WATER POLLUTION CONTROL AUTHORITY

Town of Trumbull

CONNECTICUT

TOWN HALL

(203) 452-5048

5866 MAIN STREET

TRUMBULL, CT 06611

JULY 22, 2020
AGENDA

NOTICE is hereby given that the Water Pollution Control Authority of the Town of Trumbull, Connecticut will hold a meeting on Wednesday, July 22, 2020 at 7:00 p.m. via videoconference for the following purpose:

Join the meeting online:
https://zoom.us/j/91118527394?pwd=WDFobkFyRVp4UjRJMC9mMk5GUEFpUT09
Webinar ID: 911 1852 7394
Password: 750811
Join by telephone: (312) 626-6799 or (877) 853-5257 (Toll Free) / Webinar ID: 911 1852 7394

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1. Call to Order

2. Public Hearing

TOWN OF TRUMBULL WPCA NOTICE OF PUBLIC HEARING/
PROPOSED SEWER USER RATES
JULY 22, 2020

Pursuant to section 7-255 of the Connecticut General Statutes, the Trumbull Water Pollution Control Authority hereby gives notice of a Public Hearing via zoom videoconference, Wednesday, July 22, 2020 at 7:00 p.m.
Join the meeting online: https://zoom.us/j/91118527394?pwd=WDFobkFyRVp4UjRJMC9mMk5GUEFpUT09
Webinar ID: 911 1852 7394
Password: 750811
Join by telephone: (312) 626-6799 or (877) 853-5257 (Toll Free) / Webinar ID: 911 1852 7394

Sewage Treatment Fees:

Residential Sewage Treatment per CCF	Currently $5.74	Proposed $5.904
Industrial/Commercial Sewage Treatment per CCF	Currently $6.30	Proposed $6.490
Flat Rate Treatment per quarter	Currently $171.00	Proposed $171.000

Unit Charges:

Residential Maintenance Fee per unit, per quarter,	Currently $33.00	Proposed $33.000
Industrial/Commercial Maintenance Fee per unit, per quarter	Currently $34.00	Proposed $34.000

The proposed rates and potential modifications thereof will be discussed by the Trumbull Water Pollution Control Authority Commission upon completion of the public hearing.

The final rates will be reflected on the next quarterly billing cycle mailed in August, 2020 covering the billing period through September, 2020.
Dated this 11th day of July 2020 Richard Boggs, Chairman Trumbull Water Pollution Control Authority

3. Approval of Minutes:
    - June 24, 2020 Meeting Minutes

4. New Business:
    - Kovacs Change Order #3/Beardsley Pump Station Rehabilitation
    - Proposed Sewer User Rates

5. Old Business:
    - 38 MacDonald Road Sewer Connection
    - Sewer Usage Bill Freeze
    - Bridgeport WPCA FY 2020-2021 Budget
    - Beardsley Pump Station Force Main Update/Corrosion Probe Report
    - Beardsley Pump Station Rehabilitation Update
    - Old Town and Reservoir Avenue Pump Stations Update

6. Any Other Business That May Come Before the Authority

7. Adjournment

20 July, 2020

Via E-mail: *Vanessa.McPherson@arcadis.com*

Ms. Vanessa McPherson
Principal Engineer
Arcadis
44 S. Broadway
White Plains, New York 10602

Subject: Beardsley Park Force Main Analysis located in Trumbull, CT

Dear Ms. McPherson

Corrosion Probe, Inc. (CPI) was asked to perform a desktop analysis of the Beardsley Park Force Main by Arcadis for the Town of Trumbull, CT. We understand that new pumps have been recently installed in this pump station and therefore the current hydraulic conditions of the system are not consistent with the historic conditions. The current system is designed to maintain a velocity of 2 fps with a weekly "flushing" schedule. The pumps are equipped to handle larger flow requirements as well. All information provided within about the subject force main is derived from historic records provided by Arcadis, as well as prior inspection by CPI.

The engineering services requested above were prompted by a localized failure at the invert of a section of force main in January 2020 located near the Beardsley Pump Station along White Plains Road in Trumbull, CT. An investigation was performed by CPI, including laboratory assessment of a sample taken from the failure location, and subsequent report titled *Force Main Failure Inspection Report at the Beardsley Pump Station for the Town of Trumbull, CT* was issued by CPI to Arcadis on May 6, 2020. Said report can be found attached to this document.

Aside from the aforementioned failure in 2020, there is no history of leaks in this 1970-era force main. This force main is roughly 9,400 ft long and comprised of 20" diameter ductile iron pipe, ranging from Class I to Class IV in various sections throughout. The prior investigation indicated that this pipe was cement mortar lined at the 2020 failure location. Historically, the force main has operated at average velocities less than 2 fps at normal flow for unknown periods of time.

Gravity sewers and force mains are designed to prevent grit build-up, and ultimately sulfide production, in the system. Necessary shear stresses and scouring velocities can be analyzed and assessed, respectively, to maximize the efficiency of a given system and prolong the service life of said system. Critical shear stresses are determined based upon the maximum grit size within the process fluid, or the amount of boundary shear stress necessary to initiate motion of the largest grit

particles once deposited at the invert of the pipe. The scouring velocity, therefore, is the required velocity of the process fluid to meet that critical shear stress value and initiate motion of the largest deposited particle. Build-up on pipe walls, commonly referred to as slime, will always occur in wastewater force mains. Regular scouring velocities can reduce the thickness of this slime, inhibiting its ability to create deoxygenated zones against the surface of the pipe wall.

In systems which fail to meet the required scouring velocity, timed at regular intervals, the system will see increased build-up and sulfide production. A mass of microorganisms, sulfate reducing bacteria (SRB), will form under this buildup in the deoxygenated zone below the process fluid. These SRB will create an acidic environment which will break down a cement mortar lining and initiate corrosion of the pipe wall. The build-up of this grit layer can increase the cohesiveness of the grit particles, requiring a greater scouring velocity than that initially required for a system with no buildup. In typical summer climate conditions in North America, it can take anywhere from 2 to 4 weeks for this SRB formation to occur under the grit buildup. A scouring velocity commonly used in waste water force main design is 3.5 fps and it is recommended that this minimum scouring velocity is met on a daily basis for the greatest assurance of grit suspension and transportation.

The conclusion, based on the 2020 failure, was that a deoxygenated zone at the invert of the pipe, beneath grit buildup, led to the formation of sulfate reducing bacteria and from the bacteria, an acidic environment. Coupled with graphitic corrosion, caused by the lowered pH of the process fluid, the invert of the pipe was thinned to the point of failure. The smooth fracture faces along the long, lateral, failure crack may be evidence of erosion as well. This would be an indication that the historic trend for this force main was extended periods of low flow and intermittent high scouring velocities, or flushing exercises.

Sporadic scouring velocities or flushing events timed too far apart and with too great velocity can be detrimental to the service life of a force main. If the scouring velocity is too great and occurs with a thick layer of grit formed at the invert of the pipe, an erosive mechanism of deterioration can occur. As the thick layer of grit is pushed through the system, the high scouring velocity will drag the grit against the invert of the pipe wearing down any existing lining and eventually the pipe wall itself.

Ductile iron is a form of cast iron where an iron matrix contains small graphite nodules; this composition is less brittle than the flakey composition of traditional grey cast irons. Iron is anodic to graphite, which means that the iron matrix will be preferentially leached from the metal in an acidic environment, leaving behind the graphite nodules weakly connected by iron oxides. Graphitic corrosion and pitting were observed in the previously inspected section of pipe from the 2020 failure. Instances of graphitic corrosion and pitting were observed both internally and externally during the inspection. This external corrosion can be an indication of an acidic, or otherwise aggressive, soil-side environment. The observed internal pitting is a common corrosion method for ductile iron in a low pH, acidic, environment such as wastewater applications. If the surficial graphite nodules of the pipe wall are removed by a high scouring velocity, fresh iron is exposed and then allowed to readily corrode from the normal conditions within the force main.

This is especially true if a grit layer is repeatedly allowed to form and a deoxygenated zone is created at this area of fresh iron, accelerating the corrosion of the pipe wall.

The most severe mechanism of corrosion in wastewater force mains is normally biogenic hydrogen sulfide (H_2S) corrosion. This occurs when H_2S is present in the wastewater and a headspace, or air pocket, is created at the crown of the pipe due to less-than-full conditions in the pipe. Turbulent flow conditions strip H_2S from the sewage and, coupled with the available oxygen in the headspace, allow for aerobic sulfur-oxidizing bacteria to metabolize the H_2S and form sulfuric acid (H_2SO_4). Certain internal linings are resistant to this form of attack, but older coatings and cement mortar linings will generally degrade over time allowing for the iron pipe to corrode. Due to the aggressive nature of this corrosion mechanism, H_2S corrosion typically manifests itself within 20 years of the system's service life.

No headspace was observed in the crown of the pipe at the 2020 failure location. The section of pipe at the failure would be unlikely to exhibit this type of corrosion mechanism due to its distance from the pump station, and the geometry of the system at this location. Two areas along the length of this force main would be (more) likely to incur biogenic H_2S corrosion - near the two air release valves (ARV) located at high elevation points south of the river. Per Arcadis, these ARVs are not operating properly and are due to be replaced in the near future. It is likely that air is not vacating the pipes through these ARVs and a resulting headspace is present.

Recommendations

CPI would recommend the following measures to better analyze the current condition of the Beardsley Park Force Main. General locations for inspections are detailed below, attached annotated record documents should be used in conjunction with the following recommendations as well. Any test pit should be excavated with care as the condition of the pipe at any of these locations is unknown. There is potential for sections of pipe in near-failure conditions to perforate once the surrounding environment is no longer supporting the pipe. Proper measures should be taken prior to commencing any excavation work to prepare for potential failures between excavation and backfilling procedures.

1. Perform a test pit inspection of the 20" ductile iron pipe located near each ARV, for a total of two test pits and inspections. Inspection at each ARV, by confined space entry into the below-grade structures, may provide some information regarding the formation of a potential headspace and possible H_2S thinning at the crown of the 20" ductile iron pipe. This type of inspection would be limited to the upper half of the pipe circumference. A full test pit inspection, including exposing the invert of the pipe and providing access to the full circumference of the pipe would return more conclusive results representative of the system. See pages 11 and 14 of this document.

2. Perform a single test pit inspection of the 20" ductile iron pipe located near the pump station on the north shore of the river. This investigation would acquire data to compare to that

obtained from the 2020 failure to determine if the 2020 failure was an isolated incident or indicative of a greater length of the force main. See pages 6 and 7 of this document.

3. Perform a single test pit inspection of the 20" ductile iron pipe located at the low point in the force main along Seltsam Road. This point in the system may see similar mechanisms of deterioration as locations near the pump station as this is a belly in the run with minimal slope both upstream and downstream. See page 12 of this document.

