TOWN OF BARNSTABLE, MASSACHUSETTS
STRAIGHTWAY WATER TREATMENT FACILITY

DWSRF-16849
CONTRACT NO. XX-XX-XX

DECEMBER 2024

TOWN OF BARNSTABLE DEPARTMENT OF PUBLIC WORKS
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

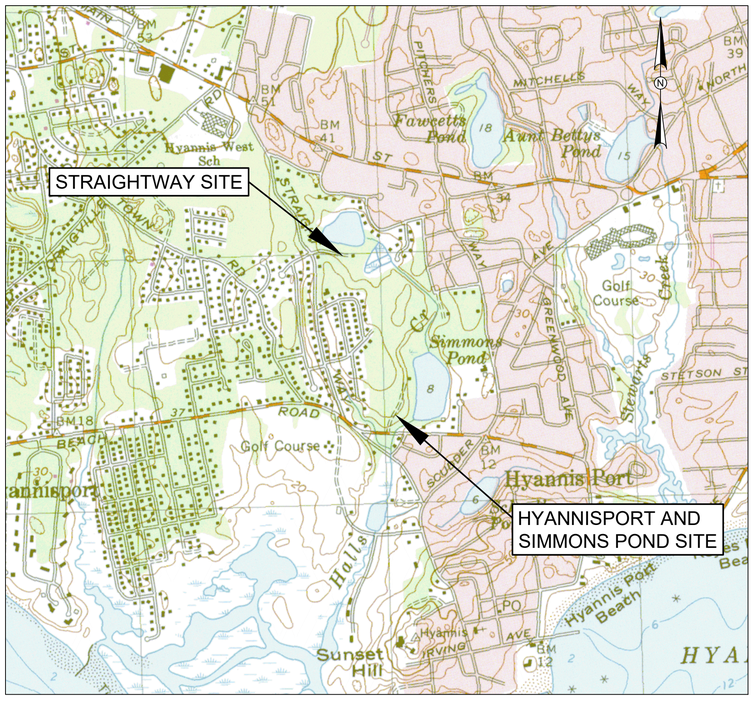
TOWN MANAGER
MARK ELLS

DPW DIRECTOR
DAN SANTOS, P.E.

TOWN ENGINEER
GRIFFIN BEAUDOIN, P.E.

WATER SUPPLY DIVISION SUPERVISOR
HANS KEIJSER

PROJECT MANAGER
MATTHEW WROBEL, P.E.



LOCUS PLAN
SCALE: 1" = 1000'

PROJECT MILESTONES / REVISIONS

DATE	TYPE	DESCRIPTION
6/10/2024		30% DESIGN SUBMITTAL
9/20/2024		60% DESIGN SUBMITTAL
11/15/2024		SITE PLAN REVIEW
12/23/2024		NOI SUBMITTAL

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CAD FILE: L:\Town Of Barnstable MA\24003062.001A-W.Barnstable MA - New Str\Working\04 - Design Phase\06 - CAD\Production Drawings\0-COVER.dwg LTDEFAULT 12/23/2024 8:46 PM BY: matthew stevens

SHEET NUMBER	SHEET TITLE
G0-000	COVER
G0-001	SHEET INDEX
G0-002	GENERAL NOTES
C0-001	GENERAL KEY PLAN
C1-111	STRAIGHTWAY EXISTING CONDITIONS
C1-112	STRAIGHTWAY SITE DEMOLITION PLAN
C1-113	STRAIGHTWAY OVERALL SITE PLAN
C1-114	STRAIGHTWAY GRADING PLAN
C1-115	STRAIGHTWAY UTILITIES PLAN
C1-116	STRAIGHTWAY UTILITIES INSET PLAN
C1-117	STRAIGHTWAY SEWER PLAN
C1-151	STRAIGHTWAY SEWER DETAILS -I
C1-152	STRAIGHTWAY SEWER DETAILS - II
C1-153	STRAIGHTWAY TURNING DIAGRAM
C2-111	HYANNISPORT - SIMMONS POND EXISTING CONDITIONS
C2-112	HYANNISPORT - SIMMONS POND SITE DEMOLITION PLAN
C2-113	HYANNISPORT - SIMMONS POND OVERALL SITE PLAN
C2-114	HYANNISPORT - SIMMONS POND GRADING PLAN
C2-115	HYANNISPORT - SIMMONS POND RIVERFRONT AREA GRADING PROFILES
C2-116	HYANNISPORT - SIMMONS POND UTILITIES PLAN
C2-117	HYANNISPORT - SIMMONS POND SEWER PLAN
C2-151	HYANNISPORT - SIMMONS POND SEWER DETAILS - I
C2-152	HYANNISPORT - SIMMONS POND SEWER DETAILS - II
C2-153	HYANNISPORT - SIMMONS POND TURNING DIAGRAM
C5-051	GENERAL DETAILS - I
C5-052	GENERAL DETAILS - II
C5-053	GENERAL DETAILS -III
C5-054	GENERAL DETAILS - IV
C5-055	GENERAL DETAILS - V
C5-056	SUBSURFACE CHAMBER DETAILS - I
C5-057	SUBSURFACE CHAMBER DETAILS - II

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PLOTTED:

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COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51481
REGISTERED PROFESSIONAL ENGINEER

12/23/2024

#####

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

SHEET INDEX

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED MAY 3, 1685

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	
DESIGNED BY	TB
DRAWN BY	MD
CHECKED BY	TB
APPROVED BY	MT

G0-001

SHEET 2 of 31

GENERAL NOTES:

1. PRIOR TO BIDDING THE PROJECT, THE CONTRACTOR IS ENCOURAGED VISIT THE SITE TO VERIFY EXISTING CONDITIONS.
2. THE DATA ACCUMULATION AND BOUNDARY SURVEY DEPICTED HERE WERE OBTAINED BY A FIELD SURVEY BETWEEN NOVEMBER 28 AND DECEMBER 6, 2023 BY CHESS ENGINEERING, LLC. THIS PLAN AND SURVEY WERE PREPARED USING CONVENTIONAL & RTK SURVEY METHODS. A LEICA MS60 TOTAL STATION WAS USED HAVING A MINIMAL AT ACCURACY OF 1" AND 1 PPM. A LEICA GS-18 GNSS RECEIVER WAS UTILIZED THROUGHOUT THE PROJECT AREA FOR REDUNDANT MEASUREMENTS BETWEEN NOVEMBER 27-30, 2023 AND ADDITIONALLY BETWEEN FEBRUARY 26-27, 2024 TO CONFIRM PREVIOUS MEASUREMENTS. BASE MAP INFORMATION WAS PREPARED BY CHESS ENGINEERING, LLC DATED MAY 23, 2024. THE COORDINATES OF THE SURVEY ARE IN FEET AND ARE BASED UPON THE NORTH AMERICAN DATUM OF 1983 MASSACHUSETTS STATE PLANE (NAD '83 MASSACHUSETTS STATE PLANE, MAINLAND ZONE). THE ELEVATIONS OF THE SURVEYS ARE IN FEET AND REFER TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD '88).
3. FOR TEMPORARY BENCH MARKS:

   SEE SHEET C1-111:
   - TBM: WESTERLY HYDRANT FLANGE BOLT. ELEV. = 24.36'
   - TBM: TOP OF CONCRETE BASE. ELEV. = 31.77'
   - TBM: TOP OF CONCRETE PAD. ELEV. = 32.49'
   - TBM: CONCRETE BOUND 1. ELEV. = 23.12'
   - TBM: CONCRETE BOUND 2. ELEV. = 21.03'
   - TBM: CONCRETE BOUND 3. ELEV. = 28.68'

   SEE SHEET C2-111:
   - TBM: SOUTH-EASTERLY HYDRANT FLANGE BOLT. ELEV. = 17.77'
   - TBM: SOUTH-EASTERLY HYDRANT FLANGE BOLT. ELEV. = 13.61'
   - TBM: CONCRETE BOUND 4. ELEV. = 15.17'
   - TBM: CONCRETE BOUND 5. ELEV. = 17.12'

4. THE WETLANDS WERE DELINEATED ON NOVEMBER 29, 2023 BY LUCAS ENVIRONMENTAL.
5. THE CONTRACTOR SHALL CALL THE DIG-SAFE CENTER AT 1-888-344-7233 A MINIMUM OF 72 HOURS PRIOR TO ANY EXCAVATION TO LOCATE UNDERGROUND UTILITIES IN THE FIELD AND NOTIFY UTILITIES OF CONSTRUCTION.
6. INFORMATION SHOWN ON THE DRAWINGS RELATING TO MATERIALS, CONDITIONS AND/OR LOCATIONS OF EXISTING STRUCTURES AND UTILITIES HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING FIELD SURVEY, AERIAL PHOTOGRAPHY, RECORD MAPS AND DRAWINGS, AND UTILITY RECORD DRAWINGS AND IS NOT GUARANTEED CORRECT OR COMPLETE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY EXISTING CONDITIONS AND DIMENSIONS INCLUDING THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. LOCATIONS AND DEPTHS OF CRITICAL UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR IN THE FIELD BY TEST PITS AS APPROVED BY THE ENGINEER. ANY DAMAGE TO UTILITIES OR PUBLIC/PRIVATE PROPERTY CAUSED BY THE CONTRACTOR SHALL BE THE CONTRACTOR'S RESPONSIBILITY, AND COSTS FOR THE REPAIR OR REPLACEMENT OF SUCH DAMAGED UTILITIES OR PROPERTY SHALL BE BORNE BY THE CONTRACTOR.
7. ACCORDING TO FEMA FIRM (FLOOD INSURANCE RATE MAP) COMMUNITY PANEL 250001; REVISION DATED 7/16/2014, THE APPROXIMATE 100-YEAR FLOODPLAIN ELEVATION ON THE SITE IS 12 FEET. THIS FIRM APPLIES TO BOTH SITES SHOWN IN THIS PLANSET. NO WORK IS PROPOSED WITHIN THE 100-YEAR FLOODPLAIN.
8. THE EXISTING WATER TREATMENT FACILITY, SIMMONS POND WELLS, AND HYANNISPORT WELLS MUST BE LEFT OPERATIONAL AT ALL TIMES DURING CONSTRUCTION OF NEW STRAIGHTWAY FACILITIES EXCLUDING APPROVED CONNECTION SHUTDOWNS. ALL SHUTDOWNS WILL REQUIRE ADVANCE COORDINATION WITH ENGINEER, VEOLIA, AND HYANNIS WATER SYSTEM. SHUTDOWNS WILL NOT BE PERMITTED BETWEEN MAY 1 AND SEPTEMBER 1.
9. HYANNIS WATER SYSTEM TO REQUIRE A THIRD PARTY INSPECTOR ONSITE DURING ALL PHASES OF CONSTRUCTION.

SOIL EROSION AND SEDIMENT CONTROL NOTES:

1. APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES TO COMPLY WITH THE REQUIREMENTS OF THE STORM WATER MANAGEMENT PERMIT SHALL BE INSTALLED PRIOR TO SOIL DISTURBANCE. MEASURES SHALL BE TAKEN TO CONTROL EROSION WITHIN THE PROJECT AREA. SEDIMENT IN RUNOFF WATER SHALL BE TRAPPED AND RETAINED WITHIN THE PROJECT AREA. WETLAND AREAS AND SURFACE WATERS SHALL BE PROTECTED FROM SEDIMENT.
2. CONTRACTOR SHALL MINIMIZE TOTAL AREA OF DISTURBANCE AND PROTECT NATURAL FEATURES AND SOIL.
3. INSTALL AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND/OR IN ACCORDANCE WITH ALL PERMIT REQUIREMENTS, THE MORE STRINGENT REQUIREMENT SHALL APPLY. CONTRACTOR SHALL INSTALL EROSION AND SEDIMENTATION CONTROLS IN ACCORDANCE WITH SPECIFICATION SECTION 01568 AND DETAILS PROVIDED ON SHEET C1-111 THROUGH C5-056.
4. CONTRACTOR TO COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS INCLUDING WASTE DISPOSAL.
5. CONTRACTOR SHALL PROPERLY MANAGE ON-SITE CONSTRUCTION AND WASTE MATERIALS.
6. CONTRACTOR SHALL IMPLEMENT APPROPRIATE DUST CONTROL MEASURES AT THE SITE.
7. STOCKPILE SIDE SLOPES SHALL NOT BE GREATER THAN 1:1. ALL STOCKPILES SHALL BE SURROUNDED BY SEDIMENT CONTROLS.
8. A VEHICLE TRACKING PAD OR OTHER APPROVED STABILIZATION METHOD SHALL BE CONSTRUCTED AT ALL ENTRANCE/EXIT POINTS OF THE SITE TO PREVENT SOIL CARRIED ONTO ROADWAYS AND OFF THE SITE. CONTRACTOR SHALL FURNISH A MECHANICAL SWEEPER ON SITE FOR THE PURPOSE OF SWEEPING ALL PAVED AREAS ON A DAILY BASIS OR AS REQUIRED TO PREVENT SOIL TRACKING ON ROADWAYS.
9. ALL PREVIOUSLY DISTURBED LAND SHALL BE STABILIZED BY APPROVED METHODS WITHIN 14 DAYS IF LEFT UNDISTURBED. THIS INCLUDES STOCKPILES, CONSTRUCTION ENTRANCES, GRADED AREAS AND OTHER CONSTRUCTION ACTIVITY RELATED CLEARING
10. PERMANENT SEEDING SHALL BE UNDERTAKEN IN THE SPRING FROM APRIL 15 THROUGH JUNE 1, AND IN LATE SUMMER AND EARLY FALL FROM AUGUST 15 THROUGH NOVEMBER 1. DURING THE PEAK SUMMER MONTHS AND IN THE FALL AFTER NOVEMBER 1, WHEN SEEDING IS FOUND TO BE IMPRACTICAL, APPROPRIATE TEMPORARY STABILIZATION SHALL BE APPLIED. PERMANENT SEEDING MAY BE UNDERTAKEN DURING THE SUMMER IF PLANS PROVIDE FOR ADEQUATE MULCHING AND WATERING. IN ACCORDANCE WITH SPECIFICATION SECTION 02480, THE PLANTING AREA WILL BECOME ACCEPTABLE IF THE GRASS AND SEED MIXTURES SHOW A UNIFORM, THICK, AND WELL-DEVELOPED GROWTH. IF AN INSUFFICIENT PERCENTAGE OF GRASS ESTABLISHES, THE CONTRACTOR WILL NEED TO RESEED AT THEIR OWN EXPENSE. NATIVE SEED MIXES SHALL CONFORM TO MASSDOT STANDARD NATIVE UPLAND SEED MIXES.
11. IF WORK IS HALTED OVER WINTER MONTHS THE CONTRACTOR SHALL BE RESPONSIBLE FOR STABILIZING THE AREA THROUGH GROUNDCOVER PRACTICES.

WORK OF GENERAL CONTRACTOR:

1. THE GENERAL CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED TO COMPLETE THE STRAIGHTWAY WATER TREATMENT FACILITY PROJECT, COMPLETE AND READY FOR OPERATION AS INDICATED ON THE DRAWINGS AND SPECIFICATIONS, INCLUDING ALL CONTRACT DOCUMENTS.
2. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF SUBCONTRACTORS' WORK WITH EACH OTHER AND WITH THE WORK OF THE GENERAL CONTRACTOR.
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE OVERALL CONSTRUCTION SEQUENCE.
4. THE GENERAL CONTRACTOR SHALL NOT STORE EQUIPMENT OR STOCKPILE MATERIAL WITHIN WETLAND BUFFER ZONES. STORING EQUIPMENT OR STOCKPILING MATERIAL ON TOWN OWNED LAND WILL REQUIRE TOWN AUTHORIZATION.
5. SOME PIPE/EQUIPMENT CONNECTIONS MAY REQUIRE TRANSITION FITTING OR OTHER FITTINGS NOT SHOWN ON DRAWINGS, THE CONTRACTOR SHALL PROVIDE ADEQUATE FITTING TO MAKE COMPLETE CONNECTION.
6. WHERE BURIED DUCTILE IRON PIPE LEAVES/ENTERS A BUILDING OR STRUCTURE, THE GENERAL CONTRACTOR SHALL PROVIDE MULTIPLE MECHANICAL JOINT BELLS.
7. PROPOSED FIELD MODIFICATION, REVISIONS AND ADDITIONS TO THE DESIGN DRAWINGS MUST BE APPROVED BY THE ENGINEER, IN WRITING, BEFORE WORK BEGINS. ANY REQUEST TO DEVIATE FROM THE ENGINEER'S SPECIFIED DETAILS ON THE DESIGN DRAWINGS BY THE CONTRACTOR MUST BE SUBMITTED IN WRITING TO THE ENGINEER FOR APPROVAL. CONTRACTOR WILL NOT BE PAID FOR ANY WORK PERFORMED WITHOUT PRIOR APPROVAL AND MAY BE REQUIRED TO REMOVE AT THEIR OWN EXPENSE WITHOUT IMPACT TO THE PROJECT SCHEDULE.
8. GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL VISIT THE PROJECT SITE AND OBSERVE CONDITIONS FOR THE PROPOSED CONSTRUCTION. ANY DISCREPANCY BETWEEN THE DESIGN DRAWINGS AND ACTUAL SITE CONDITIONS MUST BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER, IN WRITING, FOR RESOLUTION PRIOR TO COMMENCEMENT OF THE WORK.
9. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS, ELEVATIONS AND DIMENSIONS PRIOR TO FABRICATING NEW WORK THAT WILL BE CONNECTED TO EXISTING CONSTRUCTION.
10. ALL ITEMS OF CONSTRUCTION MUST BE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS APPLICABLE TO THE PROJECT INCLUDING THE BUILD AMERICA, BUY AMERICA ACT (BABA) AND THE AMERICAN IRON AND STEEL (AIS) REQUIREMENT.
11. THE CONTRACTOR IS RESPONSIBLE FOR SEGREGATING WORK AREAS FROM THE GENERAL PUBLIC USING TEMPORARY FENCES, SIGNS, CONES, CAUTION TAPE, ETC.
12. THE CONTRACTOR'S BID FOR THIS PROJECT MUST INCLUDE ALL LABOR, MOBILIZATION, PERMITTING, MATERIALS, TEMPORARY PROTECTION, ETC. NO ADDITIONAL COSTS WILL BE SUBMITTED TO THE ENGINEER IN ORDER TO COMPLETE THE INTENT OF THE WORK AS INDICATED ON THE DESIGN DRAWINGS.
13. IN LOCATIONS WHERE WATER IS IN SUFFICIENT SUPPLY, THE CONTRACTOR MAY BE ALLOWED TO USE WATER WITHOUT CHARGE FOR CONSTRUCTION PURPOSES AFTER APPROVAL OF THE OWNER IS OBTAINED. ELECTRICITY SHALL STILL BE PROVIDED BY THE CONTRACTOR. IN LOCATIONS WHERE WATER IS NOT IN SUFFICIENT SUPPLY, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING WATER AND ELECTRICITY REQUIRED TO PERFORM THE WORK. SUBMIT PROPOSED MEANS AND METHODS TO THE ENGINEER FOR REVIEW.
14. ALL DIMENSIONS AND QUANTITIES MUST BE DETERMINED OR VERIFIED BY THE CONTRACTOR. QUANTITIES TO BE CARRIED UNDER THE BASE BID WORK HAVE BEEN INDICATED ON THE CONTRACT DRAWINGS. THE CONTRACT DRAWINGS HAVE BEEN COMPILED FROM VARIOUS SOURCES AND MAY NOT REFLECT THE ACTUAL CONDITION AT THE MOMENT OF CONSTRUCTION. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS AND MAKE ALL INVESTIGATIONS NECESSARY TO INSTALL THE PROPOSED WORK.
15. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND THEIR SUBCONTRACTORS TO REVIEW ALL DRAWINGS, PROJECT MANUAL, PROJECT SPECIFICATIONS, SCHEDULES, ADDENDA ETC. IN ORDER TO ASSURE THE COORDINATION OF ALL WORK AFFECTING EACH TRADE. FAILURE TO REVIEW AND COORDINATE ALL CONTRACTOR DOCUMENTS BY THE GENERAL WITH ALL THE SUBCONTRACTORS FOR APPLICABLE ITEMS OF THE WORK SHALL NOT RELIEVE THE RESPONSIBLE PARTY FROM PERFORMING ALL WORK SO REQUIRED AS PART OF THE CONTRACT.
16. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND THEIR SUBCONTRACTORS FOLLOWING THE REVIEW OF ALL THE DRAWINGS, PROJECT MANUAL, ADDENDA, ETC. TO INFORM THE ENGINEER OF ANY DISCREPANCIES IN THE DOCUMENTS AND TO OBTAIN CLARIFICATION ON ALL ITEMS AFFECTING CONSTRUCTION COST PRIOR TO THE SUBMISSION OF THE BID.
17. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE DPW OF ANY TRAFFIC DETAIL OR FLAGGER REQUESTS AND OF CANCELLATION IN THE EVENT THEY ARE NO LONGER NEEDED. ANY COST INCURRED BY THE DPW FOR POLICE DETAILS CANCELED WITH INSUFFICIENT NOTICE BY THE CONTRACTOR WILL BE REIMBURSED TO THE DPW BY THE CONTRACTOR.
18. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH THE HYANNIS WATER SYSTEM (VEOLIA/DPW) FOR ANY WATER SHUTDOWNS OR CONNECTIONS INCLUDING THOSE REQUIRED FOR CHLORINATION AND PRESSURE TESTING.
19. THE CONTRACTOR WILL BE ASSESSED DAILY LIQUIDATED DAMAGES FOR ANY WORK BEYOND THE CONTRACT DEADLINE IF NOT APPROVED FOR EXTENSION.
20. THE CONTRACTOR AND ALL PRODUCTS INCORPORATED INTO THE WORK MUST COMPLY WITH ALL BABA, DWSRF, AND AIS REQUIREMENTS.
21. WORK HOURS WILL BE CLARIFIED WITH THE DPW AND REQUESTS OUTSIDE OF THESE HOURS REQUIRE WRITTEN NOTICE/APPROVAL BY DPW DIRECTOR.
22. TREE CLEARING SHALL NOT OCCUR BETWEEN MARCH 15 AND OCTOBER 1.
23. FOLLOWING FINAL CONNECTIONS AND RECEIPT OF MASSDEP APPROVAL TO OPERATE THE NEW SIMMONS POND AND HYANNISPORT PUMP STATIONS, THE EXISTING PUMP STATIONS SHALL BE DEMOLISHED AND ALL MATERIALS SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS. A PRE-DEMOLITION SURVEY FOR EACH BUILDING IS INCLUDED IN APPENDIX XXXXX OF THE SPECIFICATIONS.

EXISTING LEGEND

- MINOR CONTOUR
- MAJOR CONTOUR
- SPOT ELEVATION
- 100-YR FLOOD ZONE
- RECORD WATER LINE
- ABANDONED/REMOVED WATER LINE
- HYDRANT
- WATER GATE
- WATER WELL
- STANDPIPE
- ELECTRIC LINE
- OVERHEAD WIRES
- UTILITY POLE
- GUY WIRE
- TRANSFORMER
- ELECTRIC MANHOLE
- RECORD GAS LINES
- GAS METER
- WETLAND LIMIT
- WETLAND FLAG
- WETLAND EDGE
- 100' WETLAND BUFFER
- 50' WETLAND BUFFER
- 200' RIVERFRONT AREA
- 100' RIVERFRONT AREA
- SOIL PROBE
- CHAINLINK FENCE
- TREELINE
- DRAIN LINE
- DRAIN MANHOLE
- SEWER LINE
- SEWER MANHOLE
- CHAIN LINK FENCE
- CONCRETE PAD
- DUCTILE IRON
- EDGE OF PAVEMENT
- EDGE OF PAVEMENT LINE
- EDGE OF WATER
- SOIL BORING

PROPOSED LEGEND

- SPOT GRADE
- PROPOSED CONTOUR
- RAW WATER LINE
- WATER LINE
- PROPOSED WATER TAP
- PROPOSED WATER GATE
- CHAIN LINK FENCE
- PROPOSED TREELINE
- DRAIN LINE
- SEWER LINE
- ELECTRIC LINE
- GAS LINE
- COUPLING
- BACKWASH WASTE
- DRAIN MANHOLE
- CATCH BASIN
- CONCRETE
- RIPRAP
- EXTENT OF ASPHALT/STRUCTURE REMOVAL
- EXTENT OF PAVED ACCESS DRIVE
- EXTENT OF ASPHALT/STRUCTURE REMOVAL
- PROPOSED BUILDING
- AREA OF STORMWATER FEATURE
- EXTENT OF STORMWATER FEATURE
- ARBORVITAE PLANTING
- STRAW WATTLE
- VEHICULAR ACCESS GATE

NOT FOR CONSTRUCTION

PLOTTED:

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COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51481
REGISTERED PROFESSIONAL ENGINEER

12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 — 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

GENERAL NOTES

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 RESILE'S MNY A. 1685

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

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ISSUE DATE	12/23/2024
CURRENT REVISION	-
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APPROVED BY	MT

G0-002

SHEET 3 of 31



PLOTTED

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COMMONWEALTH OF MASSACHUSETTS
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SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

