TOWN OF NEWPORT PRV BUILDING UPGRADES AND WATER MAIN IMPROVEMENTS

DWSRF# 1741010-03

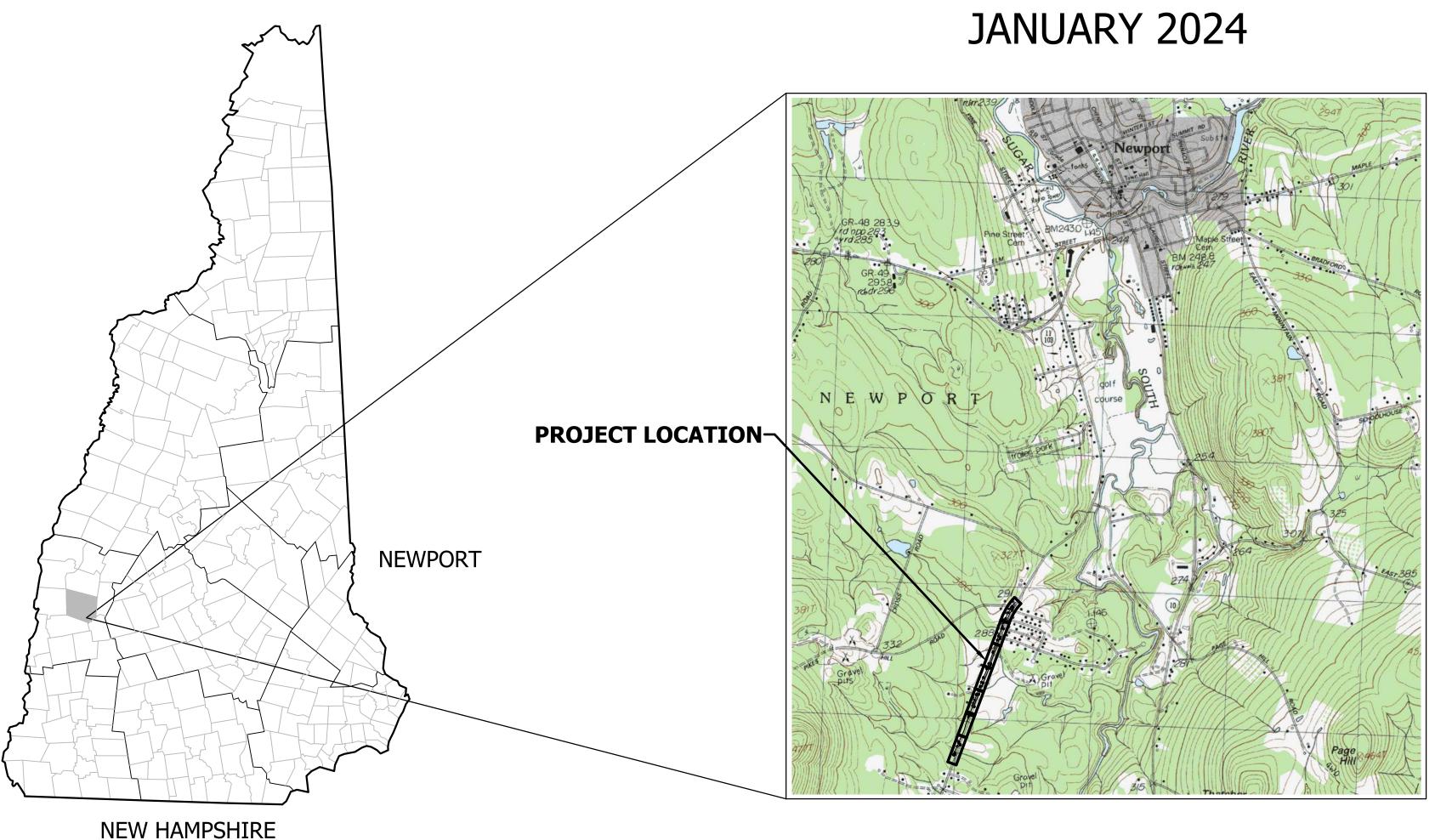
NBRC# 21GNH03

UNITY ROAD, NEWPORT, NEW HAMPSHIRE

14NIJARY 2024

LOCATION PLAN

SCALE: 1" = 2000'



OWNER:

TOWN OF NEWPORT 15 SUNAPEE STREET NEWPORT, NH 03773 (603) 862-1877

ENGINEER/SURVEYOR:





34 SCHOOL STREET LITTLETON, NH 03561 (603) 444-4111

SHEET INDEX:

COVER

C 1.1 SHEET LAYOUT, GENERAL NOTES AND LEGEND

C 2.0-2.4 EXISTING CONDITIONS

C 3.1-3.8 WATER MAIN PLAN AND PROFILE

C 4.1-4.5 WATER MAIN INTERCONNECTIONS PLANS AND PROFILES

C 5.1-5.3 PRV BUILDING UPGRADES AND INTERCONNECTION

D 1-4 DETAILS

FOR CONSTRUCTION

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DATE OF PRINT

JANUARY 09 2025

HORIZONS ENGINEERING

LEGEND

PROPOSED

EXISTING

GENERAL NOTES

1. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE PLANS AND

UPGRADES AND WATER MAIN IMPROVEMENTS PROJECT DATED JANUARY 2025."

"TECHNICAL SPECIFICATIONS FOR TOWN OF NEWPORT, PRV BUILDING

2. NO EXISTING MONUMENTS, BOUNDS, OR BENCHMARKS SHALL BE DISTURBED

3. ALL WORK SHALL BE PERFORMED WITHIN THE PROPERTY OF, AND EASEMENTS

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DATA COLLECTION AND

5. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR CONTROLLING EROSION IN ALL

REGARDLESS OF WHETHER OR NOT SUCH MEASURES ARE SHOWN ON THE

6. UTILITY LOCATIONS ARE BASED ON THE BEST AVAILABLE INFORMATION. THE

OR ANTICIPATED. THE CONTRACTOR SHALL CONTACT DIG SAFE AND THE APPROPRIATE AUTHORITIES PRIOR TO ANY CONSTRUCTION IN ORDER TO

7. PLANIMETRIC FEATURES AND TOPOGRAPHY ARE BASED ON A FIELD SURVEY

8. THE BASIS OF BEARING SHOWN HEREON REFERENCES GRID NORTH AND IS

BASED ON THE NEW HAMPSHIRE STATE PLANE COORDINATE SYSTEM NAD 83 (2011). THE VERTICAL DATUM IS NAVD 88. BOTH DATUMS WERE DERIVED FROM

STATIC GPS OBSERVATIONS THAT WERE CORRECTED USING THE NATIONAL GEODETIC SURVEY'S ONLINE USER POSITION SERVICE (OPUS). THE CONTOUR

9. THE DESIGN INTENT REGARDING UTILITY POLES IS THAT POLES WILL NOT BE RELOCATED. HOWEVER, IF POLES ARE PROPOSED TO BE HELD OR RELOCATED,

CONFORM TO THE NHDOT UTILITY ACCOMMODATIONS MANUAL, DATED OCTOBER 2017. ALL PROPOSED POLE RELOCATIONS SHALL HAVE PROVISIONS

THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE UTILITY FOR

SUCH RELOCATIONS. FURTHER, ANY PROPOSED POLE RELOCATIONS SHALL BE APPROVED BY THE NHDOT DISTRICT 2 PRIOR TO START OF WORK AND SHALL

MADE IN THE CONTRACTORS BID PRICING. UTILITY POLE RELOCATIONS/HOLDS

10. AS BUILT DRAWINGS FOR WORK WITHIN UNITY ROAD RIGHT OF WAY SHALL BE

DRAINAGE DITCHES AND SWALES OUTSIDE OF THE SHOULDER THAT ARE

DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO FREE FLOWING

12. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE CUTTING, HANDLING AND

OTHER FEDERAL, STATE, OR LOCAL RULES FOR MANAGING AND CONTROLLING

13. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF PAVEMENT SURFACE DURING UNLOADING AND/OR MOVEMENTS OF EQUIPMENT WITHIN THE WORK AREA. ANY DAMAGE TO THE PAVEMENT SURFACE SHALL BE REPAIRED TO THE SATISFACTION OF AND AT NO EXPENSE TO NHDOT DISTRICT #2 OR THE

NOVEMBER 15TH. REPAIR OF ANY SETTLING OR HEAVING OF TEMPORARY OR

RECONSTRUCTED IN KIND AND IN PLACE, UNLESS PREVIOUS ARRANGEMENTS

APPURTENANCES IN PLACE, WITH THE EXCEPTION OF VALVE BOX AND CURB BOX TOPS AND COVERS, WHICH WILL BE REMOVED AND SALVAGED TO THE OWNER.