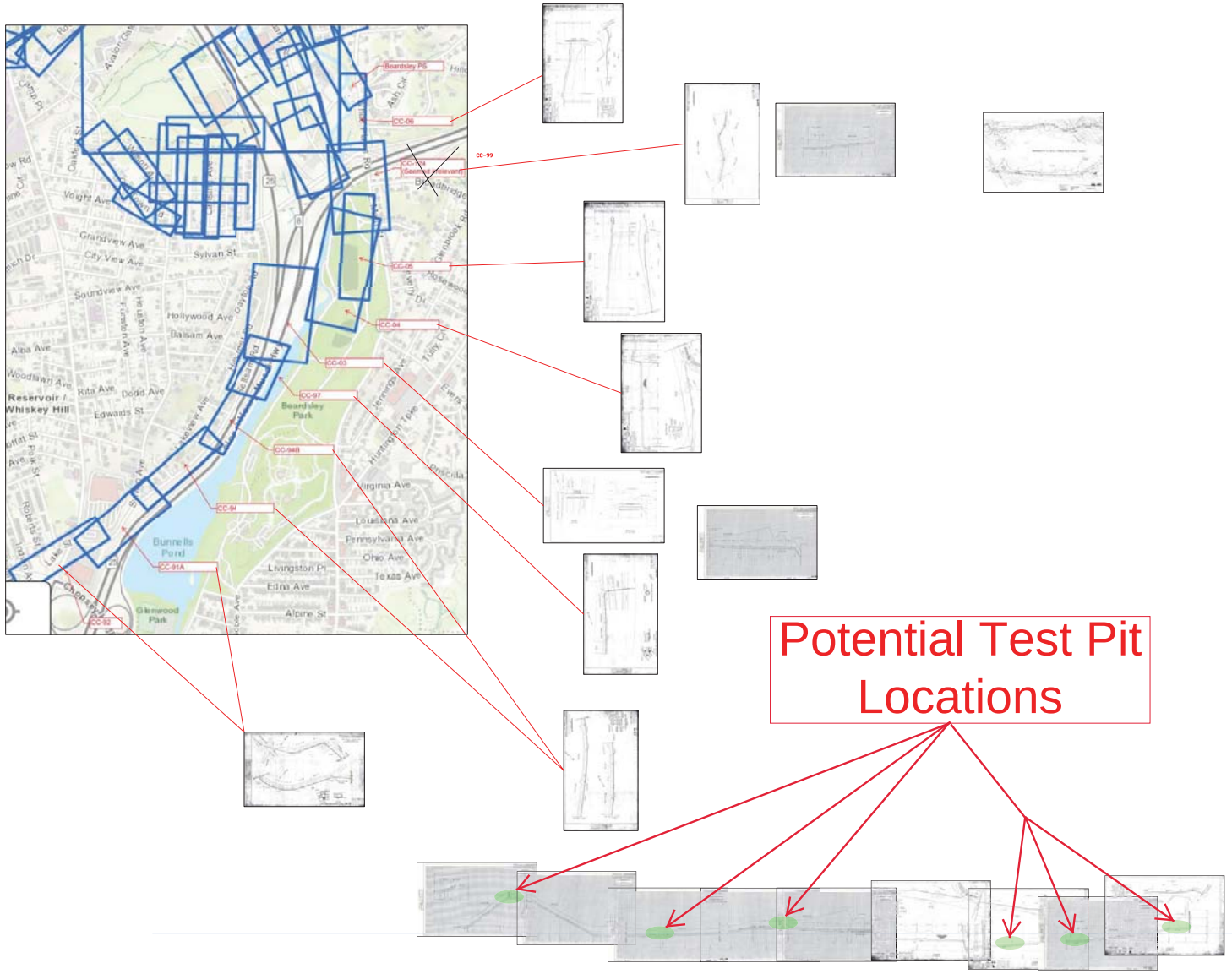
Exact test pit locations are to be determined by others. Environmental factors (roads, utilities, structures) may influence these locations. Per the record documents, see attached, various classes of pipe were installed for this force main (Classes I-IV). It is recommended that sections of pipe with lower class values be inspected as these sections of pipe are both typically closer to grade and would have thinner nominal wall thickness. These sections of Class I and Class II pipe are more likely to fail than the Class III and Class IV sections when exposed to similar conditions.

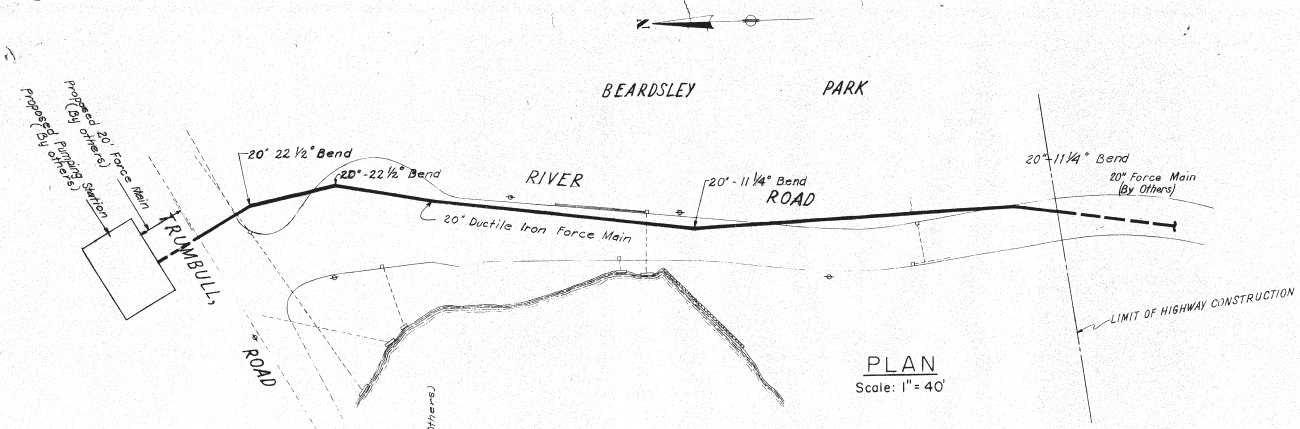
We at CPI sincerely appreciate the opportunity to support Arcadis on this important project. This analysis and included recommendations are respectfully submitted for your review and consideration by,

The Staff of Corrosion Probe, Inc.

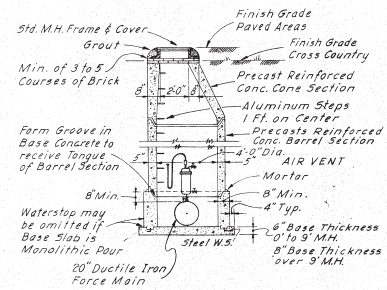
Bryce Annino
Project Engineer

Tom Sherer
Senior Consultant


Potential Test Pit Locations
Beardsley PS
CC-06
CC-99
CC-05
CC-04
CC-03
CC-97
CC-94B
CC-94
CC-91A
CC-92
Beardsley Park
Bunnells Pond
Glenwood Park
Reservoir / Whiskey Hill
Vought Ave
Grandview Ave
City View Ave
Sylvan St
Soundview Ave
Hollywood Ave
Balsam Ave
Alba Ave
Woodlawn Ave
Rita Ave
Dodd Ave
Edwards St
Virginia Ave
Louisiana Ave
Pennsylvania Ave
Ohio Ave
Texas Ave
Livingston Pl
Edna Ave
Alpine St

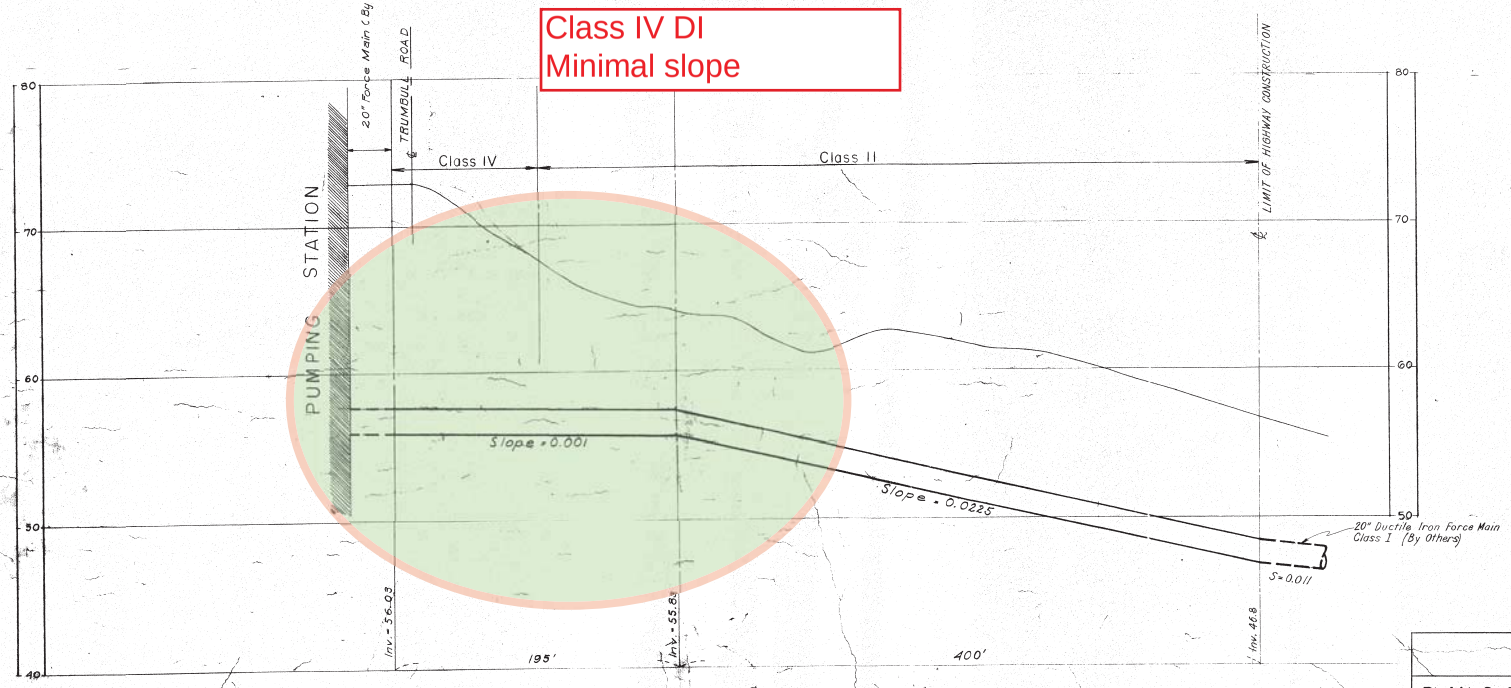


PLAN
Scale: 1" = 40'



AIR VENT MANHOLE DETAIL

Class IV DI
Minimal slope



PROFILE
Scale: Horiz. 1" = 40'
Vert. 1" = 4'

RIVER ROAD
PLAN & PROFILE OF FORCE MAIN
TRUMBULL, CONN.