0 150 300 450

SCALE: 1" = 150' SCALE IN FEET

ORIGINAL DRAWING SIZE IS 22 x 34

STRAIGHTWAY WATER TREATMENT FACILITY
GENERAL
KEY PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED MAY 4, 1685

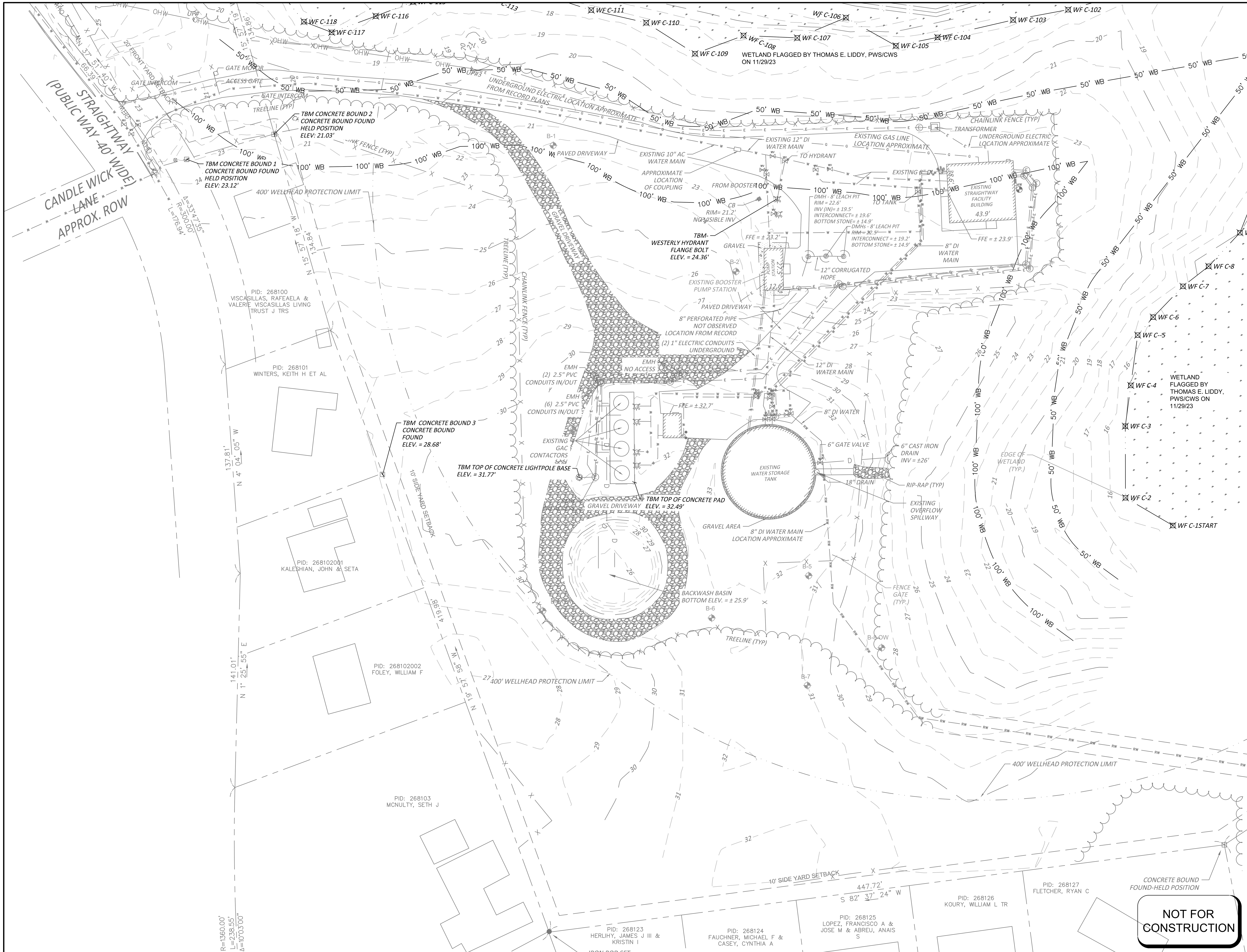
TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

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CHECKED BY	TB/GAA
APPROVED BY	GAA

C0-001

SHEET 4 of 31



PLOTTED:

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COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51461
REGISTERED PROFESSIONAL ENGINEER
12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

0 30 60 90

SCALE: 1" = 30' SCALE IN FEET

ORIGINAL DRAWING SIZE IS 22 x 34

STRAIGHTWAY

EXISTING CONDITIONS

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE, MASS. 1639. ADOPTED MAY 4, 1889

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

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C1-111

50' BUFFER ZONE MITIGATION CALCULATION

CRITERIA	AREA (SF)
STRAIGHTWAY PROPOSED HARDSCAPE WITHIN 50' BUFFER	0 SF
HYANNISPORT/SIMMONS POND PROPOSED HARDSCAPE WITHIN 50' BUFFER	1,047 SF
STRAIGHTWAY PROPOSED HARDSCAPE WITHIN 50'-100' BUFFER	2,136 SF
HYANNISPORT/SIMMONS POND PROPOSED HARDSCAPE WITHIN 50'-100' BUFFER	2,385 SF
TOTAL PROPOSED NEW HARDSCAPE WITHIN BUFFER AREAS	5,568 SF
AREA OF MITIGATION REQUIRED (MULTIPLIED BY 3)	16,704 SF
TOTAL PROPOSED RESTORATION AREA WITHIN 50' BUFFER	6,822 SF

NOTES:

1. CONTRACTOR SHALL REFER TO SPECIFICATION SECTION XXXXX FOR SEQUENCE OF CONSTRUCTION FOR DEMOLITION OF EXISTING PIPES AS REQUIRED TO MAINTAIN SERVICE TO EXISTING FACILITIES. ALL SHUTDOWNS WILL REQUIRE ADVANCE COORDINATION WITH ENGINEER, VEOLIA, AND HYANNIS WATER SYSTEM. SHUTDOWNS WILL NOT BE PERMITTED BETWEEN MAY 1 AND SEPT 1.

2. CONTRACTOR SHALL FIELD STAKE AND INSTALL TEMPORARY CONSTRUCTION FENCING ALONG ENTIRETY OF LIMIT OF DISTURBANCE WHERE VEHICULAR ACCESS IS NOT NECESSARY FOR OPERATIONS. CONSTRUCTION FENCING SHALL BE MAINTAINED THROUGHOUT THE DURATION OF CONSTRUCTION AND REMOVED UP FINAL COMPLETION OF SITE CONSTRUCTION.

3. TREE CLEARING SHALL NOT OCCUR BETWEEN MARCH 15 AND OCTOBER 1.

4. SELECTIVE DEMOLITION IS REQUIRED WITHIN THE EXISTING STRAIGHTWAY FACILITY. REFER TO SHEETS MX-XXX AND EX-XXX FOR ADDITIONAL INFORMATION.

5. DEWATERING AREAS ARE SHOWN IN EXPECTED LOCATIONS NEEDED FOR CONSTRUCTION AND ARE SUBJECT TO ADJUSTMENT BASED ON FIELD CONDITIONS WITHIN THE APPROVED LIMIT OF DISTURBANCE.

LEGEND:

- LIMITS OF TREE CLEARING AND GRUBBING (SEE NOTE 3)
- REMOVAL OF EXISTING GRAVEL DRIVE
- REMOVAL OR ABANDONMENT OF EXISTING UTILITY

CUT AND CAP EXISTING 10" PIPE (SEE NOTE 1)
CONSTRUCTION DEWATERING AREA
CONSTRUCTION VEHICLE EXIT
EXIST. 10" AC WATER MAIN TO BE ABANDONED IN PLACE
WETLAND FLAGGED BY THOMAS E. LIDDY, PWS/CWS ON 11/29/23
CUT AND CAP EXISTING 8" PIPE ABANDON IN PLACE (SEE NOTE 1)
CUT AND CAP EXISTING 8" PIPE ABANDON IN PLACE (SEE NOTE 1)
EXISTING STRAIGHWAY FACILITY AND WELL TO REMAIN (SEE NOTE 4)
TEMPORARY SEDIMENT BASIN
SILT SACK (TYP.)
EXISTING FENCE TO BE DEMOLISHED (SEE NOTE 2)
GRAVEL DRIVEWAY TO BE REMOVED
CONSTRUCTION VEHICLE EXIT
TREE CLEARING SHALL NOT OCCUR BETWEEN MARCH 15 AND OCTOBER 1
EXISTING ELECTRICAL TO BE REMOVED AND REINSTALLED PER E1-112
EXISTING FENCE TO BE DEMOLISHED
EXTENT OF TREE CLEARING AND GRUBBING
EXISTING 8" PIPES TO BE ABANDONED IN PLACE
PLUG AND CAP EXISTING 8" TEES. 8" VALVES TO BE REMOVED AND RETURNED TO OWNER.
TEMPORARY SEDIMENT BASIN DISCHARGE TO BE ROUTED TO EAST
LIMIT OF DISTURBANCE (TYP.)
CUT AND CAP EXISTING 8" PIPE REMOVE AND DISPOSE (SEE NOTE 1)
REMOVE AND REUSE EXISTING HYDRANTS. HYDRANTS NOT USED UNDER THE CONTRACT SHALL BE RETURNED TO THE OWNER (TYP.)
CONSTRUCTION DEWATERING AREA
STRAW WATTLE (TYP.)
EXISTING WATER STORAGE TANK TO REMAIN
EXISTING CHLORINE SHED TO REMAIN FOR STORAGE (SEE NOTE 4.)
EXTENT OF TREE CLEARING AND GRUBBING (SEE NOTE 3)
PLUG AND CAP EXISTING 8" TEE
EXISTING GAC FILTERS ON CONCRETE PAD TO BE WINTERIZED
EXTENT OF TREE CLEARING AND GRUBBING (SEE NOTE 3)
TEMPORARY SEDIMENT BASIN
TREE CLEARING AND BUILDING DEMOLITION ACTIVITIES SHALL NOT OCCUR BETWEEN MARCH 15 AND OCTOBER 1
CUT AND CAP EXISTING 8" PIPE REMOVE AND DISPOSE (SEE NOTE 1)
STRAIGHTWAY (PUBLIC WAY -40' WIDE)
CANDLE WICK LANE APPROX. ROW
STING BOOSTER PUMP STATION
EXISTING STRAIGHTWAY FACILITY BUILDING
EXISTING WATER STORAGE TANK
GRAVEL AREA
TREELINE (TYP.)
100' WELLHEAD PROTECTION LIMIT
NOT FOR CONSTRUCTION

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COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51461
REGISTERED PROFESSIONAL ENGINEER
12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

0 30 60 90

SCALE: 1" = 30' SCALE IN FEET

ORIGINAL DRAWING SIZE IS 22 x 34

STRAIGHTWAY

SITE DEMOLITION PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 ADOPTED MAY 4, 1989

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

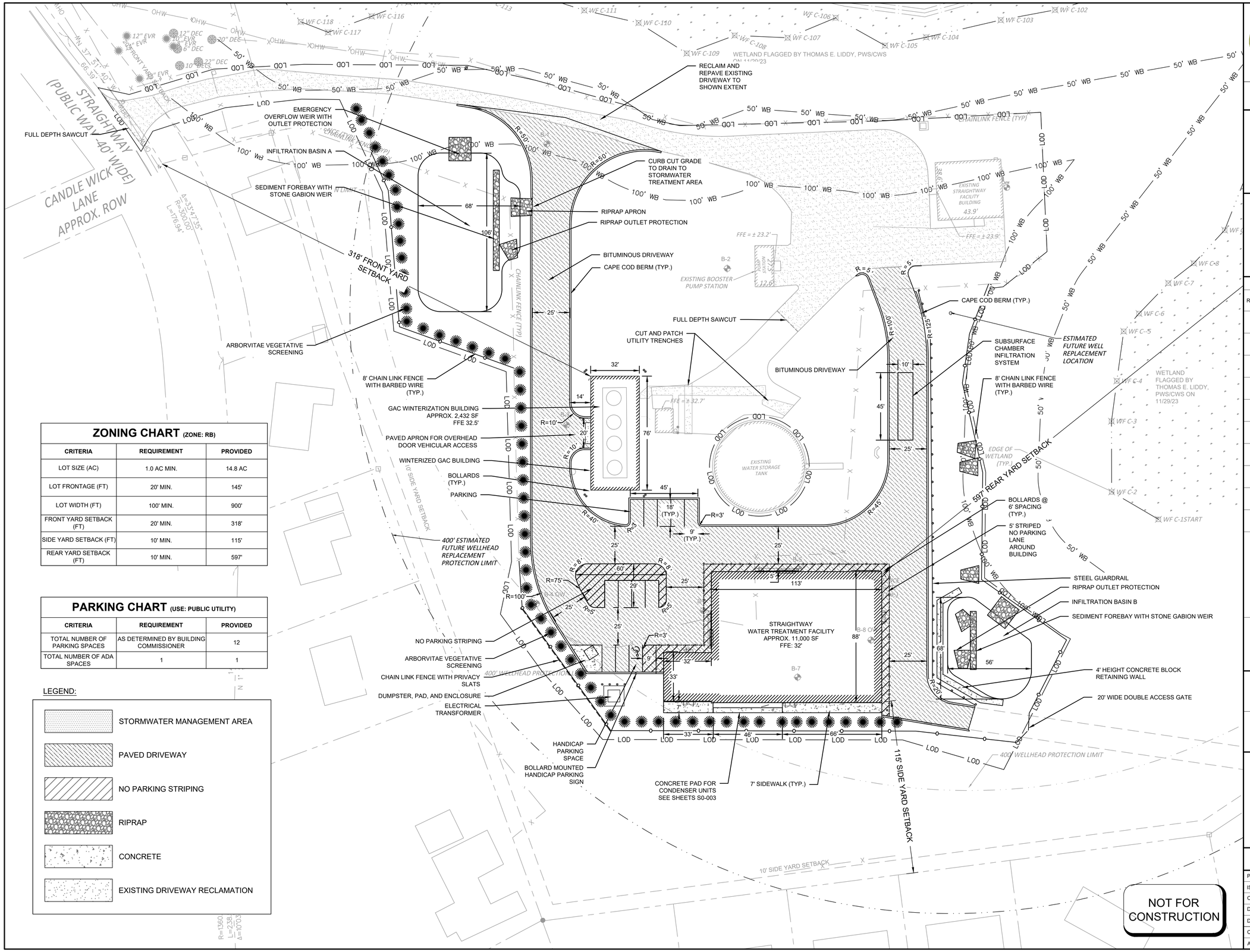
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PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	-
DESIGNED BY	MPS
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APPROVED BY	GAA

C1-112

SHEET 6 of 31

PLOTTED



ZONING CHART (ZONE: RB)

CRITERIA	REQUIREMENT	PROVIDED
LOT SIZE (AC)	1.0 AC MIN.	14.8 AC
LOT FRONTAGE (FT)	20' MIN.	145'
LOT WIDTH (FT)	100' MIN.	900'
FRONT YARD SETBACK (FT)	20' MIN.	318'
SIDE YARD SETBACK (FT)	10' MIN.	115'
REAR YARD SETBACK (FT)	10' MIN.	597'

PARKING CHART (USE: PUBLIC UTILITY)

CRITERIA	REQUIREMENT	PROVIDED
TOTAL NUMBER OF PARKING SPACES	AS DETERMINED BY BUILDING COMMISSIONER	12
TOTAL NUMBER OF ADA SPACES	1	1

LEGEND:

- STORMWATER MANAGEMENT AREA
- PAVED DRIVEWAY
- NO PARKING STRIPING
- RIPRAP
- CONCRETE
- EXISTING DRIVEWAY RECLAMATION

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STRAIGHTWAY

OVERALL SITE PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORP. MAY 4, 1685

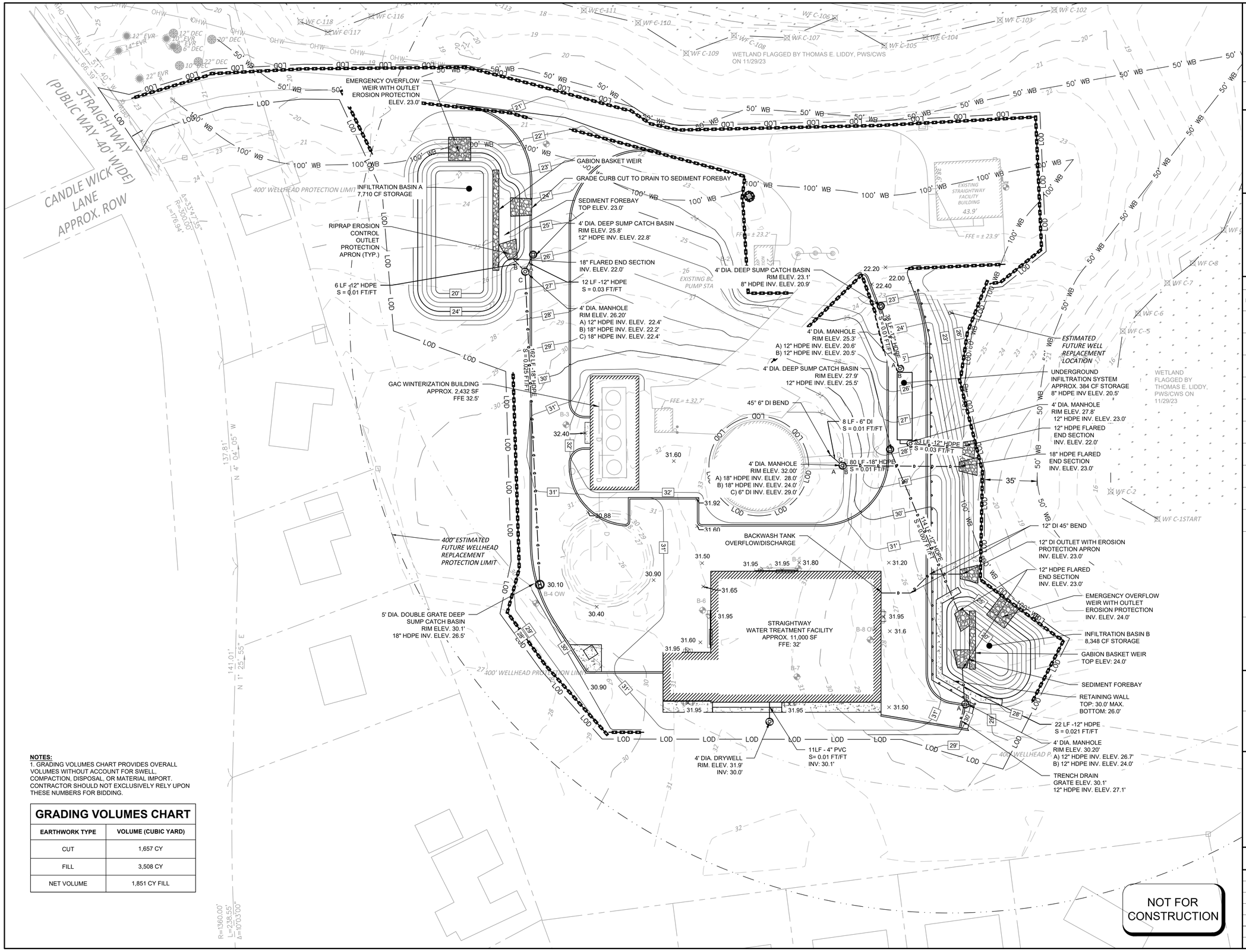
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WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

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SHEET 7 of 31



NOTES:
1. GRADING VOLUMES CHART PROVIDES OVERALL VOLUMES WITHOUT ACCOUNT FOR SWELL, COMPACTION, DISPOSAL, OR MATERIAL IMPORT. CONTRACTOR SHOULD NOT EXCLUSIVELY RELY UPON THESE NUMBERS FOR BIDDING.

GRADING VOLUMES CHART

EARTHWORK TYPE	VOLUME (CUBIC YARD)
CUT	1,657 CY
FILL	3,508 CY
NET VOLUME	1,851 CY FILL

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STRAIGHTWAY

GRADING PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE, MASS. 1639 ADOPTED MAY 4, 1989

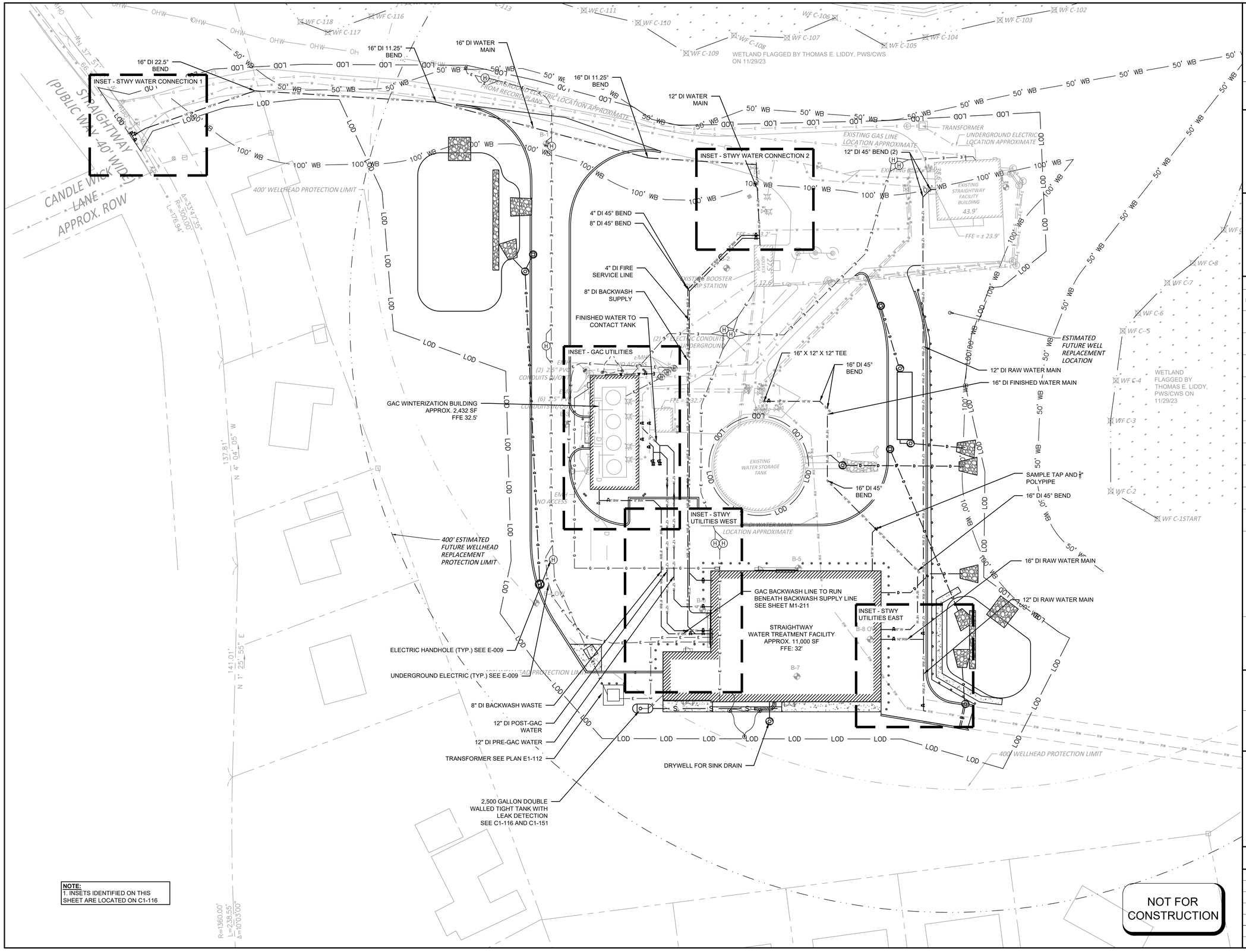
TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
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HYANNIS, MA 02601

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SHEET 8 of 31



NOTE:
1. INSETS IDENTIFIED ON THIS SHEET ARE LOCATED ON C1-116

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ORIGINAL DRAWING SIZE IS 22 x 34

STRAIGHTWAY

UTILITIES PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED MAY 3, 1939

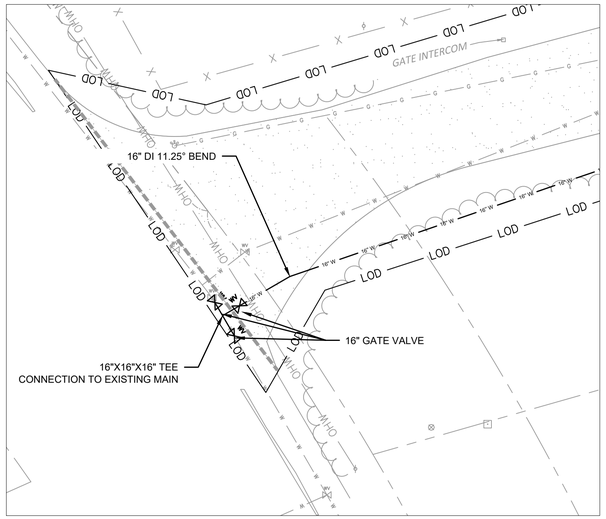
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WATER SUPPLY DIVISION
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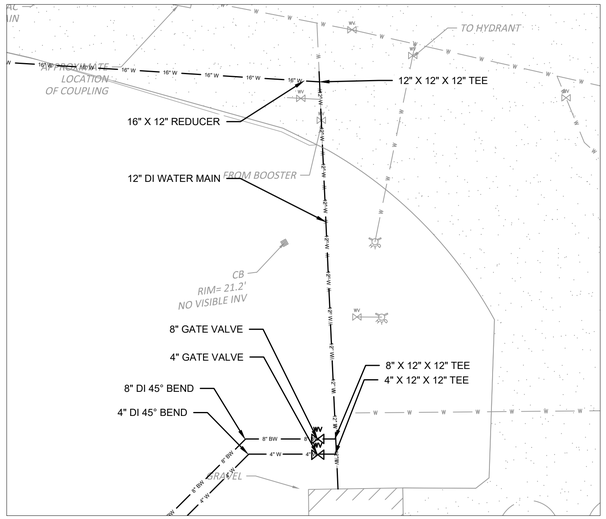
C1-115

SHEET 9 of 31



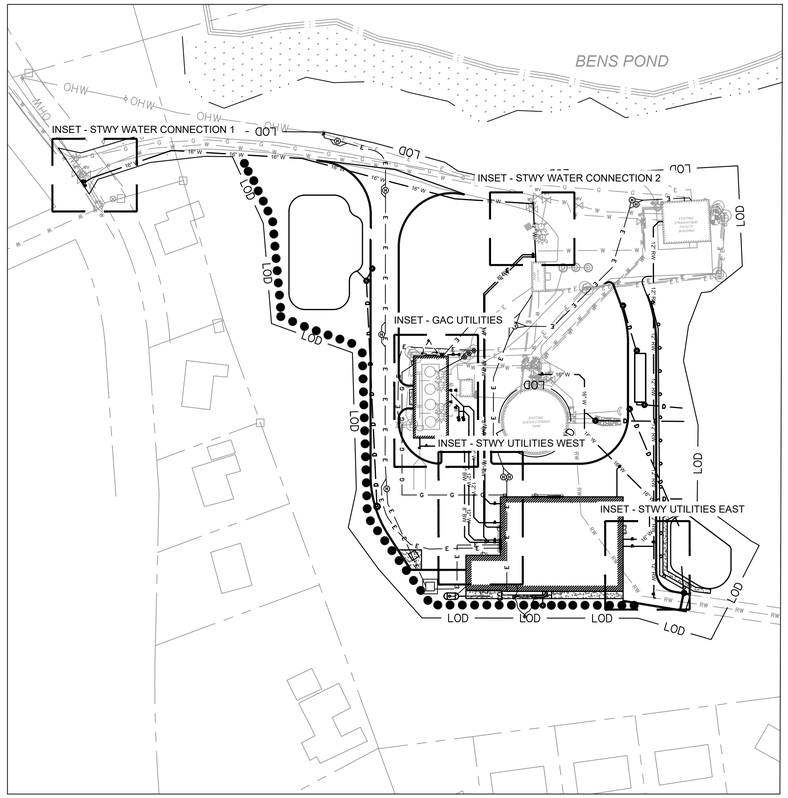
INSET - STWY WATER CONNECTION 1

SCALE: 1" = 10'