ALL ABANDONED WATER MAINS SHALL BE CAPPED. ANY WATER MAINS, VALVES, APPURTENANCES, OR SERVICE LINES ENCOUNTERED THAT ARE IN CONFLICT

WITH THE PROPOSED WORK SHALL BE REMOVED BY THE CONTRACTOR AND

17. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE CUTTING, HANDLING AND

ASBESTOS MANAGEMENT RULES ENV-A-1800 AND IN CONJUNCTION WITH ANY OTHER FEDERAL, STATE, OR LOCAL RULES FOR MANAGING AND CONTROLLING

18. ALL DRILLING RECEIVING PITS ARE FOR ILLUSTRATION ONLY. THESE LOCATIONS

DISTURBED. CONSIDERATIONS FOR WETLANDS LOCATION, DISTURBANCE OF

19. ANY WATER MAIN CROSSING DITCH LINES SHALL MAINTAIN A MINIMUM FIVE (5)

21. INVASIVE PLANT SPECIES MAY BE ENCOUNTERED DURING CONSTRUCTION. IF AND AS IDENTIFIED, THE CONTRACTOR SHALL FOLLOW PROHIBITED INVASIVE

HTTP://WWW.GENCOURT.STATE.NH.US/RULES/STATE_AGENCIES/AGR3800.HTML AND THE NHDOT'S 2018 BEST MANAGEMENT PRACTICES FOR THE CONTROL OF

HTTPS://WWW.NH.GOV/DOT/ORG/PROJECTDEVELOPMENT/ENVIRONMENT/UNITS/

PROGRAM-MANAGEMENT/DOCUMENTS/FINAL-ENV1MANUAL1-INVASIVESPECIES.PDF.

CONTRACTOR MUST CONSULT THE ENGINEER BEFORE A NEW LOCATION IS

MAY NEED TO BE MOVED DURING CONSTRUCTION. IN THIS CASE, THE

EXISTING CONDITIONS, AND VEGETATION REMOVAL SHALL BE MADE.

20. NO SHEETING SHALL BE LEFT IN PLACE WITHIN NHDOT RIGHTS-OF-WAY.

DISPOSAL OF ANY A/C PIPE ENCOUNTERED IN ACCORDANCE WITH NHDES

PERMANENT PATCHES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR

14. PERMANENT PAVEMENT PATCHES SHALL BE COMPLETED NO LATER THAN

ARE MADE (AND CONFIRMED IN WRITING) WITH THE LANDOWNER.

DISCONTINUED/ABANDONED WATER MAIN, VALVES, SERVICE LINES, AND

15. BOULDER WALLS DISTURBED DURING CONSTRUCTION SHALL BE

16. IT IS THE INTENT OF THIS CONTRACT TO LEAVE ALL

PROPERLY DISPOSED OF OFF -SITE.

ASBESTOS.

FEET OF COVER.

PLAN SPECIES RULES:

INVASIVE AND NOXIOUS PLANT SPECIES:

DISPOSAL OF ANY A/C PIPE ENCOUNTERED IN ACCORDANCE WITH NHDES ASBESTOS MANAGEMENT RULES ENV-A-1800 AND IN CONJUNCTION WITH ANY

SUBMITTED TO THE NHDOT AT THE COMPLETION OF THE WORK.

CONTRACTOR IS RESPONSIBLE FOR LOCATION AND PROTECTION OF EXISTING UTILITIES AND SHALL REPAIR ANY DAMAGE AS OUICKLY AS POSSIBLE AT HIS

OWN EXPENSE. ALL UTILITIES ENCOUNTERED SHALL BE LOCATED BY DEPTH AND

EXCAVATION SHALL BE DONE WHEREVER UNDERGROUND UTILITIES ARE SHOWN

USING A LEICA TS12 ROBOTIC TOTAL STATION AND SOKKIA GRX3 AND TOPCON HIPER V DUAL FREQUENCY GPS RECEIVERS WITH RTK CAPABILITY, CONDUCTED

TIES AND SHOWN BY THE CONTRACTOR ON HIS "AS BUILT" DRAWINGS. HAND

AREAS DISTURBED BY HIS ACTIONS. COSTS FOR REQUIRED EROSION CONTROL,

WITHOUT FIRST MAKING PROVISIONS FOR RELOCATION.

ENGINEERING DRAWINGS, SHALL BE BORNE BY HIM.