NO.	DESCRIPTION	DATE
	REVISIONS	

C-C 6

WHITMAN & HOWARD, INC.
ENGINEERS AND ARCHITECTS
89 BROAD ST. BOSTON, MASS.

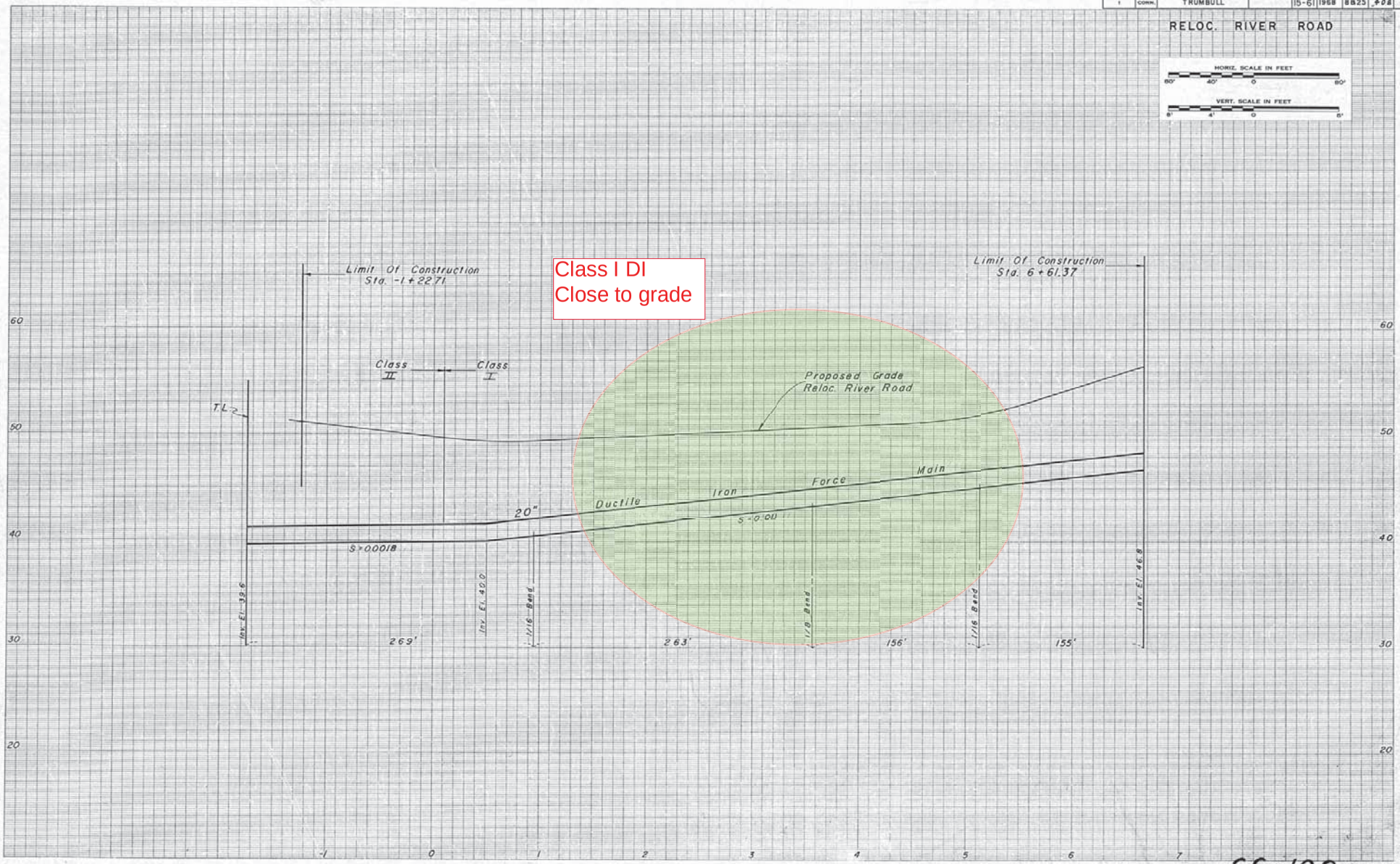
DESIGNED BY PJG	SCALE AS SHOWN	DATE MAY, 1970
DRAWN BY VPA	APPROVED James F. McNamara	
CHECKED BY GTC	JOB NO. B-11	SHEET

STATE OF CONNECTICUT JAMES F. McNAMARA NO. 8779 REGISTERED PROFESSIONAL ENGINEER

W.P.C. CONN-132

PUB. ROAD DIV. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	TRUMBULL		15-61	1968	8825	408	408

RELOC. RIVER ROAD



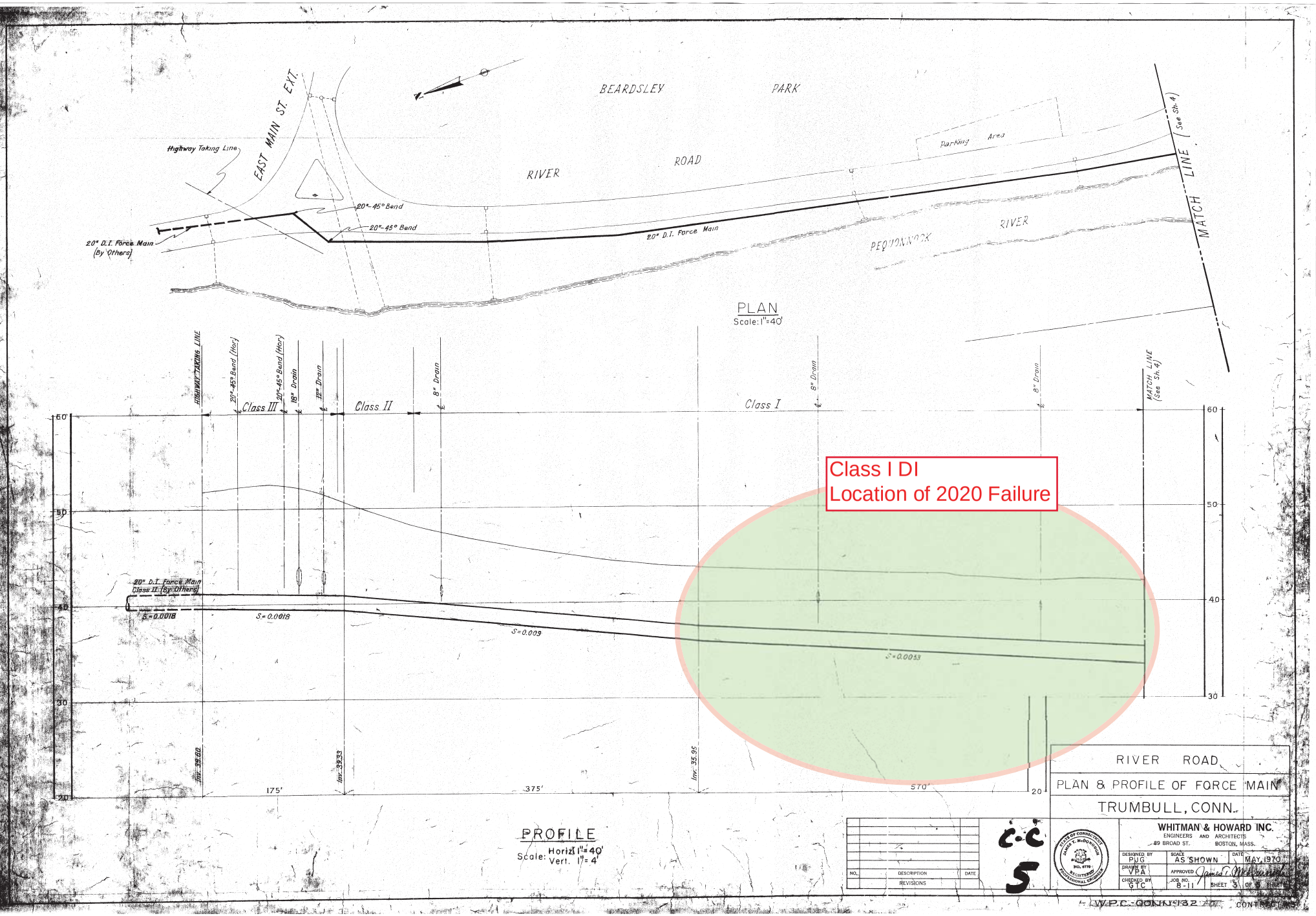
PROFILE	BY	DATE	CHECKED BY	DATE
Surveyed	F.J.B.	1-19-66		
Plotted	F.J.B.	1-19-66		
Traced	W.W.	10-1-68		
Designed	W.W.	10-1-68		
Bar Control Name				
Tab Field Checked				
NOTE BOOK NO.				