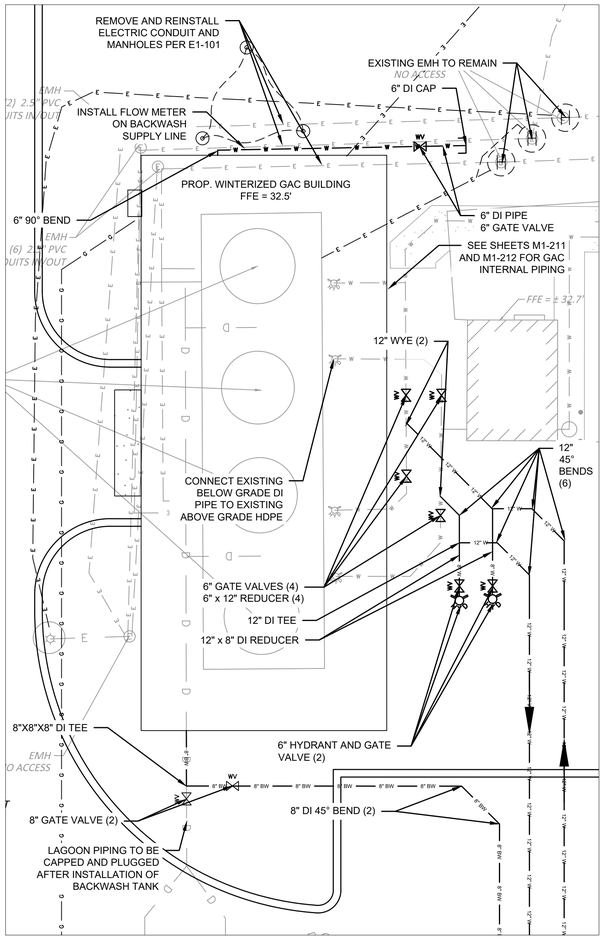
INSET - STWY WATER CONNECTION 2

SCALE: 1" = 10'



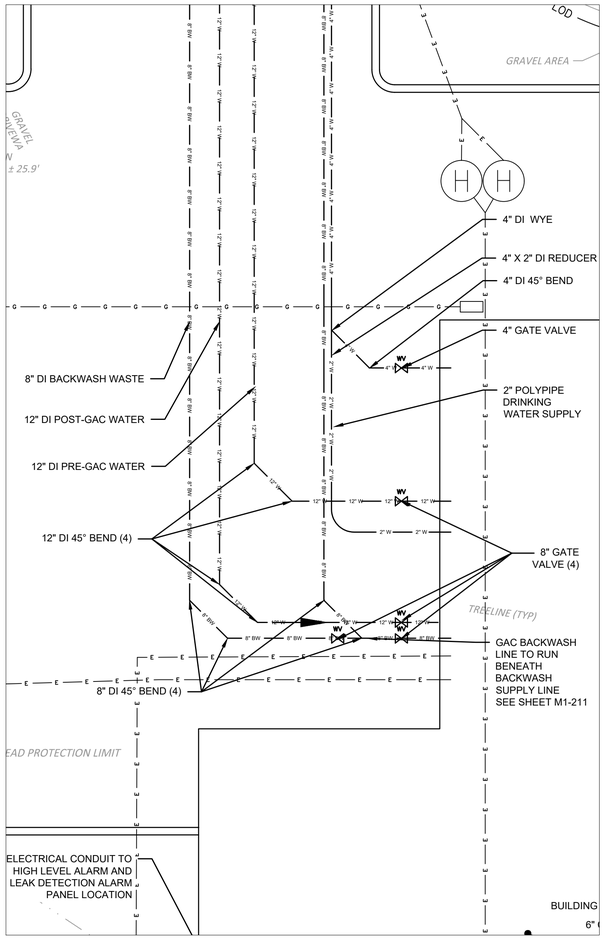
STRAIGHTWAY INSET KEY PLAN

SCALE: 1" = 60'



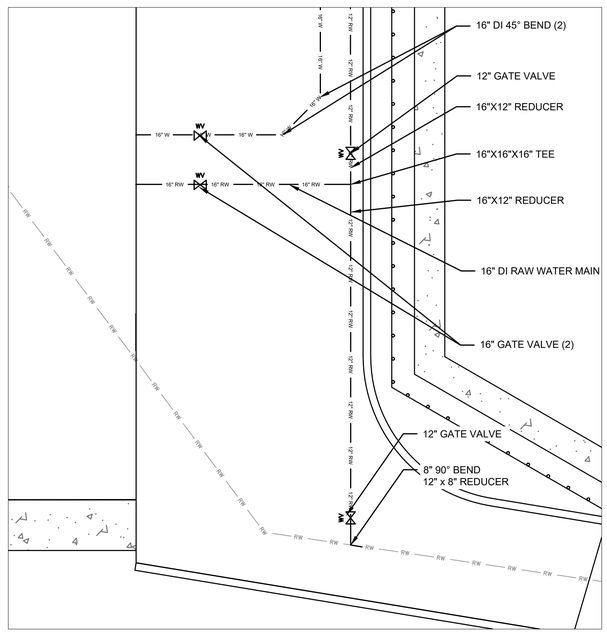
INSET - GAC UTILITIES

SCALE: 1" = 10'



INSET - STWY UTILITIES WEST

SCALE: 1" = 10'



INSET - STWY UTILITIES EAST

SCALE: 1" = 10'

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IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

0 70 140 210

SCALE: 1" = 70' SCALE IN FEET

ORIGINAL DRAWING SIZE IS 22 x 34

STRAIGHTWAY

UTILITIES INSET PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED A.D. 1685

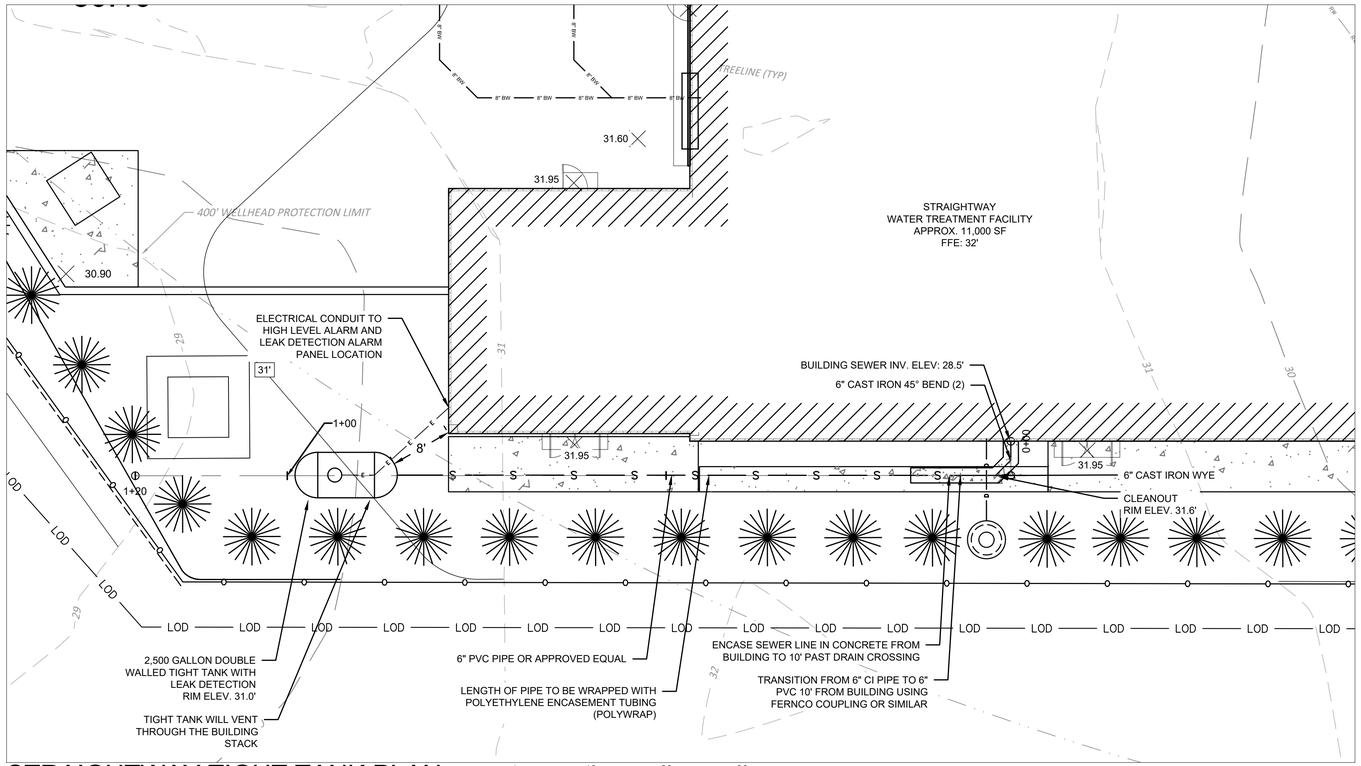
TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
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HYANNIS, MA 02601

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SHEET 10 of 31

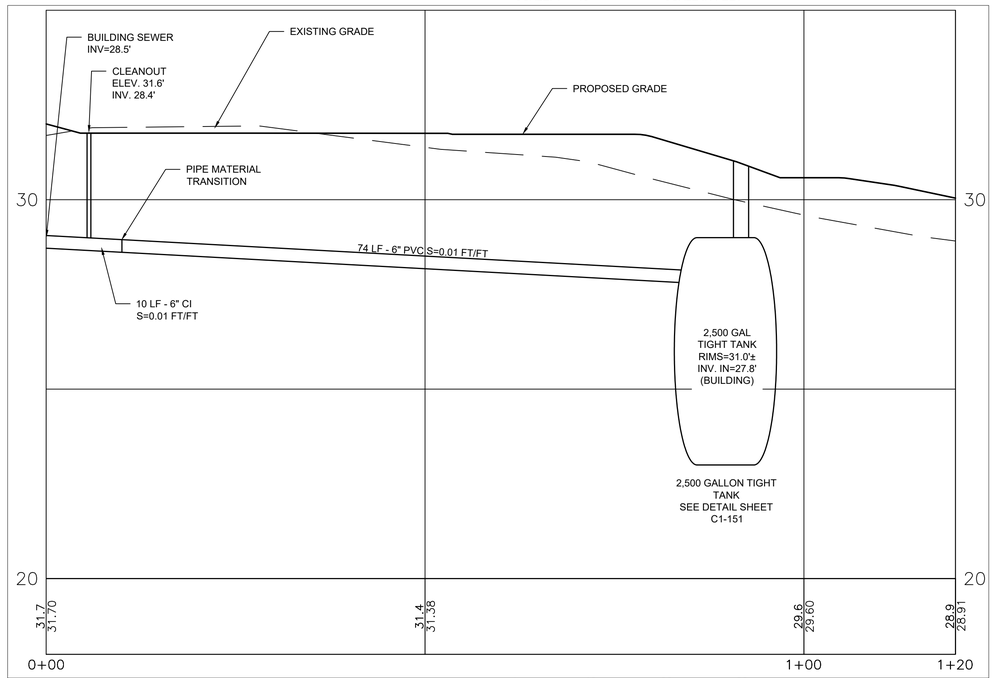


STRAIGHTWAY TIGHT TANK PLAN

SCALE: 1" = 10'

0 10 20 30

SCALE: 1" = 10' SCALE IN FEET

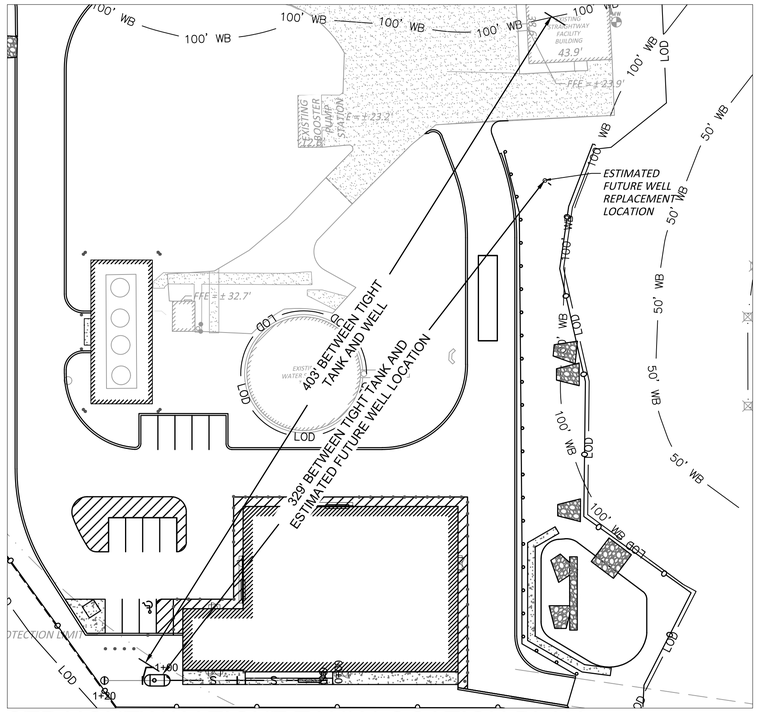


STRAIGHTWAY TIGHT TANK PROFILE

VERTICAL SCALE: 1" = 2'
HORIZONTAL SCALE: 1" = 10'

0 10 20 30

SCALE: 1" = 10' SCALE IN FEET



STRAIGHTWAY TIGHT TANK LOCATION PLAN

SCALE: 1" = 40'

0 40 80 120

SCALE: 1" = 40' SCALE IN FEET

TIGHT TANK NOTES:

1. THE PROPOSED DESIGN COMPLIES WITH TITLE 5 REQUIREMENTS AND SHALL BE INSTALLED AS SHOWN.
2. THE PROPOSED SYSTEM SHALL BE INSTALLED BY A TITLE V LICENSED SEPTIC INSTALLER LISTED ON THE TOWN OF BARNSTABLE' MOST CURRENT LIST OF LICENSED SEPTIC INSTALLERS.
3. THE BARNSTABLE ELECTRICAL INSPECTOR SHALL BE NOTIFIED AT LEAST 36 HOURS PRIOR TO INSTALLATION OF THE ALARM SYSTEM AND ASSOCIATED ELECTRICAL COMPONENTS.
4. THE BARNSTABLE STRAIGHTWAY WELL IS 403 FEET FROM THE TIGHT TANK.
5. THE TIGHT TANK IS OUTSIDE OF THE 400-FOOT RADIUS OF THE MASSDEP ZONE I PROTECTIVE AREA SURROUNDING THE WELL.
6. THE TOWN HAS IDENTIFIED AN APPROXIMATE AREA FOR THE INSTALLATION OF A REPLACEMENT WELL. THE TIGHT TANK IS APPROXIMATELY 329' FROM THIS AREA. THE REPLACEMENT WELL WILL NOT BE INSTALLED AS PART OF THIS PROJECT.
7. THERE ARE NO WETLANDS WITHIN 100 FEET OF THE TIGHT TANK.
8. THE PROPOSED TIGHT TANK WILL SERVE A PUBLIC WATER SUPPLY FACILITY WHERE IT IS NOT FEASIBLE TO CONNECT TO A PUBLIC SEWER.
9. THE PROJECT IS SUBJECT TO REVIEW AND APPROVAL BY THE BARNSTABLE CONSERVATION COMMISSION.

THE SIZING OF THE TANK WAS DETERMINED IN ACCORDANCE WITH TITLE 5. THE ASSOCIATED CALCULATIONS ARE BELOW:

DAILY SEWAGE FLOW

USE: FACTORY, INDUSTRIAL PLANT, NO CAFETERIA

DAILY DESIGN FLOW = 15 GPD PER EMPLOYEE

DAILY FLOW (REQUIRED) 15 GPD X 2 EMPLOYEES

TOTAL DAILY FLOW WELL 3 TREATMENT FACILITY = 30 GPD

TIGHT TANK

2,500 GALLON TANK

MUST CONTAIN 500% OF SEPTIC REQUIREMENTS PER 310 CMR 15.203

48-HOUR STORAGE CAPACITY IN COMPARTMENT 30 GPD X 2 DAYS = 60 GALLONS STORAGE REQUIRED

500% OF 60 GALLONS = 300 GALLONS

2000-GALLON MINIMUM TANK SIZE PER 310 CMR 15.260

TOTAL STORAGE: 2,500 GALLONS > 2,000 GALLONS

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STRAIGHTWAY

SEWER PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

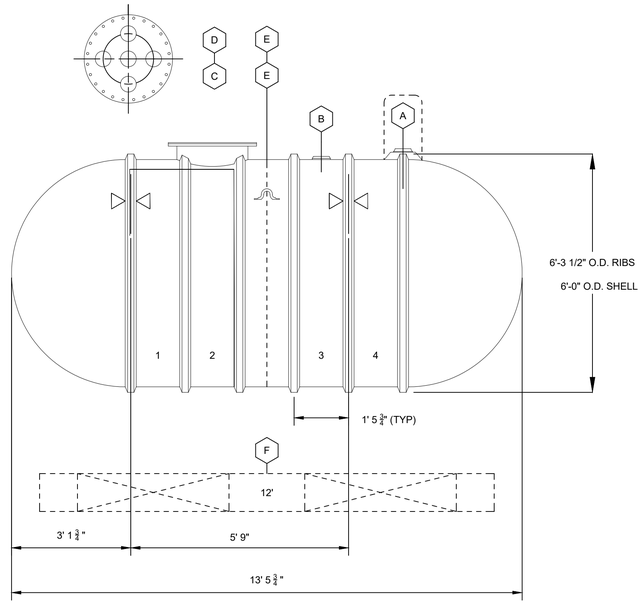
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WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

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SHEET 11 of 31



ITEM	QTY	DESCRIPTION
A	1	4"NPT MONITOR FITTING WITH HYDROSTATIC MONITORING RESERVOIR
B	1	4"NPT SERVICE FITTING WITH STRIKER PLATE
C	1	22"DIA MANWAY WITH 5-4"NPT FITTINGS IN COVER & STRIKER PLATE
D	1	XX"DIA SW CONTAINMENT COLLAR & 36"HIGH SW SUMP WITH
E	2	LIFTING LUG
F	2	12' PREFABRICATED CONCRETE DEADMEN
⋈	2	HOLD DOWN STRAP LOCATION

NOTE:
1 - PREFABRICATED DEADMEN SHOWN. ACCOMMODATIONS MAY BE REQUIRED TO SECURE THE STRAPS TO THE DEADMEN. SEE DETAIL NEXT SHEET

2 - NOMINAL TANK WEIGHT: 2,200 LBS

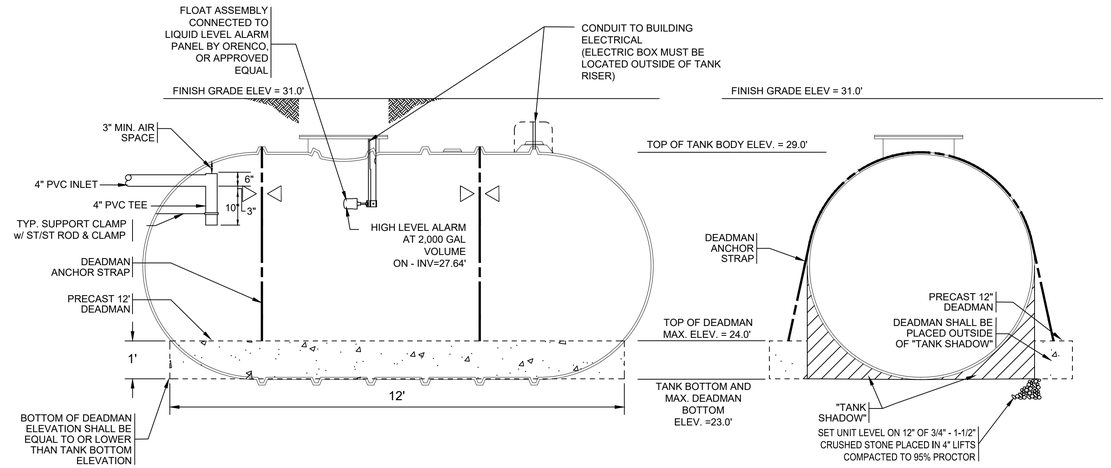
0	REVISION DESCRIPTION					
DSN -	DATE -	CHK -	DATE -	APVD -	DATE -	

XERXES® a ZCL company

DRN -	DATE	TITLE	6'DIA DW CAP. 2,500 GALLONS
CHK -	DATE		-
APVD	DATE	JOB NO. D	DR. NUMBER - REV 00
		SCALE	SHT 1 OF 1

TYP. MANUFACTURER DETAIL FOR 2,500 GALLON DOUBLE WALL FIBERGLASS TIGHT TANK

N.T.S.



THE REQUIRED BUOYANCY CALCULATIONS IN ACCORDANCE WITH TITLE 5 ARE BELOW:

ASSUMPTIONS/INITIAL INFORMATION:

GROUNDWATER AT ELEVATION 18 PER SHGWT
TANK EVALUATED FULLY SUBMERGED
EARTH COVER DEPTH = 24 INCHES

WEIGHT OF EARTH = 110 PCF

WEIGHT OF WATER = 62.4 PCF

OUTER TANK AREA = 74.2 SF (SEE CALC THIS PAGE)

WEIGHT OF TANK (2,500-GALLON TANK EMPTY PER MANUFACTURER) = 2,200 LBS

WEIGHT OF 12' DEADMAN (12" X 12" CROSS SECTION PER MANUFACTURER)
= 1,800 LBS

DEADMAN AREA (TOP FACE) = 1' X 12' = 12 SF

BUOYANCY CALCULATION

USING OUTER TANK DIMENSIONS

WEIGHT OF EARTH ON TANK = (TANK AREA * EARTH COVER) * (WEIGHT OF EARTH)
= (74.2 SF * 2') * (110 PCF)
= 16,324 LBS

WEIGHT OF TANK + WEIGHT OF EARTH ON TANK = 18,524 LBS.

WEIGHT OF EARTH ON DEADMAN = (DEADMAN AREA * EARTH COVER) * (WEIGHT OF EARTH)
= (12 SF * 7') * (110 PCF)
= 9,240 LBS

TOTAL SYSTEM WEIGHT = WEIGHT OF TANK + TANK WEIGHT OF EARTH + 2 * (WEIGHT OF DEADMAN + DEADMEN WEIGHT OF EARTH)
= 18,524 LBS + 2*(1,800 LBS + 9,240 LBS) = 40,604 LBS

HYDROSTATIC PRESSURE = (TANK AREA X SHGW HEIGHT) * (WEIGHT OF WATER) + (DEADMAN AREA * SHGW HEIGHT) * (WEIGHT OF WATER)
= (74.2 SF * 6') * (62.4 PCF) + (12.0 SF * 1') * (62.4)
= 28,528 LBS

HYDROSTATIC PRESSURE = 28,528 LBS < 40,604 LBS
<= TOTAL SYSTEM WEIGHT (OK)

THE ALARM HEIGHT WAS SET AT THE VOLUME AT WHICH THE TANK WILL CONTAIN 2,000 GALLONS OF WASTEWATER AS CALCULATED BELOW:

ALARM HEIGHT

PER MANUFACTURER SPECIFICATIONS, TANK VOLUME IS EQUAL TO 2,000 GALLONS 55-5/8" ABOVE THE BOTTOM OF THE TANK.

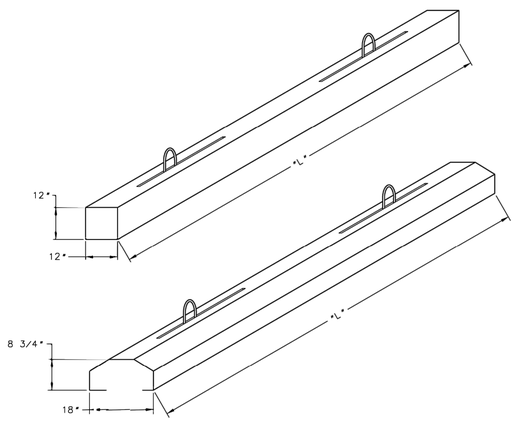
55-5/8" = 4.64' ABOVE THE BOTTOM OF THE TANK

TIGHT TANK TYPICAL DETAIL

N.T.S.

XERXES DEADMAN

TANK SIZE GALLONS	QTY	"L"	APPROX. WEIGHT EACH
4'-600	2	12'	1,800 LBS
4'-1,000	2	12'	1,800 LBS
4'-1,500	2	16'	2,400 LBS
6'-1,500	2	12'	1,800 LBS
6'-2,000	2	12'	1,800 LBS
6'-3,000	2	16'	2,400 LBS
6'-4,000	2	18'	2,700 LBS
6'-5,000	4	12'	1,800 LBS
6'-6,000	4	16'	2,400 LBS
6'-8,000	4	18'	2,700 LBS
8'-2,000	2	12'	1,800 LBS
8'-3,000	2	12'	1,800 LBS
8'-4,000	2	12'	1,800 LBS
8'-5,000	2	16'	2,400 LBS
8'-6,000	2	18'	2,700 LBS
8'-7,000	4	12'	1,800 LBS
8'-8,000	4	12'	1,800 LBS
8'-9,000	2	12'	1,800 LBS
	2	16'	2,400 LBS
8'-10,000	4	16'	2,400 LBS
8'-11,000	4	16'	2,700 LBS
8'-12,000	4	18'	2,700 LBS
8'-13,000	4	12'	1,800 LBS
	2	16'	2,400 LBS
8'-14,000	2	12'	1,800 LBS
	4	16'	2,400 LBS
8'-15,000	6	16'	2,400 LBS
10'-10,000	2	22'	3,000 LBS
10'-11,000	2	22'	3,000 LBS
10'-12,000	2	22'	3,000 LBS
10'-13,000	4	14'	1,900 LBS
10'-14,000	4	14'	1,900 LBS
10'-15,000	4	14'	1,900 LBS
10'-20,000	4	18'	2,400 LBS
10'-22,000	4	22'	3,000 LBS
10'-25,000	4	14'	1,900 LBS
	2	18'	2,400 LBS
10'-30,000	6	18'	2,400 LBS
10'-35,000	2	18'	2,400 LBS
	4	22'	3,000 LBS
10'-40,000	8	18'	2,400 LBS



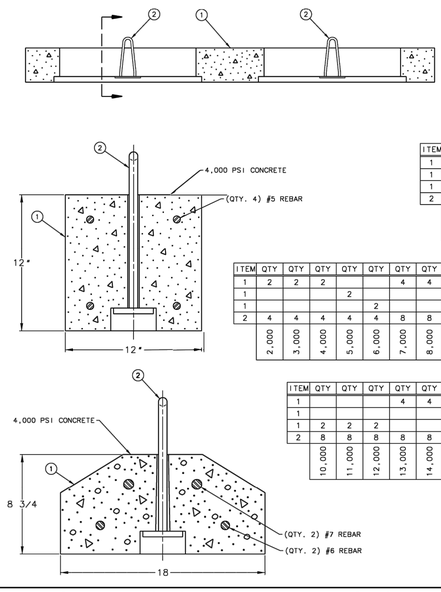
XERXES PRECAST DEADMEN

- XERXES DEADMEN ARE ENGINEERED AND DESIGNED TO BE USED WITH XERXES TANKS.
- IN MULTIPLE TANK INSTALLATIONS, EACH TANK REQUIRES ITS OWN SET OF DEADMEN.
- FOR CAST IN PLACE OR DEADMAN CONSTRUCTED OFF SITE, REFER TO XERXES INSTALLATION MANUAL AND OPERATING GUIDELINES FOR PROPER SIZING AND ANCHOR POINT SPECIFICATIONS.