VERIFY EXISTING CONDITIONS AND UTILITY LOCATIONS.

IN JULY 2022 BY HORIZONS ENGINEERING, INC.

SHALL NOT BE PAID AS A SEPARATE ITEM.

TO THE NEAREST DRAINAGE STRUCTURE.

DEPARTMENT OF WATER.

INTERVAL IS TWO FOOT.

SECURED BY, THE OWNER.

PREPARATION OF RECORD DRAWINGS.

—— *785* —— —— —— 10 FOOT CONTOURS CULVERT / DRAIN PIPE **FENCE PAVEMENT** — — — — APPROX. PROPERTY LINE (TAX MAP) TREELINE STONE WALL WATER MAIN WATER SERVICE —ws—ws—ws—ws—ws— SEWER MANHOLE CATCH BASIN HYDRANT WATER SHUT OFF WATER METER GATE VALVE REDUCER б UTILITY POLE SIGN MAILBOX DECIDUOUS TREE CONIFER TREE STONE MONUMENT IRON PIPE/REBAR L_____ BUILDING - DIGITIZED (PHOTO) LIMIT OF DISTURBANCE LIMIT OF PAVEMENT DISTURBANCE

SILT SOCK

TEMPORARY WATER

2 FOOT CONTOURS

PHASING NOTES (WATERMAIN)

THE ENGINEERS CONSTRUCTION APPROACH IS DIRECTIONAL BORING. IT IS PLANNED TO BE UTILIZED FROM THE PRV STATION TO THE EXTENTS SHOWN NEAR PIKE HILL ROAD (SHEET C 3.7). OPEN CUT TRENCHING IS OPTIONAL BEYOND THOSE LIMITS AT THE RISK OF THE CONTRACTOR. OPEN CUT TRENCHING DIFFERING FROM THE SHOWN EXTENTS MAY BE PERFORMED AT THE RISK AND EXPENSE OF THE CONTRACTOR PROVIDED THE FOLLOWING.

- NHDOT DISTRICT 2 HAS GIVEN WRITTEN APPROVAL TO PERFORM OPEN CUTS IN THESE AREAS THE CONTRACTOR HAS APPLIED AND OBTAIN THE NECESSARY PERMITS, INCLUDING BUT NOT
- NHDES WETLANDS PERMIT
- NHDOT TRENCH PERMIT

PROJECT PHASING FOR WATER MAIN REPLACEMENT AND CONNECTIONS USING THE DIRECTIONAL BORING METHOD ARE AS FOLLOWS.

- 1. DIRECTIONAL BORE AND INSTALL THE PROPOSED 10" HDPE WATER MAIN FROM APPROXIMATELY STATION 0+00 - 35+65.
- 2. INSTALL PROPOSED HYDRANTS LOCATED ON SAME SIDE (LEFT SIDE) OF UNITY ROAD AS PROPOSED WATER MAIN.
- COMPLETE NECESSARY TESTING BEFORE WATER MAIN IS PUT INTO SERVICE.
- 4. INSTALL AND CONNECT ALL WATER SERVICES LOCATED ON SAME SIDE (LEFT SIDE) OF UNITY AS PROPOSED WATER MAIN.
- INSTALL TEMPORARY WATER CONNECTIONS TO HOMES AND STREETS SHOWN ON DESIGN PLANS.
- 6. COMPLETE INTERCONNECTION OF PROPOSED WATER MAIN TO EXISTING WATER MAINS STARTING AT STATION 35+65.
- 7. ISOLATE CAPPED SECTIONS OF EXISTING WATER MAINS (6" CI, 8" CI, 10" AC) AT THE EXISTING PRV BUILDING AND ACTIVATE THE INSTALLED 10" HDPE WATER MAIN.
- 8. COMMENCE DIRECTIONAL BORING AND CONNECTIONS OF SERVICES AND STREET
- 9. COMPLETE NECESSARY TESTING BEFORE WATER MAINS ARE PUT INTO SERVICE. 10. REMOVE TEMPORARY WATER ONCE SERVICE AND STREET INTERCONNECTIONS HAVE BEEN

PHASING NOTES (PRV BUILDING)

THE CONSTRUCTION INTENT OF THE PROVIDED PLANS IS TO UPGRADE THE EXISTING PRV BUILDING, ESTABLISH CONNECTIONS TO THE EXISTING MAINS, AND PROVIDE FUTURE WATER MAIN CONNECTION OPPORTUNITIES.