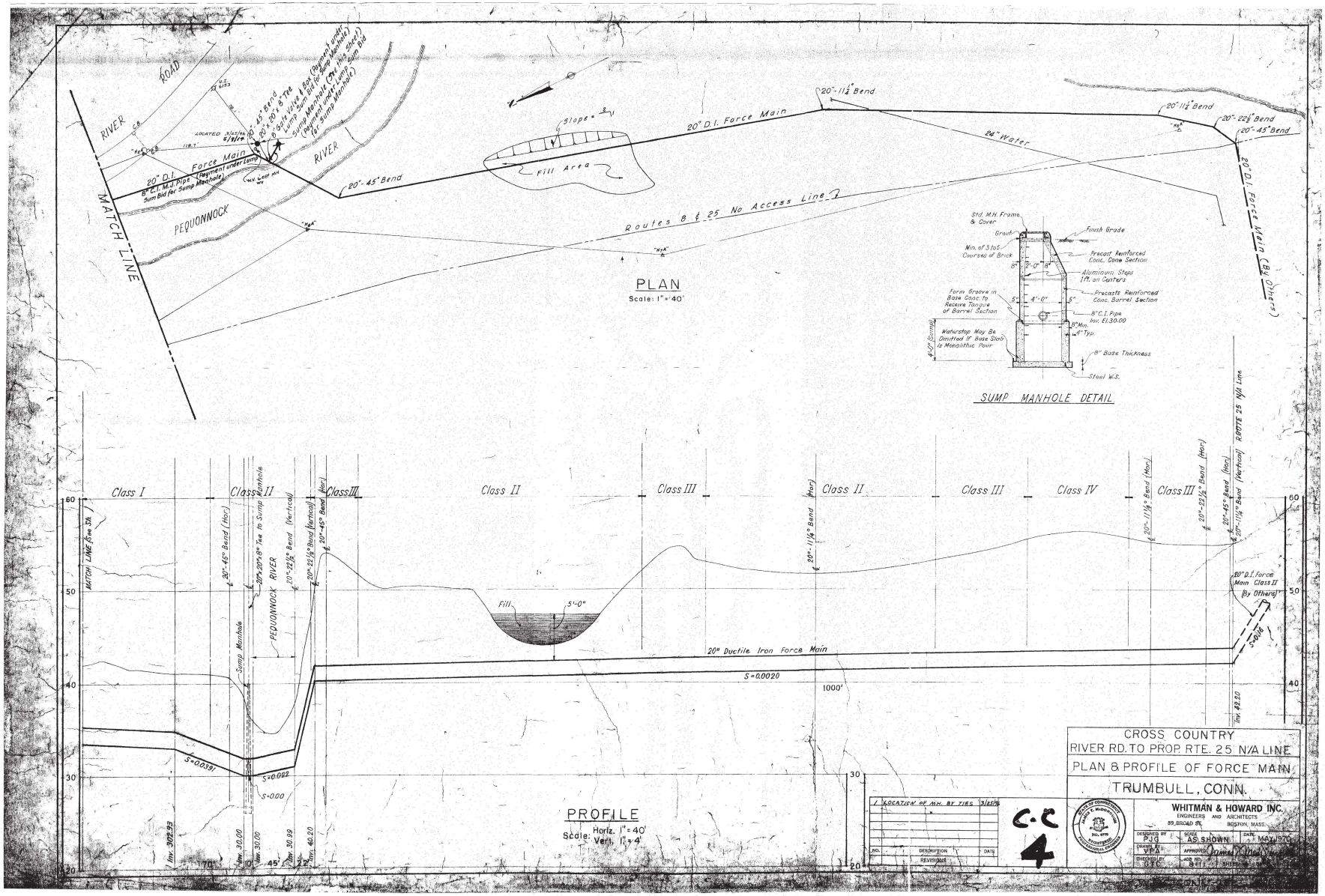
CC-100

15-61

399 01

408

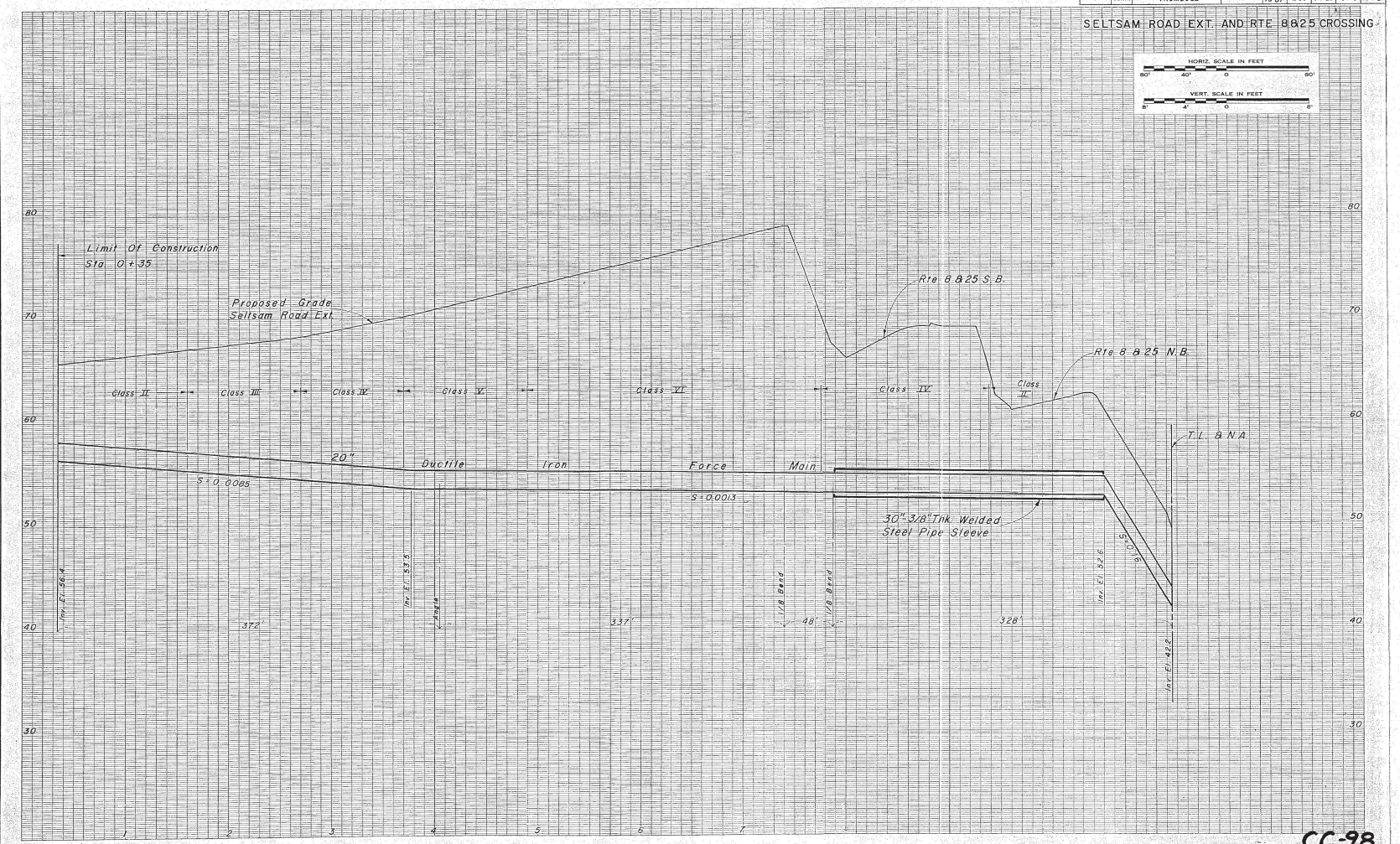

BEARDSLEY PARK
EAST MAIN ST. EXT.
Highway Taking Line
RIVER ROAD
Parking Area
20"-45° Bend
20"-45° Bend
20" D.I. Force Main (By Others)
20" D.I. Force Main
PEQUONNOCK RIVER
MATCH LINE (See Sh. 4)
PLAN
Scale: 1"=40'
HIGHWAY TAKING LINE
20"-45° Bend (Hor.)
20"-45° Bend (Hor.)
18" Drain
12" Drain
8" Drain
8" Drain
8" Drain
MATCH LINE (See Sh. 4)
Class III
Class II
Class I
Class I DI
Location of 2020 Failure
20" D.I. Force Main Class II (By Others)
K=0.0018
S=0.0018
S=0.009
S=0.0053
Inv. 35.80
Inv. 39.23
Inv. 35.95
175'
375'
570'
PROFILE
Scale: Horiz. 1"=40' Vert. 1"=4'
RIVER ROAD
PLAN & PROFILE OF FORCE MAIN
TRUMBULL, CONN.
WHITMAN & HOWARD INC.
ENGINEERS AND ARCHITECTS
89 BROAD ST. BOSTON, MASS.
DESIGNED BY PJG
DRAWN BY VBA
CHECKED BY GTC
SCALE AS SHOWN
APPROVED
JOB NO. 8-11
DATE MAY, 1970
SHEET 3 OF 8 SHEETS
NO. DESCRIPTION DATE
REVISIONS
C-C 5
W.P.C.-CONN.-532
CONTRACT NO.


PLAN
Scale: 1" = 40'
MATCH LINE
RIVER ROAD
PEQUONNOCK RIVER
20" D.I. Force Main
20" - 45° Bend
Fill Area
Slope = 2:1
20" D.I. Force Main
20" - 11¼° Bend
24" Water
20" - 22½° Bend
20" - 45° Bend
20" D.I. Force Main (By Others)
Routes 8 & 25 No Access Line
SUMP MANHOLE DETAIL
Std. M.H. Frame & Cover
Grout
Finish Grade
Min. of 3 to 5 Courses of Brick
Precast Reinforced Conc. Cone Section
Aluminum Steps 1 ft. on Centers
Form Groove in Base Conc. to Receive Tongue of Barrel Section
Precasts Reinforced Conc. Barrel Section
8" C.I. Pipe Inv. El. 30.00
Waterstop May Be Omitted If Base Slab Is Monolithic Pour
8" Base Thickness
Steel W.S.
Class I
Class II
Class III
Class IV
MATCH LINE (See 3A)
20" - 45° Bend (Hor)
20" x 20" x 8" Tee In Sump Manhole
20" - 22½° Bend (Vertical)
20" - 45° Bend (Vertical)
20" - 11¼° Bend (Hor)
20" - 22½° Bend (Hor)
20" - 11¼° Bend (Vertical)
ROUTE 25 N/A Line
20" D.I. Force Main Class II (By Others)
Sump Manhole
PEQUONNOCK RIVER
Fill
5'-0"
20" Ductile Iron Force Main
S = 0.0020
1000'
S = 0.0031
S = 0.022
S = 0.000
S = 0.016
Inv. 42.20
Inv. 30.00
Inv. 30.99
Inv. 40.20
PROFILE
Horiz. 1" = 40'
Scale: Vert. 1" = 4'
CROSS COUNTRY
RIVER RD. TO PROP. RTE. 25 N/A LINE
PLAN & PROFILE OF FORCE MAIN
TRUMBULL, CONN.
WHITMAN & HOWARD INC.
ENGINEERS AND ARCHITECTS
89 BROAD ST. BOSTON, MASS.
DESIGNED BY PJG
SCALE AS SHOWN
DATE MAY 1970
DRAWN BY YBA
CHECKED BY DTC
JOB NO. 8811
SHEET
LOCATION OF MH. BY TIES 3/25/76
NO. DESCRIPTION DATE
REVISIONS
C-C 4

FORM NO. ENG. 12 RD. 7-62

FED. ROAD DIV. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	TRUMBULL		15-61	1968	8825	4-07	4-08

SELTSAM ROAD EXT. AND RTE 8&25 CROSSING



PROFILE	BY	DATE	CHKD BY	DATE
Surveyed				
Plotted	F.E.S.	1-9-68		
Traced	F.E.S.	1-15-68		
Designed	J.C.A.	10-24-67		
Prov. Const. Road	W.H.	1-29-68		
Trk. Plotted & Traced				
NOTE BOOK				
NO.				