XERXES®
TITLE: XERXES PRECAST DEADMEN
DATE 1/24 DR.NO. S11-376.02

TYPICAL PRECAST DEADMAN DETAIL

N.T.S.



ITEM	QTY	QTY	QTY	UNIT	DESCRIPTION
1	2	2		EA	DEADMAN, 12"x12"x12'
1			2	EA	DEADMAN, 12"x12"x16'
2	4	4	4	EA	GALVANIZED ANCHOR POINT
	600	1,000	1,500		4' TANKS

ITEM	QTY	QTY	QTY	QTY	QTY	QTY	QTY	UNIT	DESCRIPTION
1	2	2			4			EA	DEADMAN, 12"x12"x12'
1			2			4		EA	DEADMAN, 12"x12"x16'
1				2			4	EA	DEADMAN, 12"x12"x18'
2	4	4	4	4	8	8	8	EA	GALVANIZED ANCHOR POINT
	1,500	2,000	3,000	4,000	5,000	6,000	8,000		6' TANKS

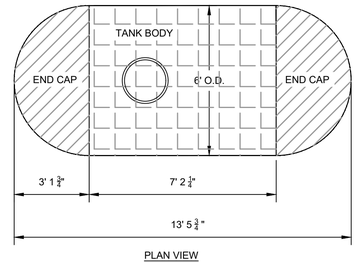
ITEM	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	UNIT	DESCRIPTION
1	2	2	2			4	4	2				4	2		EA	DEADMAN, 12"x12"x12'
1				2				2	4	4		2	4	6	EA	DEADMAN, 12"x12"x16'
1					2						4				EA	DEADMAN, 12"x12"x18'
2	4	4	4	4	4	8	8	8	8	8	8	12	12	12	EA	GALVANIZED ANCHOR POINT
	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	11,000	12,000	13,000	14,000	15,000		8' TANKS

ITEM	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	UNIT	DESCRIPTION
1				4	4	4			4					EA	DEADMAN, 8 3/4"x18"x14'
1							4		2	6	2	8	EA	DEADMAN, 8 3/4"x18"x18'
1	2	2	2					4			4		EA	DEADMAN, 8 3/4"x18"x22'
2	8	8	8	8	8	8	12	16	16	20	24	28	EA	GALVANIZED ANCHOR POINT
	10,000	11,000	12,000	13,000	14,000	15,000	20,000	22,000	25,000	30,000	35,000	40,000		10' TANKS

XERXES®
TITLE: XERXES PRECAST DEADMEN ANCHOR POINT ASSEMBLY
DATE 1/24 DR.NO. S11-377.02

TYPICAL PRECAST DEADMAN ANCHOR DETAIL

N.T.S.



PLAN VIEW

THE MAXIMUM CROSS-SECTIONAL AREA OF THE TANK WHEN VIEWED FROM ABOVE IS CALCULATED BELOW. THIS AREA IS USED TO CALCULATE SOIL PRESSURE AND HYDROSTATIC PRESSURE.

AREA OF END CAP:

IDEALIZED AS A HALF CIRCLE CROSS SECTION
RADIUS = 3' 1 3/4" = 3.15'
AREA = (π*R^2)/2 = (π*(3.15')^2)/2 = 15.55 SF

AREA OF TANK BODY:

RECTANGULAR CROSS SECTION
L = 7' 2 1/4" = 7.19'
W = 6'
AREA = L*W = (7.19' * 6') = 43.1 SF

TOTAL CROSS SECTIONAL AREA:

AREA = (2* END CAP AREA) + (TANK BODY AREA) = 2*(15.55) SF + 43.1 SF = 74.2 SF

TIGHT TANK PLAN VIEW

N.T.S.

NOT FOR CONSTRUCTION

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Boston, MA 02108
Phone: 617-497-7800
www.kleinfelder.com

COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51461
REGISTERED PROFESSIONAL ENGINEER
12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

STRAIGHTWAY

SEWER DETAILS - I

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 HUSBANDS MAY A SERVE

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	
DESIGNED BY	MPS
DRAWN BY	MD/MPS
CHECKED BY	TB/GAA
APPROVED BY	GAA

C1-151

SHEET 12 of 31

PLOTTED:

TIGHT TANK SPECIFICATIONS

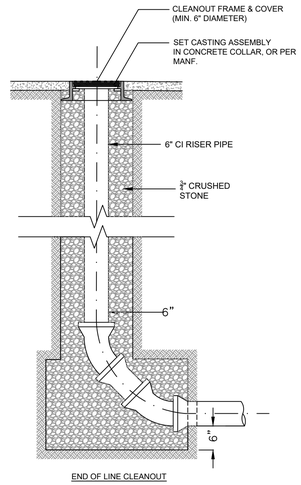
1. TIGHT TANKS SHALL BE CONSTRUCTED OF SOUND AND DURABLE WATERTIGHT MATERIALS NOT SUBJECT TO EXCESSIVE CORROSION, DECAY, OR FROST DAMAGE, OR CRACKING OR BUCKLING DUE TO SETTLEMENT OR BACKFILLING. TIGHT TANKS SHALL BE DOUBLE WALLED FIBERGLASS REINFORCED PLASTIC. (OTHER MATERIALS AS APPROVED IN WRITING BY THE DEPARTMENT, METAL TIGHT TANKS ARE PROHIBITED.)

2. TANK CONSTRUCTION MATERIALS SHALL MEET THE FOLLOWING MINIMUM SPECIFICATIONS OR AN ASTM EQUIVALENT STANDARD:
   - 2.1. INTERNAL LOAD - TANK SHALL BE DESIGNED TO WITHSTAND A 5-PSIG (35 kPA) AIR-PRESSURE TEST WITH 5:1 SAFETY FACTOR.
   - 2.2. SURFACE LOADS - TANK SHALL BE DESIGNED TO WITHSTAND SURFACE H-20 AND HS-20 AXLE LOADS WHEN PROPERLY INSTALLED ACCORDING TO MANUFACTURER'S CURRENT INSTALLATION AND OPERATING GUIDELINES.
   - 2.3. EXTERNAL HYDROSTATIC PRESSURE - TANK SHALL BE DESIGNED FOR 7 FEET OF OVERBURDEN OVER THE TOP OF THE TANK, THE HOLE FULLY FLOODED, AND A SAFETY OF 5:1 AGAINST GENERAL BUCKLING.
   - 2.4. THE TANK SIZE, FITTINGS, AND ACCESSORIES, SHALL BE AS SHOWN ON THE DRAWINGS.
   - 2.5. TANK SHALL BE MANUFACTURED WITH A LAMINATE CONSISTING OF RESIN AND GLASS FIBER REINFORCEMENT ONLY. NO SAND/SILICA FILLERS OR RESIN EXTENDERS SHALL BE USED.
   - 2.6. TANK SHALL BE VENTED TO ATMOSPHERIC PRESSURE.
   - 2.7. TANK SHALL BE CAPABLE OF HANDLING LIQUIDS WITH SPECIFIC GRAVITY UP TO 1.1.
   - 2.8. TANK SHALL BE COMPATIBLE WITH LIQUIDS IDENTIFIED IN THE MANUFACTURER'S STANDARD LIMITED WARRANTY.

3. TANK, COVERS, CONNECTIONS AND PIPING SHALL BE DESIGNED AND CONSTRUCTED SO AS TO WITHSTAND AN ANTICIPATED MINIMUM HS-20 LOADING.

4. TIGHT TANK SHALL BE MANUFACTURED IN ACCORDANCE WITH A QUALITY CONTROL/QUALITY ASSURANCE PROGRAM. THE PROGRAM FOR CONCRETE TANKS SHALL BE IN CONFORMITY WITH ASTM STANDARD C 1227-96OR AN ASTM EQUIVALENT STANDARD. CONCRETE TANKS SHALL BE EMBOSSED WITH A SEAL STATING THAT THIS ASTM STANDARD HAS BEEN MET.

5. TIGHT TANK SHALL BE EQUIPPED WITH A CONTINUOUS LEAK DETECTION SYSTEM, SUCH AS TRUCHECK BY XERXES OR SIMILAR. THE LEAK SYSTEM SHALL BE HARDWIRED WITH THE SEPTIC ALARM SYSTEMS.

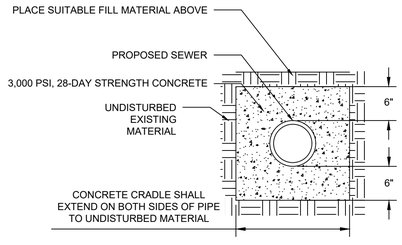


END OF LINE CLEANOUT

NOTES:
1. CLEANOUT FRAME AND COVER SHALL BE ONE OF THE FOLLOWING:
   A. PRODUCT NUMBER 00157324C01 AS MANUFACTURED BY EAST JORDAN IRON WORKS, FABRICATED FROM GRAY IRON AND CONFORMING TO ASTM A48 CLASS 35B; OR APPROVED EQUAL.

SEWER CLEANOUT TYPICAL DETAIL

N.T.S.



CONCRETE ENCASEMENT

N.T.S.

BUILDING SEWERS SPECIFICATIONS

1. THE BUILDING SEWER SHALL BE SUFFICIENT TO SERVE THE CONNECTED FIXTURES. IN NO CASE SHALL THE BUILDING SEWER BE LESS THAN FOUR INCHES IN DIAMETER.

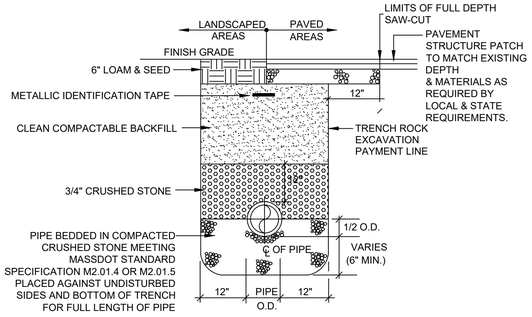
2. THE BUILDING SEWER SHALL BE CONSTRUCTED OF CORROSION RESISTANT MATERIAL AND EQUIPPED WITH WATER TIGHT JOINTS; PVC PIPE OR THE EQUIVALENT. BUILDING SEWER SHALL BE CAST IRON PIPING FOR THE FIRST 10' OF PIPING FROM THE BUILDING.

3. ALL PIPE JOINTS OF THE BUILDING SEWER SHALL BE MADE WATER-TIGHT AND PROTECTED AGAINST DAMAGE BY ROOTS. POURED-TYPE JOINTS SHALL BE PROPERLY WIPED ON THE INSIDE TO ELIMINATE OBSTRUCTION OF FLOW.

4. THE BUILDING SEWER SHALL BE LAID ON A COMPACTED FIRM BASE.

5. THE BUILDING SEWER SHALL BE VENTED THROUGH THE VENT STACK OR MAIN VENT OF THE BUILDING SERVED BY IT. NO TRAP SHALL BE INSTALLED IN THE BUILDING SEWER OR BUILDING DRAIN.

6. ALL BUILDING SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STATE PLUMBING CODE, 248 CMR2.00



NOTES:
1. METALIZED 2" WIDE DETECTABLE IDENTIFICATION TAPE SHALL BE INSTALLED OVER SEWER LINES 12" BELOW FINISH GRADE.

PVC SEWER PIPE TRENCH SECTION

N.T.S.

GENERAL CONSTRUCTION REQUIREMENTS FOR ALL TIGHT TANK SYSTEM COMPONENTS

1. TIGHT TANK:

   (A) WATERTIGHT THROUGH MANUFACTURER'S SPECIFICATION AND WARRANTY; OR

   (B) MADE WATERTIGHT BY THE MANUFACTURER, EQUIPMENT SUPPLIER OR INSTALLER USING SYNTHETIC POLYMER SEALER SPECIFIED BY THE SYNTHETIC MATERIAL MANUFACTURER.

2. TIGHT TANK SHALL BE CONSTRUCTED OR SET LEVEL AND TRUE TO GRADE ON A LEVEL STABLE BASE WHICH HAS BEEN MECHANICALLY COMPACTED. IF THE COMPONENT IS PLACED IN FILL, PROPER COMPACTION IS REQUIRED TO ENSURE STABILITY AND TO PREVENT SETTLING; NATIVE GROUND WITH A SIX INCH AGGREGATE BASE IS OTHERWISE ADEQUATE.

3. TIGHT TANK SHALL BE EQUIPPED WITH A WATERTIGHT ACCESS MANHOLE(S) WITH A MINIMUM DIAMETER OF 22 INCHES AND CONSTRUCTED OF DURABLE MATERIAL.

4. ALL SYSTEM COMPONENTS SHALL BE CONSTRUCTED OF CORROSION RESISTANT MATERIALS.

5. ALL PRESSURIZED PIPES SHALL BE DESIGNED AND INSTALLED TO MEET THE FOLLOWING REQUIREMENTS:

   (A) TO PREVENT FREEZING BY BEING INSTALLED BELOW THE FROST LINE, BY BEING ADEQUATELY INSULATED IF INSTALLED ABOVE THE FROST LINE, OR BE SELF-DRAINING;

   (B) TO SPECIFY THE APPROPRIATE CLASS OR SCHEDULE OF PIPE TO WITHSTAND MAXIMUM PRESSURE AND/OR ANTICIPATED VEHICULAR LOADS; AND

   (C) TO SPECIFY APPROPRIATE THRUST BLOCKING AT ALL ANGLES, BENDS, BRANCHES, PLUGS AND WHEREVER ELSE NECESSARY TO PREVENT DISRUPTION OF PROPER FUNCTIONING OF THE LINE.

6. THE TOP OF ALL SYSTEM COMPONENTS, INCLUDING THE TIGHT TANK SHALL BE INSTALLED NO MORE THAN 36" BELOW FINISH GRADE.

7. WHERE ANY PORTION OF ANY COMPONENT IS TO BE PLACED AT OR BELOW THE GROUND-WATER TABLE, ALL SYSTEM TANKAGE, INCLUDING THE TIGHT TANK, SHALL BE DESIGNED WITH COUNTER WEIGHTS, ANCHORS OR BALLAST AND A BUOYANCY CALCULATION FOR THE ENTIRE VOLUME OF EACH COMPONENT, WHEN EMPTY, SHALL BE PERFORMED AND SUBMITTED WITH THE SYSTEM PLANS AND SPECIFICATIONS.

8. ALL SYSTEM COMPONENTS SHALL BE MARKED WITH MAGNETIC MARKING TAPE OR A COMPARABLE MEANS IN ORDER TO LOCATE THEM ONCE BURIED.

TIGHT TANK SYSTEM GENERAL NOTES

1. THE SANITARY SEWAGE SYSTEM SHOWN SHALL BE INSTALLED IN ACCORDANCE WITH THE COMMONWEALTH OF MASSACHUSETTS STATE ENVIRONMENTAL CODE 310 CMR 15.00 (TITLE V) AND ANY LOCAL BOARD OF HEALTH REGULATIONS.

2. ANY MODIFICATION TO THE WORK SHALL BE APPROVED IN WRITING BY THE ENGINEER AND THE LOCAL BOARD OF HEALTH PRIOR TO PERFORMANCE.

3. THE TIGHT TANK SHALL BE H-20 DESIGN REINFORCED CONCRETE PRECAST MANUFACTURED BY OLDCASTLE PRECAST OR APPROVED EQUAL.

4. WHEREVER SEWER LINES CROSS WATER SUPPLY LINES, BOTH PIPES SHALL BE CONSTRUCTED OF CLASS 150 (MIN.) PRESSURE PIPE TO 10' ON EITHER SIDE OF CROSSING. PIPES SHALL ALSO BE PRESSURE TESTED TO ASSURE WATER TIGHTNESS.

5. NOTIFY THE LOCAL BOARD OF HEALTH AGENT AND ENGINEER AT THE TIME OF EXCAVATION, PRIOR TO INSTALLATION.

6. NOTIFY LOCAL BOARD OF HEALTH AGENT AND ENGINEER WHEN SYSTEM IS COMPLETED AND READY FOR INSPECTION.

7. SHOP DRAWINGS FOR THE FOLLOWING ITEMS SHALL BE PROVIDED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO THE START OF INSTALLATION:
   - ALL UNDERGROUND STRUCTURES (TANKS, STEPS)
   - FRAMES AND COVERS
   - PIPES, FITTINGS
   - WATERPROOFING & PIPE GASKETS

STRUCTURE TESTING NOTES:

TIGHT TANK SHALL BE VACUUM TESTED FOR WATER TIGHTNESS AFTER INSTALLATION IN ACCORDANCE WITH ASTM C 1227. ALL TANKS MUST PASS TESTING PRIOR TO USE.

NOT FOR CONSTRUCTION

PLOTTED:

KLEINFELDER
Bright People. Right Solutions.

One Beacon Street, Suite 8100
Boston, MA 02108
Phone: 617-497-7800
www.kleinfelder.com

COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51481
REGISTERED PROFESSIONAL ENGINEER

12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 — 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

STRAIGHTWAY

SEWER DETAILS - II

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED MAY 4, 1685

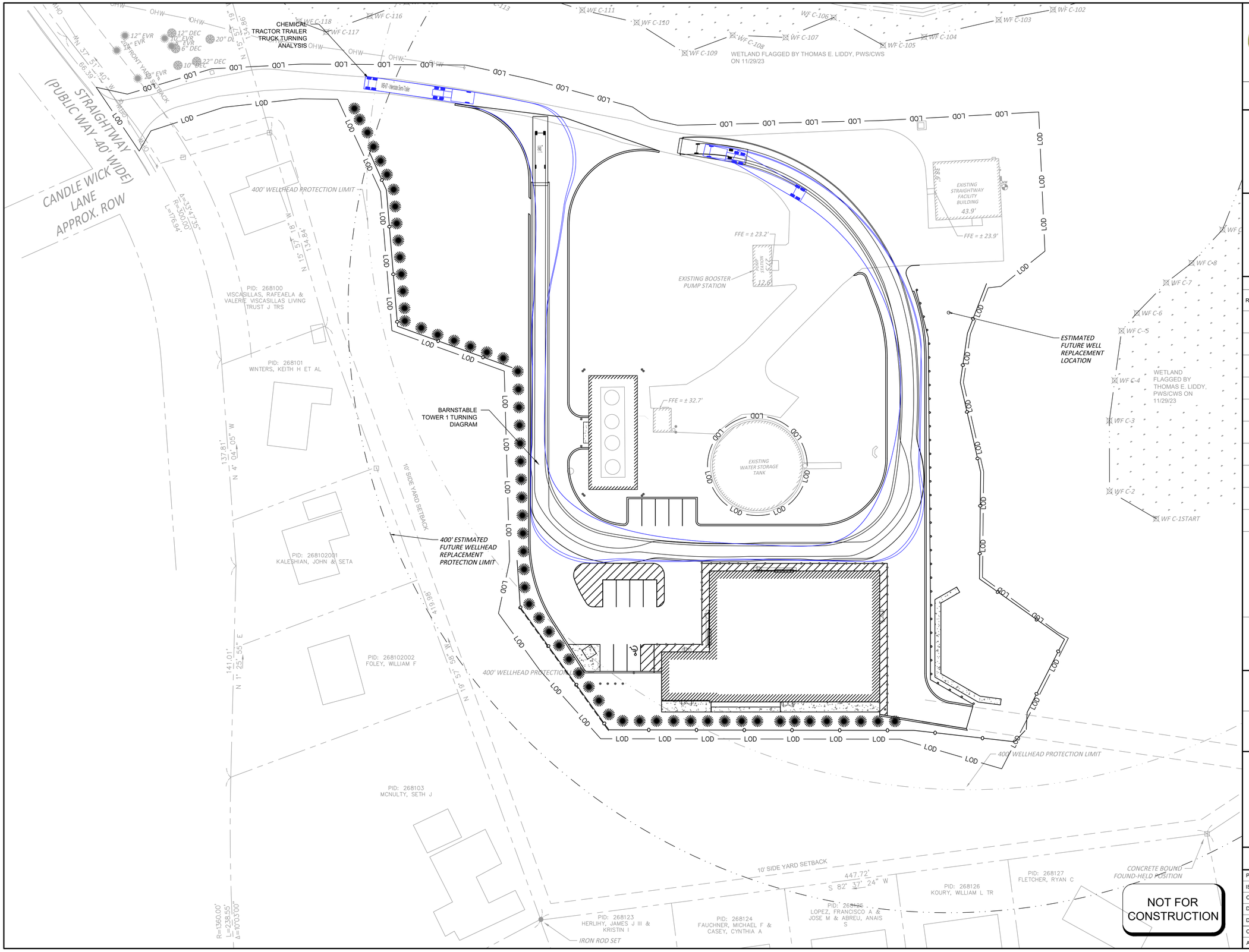
TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	
DESIGNED BY	MPS
DRAWN BY	MD/MPS
CHECKED BY	TB/GAA
APPROVED BY	GAA

C1-152

SHEET 13 of 31



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COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
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12/23/2024

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0 1"

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0 30 60 90

SCALE: 1" = 30' SCALE IN FEET

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STRAIGHTWAY

TURNING DIAGRAM

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED MAY 3, 1685

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

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SHEET 14 of 31

PLOTTED

400' EXISTING WELLHEAD PROTECTION LIMIT

400' EXISTING WELLHEAD PROTECTION LIMIT

10' SIDE YARD SETBACK

N 8° 41' 300.

N 0° 07' 00" E 479.85'

150.00'

15.00'

N 81° 18' 50" E 100.00'

TBM CONCRETE BOUND 5
CONCRETE BOUND
W/ DRILLHOLE
FOUND -HELD FOR
ALIGNMENT
ELEV: 17.12'

S 0° 07' 00" W 98.78'

START LE112923

WF F1-2

WF A-1-1 START LE112923

WF A-2

WF BF1-4

WF BF1-5

WF BF1-6

WF BF1-7

WF BF1-8

WF BF1-9END

WF A-9 START LE112923

WF A-8

WF A-7

WF A-6

WF A-5

WF A-4

WF A-3

TBM CONCRETE BOUND 4
CONCRETE BOUND WITH
DRILL HOLE FOUND
ELEV: 15.17'

S 22° 07' 50" W 49.85'

CONCRETE BOUND
WITH DRILL HOLE
FOUND

22° 07' 50" 43'

WETLAND
FLAGGED BY
THOMAS E. LIDDY,
PWS/CWS
ON 11/29/23

BANK FLAGS BF1-9 — DELINEATED BY LUCAS ENVIRONMENTAL 11/29/2023

SET IRON ROD
WITH CAP

N 88° 15' 05" W 323.11'

INV = 6.07'

CB

8" CI

SMITH STREET
(PUBLIC WAY - 40' WIDE)

TBM -
SOUTH-EASTERLY
HYDRANT FLANGE BOLT
ELEV. = 17.77'

HP-02B

HP-02B-OW

SP-03A-OW

SP-03

B-10

EXTERNAL
GENERATOR

HYANNISPORT
STATION
UNDERGROUND
ELECTRICAL
SERVICE

HYANNISPORT
WELL
STATION

FFE = 14.7

SP34-3A

BITUMINOUS
PAVEMENT

1" WATER
SAMPLE PIPE

EXISTING ACCESS
GATE

20' FRONT YARD SETBACK

EXISTING 10" DI
WATER MAIN

GRAVEL
PARKING
AREA

TREELINE
(TYP.)

FEMA FLOOD ZONE A
BOUNDARY

8" DI WATER MAIN
LOCATION APPROXIMATE
FROM RECORD PLANS

TBM -
SOUTH-EASTERLY
HYDRANT FLANGE BOLT
ELEV. = 13.61'

WF B-119

WF B-118

WF B-117

WF B-116

TREELINE (TYP.)