- NHDOT DISTRICT 2 HAS GIVEN WRITTEN APPROVAL TO PERFORM OPEN CUTS WITHIN THE RIGHT
- OF WAY OF UNITY ROAD THE CONTRACTOR HAS APPLIED AND OBTAIN THE NECESSARY PERMITS, INCLUDING BUT NOT
- LIMITED TO; •• NHDOT TRENCH PERMIT

PROJECT PHASING FOR THE PRV BUILDING UPGRADES ARE AS FOLLOWS.

- BEGIN DEMOLITION OF EXISTING PRV BUILDING FEATURES WHILE KEEPING EXISTING WATER SYSTEM IN SERVICE.
- TURN THE ISOLATING GATE VALVES INDICATED ON THE PLANS TO THE OFF POSITION.
- CONFIRM MECHANICAL WATER COMPONENTS WITHIN THE PRV BUILDING ARE NOT LIVE AND BEGIN REMOVAL OF OLD COMPONENTS AFTER PROVIDING NOTICE TO THE WATER DEPARTMENT.
- EXCAVATE TO EXISTING WATER MAIN AND WALL PENETRATIONS AT PRV BUILDING.
- DISCONNECT AND REMOVE EXISTING WATER MAIN CONNECTION TO LIMITS SHOWN. CONSTRUCT AND INSTALL NEW WATER MAIN, VALVES, AND CONNECTIONS AS SHOWN.
- INSTALL INTERIOR MECHANICAL, ELECTRICAL COMPONENTS, AND COMPLETE PRV BUILDING EXTERIOR UPGRADES.
- 8. CHLORINATE AND PRESSURE TEST NEW WATER MAIN CONNECTIONS AND REACTIVATE THE PRV COMPONENTS.