DIETZGEN 141 Ultralight Tracing Cloth 8520

15-61

399 01

4-07 CC-98

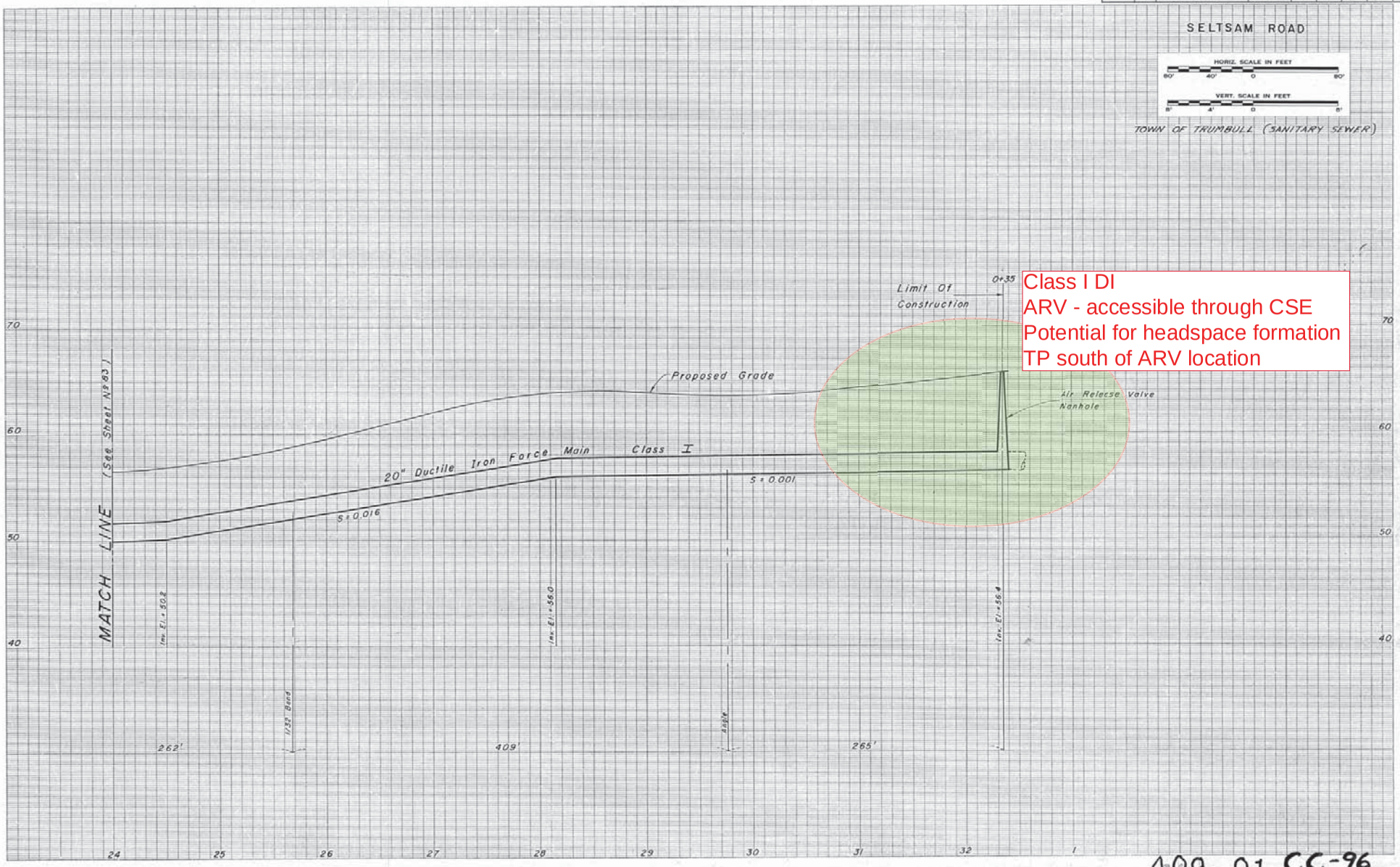
FOR. ROAD DIV. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	BRIDGEPORT	U-136 (33)	15-45	1969	8125	84	274

SELTSAM ROAD

HORIZ. SCALE IN FEET
60' 40' 0 60'

VERT. SCALE IN FEET
8' 4' 0 8'

TOWN OF TRUMBULL (SANITARY SEWER)



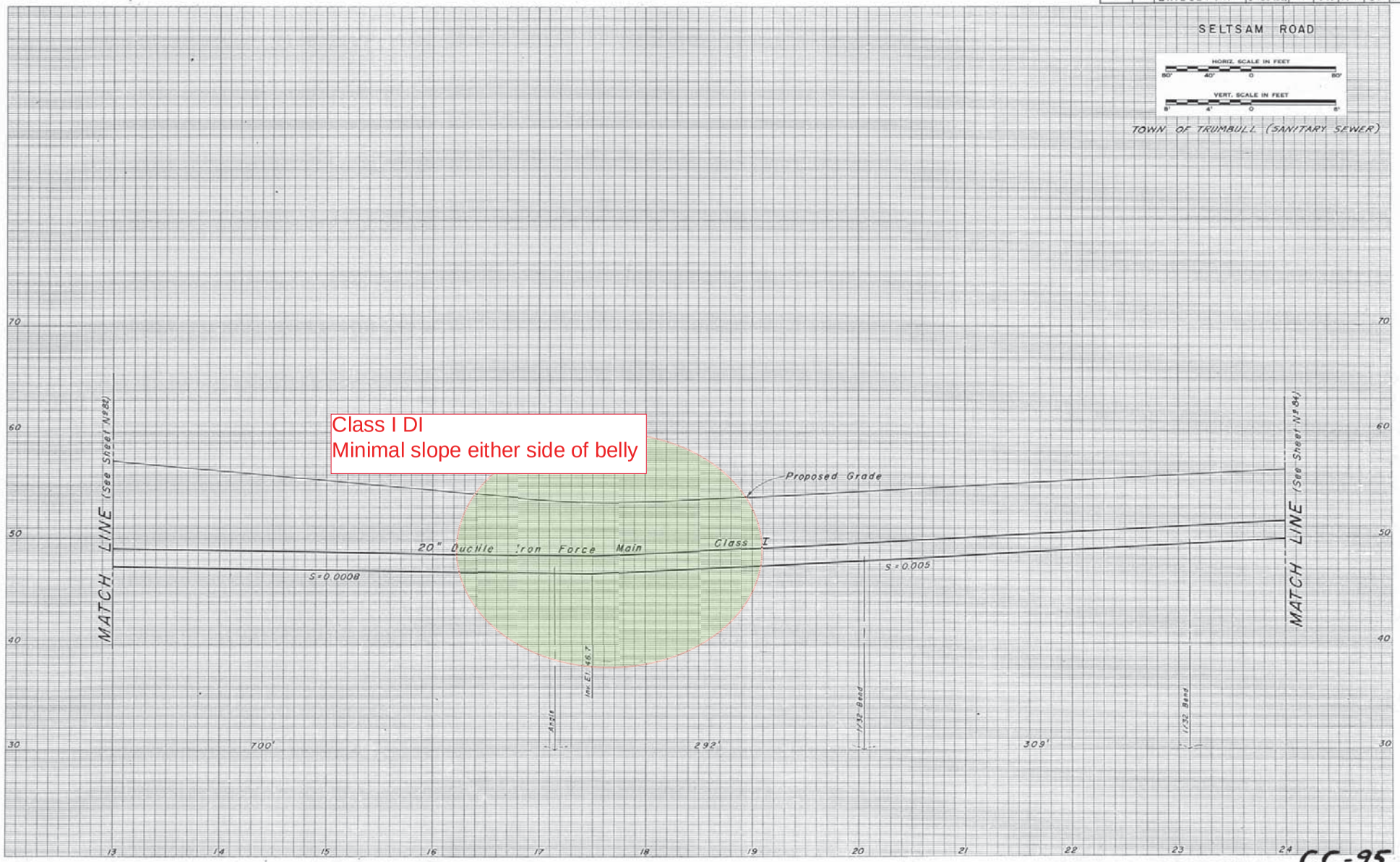
PROFILE
Surveyed
Plotted
Traced
NOTE BOOK
Designed
Checked
NO.
DATE

15-45

409 01 CC-96

84

PUB. ROAD SYS. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	BRIDGEPORT	U-136(33)	15-45	1969	8&25	83	274



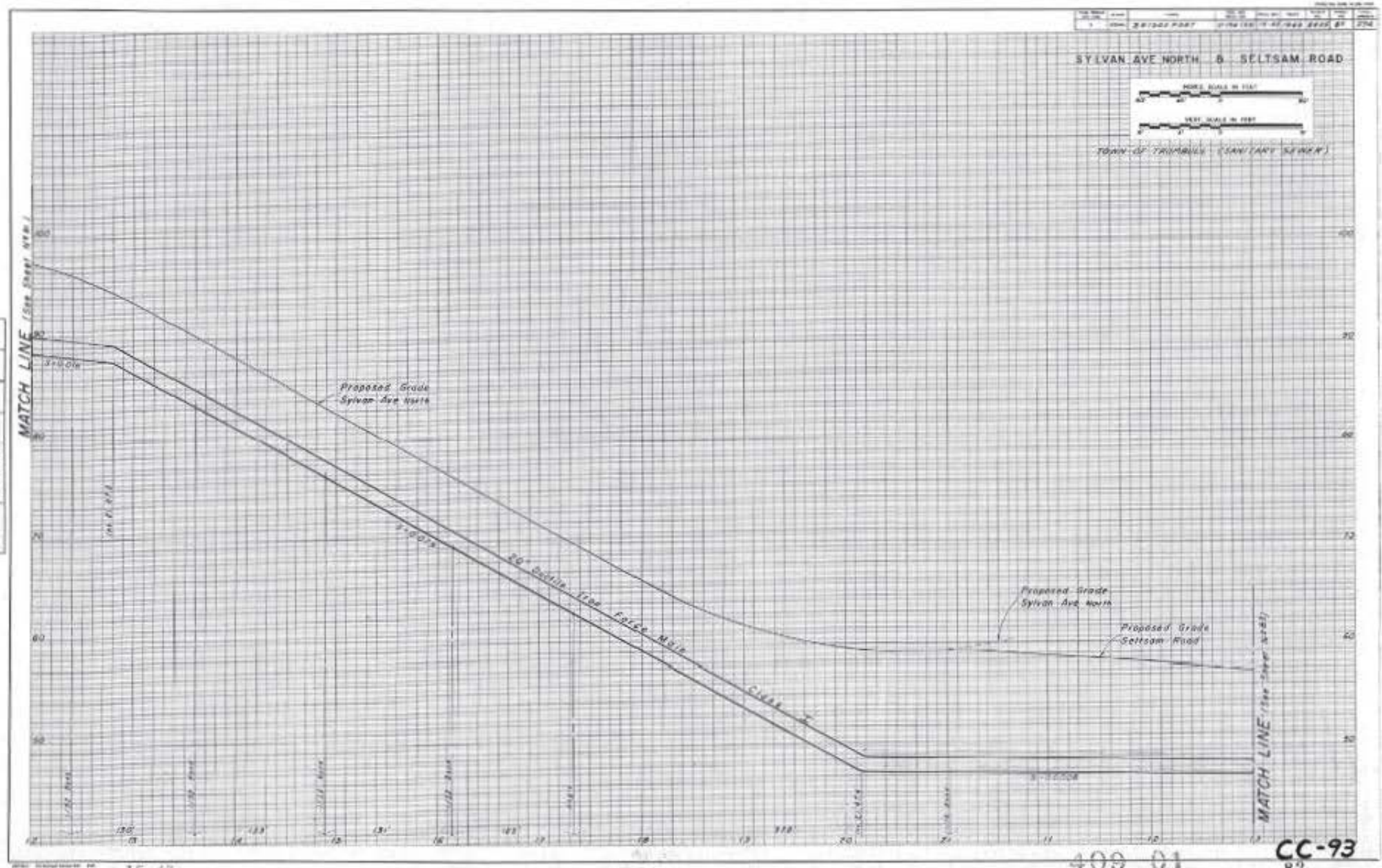
PROFILE	BY	DATE	CHECKED BY	DATE
Surveyed				
Plotted				
Traced				
Designed				
Res. Const. Notes				
Top. Field Vol. Used				
NOTE BOOK NO.				