BITUMINOUS
PAVEMENT

WF B-115

SIMMONS
POND
WELL
STATION

FFE = ± 9.7'

16.5'

20.0'

WF B-114 NE

UNDERGROUND ELECTRIC LINE
LOCATION APPROXIMATE

WF B-110

WF B-109

EXISTING 10" AC
WATER MAIN

WF B-108

WF B-107

WF B-106

WF B-105

WF B-104

WF B-103

WF B-102

WF B-101

WF B-100 START LE112923

EDGE OF BORDERING VEGETATED WETLAND

WETLAND FLAGGED BY
THOMAS E. LIDDY,
PWS/CWS ON 11/29/23

SIMMONS POND
STATION UNDERGROUND
ELECTRICAL SERVICE

EXISTING PAVED DRIVEWAY

WF B-12

WF B-14 STOP

WF B-13

EXISTING 10" AC
WATER MAIN

EXISTING MONITORING WELL

WF B-9

WF B-10

WF B-8

UNDERGROUND
ELECTRIC LINE

WF B-7

PLANTER AREA
W/STONE WALL
PERIMETER

WF B-6

WF B-5

WF B-4

WF B-3

WF B-2

WF B-1

WF BF2-1 START LE112923

WF BF2-2

WF BF2-3

WF BF2-4

WF BF2-5

WF BF2-6

WF BF2-7

WF BF2.8

WF BF2-9

WF 2-10

WF 2-11

WF BF2-12

WF BF2-13

WF BF2-14END

CONCRETE
HEADWALL

HALLS CREEK

FLOW

SIMMONS POND
(LOCATION MASS GIS)

NOT FOR
CONSTRUCTION

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HYANNISPORT - SIMMONS POND

EXISTING CONDITIONS

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED A.D. 1685

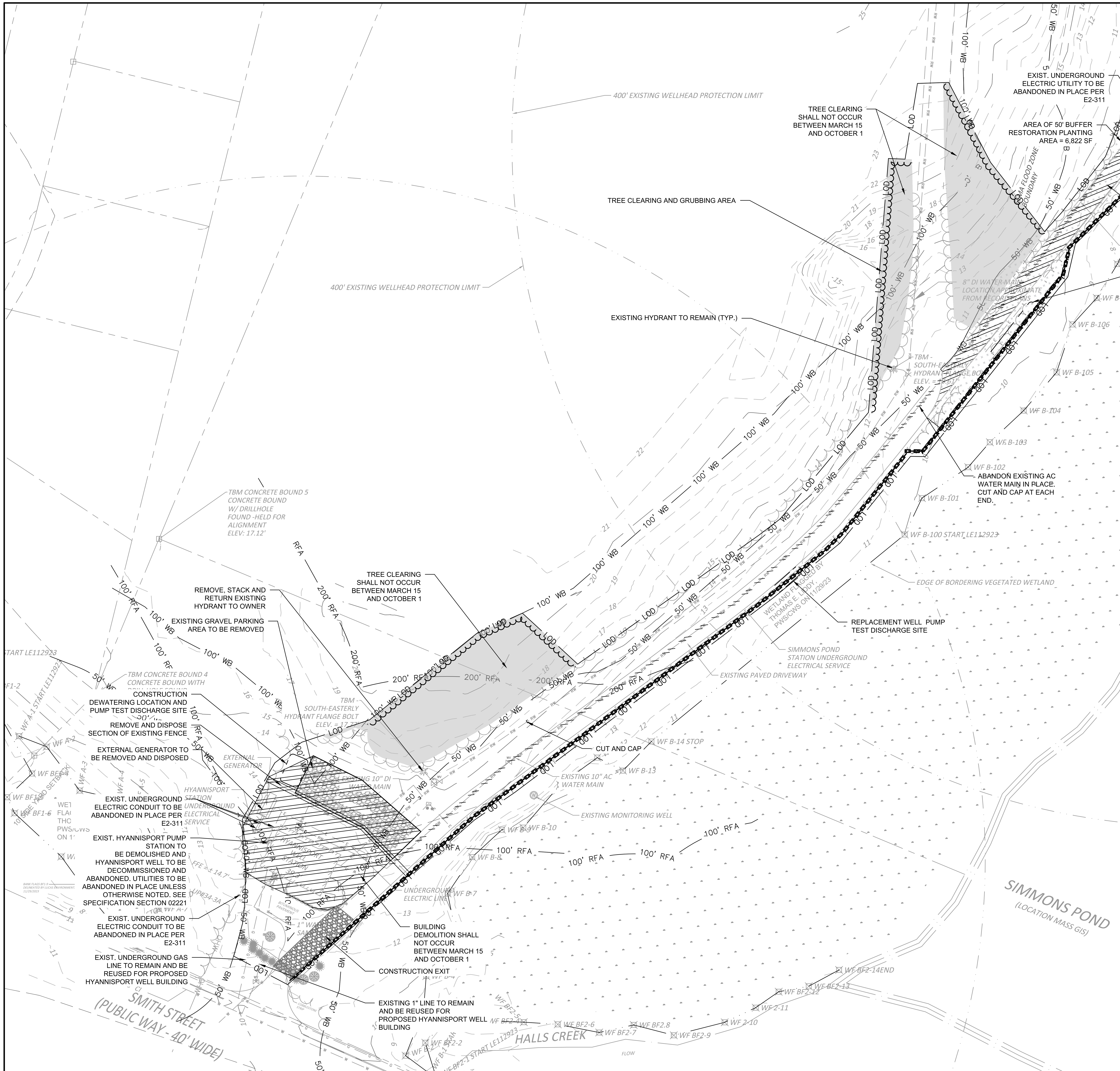
TOWN OF BARNSTABLE DPW
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APPROVED BY	GAA

C2-111

SHEET 15 of 31



50' BUFFER ZONE MITIGATION CALCULATION

CRITERIA	AREA (SF)
STRAIGHTWAY PROPOSED HARDSCAPE WITHIN 50' BUFFER	0 SF
HYANNISPORT/SIMMONS POND PROPOSED HARDSCAPE WITHIN 50' BUFFER	1,047 SF
STRAIGHTWAY PROPOSED HARDSCAPE WITHIN 50'-100' BUFFER	2,136 SF
HYANNISPORT/SIMMONS POND PROPOSED HARDSCAPE WITHIN 50'-100' BUFFER	2,385 SF
TOTAL PROPOSED NEW HARDSCAPE WITHIN BUFFER AREAS	5,568 SF
AREA OF MITIGATION REQUIRED (MULTIPLIED BY 3)	16,704 SF
TOTAL PROPOSED RESTORATION AREA WITHIN 50' BUFFER	6,822 SF

NOTES:

1. CONTRACTOR SHALL REFER TO SPECIFICATION SECTION XXXXX FOR SEQUENCE OF CONSTRUCTION FOR DEMOLITION OF EXISTING PIPES AS REQUIRED TO MAINTAIN SERVICE TO EXISTING FACILITIES. ALL SHUTDOWNS WILL REQUIRE ADVANCE COORDINATION WITH ENGINEER, VEOLIA, AND HYANNIS WATER SYSTEM. SHUTDOWNS WILL NOT BE PERMITTED BETWEEN MAY 1 AND SEPT 1.

2. CONTRACTOR SHALL FIELD STAKE AND INSTALL TEMPORARY CONSTRUCTION FENCING ALONG ENTIRETY OF LIMIT OF DISTURBANCE WHERE VEHICULAR ACCESS IS NOT NECESSARY FOR OPERATIONS. CONSTRUCTION FENCING SHALL BE MAINTAINED THROUGHOUT THE DURATION OF CONSTRUCTION AND REMOVED UP FINAL COMPLETION OF SITE CONSTRUCTION.

3. TREE CLEARING SHALL NOT OCCUR BETWEEN MARCH 15 AND OCTOBER 1.

4. SELECTIVE DEMOLITION IS REQUIRED WITHIN THE EXISTING STRAIGHTWAY FACILITY. REFER TO SHEETS MX-XXX AND EX-XXX FOR ADDITIONAL INFORMATION.

5. DEWATERING AREAS ARE SHOWN IN EXPECTED LOCATIONS NEEDED FOR CONSTRUCTION AND ARE SUBJECT TO ADJUSTMENT BASED ON FIELD CONDITIONS WITHIN THE APPROVED LIMIT OF DISTURBANCE.

LEGEND:

- LIMITS OF TREE CLEARING AND GRUBBING
- REMOVAL OF EXISTING BUILDING AND SITE FEATURES
- REMOVAL OR ABANDONMENT OF EXISTING UTILITY
- AREA OF 50' WETLAND BUFFER RESTORATION PLANTING

NOT FOR CONSTRUCTION

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COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51461
REGISTERED PROFESSIONAL ENGINEER
12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

0 30 60 90

SCALE: 1" = 30' SCALE IN FEET

ORIGINAL DRAWING SIZE IS 22 x 34

HYANNISPORT - SIMMONS POND

SITE DEMOLITION PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE, MASS. 1639. ADOPTED MAY 4, 1889

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	
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C2-112

18' DOUBLE ACCESS GATE

SIMMONS POND PUMP STATION BUILDING FFE = 18.5' APPROX. 208 SF

8' CHAIN LINK FENCE WITH BARBED WIRE (TYP.)

BITUMINOUS ACCESS DRIVE AND TURNAROUND

400' REPLACEMENT WELLHEAD PROTECTION LIMIT

400' REPLACEMENT WELLHEAD PROTECTION LIMIT

10' SIDE YARD SETBACK

685' REAR YARD SETBACK

INFILTRATION BASIN D

MILL AND OVERLAY EXISTING DRIVEWAY

CONCRETE SIDEWALK

HYANNISPORT PUMP STATION BUILDING FFE = 18.5' APPROX. 702 SF

167' SIDE YARD SETBACK

2,500 GALLON DOUBLE WALLED TIGHT TANK WITH LEAK DETECTION

8' CHAIN LINK FENCE WITH BARBED WIRE (TYP.)

INFILTRATION BASIN C

18' DOUBLE ACCESS GATE

172' FRONT YARD SETBACK

20' FRONT YARD SETBACK

PAVED PARKING/PULL-OFF AREA

WETLAND FLAGGED BY THOMAS E. LIDDY, PWS/CWS ON 11/29/23

WETLAND FLAGGED BY THOMAS E. LIDDY, PWS/CWS ON 11/29/23

SIMMONS POND
(LOCATION MASS GIS)

SMITH STREET
(PUBLIC WAY - 40' WIDE)

HALLS CREEK

FLOW

ZONING CHART (ZONE: RB)

CRITERIA	REQUIREMENT	PROVIDED
LOT SIZE (AC)	1.0 AC MIN.	14.8 AC
LOT FRONTAGE (FT)	20' MIN.	272'
LOT WIDTH (FT)	100' MIN.	162'
FRONT YARD SETBACK (FT)	20' MIN.	172'
SIDE YARD SETBACK (FT)	10' MIN.	167'
REAR YARD SETBACK (FT)	10' MIN.	685'

PARKING CHART (USE: PUBLIC UTILITY)

CRITERIA	REQUIREMENT	PROVIDED
TOTAL NUMBER OF PARKING SPACES	AS DETERMINED BY BUILDING COMMISSIONER	0
TOTAL NUMBER OF ADA SPACES	0	0

LEGEND:

PAVED DRIVEWAY

MILL AND OVERLAY EXISTING DRIVEWAY

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SCALE: 1" = 30' SCALE IN FEET

ORIGINAL DRAWING SIZE IS 22 x 34

HYANNISPORT - SIMMONS POND

OVERALL SITE PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE, MASS. 1639 INCORPORATED MAY 4, 1685

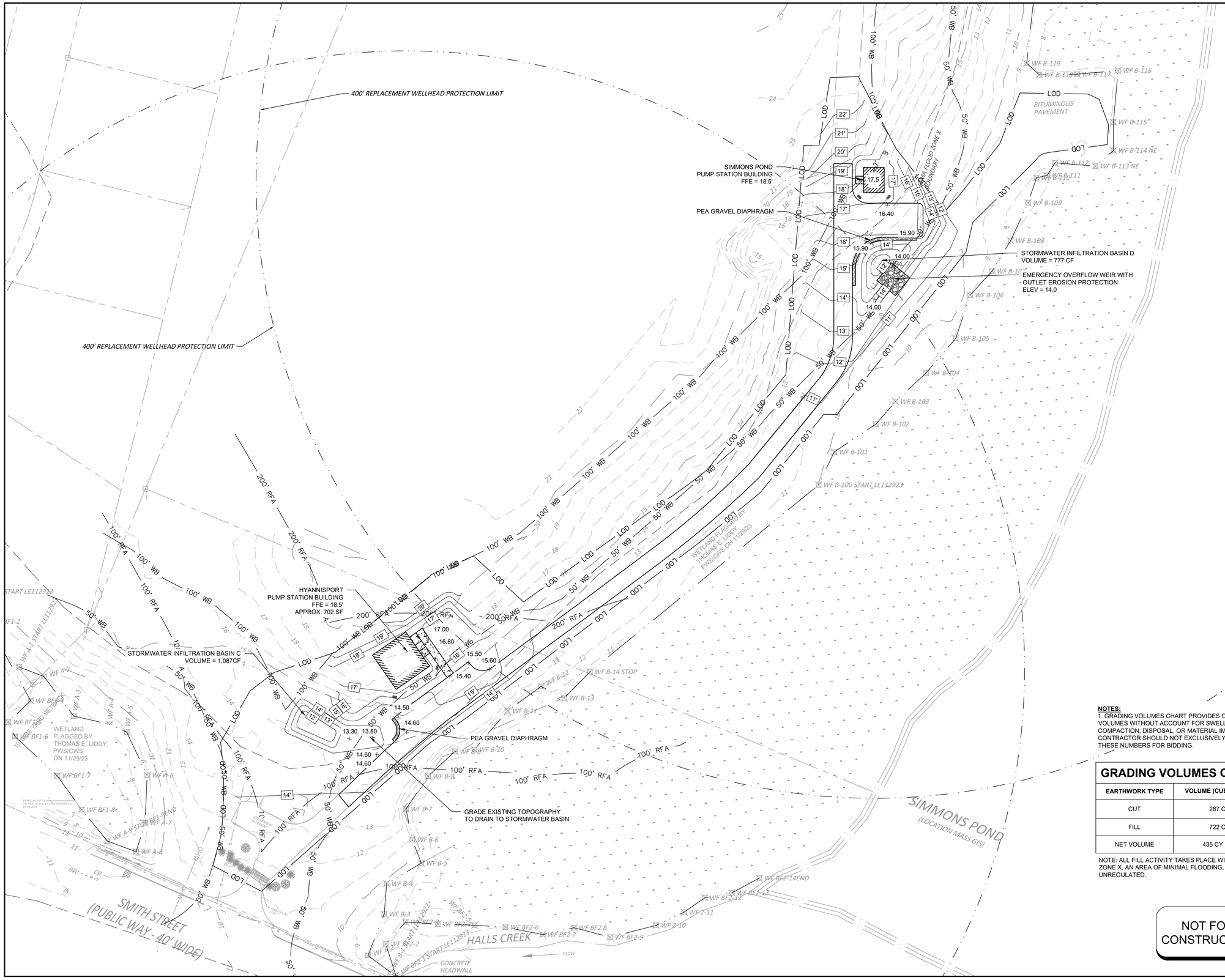
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WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

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C2-113

SHEET 17 of 31



PLOTTED:

NOTES:
1. GRADING VOLUMES CHART PROVIDES OVERALL VOLUMES WITHOUT ACCOUNT FOR SWELL, COMPACTION, DISPOSAL, OR MATERIAL IMPORT. CONTRACTOR SHOULD NOT EXCLUSIVELY RELY UPON THESE NUMBERS FOR BIDDING.

GRADING VOLUMES CHART

EARTHWORK TYPE	VOLUME (CUBIC YARD)
CUT	287 CY
FILL	722 CY
NET VOLUME	435 CY FILL

NOTE: ALL FILL ACTIVITY TAKES PLACE WITHIN FEMA ZONE X, AN AREA OF MINIMAL FLOODING, AND IS UNREGULATED.

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HYANNISPORT - SIMMONS POND

GRADING PLAN

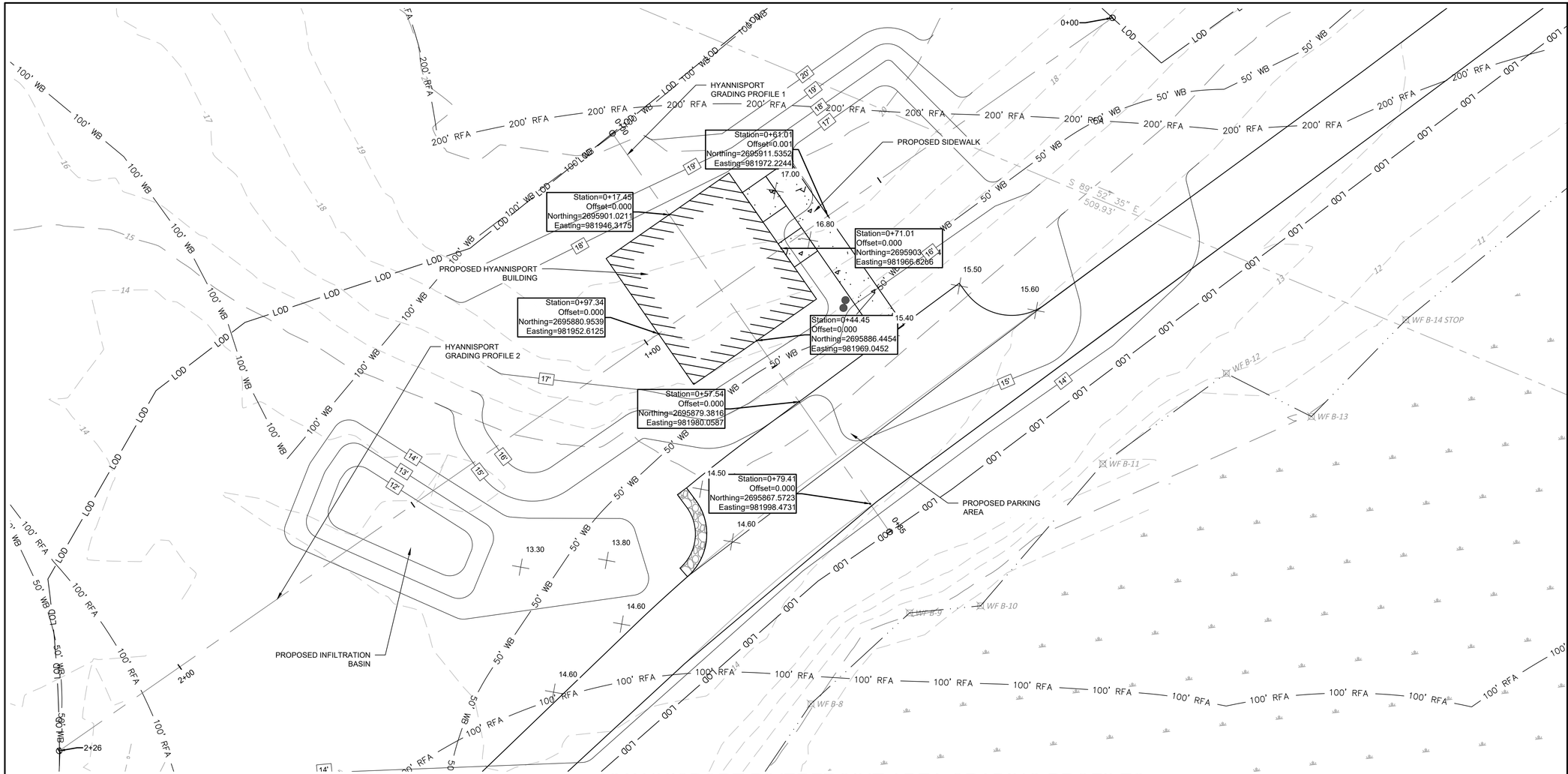
STRAIGHTWAY
WATER TREATMENT FACILITY

TOWN OF BARNSTABLE DPW
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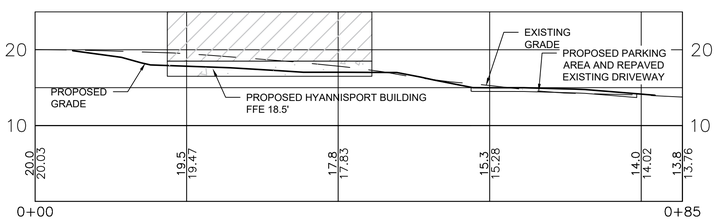
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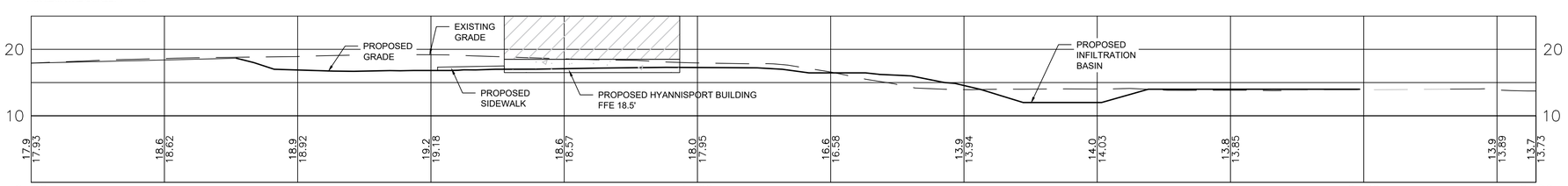
HYANNISPORT RIVERFRONT AREA GRADING PROFILES

SCALE: 1" = 10'



HYANNISPORT GRADING PROFILE - 1

VERTICAL SCALE: 1" = 10'
HORIZONTAL SCALE: 1" = 10'



HYANNISPORT GRADING PROFILE - 2

VERTICAL SCALE: 1" = 10'
HORIZONTAL SCALE: 1" = 10'

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HYANNISPORT - SIMMONS POND

RIVERFRONT AREA GRADING PROFILES

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED MAY 4, 1685

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

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SHEET 19 of 31

400' REPLACEMENT WELLHEAD PROTECTION LIMIT

400' REPLACEMENT WELLHEAD PROTECTION LIMIT

(2) 8" SOLID SLEEVE

8"X6" DI WYE

HYDRANT

6" 45° BEND

6" GATE VALVE

6"X6"X6" TEE

SIMMONS POND
PUMP STATION BUILDING
FFE = 18.5'
APPROX. 208 SF

TBM CONCRETE BOUND 5
CONCRETE BOUND
W/ DRILLHOLE
FOUND -HELD FOR
ALIGNMENT
ELEV: 17.12'

TBM CONCRETE BOUND 4
CONCRETE BOUND WITH
DRILL HOLE FOUND
ELEV: 15.17'

HYANNISPORT
PUMP STATION BUILDING
FFE = 18.5'
APPROX. 702 SF

2,500 GALLON DOUBLE
WALLED TIGHT TANK
WITH LEAK DETECTION

EXTEND EXISTING
WATER AND GAS
SERVICE TO PROPOSED
FACILITY

1" POLYPIPE WATER
SERVICE

ELECTRICAL
CONNECTION TO
EXISTING UTILITY POLE

WETLAND
FLAGGED BY
THOMAS E. LIDDY,
PWS/CWS
ON 11/29/23

WETLAND FLAGGED BY
THOMAS E. LIDDY, PWS/CWS ON 11/29/23

TBM -
SOUTH-EASTERLY
HYDRANT FLANGE BOLT
ELEV. = 18.61'

EXISTING 10" DI
WATER MAIN

EXISTING 10" AC
WATER MAIN

8" DI WATER MAIN
LOCATION APPROXIMATE
FROM RECORD PLANS

BITUMINOUS
PAVEMENT

UNDERGROUND ELECTRIC LINE
LOCATION APPROXIMATE

EXISTING PAVED DRIVEWAY

EDGE OF BORDERING VEGETATED WETLAND

EXISTING MONITORING WELL

8" GATE VALVE

8"x8"x6" TEE

8" 45° BEND (2)

SMITH STREET
(PUBLIC WAY - 40' WIDE)

HALLS CREEK

SIMMONS POND
(LOCATION MASS GIS)

CONCRETE
HEADWALL

FLOW

NOT FOR
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HYANNISPORT - SIMMONS POND

UTILITIES PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED MAY 4, 1685

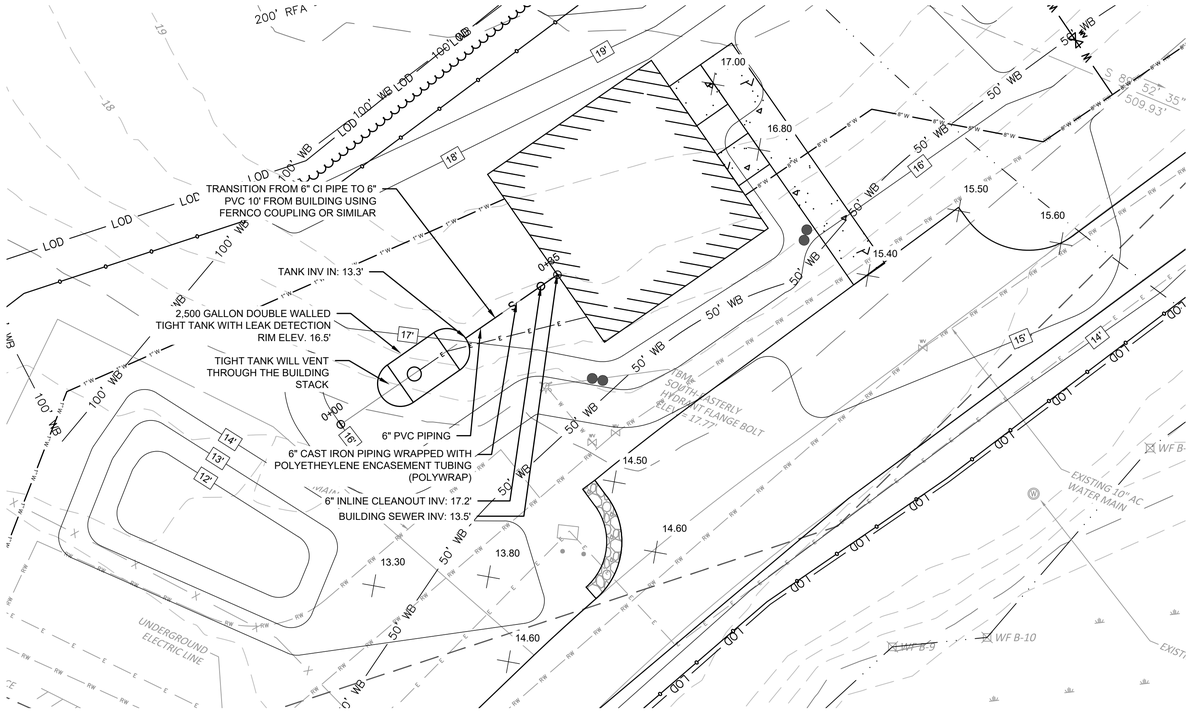
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SHEET 20 of 31

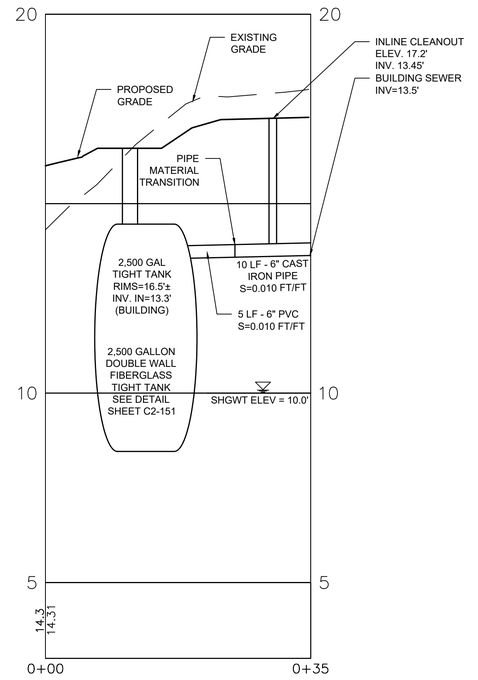


SIMMONS POND/HYANNISPORT WELLS TIGHT TANK PLAN

SCALE: 1" = 10'

0 10 20 30

SCALE: 1" = 10' SCALE IN FEET



SIMMONS POND/HYANNISPORT TIGHT TANK PROFILE

VERTICAL SCALE: 1" = 2'
HORIZONTAL SCALE: 1" = 10'

0 10 20 30

SCALE: 1" = 10' SCALE IN FEET

TIGHT TANK NOTES:

1. THE PROPOSED DESIGN COMPLIES WITH TITLE 5 REQUIREMENTS AND SHALL BE INSTALLED AS SHOWN.
2. THE PROPOSED SYSTEM SHALL BE INSTALLED BY A TITLE V LICENSED SEPTIC INSTALLER LISTED ON THE TOWN OF BARNSTABLE'S MOST CURRENT LIST OF LICENSED SEPTIC INSTALLERS.
3. THE BARNSTABLE ELECTRICAL INSPECTOR SHALL BE NOTIFIED AT LEAST 36 HOURS PRIOR TO INSTALLATION OF THE ALARM SYSTEM AND ASSOCIATED ELECTRICAL COMPONENTS.
4. THE SIMMONS POND WELL IS 450 FEET FROM THE TIGHT TANK.
5. THE HYANNISPORT WELL IS 30 FEET FROM THE TIGHT TANK.
6. THE TIGHT TANK IS WITHIN THE 400-FOOT RADIUS OF THE MASSDEP ZONE I PROTECTIVE AREA SURROUNDING THE WELL.
7. THERE ARE WETLANDS WITHIN 75 FEET OF THE TIGHT TANK.
8. THE PROPOSED TIGHT TANK WILL SERVE A PUBLIC WATER SUPPLY FACILITY WHERE IT IS NOT FEASIBLE TO CONNECT TO A PUBLIC SEWER.
9. THE PROJECT IS SUBJECT TO REVIEW AND APPROVAL BY THE BARNSTABLE CONSERVATION COMMISSION.

