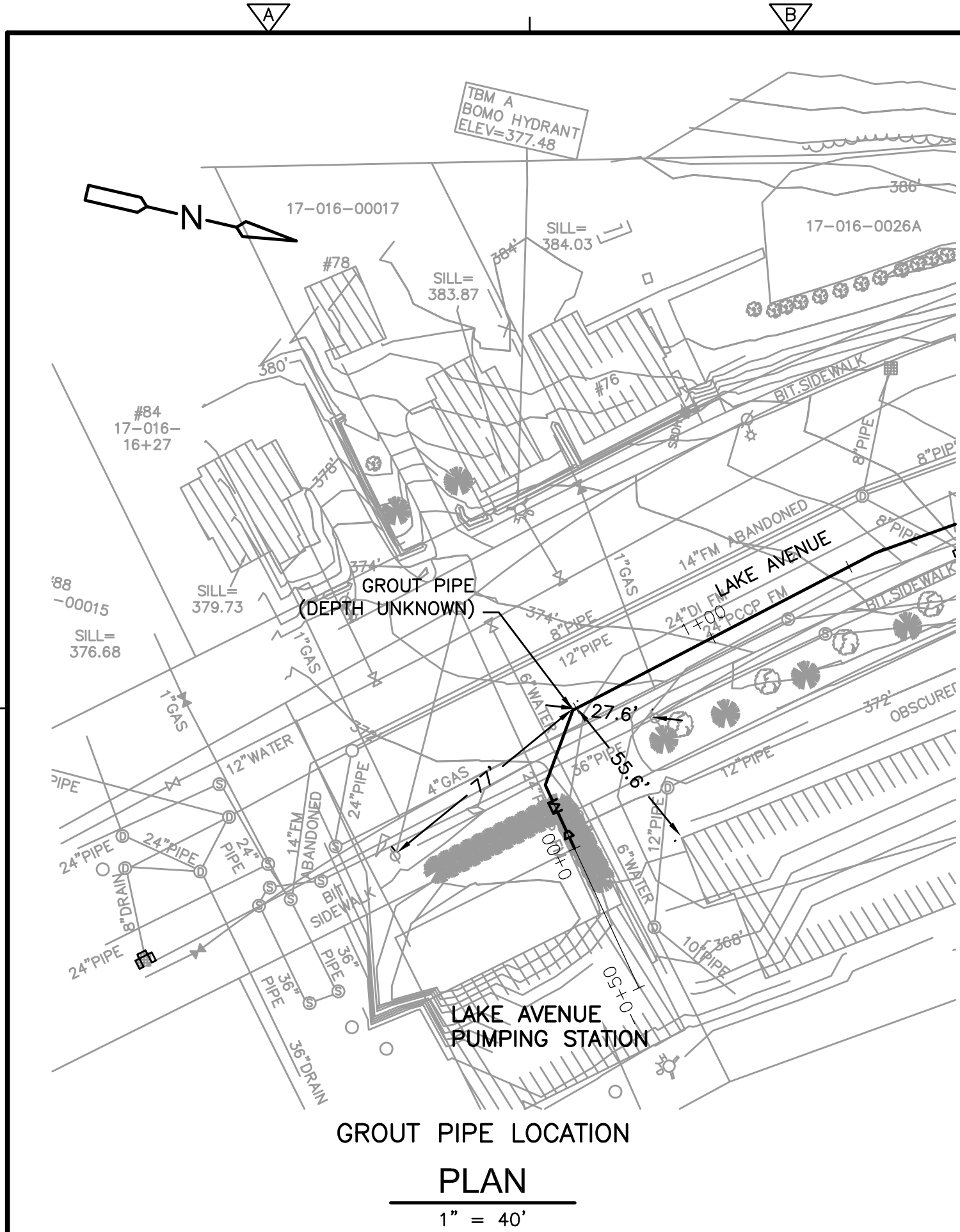
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 DEPARTMENT OF PUBLIC WORKS AND PARKS  
 LAKE AVENUE PUMPING STATION  
 FORCE MAIN NO. 1 REHABILITATION

VALVE, TEE AND BEND  
 SWING TIE LOCATIONS

PROJECT NO. 0198-65037  
 FILE NAME: OFMPL001  
 SHEET NO.  
 C-10

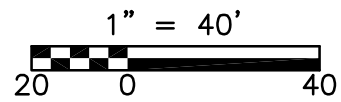




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LAKE AVENUE PUMPING STATION  
FORCE MAIN NO. 1 REHABILITATION

PROJECT NO. 0198-65037  
FILE NAME: CFMPL001  
SHEET NO.  
C-10A

GROUT PIPE LOCATIONS