CC-95

15-45

409 01

83



CC-93

409 01

15-43

82

FUB. ROAD SYS. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	BRIDGEPORT	U-136(33)	15-45	1969	8425	81	274

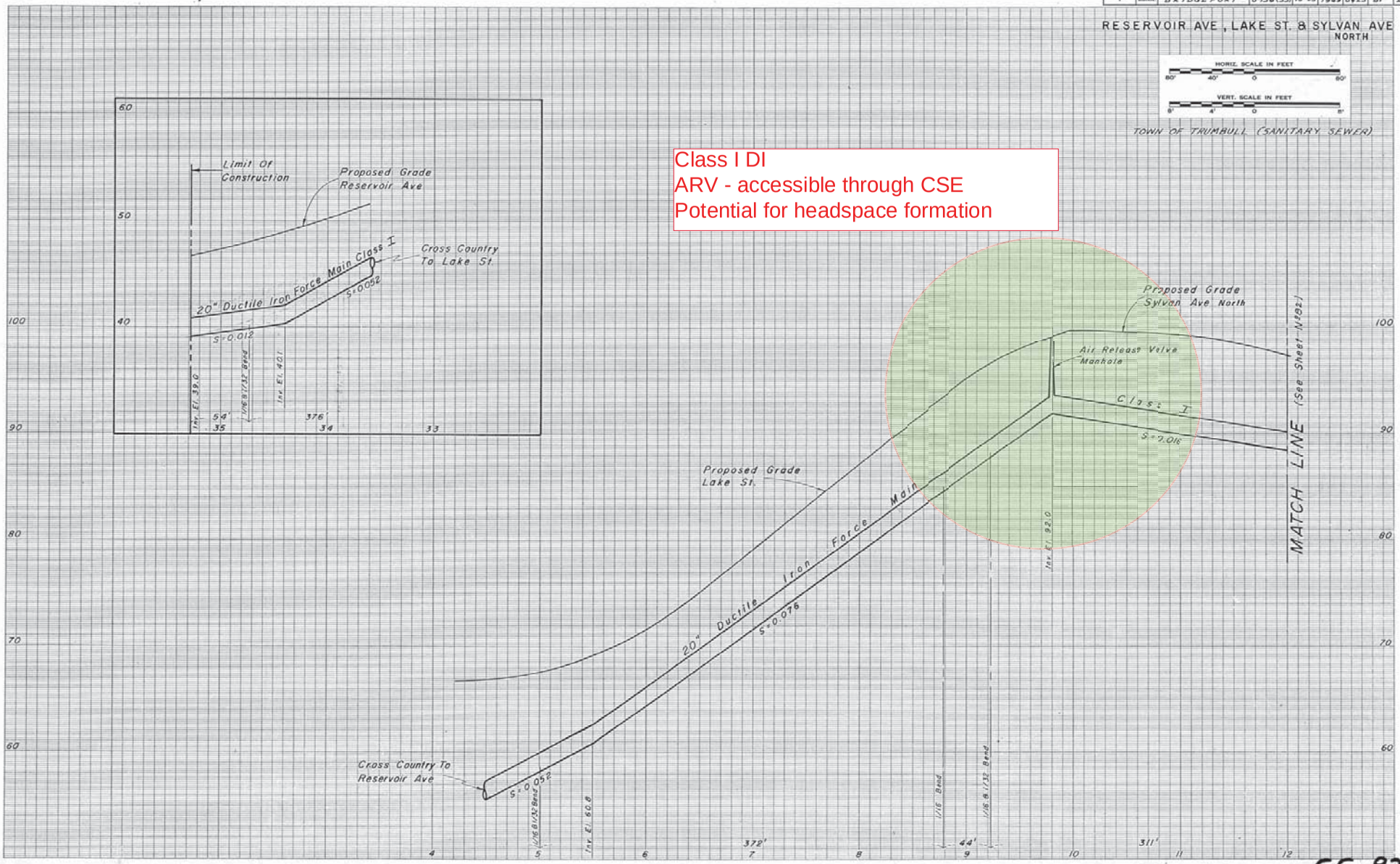
RESERVOIR AVE, LAKE ST. & SYLVAN AVE NORTH

HORIZ. SCALE IN FEET
80' 40' 0 80'

VERT. SCALE IN FEET
8' 4' 0 8'

TOWN OF TRUMBULL (SANITARY SEWER)

Class I DI
ARV - accessible through CSE
Potential for headspace formation



PROFILE
Surveyed
Plotted
Traced
Designed
Checked
Top. Field Chk. noted
NOTE BOOK
NO.

BY	DATE	CHECKED BY	DATE

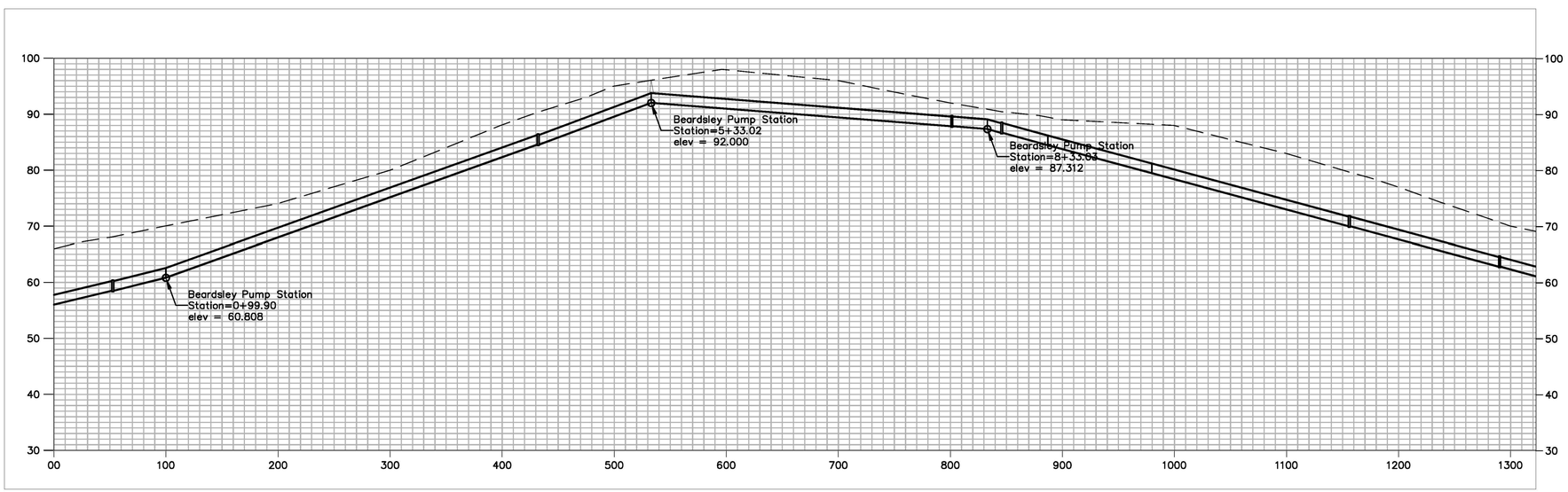
CC-92

15-45

409 01

81

PLAN
SCALE: 1"=60'



PROFILE
SCALE: 1"=60' HORIZ
1"=8' VERT

0 30' 60' 120'

ARCADIS

LEGAL ENTITY:
ARCADIS U.S., INC.

CONSULTANTS

SEALS

30% SUBMITTAL
DO NOT USE FOR CONSTRUCTION

CITY OF YOUR PROJECT
CLIENT NAME

BEARDSLEY PUMP STATION

ARCADIS PROJ. NO. XXXXXXXXX.XXXX

NO.	DATE	ISSUED FOR	BY

COPYRIGHT: ARCADIS U.S., INC. 2015

DATE: OCTOBER 2015
PROJECT NO.: XXX-XXX
FILE NAME: BEARDSLEY PUMP STATION
DESIGNED BY: X. XXXX
DRAWN BY: SHIVAKUMAR.G.D.
CHECKED BY: X. XXXX