THE SIZING OF THE TANK WAS DETERMINED IN ACCORDANCE WITH TITLE 5. THE ASSOCIATED CALCULATIONS ARE BELOW.

DAILY SEWAGE FLOW

USE: FACTORY, INDUSTRIAL PLANT, NO CAFETERIA

DAILY DESIGN FLOW = 15 GPD PER EMPLOYEE

DAILY FLOW (REQUIRED): 15 GPD X 2 EMPLOYEES

TOTAL DAILY FLOW WELL TREATMENT FACILITY = 30 GPD

TIGHT TANK

2,500 GALLON TANK

MUST CONTAIN 500% OF SEPTIC REQUIREMENTS PER 310 CMR 15.203

48-HOUR STORAGE CAPACITY IN COMPARTMENT 30 GPD X 2 DAYS = 60 GALLONS STORAGE REQUIRED

500% OF 60 GALLONS = 300 GALLONS

2000-GALLON MINIMUM TANK SIZE PER 310 CMR 15.260

TOTAL STORAGE: 2,500 GALLONS > 2,000 GALLONS

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HYANNISPORT - SIMMONS POND

SEWER PLAN

STRAIGHTWAY
WATER TREATMENT FACILITY

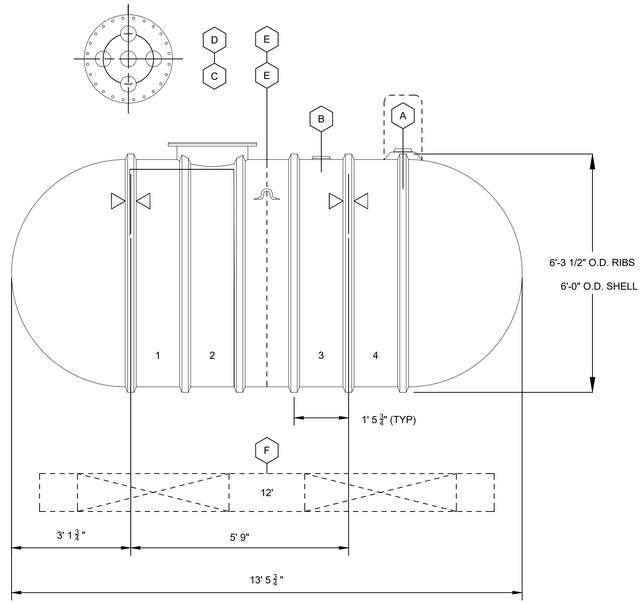
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C2-117

SHEET 21 of 31



ITEM	QTY	DESCRIPTION
A	1	4"NPT MONITOR FITTING WITH 18" HYDROSTATIC MONITORING RESERVOIR
B	1	4"NPT SERVICE FITTING WITH STRIKER PLATE
C	1	22"DIA MANWAY WITH 5-4"NPT FITTINGS IN COVER & STRIKER PLATE
D	1	XX"DIA SW CONTAINMENT COLLAR & 36"HIGH SW SUMP WITH
E	2	LIFTING LUG
F	2	12' PREFABRICATED CONCRETE DEADMEN
⋈	2	HOLD DOWN STRAP LOCATION

NOTE:
1 - PREFABRICATED DEADMEN SHOWN. ACCOMMODATIONS MAY BE REQUIRED TO SECURE THE STRAPS TO THE DEADMEN. SEE DETAIL NEXT SHEET

2 - NOMINAL TANK WEIGHT: 2,200 LBS

REVISION DESCRIPTION	
0	

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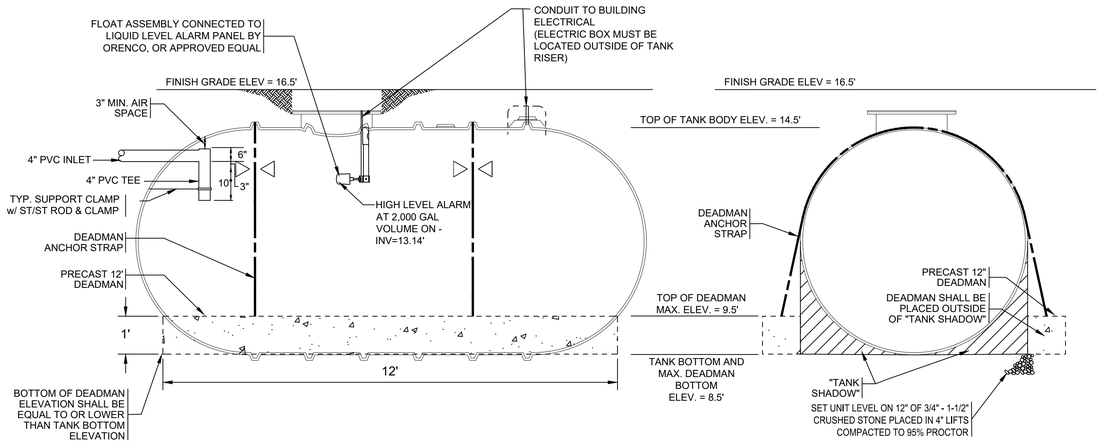
6'DIA DW CAP. 2,500 GALLONS

DR. NO. D – REV 00

SHT 1 OF 1

TYP. MANUFACTURER DETAIL FOR 2,500 GALLON DOUBLE WALL FIBERGLASS TIGHT TANK

N.T.S.



THE REQUIRED BUOYANCY CALCULATIONS IN ACCORDANCE WITH TITLE 5 ARE BELOW:

ASSUMPTIONS/INITIAL INFORMATION:

GROUNDWATER AT ELEVATION 10 PER SHGWT
TANK EVALUATED FULLY SUBMERGED
EARTH COVER DEPTH = 24 INCHES

WEIGHT OF EARTH = 110 PCF

WEIGHT OF WATER = 62.4 PCF

OUTER TANK AREA = 74.2 SF (SEE CALC THIS PAGE)

WEIGHT OF TANK (2,500-GALLON TANK EMPTY PER MANUFACTURER) = 2,200 LBS

WEIGHT OF 12' DEADMAN (12" X 12" CROSS SECTION PER MANUFACTURER) = 1,800 LBS

DEADMAN AREA (TOP FACE) = 1' X 12' = 12 SF

BUOYANCY CALCULATION

USING OUTER TANK DIMENSIONS

WEIGHT OF EARTH ON TANK = (TANK AREA * EARTH COVER) * (WEIGHT OF EARTH)
= (74.2 SF * 2') * (110 PCF)
= 16,324 LBS

WEIGHT OF TANK + WEIGHT OF EARTH ON TANK = 18,524 LBS.

WEIGHT OF EARTH ON DEADMAN = (DEADMAN AREA * EARTH COVER) * (WEIGHT OF EARTH)
= (12 SF * 7') * (110 PCF)
= 9,240 LBS
TOTAL SYSTEM WEIGHT = WEIGHT OF TANK + TANK WEIGHT OF EARTH + 2 * (WEIGHT OF DEADMAN + DEADMEN WEIGHT OF EARTH)
= 18,524 LBS + 2*(1,800 LBS + 9,240 LBS) = 40,604 LBS

HYDROSTATIC PRESSURE = (TANK AREA X SHGW HEIGHT) * (WEIGHT OF WATER) + (DEADMAN AREA * SHGW HEIGHT) * (WEIGHT OF WATER)
= (74.2 SF * 6') * (62.4 PCF) + (12.0 SF * 1') * (62.4)
= 28,528 LBS

HYDROSTATIC PRESSURE = 28,528 LBS < 40,604 LBS
<= TOTAL SYSTEM WEIGHT (OK)

THE ALARM HEIGHT WAS SET AT THE VOLUME AT WHICH THE TANK WILL CONTAIN 2,000 GALLONS OF WASTEWATER AS CALCULATED BELOW:

ALARM HEIGHT

PER MANUFACTURER SPECIFICATIONS, TANK VOLUME IS EQUAL TO 2,000 GALLONS 55-5/8" ABOVE THE BOTTOM OF THE TANK.

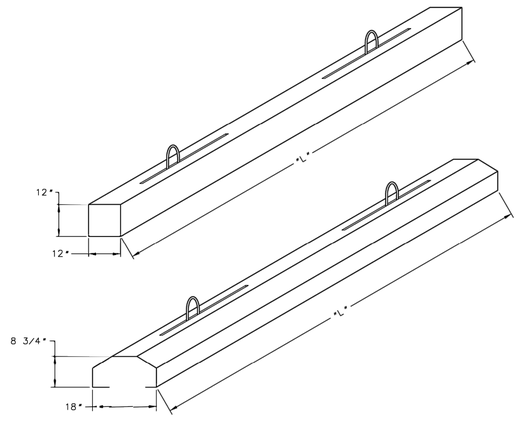
55-5/8" = 4.64' ABOVE THE BOTTOM OF THE TANK

TIGHT TANK TYPICAL DETAIL

N.T.S.

XERXES DEADMAN

TANK SIZE GALLONS	QTY	"L"	APPROX. WEIGHT EACH
4'-600	2	12'	1,800 LBS
4'-1,000	2	12'	1,800 LBS
4'-1,500	2	16'	2,400 LBS
6'-1,500	2	12'	1,800 LBS
6'-2,000	2	12'	1,800 LBS
6'-3,000	2	16'	2,400 LBS
6'-4,000	2	18'	2,700 LBS
6'-5,000	4	12'	1,800 LBS
6'-6,000	4	16'	2,400 LBS
6'-8,000	4	18'	2,700 LBS
8'-2,000	2	12'	1,800 LBS
8'-3,000	2	12'	1,800 LBS
8'-4,000	2	12'	1,800 LBS
8'-5,000	2	16'	2,400 LBS
8'-6,000	2	18'	2,700 LBS
8'-7,000	4	12'	1,800 LBS
8'-8,000	4	12'	1,800 LBS
8'-9,000	2	12'	1,800 LBS
	2	16'	2,400 LBS
8'-10,000	4	16'	2,400 LBS
8'-11,000	4	16'	2,700 LBS
8'-12,000	4	18'	2,700 LBS
8'-13,000	4	12'	1,800 LBS
	2	16'	2,400 LBS
8'-14,000	2	12'	1,800 LBS
	4	16'	2,400 LBS
8'-15,000	6	16'	2,400 LBS
10'-10,000	2	22'	3,000 LBS
10'-11,000	2	22'	3,000 LBS
10'-12,000	2	22'	3,000 LBS
10'-13,000	4	14'	1,900 LBS
10'-14,000	4	14'	1,900 LBS
10'-15,000	4	14'	1,900 LBS
10'-20,000	4	18'	2,400 LBS
10'-22,000	4	22'	3,000 LBS
10'-25,000	4	14'	1,900 LBS
	2	18'	2,400 LBS
10'-30,000	6	18'	2,400 LBS
10'-35,000	2	18'	2,400 LBS
	4	22'	3,000 LBS
10'-40,000	8	18'	2,400 LBS



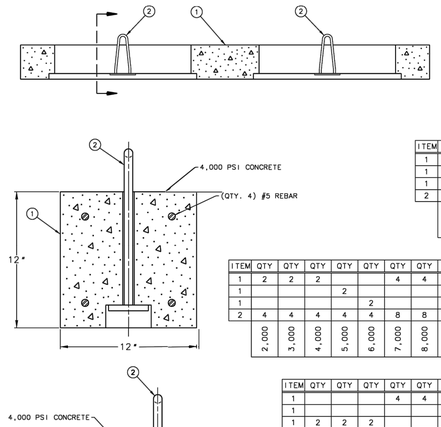
XERXES PRECAST DEADMEN

- XERXES DEADMEN ARE ENGINEERED AND DESIGNED TO BE USED WITH XERXES TANKS.
- IN MULTIPLE TANK INSTALLATIONS, EACH TANK REQUIRES ITS OWN SET OF DEADMEN.
- FOR CAST IN PLACE OR DEADMAN CONSTRUCTED OFF SITE, REFER TO XERXES INSTALLATION MANUAL AND OPERATING GUIDELINES FOR PROPER SIZING AND ANCHOR POINT SPECIFICATIONS.

XERXES®
TITLE: XERXES PRECAST DEADMEN
DATE 1/24 DR.NO. S11-376.02

TYPICAL PRECAST DEADMAN DETAIL

N.T.S.



ITEM	QTY	QTY	QTY	UNIT	DESCRIPTION
1	2	2		EA	DEADMAN, 12"x12"x12'
1			2	EA	DEADMAN, 12"x12"x16'
2	4	4	4	EA	GALVANIZED ANCHOR POINT
	600	1,000	1,500		4' TANKS

ITEM	QTY	QTY	QTY	QTY	QTY	QTY	QTY	UNIT	DESCRIPTION
1	2	2			4			EA	DEADMAN, 12"x12"x12'
1			2			4		EA	DEADMAN, 12"x12"x16'
1				2			4	EA	DEADMAN, 12"x12"x18'
2	4	4	4	4	8	8	8	EA	GALVANIZED ANCHOR POINT
	1,500	2,000	3,000	4,000	5,000	6,000	8,000		6' TANKS

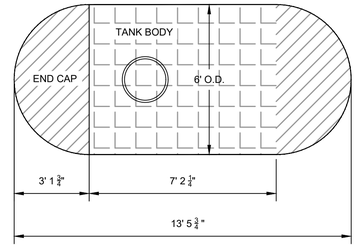
ITEM	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	UNIT	DESCRIPTION
1	2	2	2			4	4	2				4	2		EA	DEADMAN, 12"x12"x12'
1				2				2	4	4		2	4	6	EA	DEADMAN, 12"x12"x16'
1					2						4				EA	DEADMAN, 12"x12"x18'
2	4	4	4	4	4	8	8	8	8	8	8	12	12	12	EA	GALVANIZED ANCHOR POINT
	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	11,000	12,000	13,000	14,000	15,000		8' TANKS

ITEM	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	QTY	UNIT	DESCRIPTION
1					4	4	4				4				EA	DEADMAN, 8 3/4"x18"x14'
1								4			2	6	2	8	EA	DEADMAN, 8 3/4"x18"x18'
1	2	2	2						4				4		EA	DEADMAN, 8 3/4"x18"x22'
2	8	8	8	8	8	8	12	16	16	20	24	28	EA	GALVANIZED ANCHOR POINT		
	10,000	11,000	12,000	13,000	14,000	15,000	20,000	22,000	25,000	30,000	35,000	40,000		10' TANKS		

XERXES®
TITLE: XERXES PRECAST DEADMEN ANCHOR POINT ASSEMBLY
DATE 1/24 DR.NO. S11-377.02

TYPICAL PRECAST DEADMAN ANCHOR DETAIL

N.T.S.



THE MAXIMUM CROSS-SECTIONAL AREA OF THE TANK WHEN VIEWED FROM ABOVE IS CALCULATED BELOW. THIS AREA IS USED TO CALCULATE SOIL PRESSURE AND HYDROSTATIC PRESSURE.

AREA OF END CAP:

IDEALIZED AS A HALF CIRCLE CROSS SECTION
RADIUS = 3' 1 3/4" = 3.15'
AREA = (π*R^2)/2 = (π*(3.15')^2)/2 = 15.55 SF

AREA OF TANK BODY:

RECTANGULAR CROSS SECTION
L = 7' 2 1/4" = 7.19'
W = 6'
AREA = L*W = (7.19' * 6') = 43.1 SF

TOTAL CROSS SECTIONAL AREA:

AREA = (2* END CAP AREA) + (TANK BODY AREA) = 2*(15.55) SF + 43.1 SF = 74.2 SF

TIGHT TANK PLAN VIEW

N.T.S.

NOT FOR CONSTRUCTION

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Phone: 617-497-7800
www.kleinfelder.com

COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51481
REGISTERED PROFESSIONAL ENGINEER
12/23/2024

REVISIONS

REV	DESCRIPTION	DSN DWN	CHK APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

HYANNISPORT - SIMMONS POND

SEWER DETAILS - I

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 HOBBLES MAY A LIBERTY

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	
DESIGNED BY	MPS
DRAWN BY	MD/MPS
CHECKED BY	TB/GAA
APPROVED BY	GAA

C2-151

SHEET 22 of 31

PLOTTED:

TIGHT TANK SPECIFICATIONS

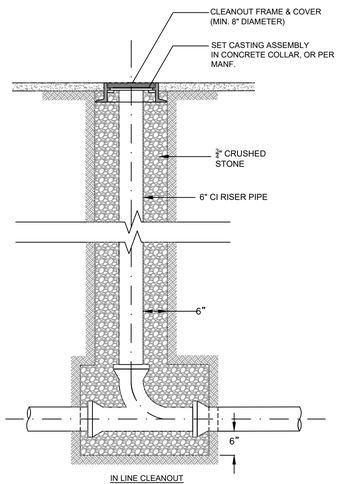
1. TIGHT TANKS SHALL BE CONSTRUCTED OF SOUND AND DURABLE WATERTIGHT MATERIALS NOT SUBJECT TO EXCESSIVE CORROSION, DECAY, OR FROST DAMAGE, OR CRACKING OR BUCKLING DUE TO SETTLEMENT OR BACKFILLING. TIGHT TANKS SHALL BE DOUBLE WALLED FIBERGLASS REINFORCED PLASTIC. (OTHER MATERIALS AS APPROVED IN WRITING BY THE DEPARTMENT, METAL TIGHT TANKS ARE PROHIBITED.)

2. TANK CONSTRUCTION MATERIALS SHALL MEET THE FOLLOWING MINIMUM SPECIFICATIONS OR AN ASTM EQUIVALENT STANDARD:
   - 2.1. INTERNAL LOAD - TANK SHALL BE DESIGNED TO WITHSTAND A 5-PSIG (35 kPA) AIR-PRESSURE TEST WITH 5:1 SAFETY FACTOR.
   - 2.2. SURFACE LOADS - TANK SHALL BE DESIGNED TO WITHSTAND SURFACE H-20 AND HS-20 AXLE LOADS WHEN PROPERLY INSTALLED ACCORDING TO MANUFACTURER'S CURRENT INSTALLATION AND OPERATING GUIDELINES.
   - 2.3. EXTERNAL HYDROSTATIC PRESSURE - TANK SHALL BE DESIGNED FOR 7 FEET OF OVERBURDEN OVER THE TOP OF THE TANK, THE HOLE FULLY FLOODED, AND A SAFETY OF 5:1 AGAINST GENERAL BUCKLING.
   - 2.4. THE TANK SIZE, FITTINGS, AND ACCESSORIES, SHALL BE AS SHOWN ON THE DRAWINGS.
   - 2.5. TANK SHALL BE MANUFACTURED WITH A LAMINATE CONSISTING OF RESIN AND GLASS FIBER REINFORCEMENT ONLY. NO SAND/SILICA FILLERS OR RESIN EXTENDERS SHALL BE USED.
   - 2.6. TANK SHALL BE VENTED TO ATMOSPHERIC PRESSURE.
   - 2.7. TANK SHALL BE CAPABLE OF HANDLING LIQUIDS WITH SPECIFIC GRAVITY UP TO 1.1.
   - 2.8. TANK SHALL BE COMPATIBLE WITH LIQUIDS IDENTIFIED IN THE MANUFACTURER'S STANDARD LIMITED WARRANTY.

3. TANK, COVERS, CONNECTIONS AND PIPING SHALL BE DESIGNED AND CONSTRUCTED SO AS TO WITHSTAND AN ANTICIPATED MINIMUM HS-20 LOADING.

4. TIGHT TANK SHALL BE MANUFACTURED IN ACCORDANCE WITH A QUALITY CONTROL/QUALITY ASSURANCE PROGRAM. THE PROGRAM FOR CONCRETE TANKS SHALL BE IN CONFORMITY WITH ASTM STANDARD C 1227-96OR AN ASTM EQUIVALENT STANDARD. CONCRETE TANKS SHALL BE EMBOSSED WITH A SEAL STATING THAT THIS ASTM STANDARD HAS BEEN MET.

5. TIGHT TANK SHALL BE EQUIPPED WITH A CONTINUOUS LEAK DETECTION SYSTEM, SUCH AS TRUCHECK BY XERXES OR SIMILAR. THE LEAK SYSTEM SHALL BE HARDWIRED WITH THE SEPTIC ALARM SYSTEMS.

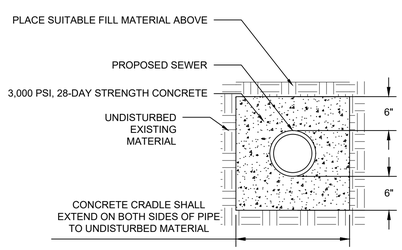


IN LINE CLEANOUT

NOTES:
1. CLEANOUT FRAME AND COVER SHALL BE ONE OF THE FOLLOWING:
   A. PRODUCT NUMBER 00157324C01 AS MANUFACTURED BY EAST JORDAN IRON WORKS, FABRICATED FROM GRAY IRON AND CONFORMING TO ASTM A48 CLASS 35B; OR APPROVED EQUAL.

SEWER CLEANOUT TYPICAL DETAIL

N.T.S.



CONCRETE ENCASEMENT

N.T.S.

BUILDING SEWERS SPECIFICATIONS

1. THE BUILDING SEWER SHALL BE SUFFICIENT TO SERVE THE CONNECTED FIXTURES. IN NO CASE SHALL THE BUILDING SEWER BE LESS THAN FOUR INCHES IN DIAMETER.

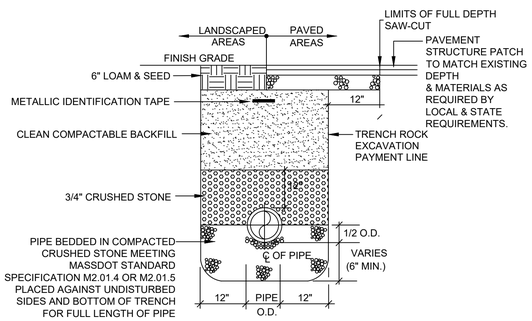
2. THE BUILDING SEWER SHALL BE CONSTRUCTED OF CORROSION RESISTANT MATERIAL AND EQUIPPED WITH WATER TIGHT JOINTS; PVC PIPE OR THE EQUIVALENT. BUILDING SEWER SHALL BE CAST IRON PIPING FOR THE FIRST 10' OF PIPING FROM THE BUILDING.

3. ALL PIPE JOINTS OF THE BUILDING SEWER SHALL BE MADE WATER-TIGHT AND PROTECTED AGAINST DAMAGE BY ROOTS. POURED-TYPE JOINTS SHALL BE PROPERLY WIPED ON THE INSIDE TO ELIMINATE OBSTRUCTION OF FLOW.

4. THE BUILDING SEWER SHALL BE LAID ON A COMPACTED FIRM BASE.

5. THE BUILDING SEWER SHALL BE VENTED THROUGH THE VENT STACK OR MAIN VENT OF THE BUILDING SERVED BY IT. NO TRAP SHALL BE INSTALLED IN THE BUILDING SEWER OR BUILDING DRAIN.

6. ALL BUILDING SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STATE PLUMBING CODE, 248 CMR2.00



NOTES:
1. METALIZED 2" WIDE DETECTABLE IDENTIFICATION TAPE SHALL BE INSTALLED OVER SEWER LINES 12" BELOW FINISH GRADE.

PVC SEWER PIPE TRENCH SECTION

N.T.S.

GENERAL CONSTRUCTION REQUIREMENTS FOR ALL TIGHT TANK SYSTEM COMPONENTS

1. TIGHT TANK:

   (A) WATERTIGHT THROUGH MANUFACTURER'S SPECIFICATION AND WARRANTY; OR

   (B) MADE WATERTIGHT BY THE MANUFACTURER, EQUIPMENT SUPPLIER OR INSTALLER USING SYNTHETIC POLYMER SEALER SPECIFIED BY THE SYNTHETIC MATERIAL MANUFACTURER.

2. TIGHT TANK SHALL BE CONSTRUCTED OR SET LEVEL AND TRUE TO GRADE ON A LEVEL STABLE BASE WHICH HAS BEEN MECHANICALLY COMPACTED. IF THE COMPONENT IS PLACED IN FILL, PROPER COMPACTION IS REQUIRED TO ENSURE STABILITY AND TO PREVENT SETTLING; NATIVE GROUND WITH A SIX INCH AGGREGATE BASE IS OTHERWISE ADEQUATE.

3. TIGHT TANK SHALL BE EQUIPPED WITH A WATERTIGHT ACCESS MANHOLE(S) WITH A MINIMUM DIAMETER OF 22 INCHES AND CONSTRUCTED OF DURABLE MATERIAL.

4. ALL SYSTEM COMPONENTS SHALL BE CONSTRUCTED OF CORROSION RESISTANT MATERIALS.

5. ALL PRESSURIZED PIPES SHALL BE DESIGNED AND INSTALLED TO MEET THE FOLLOWING REQUIREMENTS:

   (A) TO PREVENT FREEZING BY BEING INSTALLED BELOW THE FROST LINE, BY BEING ADEQUATELY INSULATED IF INSTALLED ABOVE THE FROST LINE, OR BE SELF-DRAINING;

   (B) TO SPECIFY THE APPROPRIATE CLASS OR SCHEDULE OF PIPE TO WITHSTAND MAXIMUM PRESSURE AND/OR ANTICIPATED VEHICULAR LOADS; AND

   (C) TO SPECIFY APPROPRIATE THRUST BLOCKING AT ALL ANGLES, BENDS, BRANCHES, PLUGS AND WHEREVER ELSE NECESSARY TO PREVENT DISRUPTION OF PROPER FUNCTIONING OF THE LINE.

6. THE TOP OF ALL SYSTEM COMPONENTS, INCLUDING THE TIGHT TANK SHALL BE INSTALLED NO MORE THAN 36" BELOW FINISH GRADE.

7. WHERE ANY PORTION OF ANY COMPONENT IS TO BE PLACED AT OR BELOW THE GROUND-WATER TABLE, ALL SYSTEM TANKAGE, INCLUDING THE TIGHT TANK, SHALL BE DESIGNED WITH COUNTER WEIGHTS, ANCHORS OR BALLAST AND A BUOYANCY CALCULATION FOR THE ENTIRE VOLUME OF EACH COMPONENT, WHEN EMPTY, SHALL BE PERFORMED AND SUBMITTED WITH THE SYSTEM PLANS AND SPECIFICATIONS.

8. ALL SYSTEM COMPONENTS SHALL BE MARKED WITH MAGNETIC MARKING TAPE OR A COMPARABLE MEANS IN ORDER TO LOCATE THEM ONCE BURIED.

TIGHT TANK SYSTEM GENERAL NOTES

1. THE SANITARY SEWAGE SYSTEM SHOWN SHALL BE INSTALLED IN ACCORDANCE WITH THE COMMONWEALTH OF MASSACHUSETTS STATE ENVIRONMENTAL CODE 310 CMR 15.00 (TITLE V) AND ANY LOCAL BOARD OF HEALTH REGULATIONS.