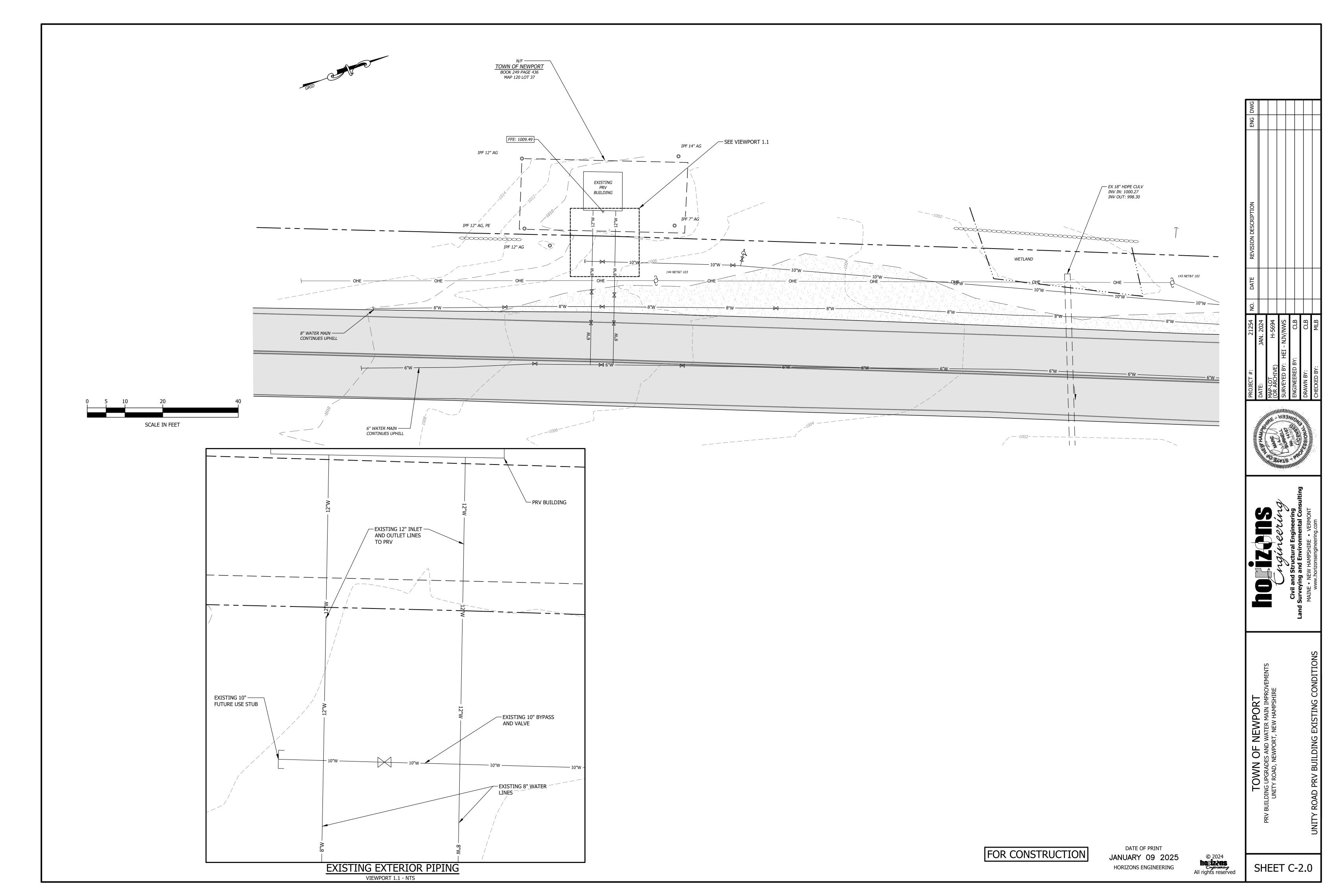
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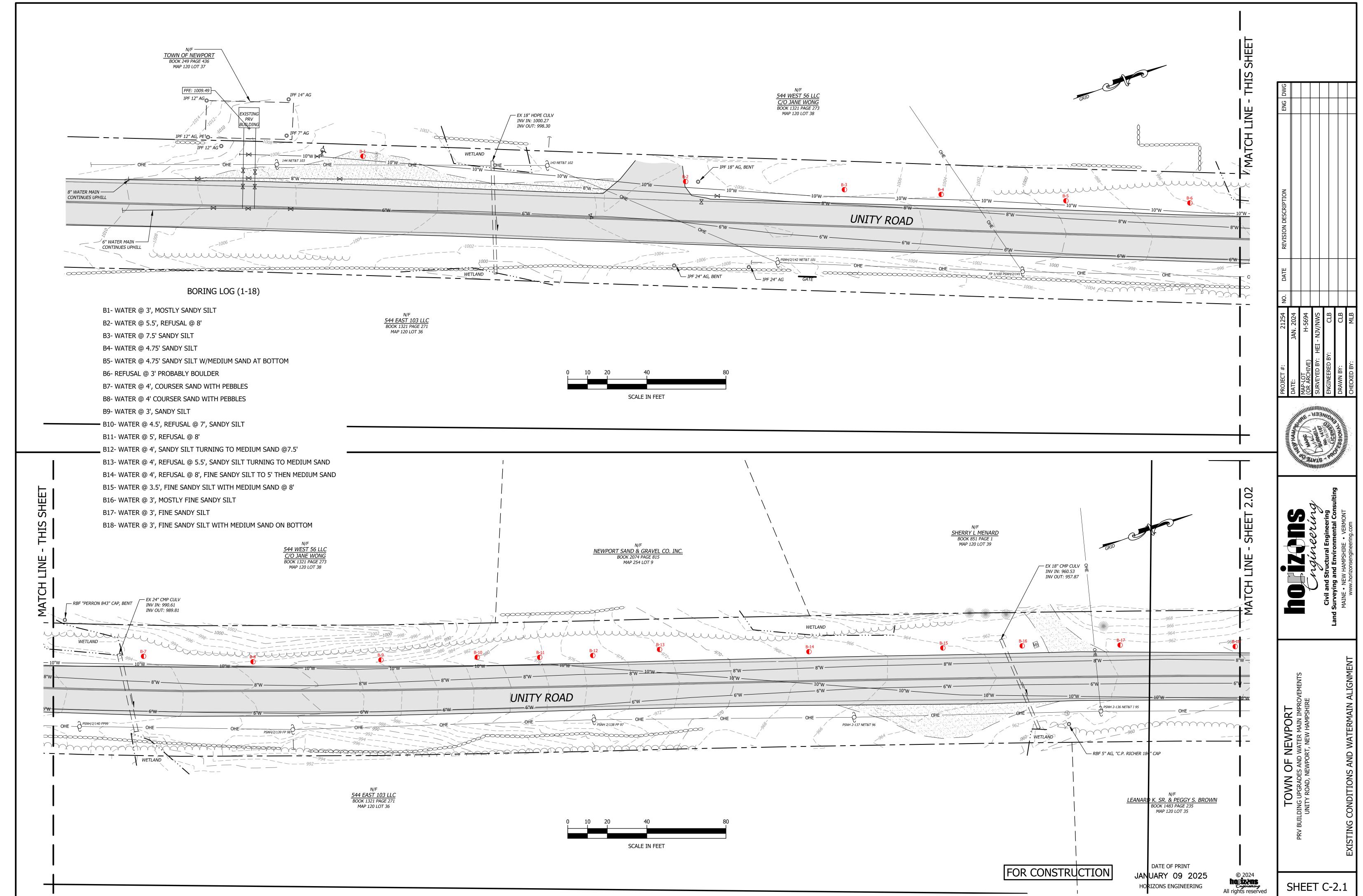