SHEET TITLE

CIVIL

SITE PLAN

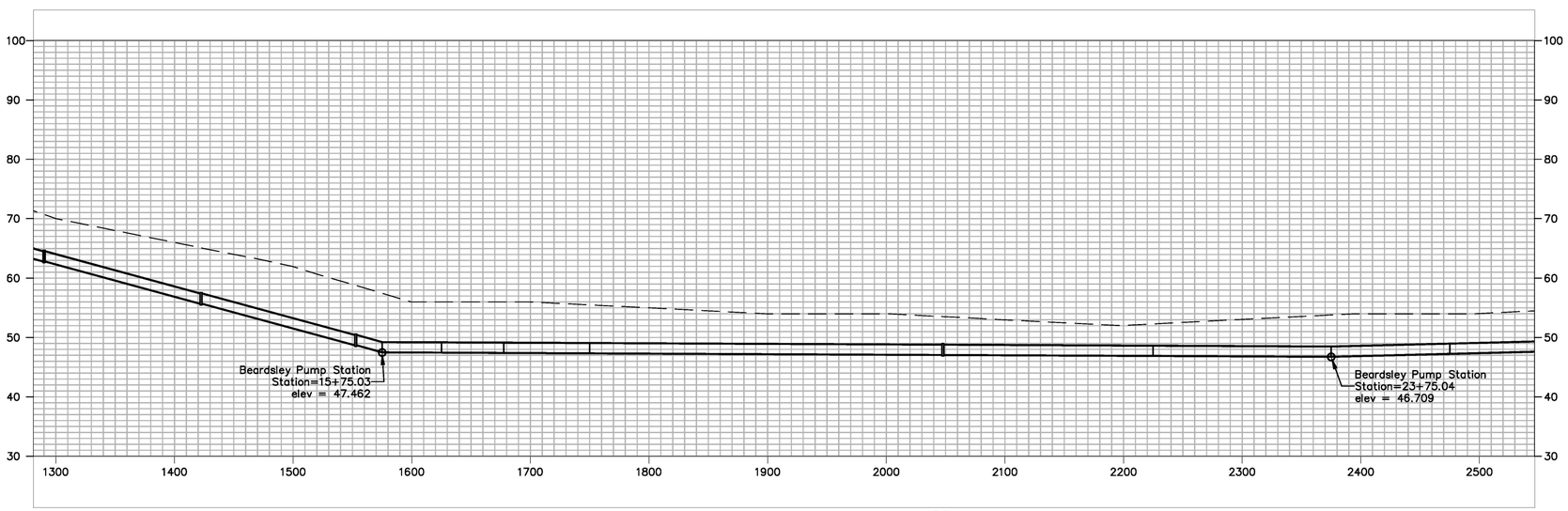
SCALE:
AS SHOWN

C-XXX

SHEET C-01 OF XXX

User: DODDABAS7123 Spec: ######## File: C:\USERS\DODDABAS7123\ARCADIS(1)\US WATER CIVIL - DOCUMENTS\BEARDSLEY PUMP STATION\D-PROJECTWORKING_\002-DRAWINGS\SHEETS\CIVIL\BEARDSLEY PUMP STATION.DWG Scale:1:1 SavedDate:7/15/2020 Time:23:32 Plot Date: Doddabasappanavar, Shivakumar; 7/15/2020; 23:38

PLAN
SCALE: 1"=60'
A



PROFILE
SCALE: 1"=60' HORIZ
1"=8' VERT
A

0 30' 60' 120'

ARCADIS

LEGAL ENTITY:
ARCADIS U.S., INC.

CONSULTANTS

SEALS

30% SUBMITTAL
DO NOT USE FOR
CONSTRUCTION

CITY OF YOUR PROJECT
CLIENT NAME

BEARDSLEY PUMP STATION

ARCADIS PROJ. NO. XXXXXXXXX.XXXX

NO.	DATE	ISSUED FOR	BY

COPYRIGHT: ARCADIS U.S., INC. 2015

DATE: OCTOBER 2015
PROJECT NO.: XXX-XXX
FILE NAME: BEARDSLEY PUMP STATION
DESIGNED BY: X. XXXX
DRAWN BY: SHIVAKUMAR.G.D.
CHECKED BY: X. XXXX

SHEET TITLE

CIVIL

SITE PLAN

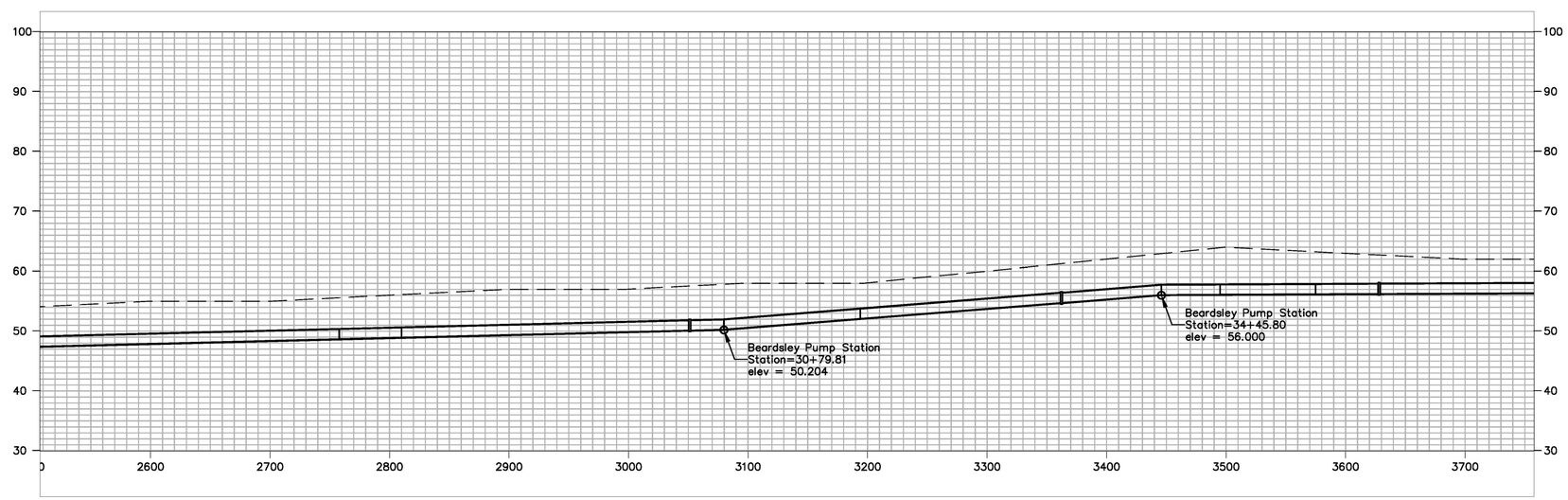
SCALE:
AS SHOWN

C-XXX

SHEET C-02 OF XXX

User: D0D0ABAS7123 Spec: ######## File: C:\USERS\D0D0ABAS7123\ARCADIS(1)\US WATER CIVIL - DOCUMENTS\BEARDSLEY PUMP STATION\D-PROJECTWORKING\002-DRAWINGS\SHEETS\CIVIL\BEARDSLEY PUMP STATION.DWG Scale:1:1 SavedDate:7/15/2020 Time:23:32 Plot Date: Dddd

PLAN
SCALE: 1"=60'



PROFILE
SCALE: 1"=60' HORIZ
1"=8' VERT

0 30' 60' 120'

ARCADIS

LEGAL ENTITY:
ARCADIS U.S., INC.

CONSULTANTS

SEALS

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CITY OF YOUR PROJECT
CLIENT NAME

BEARDSLEY PUMP STATION

ARCADIS PROJ. NO. XXXXXXXXX.XXXX

NO.	DATE	ISSUED FOR	BY

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DATE: OCTOBER 2015
PROJECT NO.: XXX-XXX
FILE NAME: BEARDSLEY PUMP STATION
DESIGNED BY: X. XXXX
DRAWN BY: SHIVAKUMAR.G.D.
CHECKED BY: X. XXXX

SHEET TITLE

CIVIL

SITE PLAN

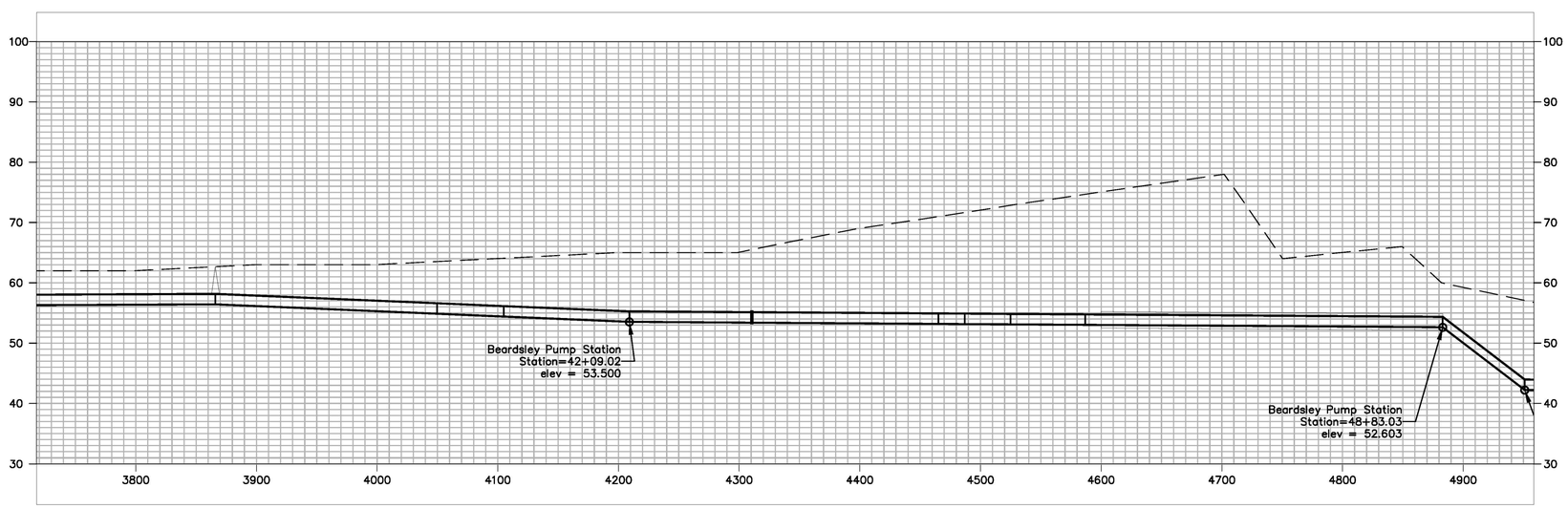
SCALE:
AS SHOWN

C-XXX

SHEET C-03 OF XXX

User: DOD0ABAS7123 Spec: ######## File: C:\USERS\DOD0ABAS7123\ARCADIS(1)\US WATER CIVIL - DOCUMENTS\BEARDSLEY PUMP STATION\D-PROJECTWORKING_\002-DRAWINGS\SHEETS\CIVIL\BEARDSLEY PUMP STATION.DWG Scale:1:1 SavedDate:7/15/2020 Time:23:32 Plot Date: Ddddddd

PLAN A
SCALE: 1"=60'



PROFILE A
SCALE: 1"=60' HORIZ
1"=8' VERT

0 30' 60' 120'

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DATE: OCTOBER 2015
PROJECT NO.: XXX-XXX
FILE NAME: BEARDSLEY PUMP STATION
DESIGNED BY: X. XXXX
DRAWN BY: SHIVAKUMAR.G.D.
CHECKED BY: X. XXXX