2. ANY MODIFICATION TO THE WORK SHALL BE APPROVED IN WRITING BY THE ENGINEER AND THE LOCAL BOARD OF HEALTH PRIOR TO PERFORMANCE.

3. THE TIGHT TANK SHALL BE H-20 DESIGN REINFORCED CONCRETE PRECAST MANUFACTURED BY OLDCASTLE PRECAST OR APPROVED EQUAL.

4. WHEREVER SEWER LINES CROSS WATER SUPPLY LINES, BOTH PIPES SHALL BE CONSTRUCTED OF CLASS 150 (MIN.) PRESSURE PIPE TO 10' ON EITHER SIDE OF CROSSING. PIPES SHALL ALSO BE PRESSURE TESTED TO ASSURE WATER TIGHTNESS.

5. NOTIFY THE LOCAL BOARD OF HEALTH AGENT AND ENGINEER AT THE TIME OF EXCAVATION, PRIOR TO INSTALLATION.

6. NOTIFY LOCAL BOARD OF HEALTH AGENT AND ENGINEER WHEN SYSTEM IS COMPLETED AND READY FOR INSPECTION.

7. SHOP DRAWINGS FOR THE FOLLOWING ITEMS SHALL BE PROVIDED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO THE START OF INSTALLATION:
   - ALL UNDERGROUND STRUCTURES (TANKS, STEPS)
   - FRAMES AND COVERS
   - PIPES, FITTINGS
   - WATERPROOFING & PIPE GASKETS

STRUCTURE TESTING NOTES:

TIGHT TANK SHALL BE VACUUM TESTED FOR WATER TIGHTNESS AFTER INSTALLATION IN ACCORDANCE WITH ASTM C 1227. ALL TANKS MUST PASS TESTING PRIOR TO USE.

NOT FOR CONSTRUCTION

PLOTTED:

KLEINFELDER
Bright People. Right Solutions.
One Beacon Street, Suite 8100
Boston, MA 02108
Phone: 617-497-7800
www.kleinfelder.com

COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51461
REGISTERED PROFESSIONAL ENGINEER
12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

HYANNISPORT - SIMMONS POND

SEWER DETAILS - II

STRAIGHTWAY
WATER TREATMENT FACILITY

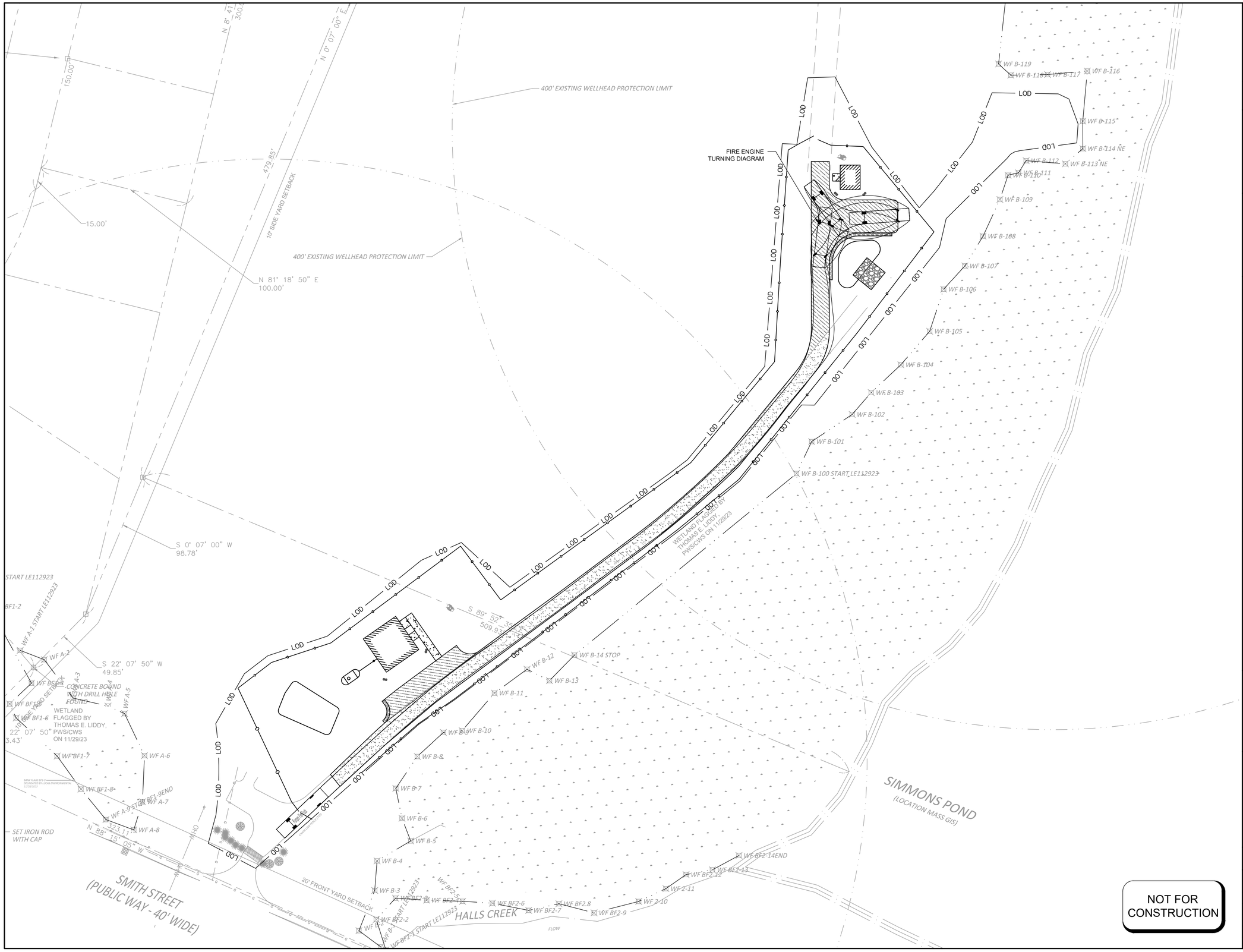
TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	
DESIGNED BY	MPS
DRAWN BY	MD/MPS
CHECKED BY	TB/GAA
APPROVED BY	GAA

C2-152

SHEET 23 of 31



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COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51481
REGISTERED PROFESSIONAL ENGINEER

12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

0 30 60 90

SCALE: 1" = 30' SCALE IN FEET

ORIGINAL DRAWING SIZE IS 22 x 34

HYANNISPORT - SIMMONS POND

TURNING DIAGRAM

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 INCORPORATED A.D. 1685

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

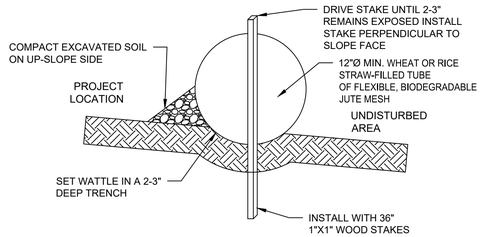
NOI SUBMITTAL

PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	-
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CHECKED BY	TB/GAA
APPROVED BY	GAA

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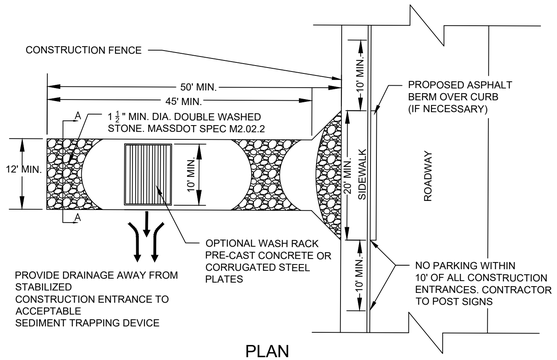
SHEET 24 of 31

SLOPE STEEPNESS	MAXIMUM LENGTH (FT)
2:1	25
3:1	50
4:1	75
5:1 OR FLATTER	100

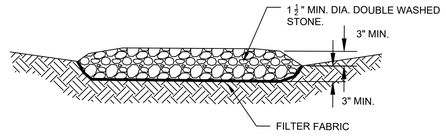


NOTES:
1. BEGIN AT THE LOCATION WHERE THE WATTLE IS TO BE INSTALLED BY EXCAVATING A 2-3" DEEP X 9" WIDE TRENCH ALONG THE CONTOUR OF THE SLOPE. EXCAVATED SOIL SHALL BE PLACED UP-SLOPE FROM THE ANCHOR TRENCH.
2. PLACE THE WATTLE IN THE TRENCH SO THAT IT CONTOURS TO THE SOIL SURFACE. COMPACT THE SOIL FROM THE EXCAVATED TRENCH AGAINST THE WATTLE ON THE UP-HILL SIDE. ADJACENT WATTLES SHOULD TIGHTLY ABUT.
3. SECURE THE WATTLE WITH 36" STAKES EVERY 3-4' WITH A STAKE ON EACH END. STAKES SHALL BE DRIVEN THROUGH THE MIDDLE OF THE WATTLES LEAVING AT LEAST SAMPLE LINE 2-3" OF STAKE EXTENDING ABOVE. THE WATTLE STAKES SHALL BE DRIVEN PERPENDICULAR TO SLOPE FACE.
4. MAX. DRAINAGE AREA ≤ 0.25 ACRES/100 LINEAR FEET.

STRAW WATTLE DETAIL
SCALE: N.T.S.

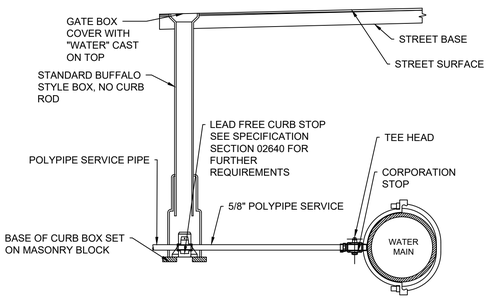


PLAN
NOT TO SCALE

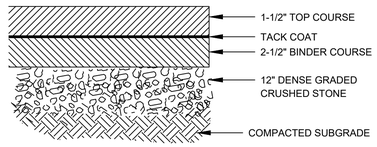


SECTION A-A

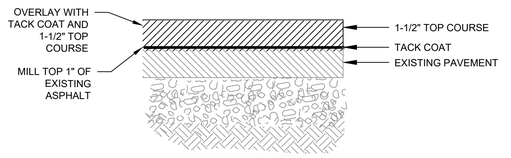
STABILIZED VEHICLE CONSTRUCTION EXIT
SCALE: N.T.S.



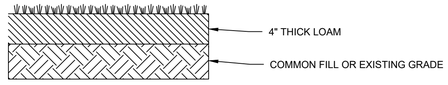
POLYPIPE WATER SERVICE CONNECTION
SCALE: N.T.S.



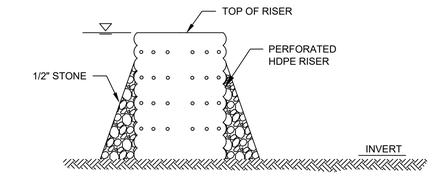
BITUMINOUS CONCRETE PAVEMENT ROAD SURFACE
SCALE: N.T.S.

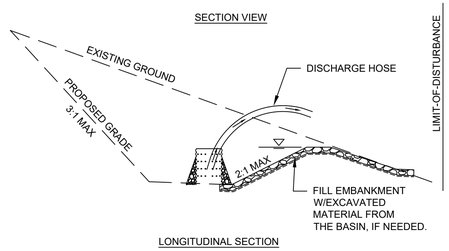


MILL AND OVERLAY
SCALE: N.T.S.



TYPICAL LOAM AND SEED SECTION
SCALE: N.T.S.

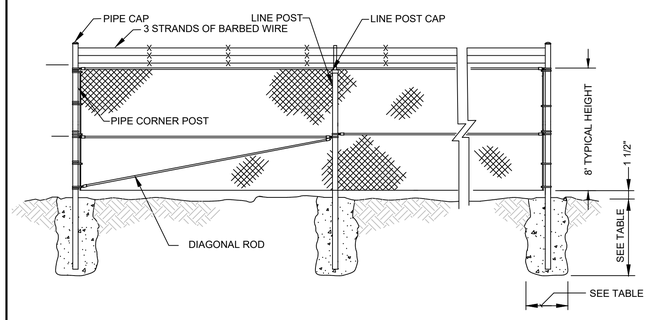




LONGITUDINAL SECTION

NOTES:
1. TRAP CAPACITY: TEMPORARY SEDIMENT TRAP 134 CY/CONTRIBUTING ACRE AND 50% OF THIS VOLUME SHALL BE WET STORAGE.
2. TOTAL MIN. STORAGE VOLUME = 1" X CONTRIBUTING AREA.
3. SEDIMENT SHALL BE REMOVED WHEN THE BASIN IS 1/2 FULL AT A MINIMUM.
4. THE BASIN SHALL REMAIN IN PLACE UNTIL THE SITE HAS BEEN STABILIZED WITH BUILDINGS, PAVEMENT, OR ESTABLISHED VEGETATION, AS APPLICABLE.

TEMPORARY SEDIMENT TRAP (TYP.)
SCALE: N.T.S.

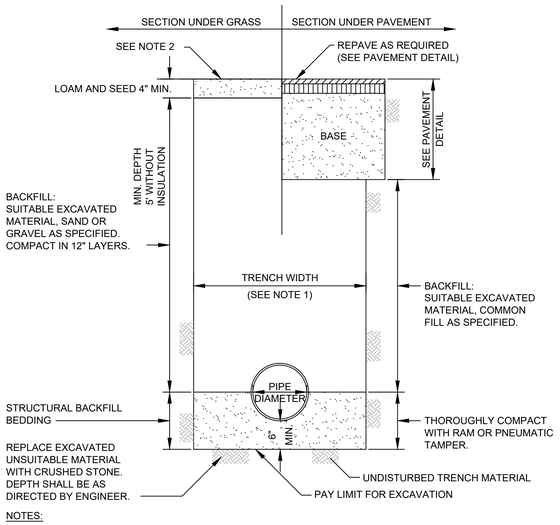


POST SETTING REQUIREMENT			
TYPE OF POST	HOLE DIA. AT TOP*	HOLE DEPTH	POST EMBEDMENT
LINE	9"	38"	36"
TERMINAL	12"	38"	36"

*MIN. HOLE DIAMETER IN SOFT OR LOOSE SOIL SHALL BE 18"

NOTES:
1. POST SPACING: LINE POSTS SHALL BE EVENLY SPACED, CENTER TO CENTER.
2. BARBED WIRE ARM WHERE REQUIRED SHALL BE PER SPECIFICATION SECTION 02444 - CHAIN LINK FENCE AND GATES.
3. POST FOOTING SHALL HAVE A 1" CROWN FINISH.
4. CONTRACTOR SHALL SUBMIT A COMPLETE SHOP DRAWING OF PROPOSED FENCE AND GATE TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

CHAIN LINK FENCE
SCALE: N.T.S.



NOTES:
1. IN TRENCH DIMENSIONS SHALL BE AS FOLLOWS:
   (a) FOR PIPE LESS THAN OR EQUAL TO 12 INCHES IN DIAMETER, ALLOWABLE TRENCH WIDTH AT PLANE 12 INCHES ABOVE PIPE SHALL BE NO MORE THAN 36 INCHES.
   (b) FOR PIPE GREATER THAN 12 INCHES IN DIAMETER THE ALLOWABLE TRENCH WIDTH SHALL BE EQUAL TO THE PIPE OUTSIDE DIAMETER PLUS 24 INCHES.
2. WHERE NO GRASS OCCURS, MATCH EXISTING MATERIALS AND DEPTHS. PLACE A MINIMUM OF 6" OF GRAVEL.
3. BEDDING SHALL BE WRAPPED WITH FILTER FABRIC IN LOCATIONS WHERE EXISTING SOIL IS CONSIDERED UNSUITABLE BY THE ENGINEER.

TYPICAL UTILITY TRENCH
SCALE: N.T.S.

NOT FOR CONSTRUCTION

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COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51461
REGISTERED PROFESSIONAL ENGINEER
12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 — 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

GENERAL DETAILS - I

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 RESIDES & MAY A. 1685

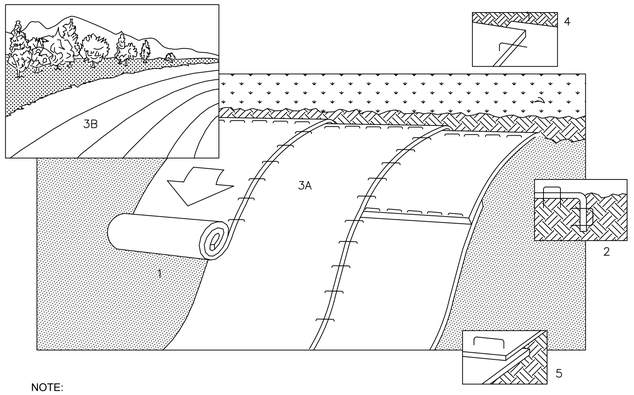
TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	-
DESIGNED BY	MPS
DRAWN BY	MD/MPS
CHECKED BY	TB/GAA
APPROVED BY	GAA

C5-051

SHEET 25 of 31

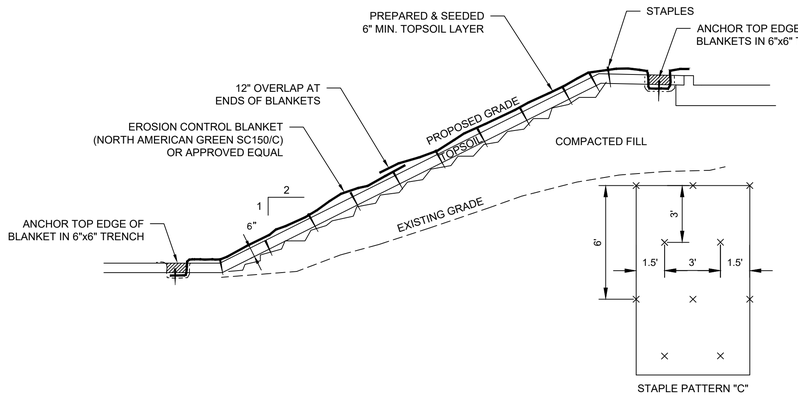


NOTE:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" OVERLAP.
5. WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH APPROXIMATELY 4" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.

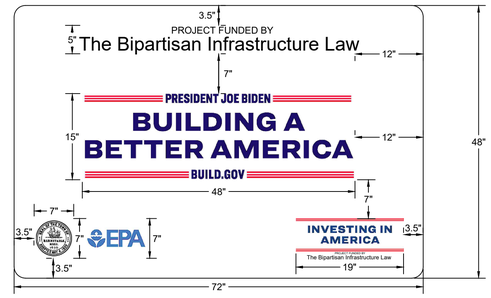
EROSION CONTROL BLANKET INSTALLATION

SCALE: N.T.S.



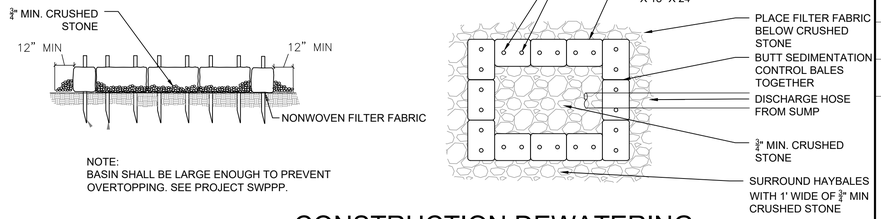
EROSION CONTROL BLANKET

SCALE: N.T.S.



PROJECT SIGN

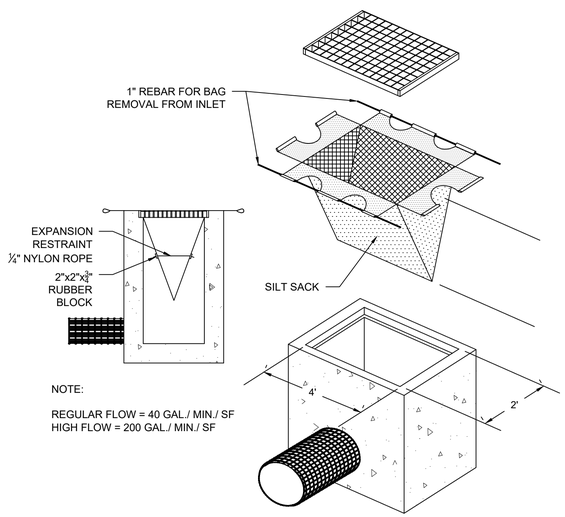
SCALE: N.T.S.



NOTE:
BASIN SHALL BE LARGE ENOUGH TO PREVENT OVERTOPPING. SEE PROJECT SWPPP.

CONSTRUCTION DEWATERING

SCALE: N.T.S.

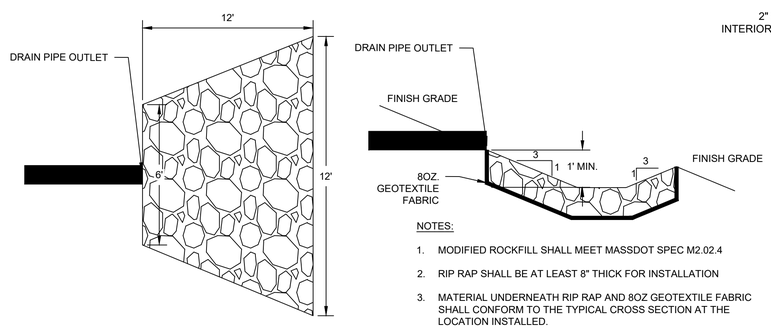


NOTE:

REGULAR FLOW = 40 GAL./ MIN./ SF
HIGH FLOW = 200 GAL./ MIN./ SF

SILT SACK

SCALE: N.T.S.

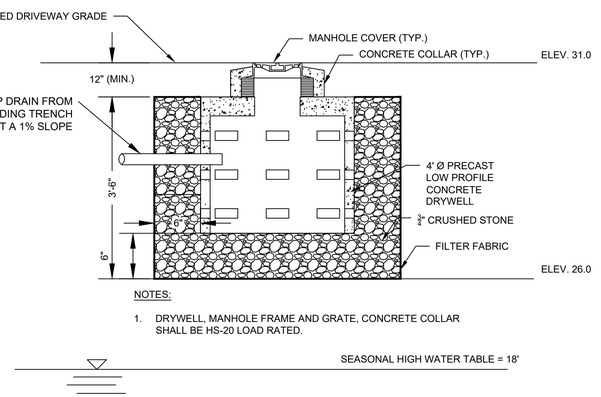


NOTES:

1. MODIFIED ROCKFILL SHALL MEET MASSDOT SPEC M2.02.4
2. RIP RAP SHALL BE AT LEAST 8" THICK FOR INSTALLATION
3. MATERIAL UNDERNEATH RIP RAP AND 8OZ GEOTEXTILE FABRIC SHALL CONFORM TO THE TYPICAL CROSS SECTION AT THE LOCATION INSTALLED.

RIPRAP EROSION CONTROL OUTLET PROTECTION APRON

SCALE: N.T.S.



NOTES:

1. DRYWELL, MANHOLE FRAME AND GRATE, CONCRETE COLLAR SHALL BE HS-20 LOAD RATED.

PRECAST 4' DIA. DRYWELL

SCALE: N.T.S.

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GENERAL DETAILS - II

STRAIGHTWAY
WATER TREATMENT FACILITY

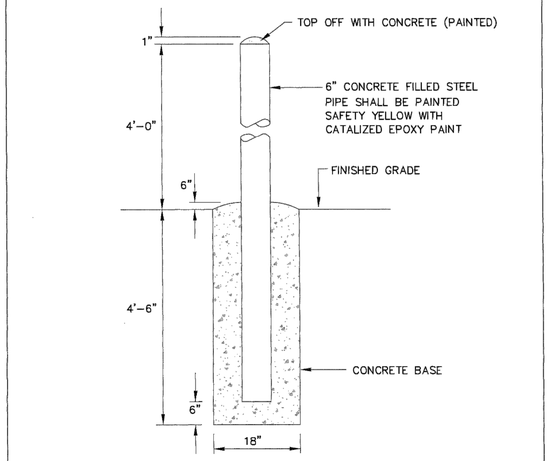
TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

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C5-052

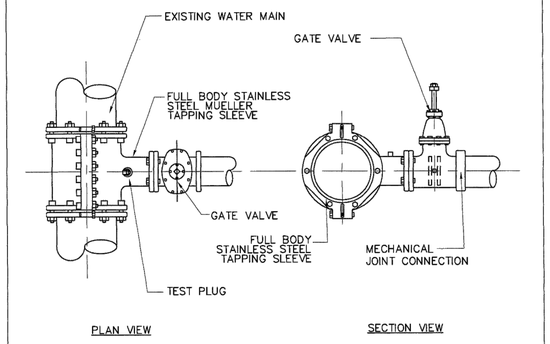
SHEET 26 of 31



DETAIL NO.: 5

SCALE:N.T.S.	REVISION
NO.:	1
DATE:	MARCH 2014

TOWN OF BARNSTABLE
DPW WATER SUPPLY DIVISION
HYANNIS WATER SYSTEM
CONCRETE BOLLARD DETAIL



NOTE:

1. GATE VALVE FOR TAPPING SLEEVE SHALL BE MJxFL, MODEL T-2360, OPEN-LEFT, AS MANUFACTURED BY MUELLER.

DETAIL NO.: 7

SCALE:N.T.S.	REVISION
NO.:	1
DATE:	MARCH 2014

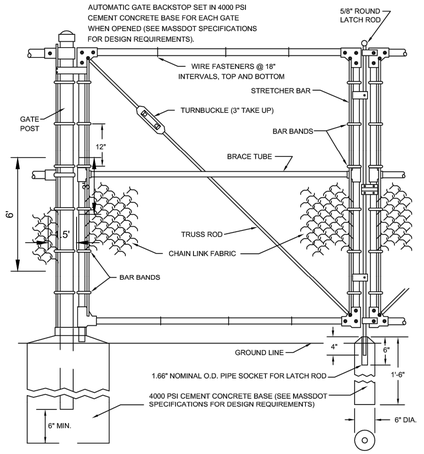
TOWN OF BARNSTABLE
DPW WATER SUPPLY DIVISION
HYANNIS WATER SYSTEM
TAPPING SLEEVE AND GATE VALVE

MassDOT Highway Division — CONSTRUCTION STANDARDS

CHAIN LINK FENCE - SWING GATE

DRAWING NUMBER E 404.6.0

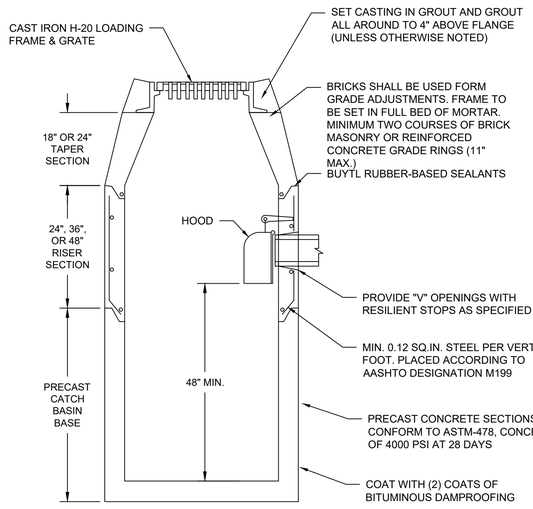
DATE OF ISSUE OCTOBER 2017



DOUBLE GATES

END POSTS TO BE USED ON LATCH SIDE OF SINGLE GATE OPENINGS.