SHEET TITLE

CIVIL

SITE PLAN

SCALE: AS SHOWN

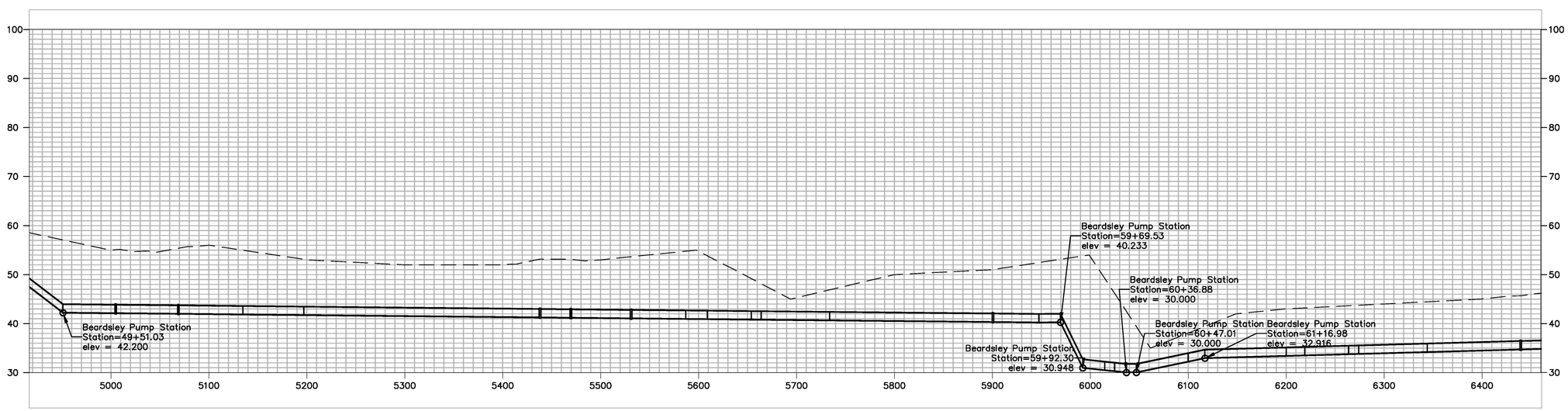
C-XXX

SHEET C-04 OF XXX

User: DODDABAS7123 Spec: ######## File: C:\USERS\DODDABAS7123\ARCADIS(1)\US WATER CIVIL - DOCUMENTS\BEARDSLEY PUMP STATION\0-PROJECTWORKING\002-DRAWINGS\SHEETS\CIVIL\BEARDSLEY PUMP STATION.DWG Scale:1:1 SavedDate:7/15/2020 Time:23:32 Plot Date: Doddabasappanavar, Shivakumar, 7/15/2020, 23:42

PLAN
SCALE: 1"=60'

A



PROFILE
SCALE: 1"=60' HORIZ
1"=8' VERT

A

0 30' 60' 120'

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DATE: OCTOBER 2015
PROJECT NO.: XXX-XXX
FILE NAME: BEARDSLEY PUMP STATION
DESIGNED BY: X. XXXX
DRAWN BY: SHIVAKUMAR.G.D.
CHECKED BY: X. XXXX

SHEET TITLE

CIVIL

SITE PLAN

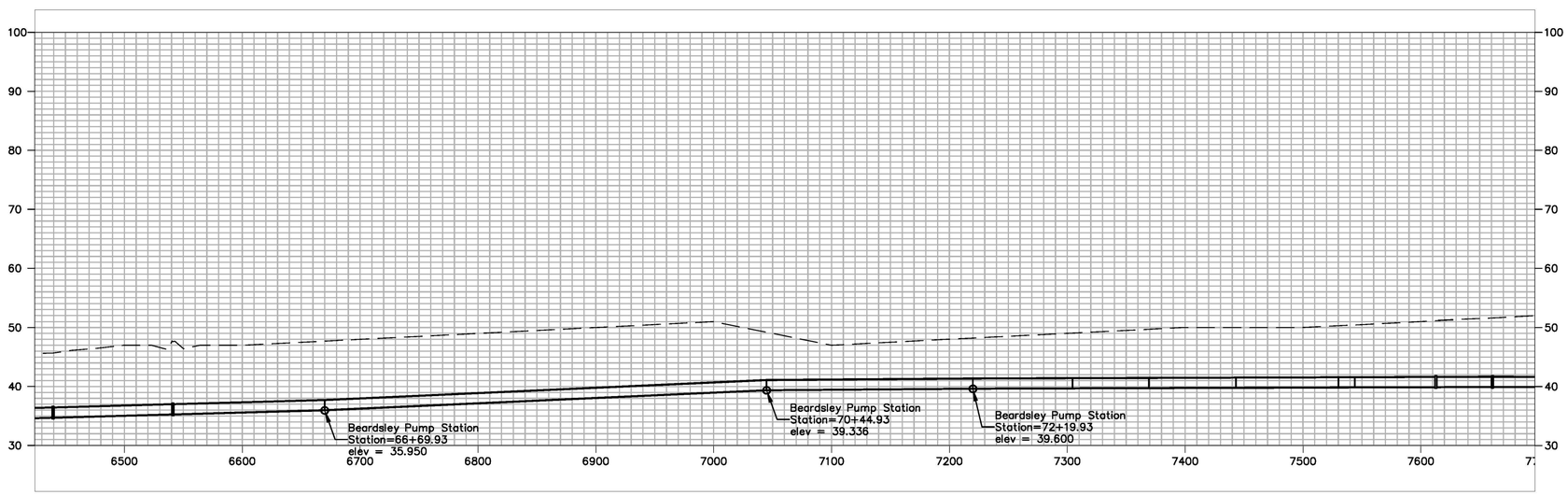
SCALE: AS SHOWN

C-XXX

SHEET C-05 OF XXX

User: DODDABAS7123 Spec: ######## File C:\USERS\DODDABAS7123\ARCADIS(1)\US WATER CIVIL - DOCUMENTS\BEARDSLEY PUMP STATION\D-PROJECTWORKING\002-DRAWINGS\SHEETS\CIVIL\BEARDSLEY PUMP STATION.DWG Scale:1:1 SavedDate:7/15/2020 Time:23:32 Plot Date: Doddabasappraver, Shivakumar; 7/15/2020; 23:43

PLAN
SCALE: 1"=60'



PROFILE
SCALE: 1"=60' HORIZ
1"=8' VERT

0 30' 60' 120'

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CLIENT NAME

BEARDSLEY PUMP STATION

ARCADIS PROJ. NO. XXXXXXXXX.XXXX

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DATE: OCTOBER 2015
PROJECT NO.: XXX-XXX
FILE NAME: BEARDSLEY PUMP STATION
DESIGNED BY: X. XXXX
DRAWN BY: SHIVAKUMAR.G.D.
CHECKED BY: X. XXXX

SHEET TITLE

CIVIL

SITE PLAN

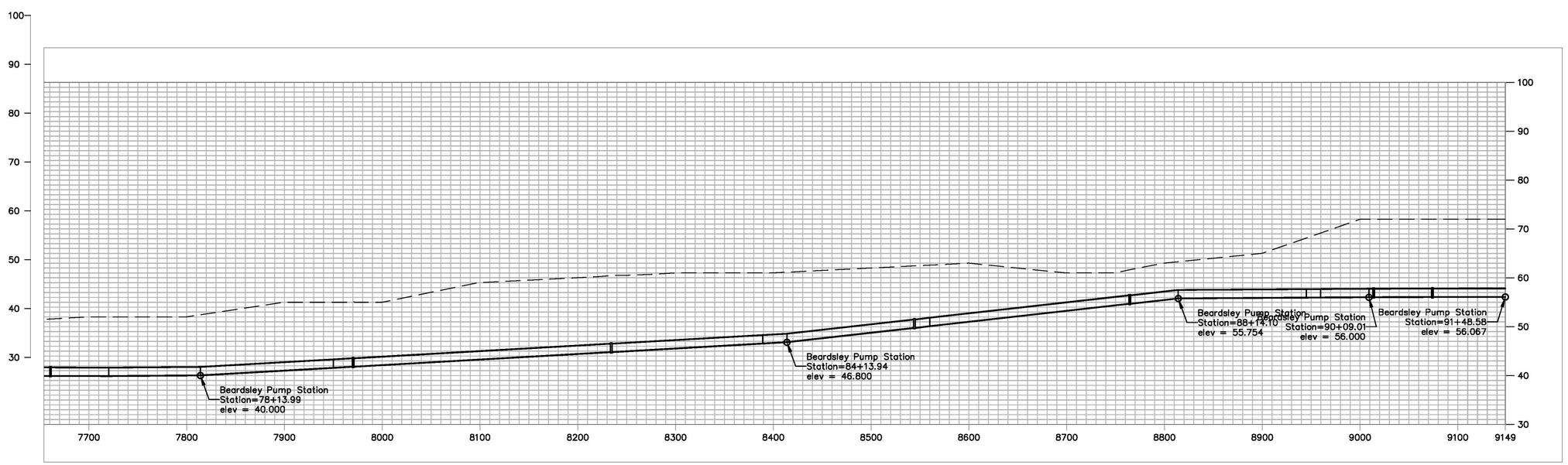
SCALE: AS SHOWN

C-XXX

SHEET C-06 OF XXX

User: DODDABAS7123 Spec: ######## File: C:\USERS\DODDABAS7123\ARCADIS(1)\US WATER CIVIL - DOCUMENTS\BEARDSLEY PUMP STATION\0-PROJECTWORKING\002-DRAWINGS\SHEETS\CIVIL\BEARDSLEY PUMP STATION.DWG Scale:1:1 SavedDate:7/15/2020 Time:23:32 Plot Date: Doddabasappanavar, Shivakumar, 7/15/2020, 23:43

PLAN
SCALE: 1"=60'



PROFILE
SCALE: 1"=60' HORIZ
1"=8' VERT

0 30' 60' 120'

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BEARDSLEY PUMP STATION

ARCADIS PROJ. NO. XXXXXXXXX.XXXX

NO.	DATE	ISSUED FOR	BY

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DATE: OCTOBER 2015
PROJECT NO.: XXX-XXX
FILE NAME: BEARDSLEY PUMP STATION
DESIGNED BY: X. XXXX
DRAWN BY: SHIVAKUMAR.G.D.
CHECKED BY: X. XXXX

SHEET TITLE

CIVIL

SITE PLAN

SCALE: AS SHOWN

C-XXX

SHEET C-07 OF XXX

User:DODDABAS7123 Spec:######## File:C:\USERS\DODDABAS7123\ARCADIS(1)\US WATER CIVIL - DOCUMENTS\BEARDSLEY PUMP STATION\D-PROJECTWORKING_\002-DRAWINGS\SHEETS\CIVIL\BEARDSLEY PUMP STATION.DWG Scale:1:1 SavedDate:7/15/2020 Time:23:32 Plot Date: Doddabasappanavar, Shivakumar; 7/15/2020; 23:44