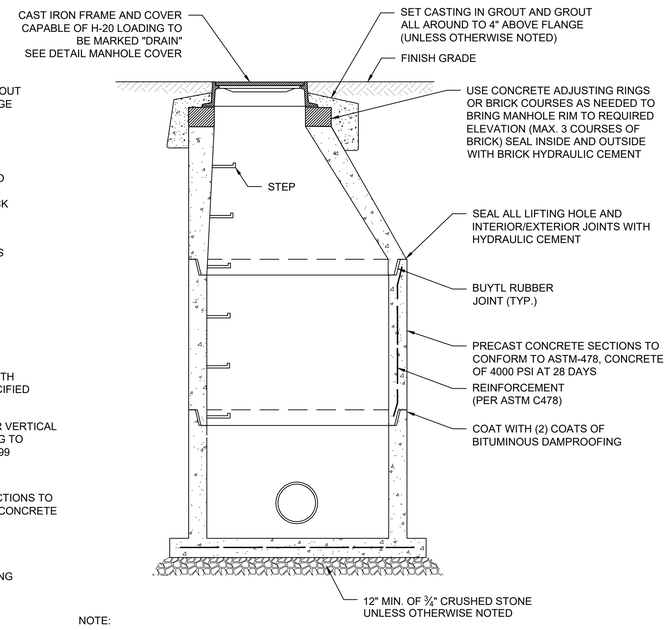
1. CHAIN LINK FABRIC FOR GATES TO BE THE SAME AS REQUIRED FOR FENCE.
2. FOR GATE POST BASE, SEE DRAWING 404.5.0



NOTES:

1. BASE AND JOINTS DETAILS SHALL BE IN ACCORDANCE WITH MA DOT STANDARDS.
2. PRECAST CONCRETE H-20 LOADING

PRECAST CONCRETE CATCH BASIN
SCALE: N.T.S.



NOTE:

1. 5'-0" DIAMETER FOR ALL MANHOLE DEPTHS GREATER THAN 20 FEET OR WHEN ORDERED BY THE ENGINEER.

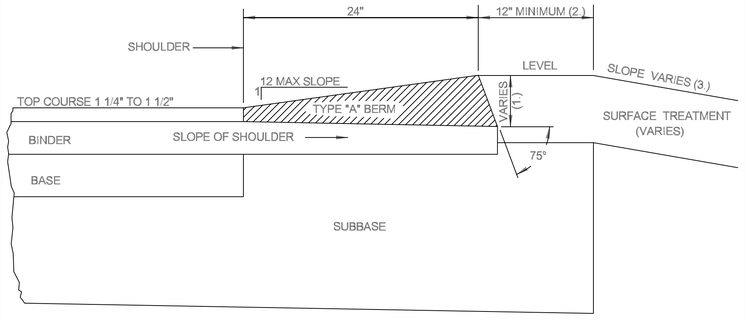
TYPICAL 48" DIAMETER STORMWATER MANHOLE
SCALE: N.T.S.

MassDOT CONSTRUCTION STANDARDS

HOT MIX ASPHALT BERM TYPE A

DRAWING NUMBER E 106.1.0

DATE OF ISSUE OCTOBER 2017



NOTE:

FOR MODIFIED BERM THE SLOPE REMAINS CONSTANT AT 1 (V) TO 12 (H)

1. THIS DIMENSION VARIES WITH THE THICKNESS OF THE TOP COURSE AND SLOPE OF BINDER
2. SEE E 401.1.1 FOR TYPICAL SECTION AT GUARDRAIL LOCATIONS
3. SEE TYPICAL SECTIONS FOR PROJECT

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GENERAL DETAILS - III

STRAIGHTWAY
WATER TREATMENT FACILITY

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

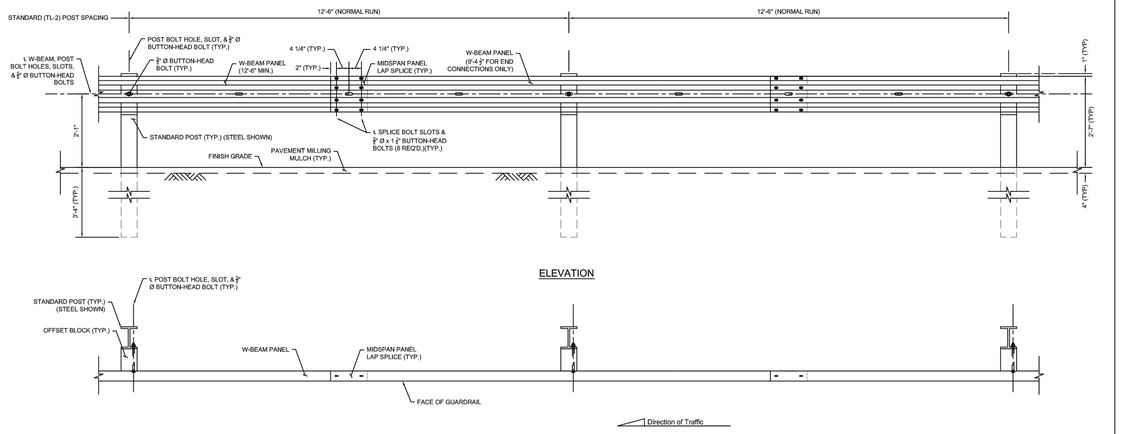
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C5-053

SHEET 27 of 31

PLOTTED:



NOTES:

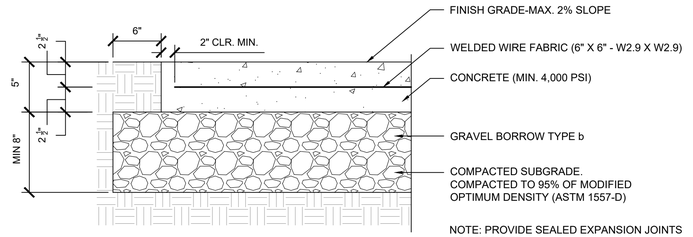
1. A 9'-4 ½" PANEL IS REQUIRED WHEN TRANSITIONING TO TL-3 W-BEAM GUARDRAIL TO MAINTAIN PROPER POST SPACING.

massDOT Massachusetts Department of Transportation Highway Division | CONSTRUCTION STANDARDS SECTION 400

GUARDRAIL, TL-2

DATE OF ISSUE: OCTOBER 2017

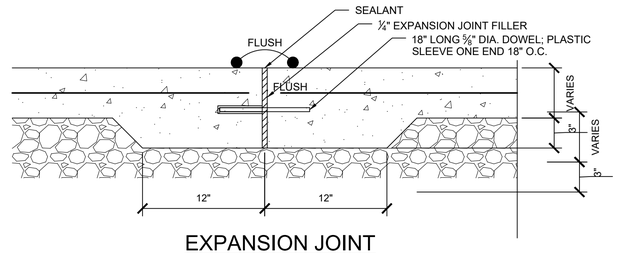
DRAWING NUMBER: 400.1.2



NOTE: PROVIDE SEALED EXPANSION JOINTS AS SPECIFIED.

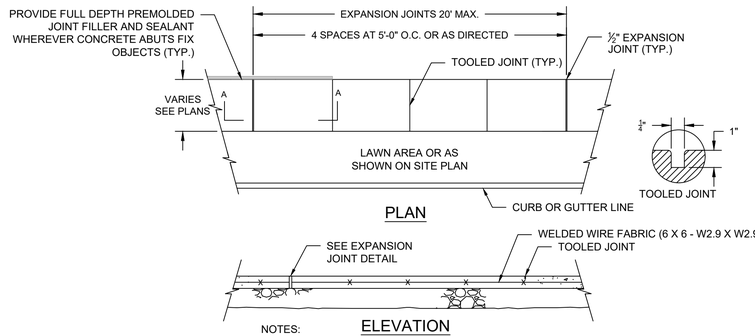
CONCRETE WALK

SCALE: N.T.S.



EXPANSION JOINT

SCALE: N.T.S.

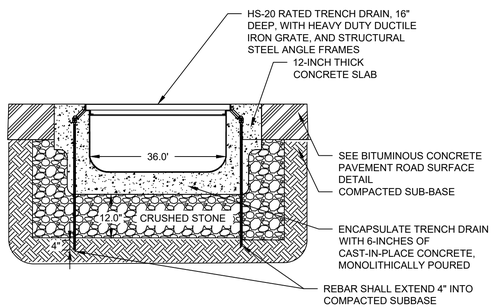


NOTES:

1. ¼" WIDE x 1" DEEP TOOLED JOINT SCORED AT 5'-0" INTERVALS.
2. SIDEWALK TO BE BROOM FINISHED.
3. COLOR TO BE SELECTED BY OWNER.

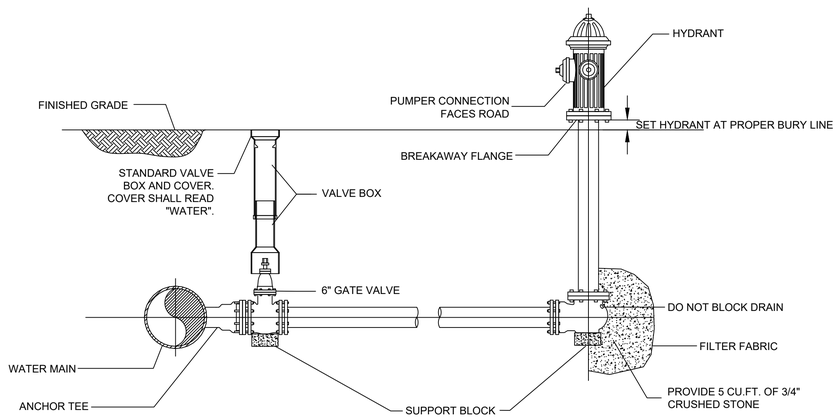
REINFORCED CONCRETE WALK

SCALE: N.T.S.



TRENCH DRAIN

SCALE: N.T.S.

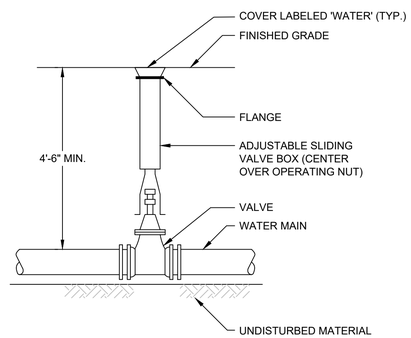


NOTES:

1. PROVIDE HYDRANT AND VALVE JOINTS WITH RESTRAINED MECHANICAL JOINTS.
2. SUPPORT BLOCKS TO BE PRESSURE TREATED WOOD OR CONCRETE MASONRY BLOCK.

HYDRANT SETTING WITH GATE VALVE

SCALE: N.T.S.



TYPICAL WATER VALVE DETAIL

TYPICAL WATER VALVE DETAIL

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COMMONWEALTH OF MASSACHUSETTS — GREGORY AVENIA — CIVIL — No. 51481 — REGISTERED PROFESSIONAL ENGINEER

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GENERAL DETAILS - IV

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 — INCORPORATED MAY 3, 1685

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

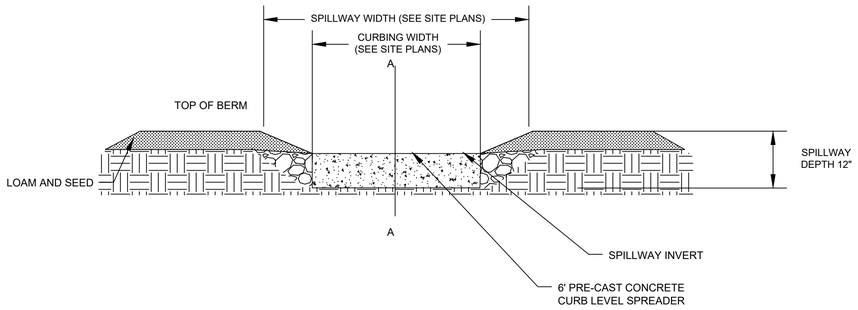
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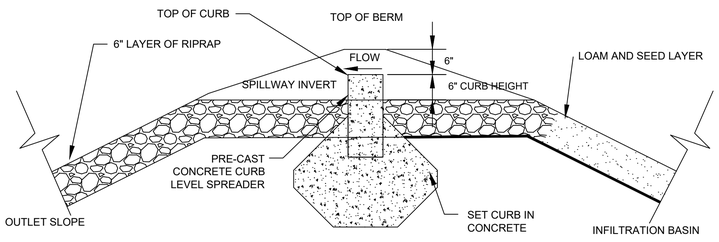
C5-054

SHEET 28 of 31

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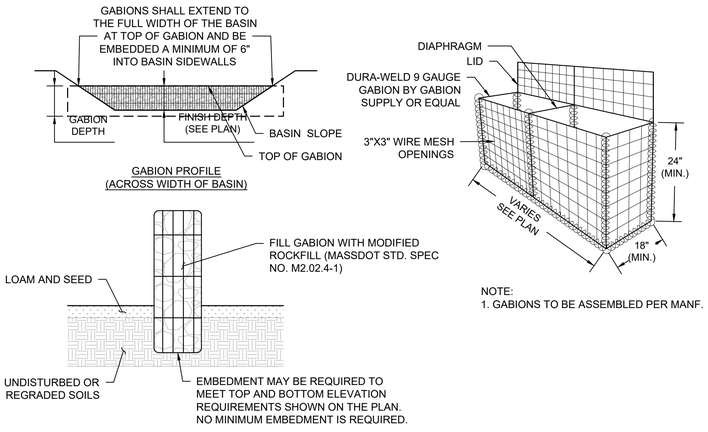
FRONT VIEW



SECTION VIEW

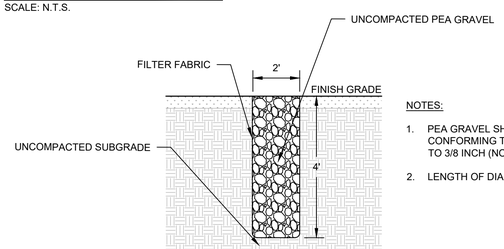
TYPICAL PRECAST CONCRETE CURB OUTLET WEIR

SCALE: N.T.S.



GABION BASKET

SCALE: N.T.S.

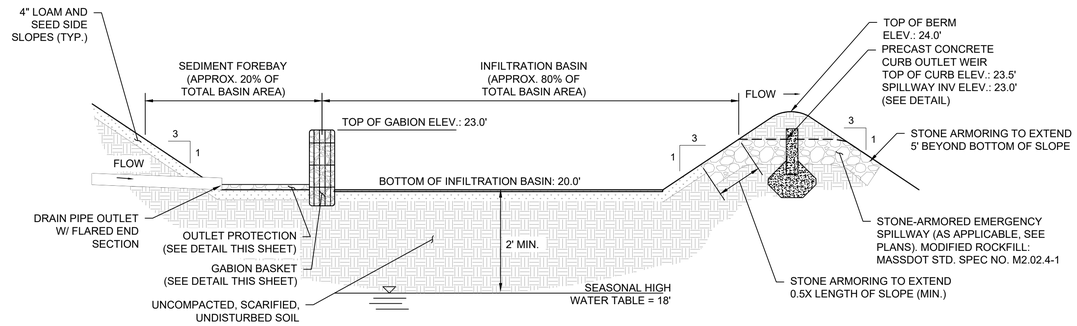


NOTES:

1. PEA GRAVEL SHALL BE CLEAN BANK-RUN GRAVEL, CONFORMING TO ASTM D 448, VARYING IN SIZE FROM 1/8 INCH TO 3/8 INCH (NO. 6 STONE).
2. LENGTH OF DIAPHRAGM SHALL BE AS SHOWN ON PLAN.

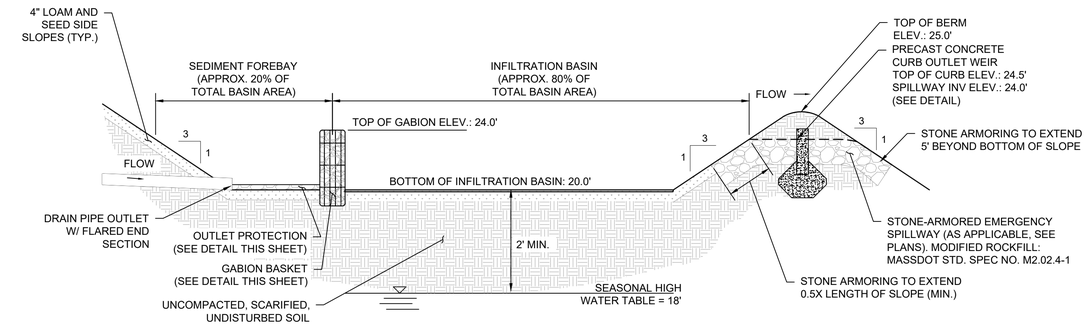
PEA GRAVEL DIAPHRAGM

SCALE: N.T.S.



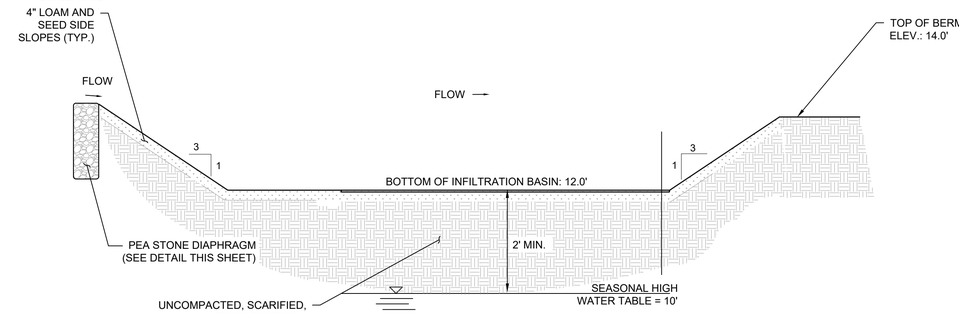
INFILTRATION BASIN A SECTION

SCALE: N.T.S.



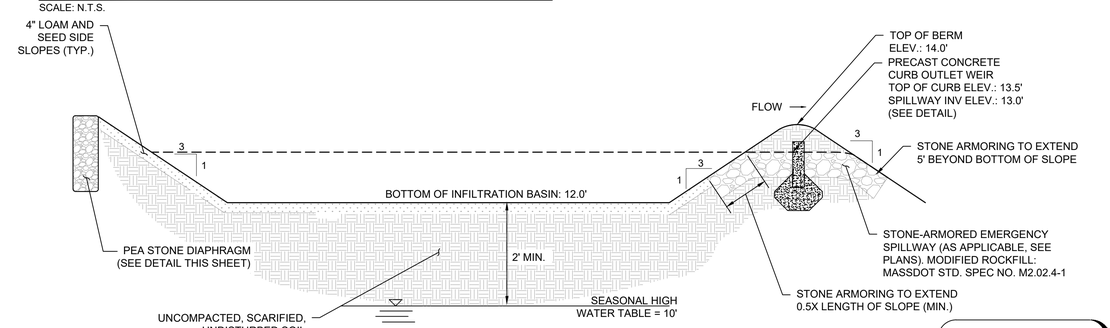
INFILTRATION BASIN B SECTION

SCALE: N.T.S.



INFILTRATION BASIN C SECTION

SCALE: N.T.S.



INFILTRATION BASIN D SECTION

SCALE: N.T.S.

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WATER SUPPLY DIVISION
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C5-055

SHEET 29 of 31

SUBSURFACE CHAMBER INFILTRATION SYSTEM

1. STORMTECH SC-310 SPECIFICATIONS AND DETAILS INCLUDED BELOW AS A REFERENCE ONLY. APPROVED EQUALS ARE ACCEPTABLE.

SC-310 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-310.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/% THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310 SYSTEM

1. STORMTECH SC-310 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

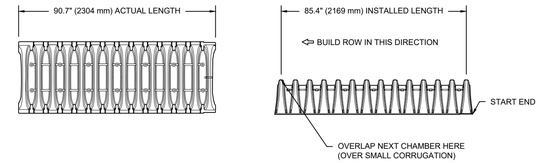
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

PLOTTED:

SC-310 TECHNICAL SPECIFICATION

NTS

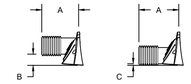




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	31.0 CUBIC FEET	(0.88 m³)
WEIGHT	35.0 lbs.	(16.8 kg)

*ASSUMES 6" (152 mm) ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC310EPE06T / SC310EPE06TPC	6" (150 mm)	9.6" (244 mm)	5.8" (147 mm)	---
SC310EPE06B / SC310EPE06BPC			---	0.5" (13 mm)
SC310EPE08T / SC310EPE08TPC	8" (200 mm)	11.9" (302 mm)	3.5" (89 mm)	---
SC310EPE08B / SC310EPE08BPC			---	0.6" (15 mm)
SC310EPE10T / SC310EPE10TPC	10" (250 mm)	12.7" (323 mm)	1.4" (36 mm)	---
SC310EPE10B / SC310EPE10BPC			---	0.7" (18 mm)
SC310ECEZ*	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)

ALL STUBS, EXCEPT FOR THE SC310ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-800-821-6710.

* FOR THE SC310ECEZ THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

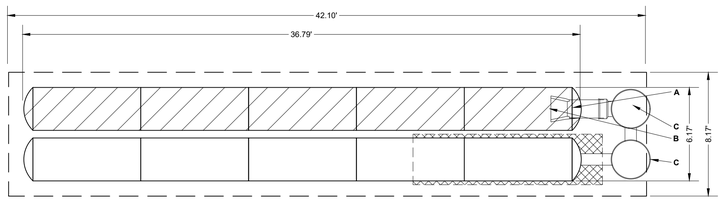
STORMTECH SC-310 SPECIFICATIONS

SCALE: N.T.S.

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS:	
10	STORMTECH SC-310 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	9.83
4	STORMTECH SC-310 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	3.83
6	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	3.33
6	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	3.33
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	3.33
409	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	2.33
		TOP OF SC-310 CHAMBER:	1.83
		8" x 8" TOP MANIFOLD INVERT:	0.79
		12" ISOLATOR ROW PLUS INVERT:	0.58
344	SYSTEM AREA (SF)	BOTTOM OF SC-310 CHAMBER:	0.50
100.5	SYSTEM PERIMETER (ft)	BOTTOM OF STONE:	0.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED EZ END CAP	A	12" BOTTOM PREFABRICATED EZ END CAP, PART#: SC310ECEZ / TYP OF ALL 12" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	0.90"	
FLAMP	B	INSTALL FLAMP ON 12" ACCESS PIPE / PART#: SC31012RAMP		
48" DIA.PRECAST CONCRETE MANHOLE	C	48" DIAMETER (24.00" SUMP MIN)		



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 12.50' OF ADSPLUS625 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

—— —— BED LIMITS

SUBSURFACE INFILTRATION SYSTEM PLAN

SCALE: N.T.S.

NOT FOR CONSTRUCTION

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COMMONWEALTH OF MASSACHUSETTS
GREGORY AVENIA
CIVIL
No. 51481
REGISTERED PROFESSIONAL ENGINEER

12/23/2024

REVISIONS

REV	DESCRIPTION	DSN / DWN	CHK / APP	DATE

SCALE VERIFICATION

THIS BAR IS 1 INCH IN LENGTH ON ORIGINAL DRAWING

0 — 1"

IF IT'S NOT 1 INCH ON THIS SHEET ADJUST YOUR SCALES ACCORDINGLY

ORIGINAL DRAWING SIZE IS 22 x 34

SUBSURFACE CHAMBER DETAILS - I

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE, MASS. 1639 INCORPORATED MAY 3, 1685

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
HYANNIS, MA 02601

NOI SUBMITTAL

PROJECT NO.	24003062.001A
ISSUE DATE	12/23/2024
CURRENT REVISION	
DESIGNED BY	MPS
DRAWN BY	MD/MPS
CHECKED BY	TB/GAA
APPROVED BY	GAA

C5-056

SHEET 30 of 31

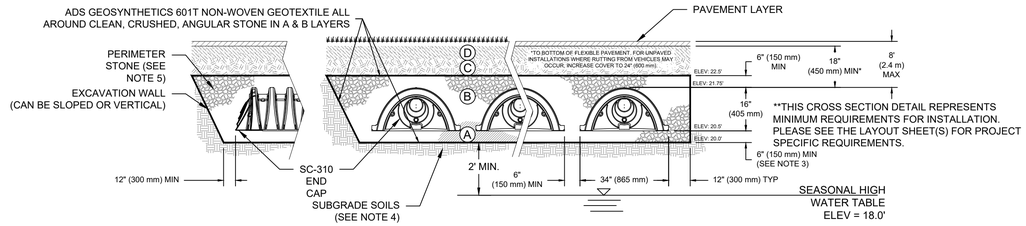
SUBSURFACE CHAMBER INFILTRATION SYSTEM

1. STORMTECH SC-310 DETAILS INCLUDED BELOW AS A REFERENCE ONLY. APPROVED EQUALS ARE ACCEPTABLE.

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE5	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE5	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".

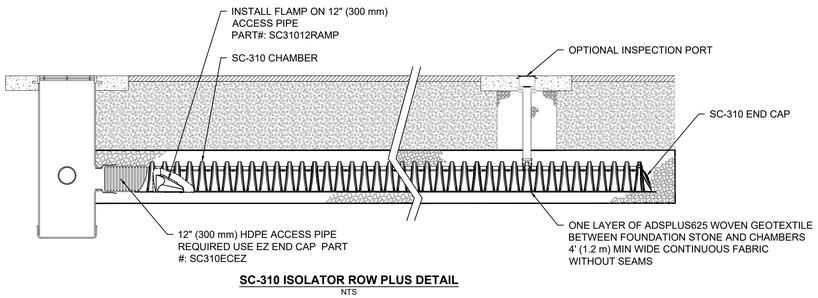


NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".

SUBSURFACE INFILTRATION SYSTEM CROSS SECTION

SCALE: N.T.S.



SC-310 ISOLATOR ROW PLUS DETAIL

NTS

SUBSURFACE INFILTRATION SYSTEM PROFILE

SCALE: N.T.S.

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COMMONWEALTH OF MASSACHUSETTS
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SUBSURFACE CHAMBER DETAILS - II

STRAIGHTWAY
WATER TREATMENT FACILITY

SEAL OF THE TOWN OF BARNSTABLE MASS. 1639 ADOPTED 6 MAY A.D. 1685

TOWN OF BARNSTABLE DPW
WATER SUPPLY DIVISION
47 OLD YARMOUTH ROAD
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APPROVED BY	GAA

C5-057

SHEET 31 of 31