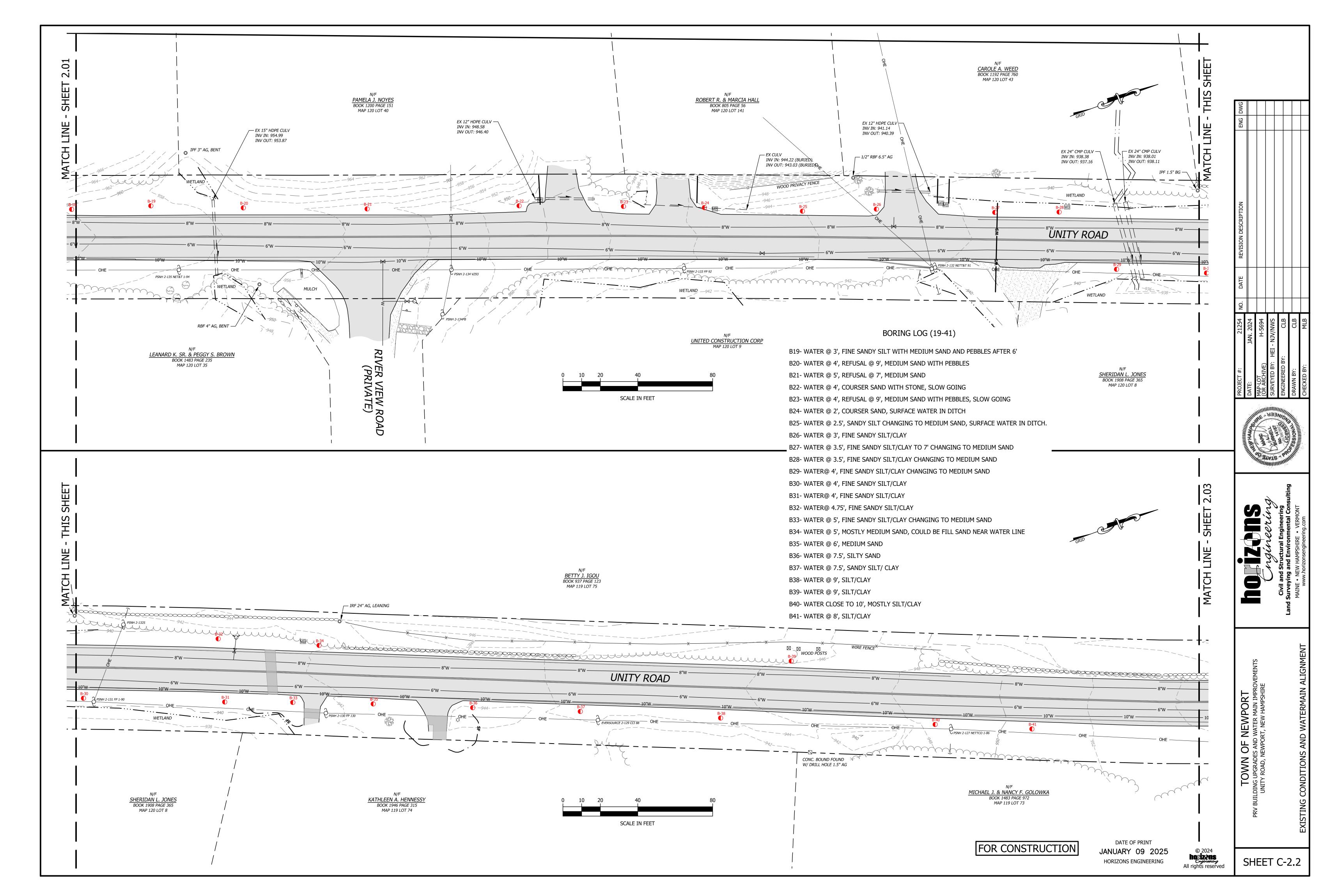
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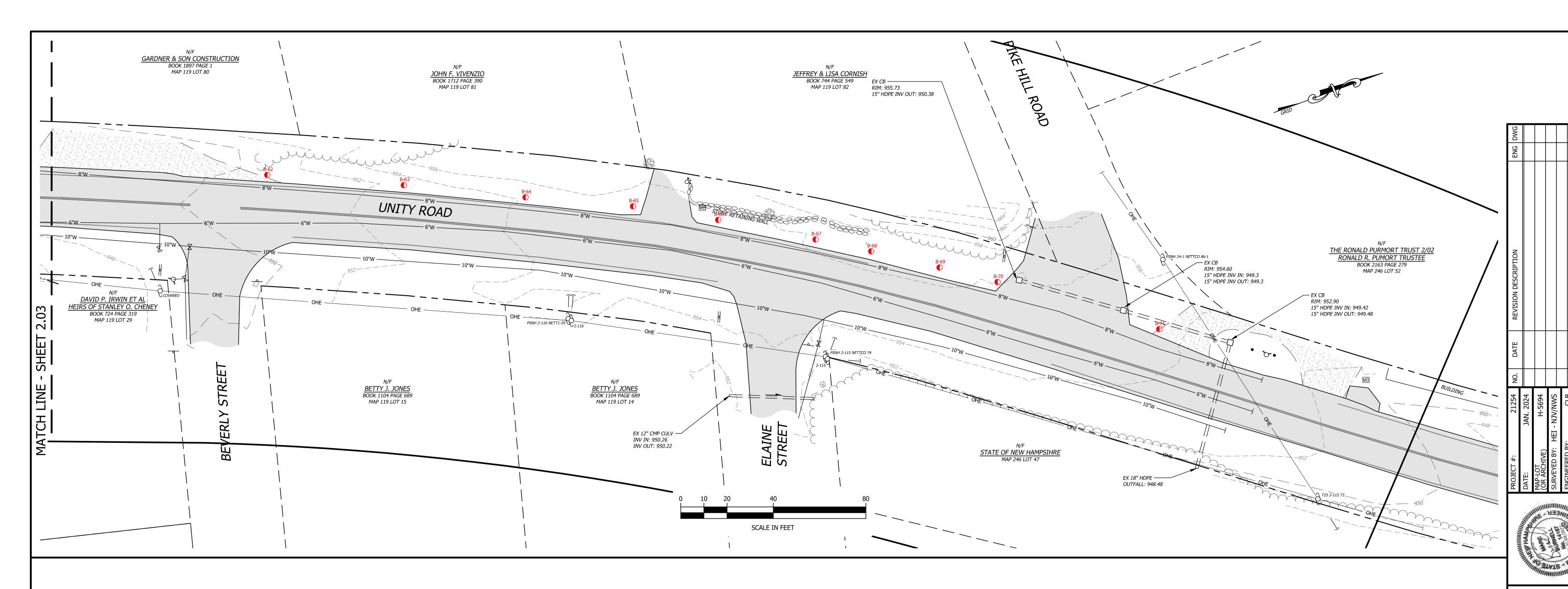


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BORING LOG (62-72)

B62- WATER @ 7', MOSTLY SILT/CLAY WITH LAYERS OF MEDIUM SAND

B63- WATER @ 7', MOSTLY SILT/CLAY

B64- WATER @ 7', MOSTLY SILT/CLAY

B65- WATER @ 7.5', MOSTLY SILT/CLAY WITH FINE SAND

B66- REFUSAL @ 6', ROCKY, DID NOT WANT TO BREAK SAMPLER, SLOW GOING

B67- REFUSAL @ 6', ROCKY, DID NOT WANT TO BREAK SAMPLER, SLOW GOING

B68- REFUSAL @ 5', ROCKY, DID NOT WANT TO BREAK SAMPLER, SLOW GOING

B69- REFUSAL @ 7', ROCKY, DID NOT WANT TO BREAK SAMPLER, SLOW GOING B70- REFUSAL @ 8', ROCKY, DID NOT WANT TO BREAK SAMPLER, SLOW GOING

B71- WATER @ 8.5', REFUSAL @ 9', WATER JUST ON TOP OF ROCK

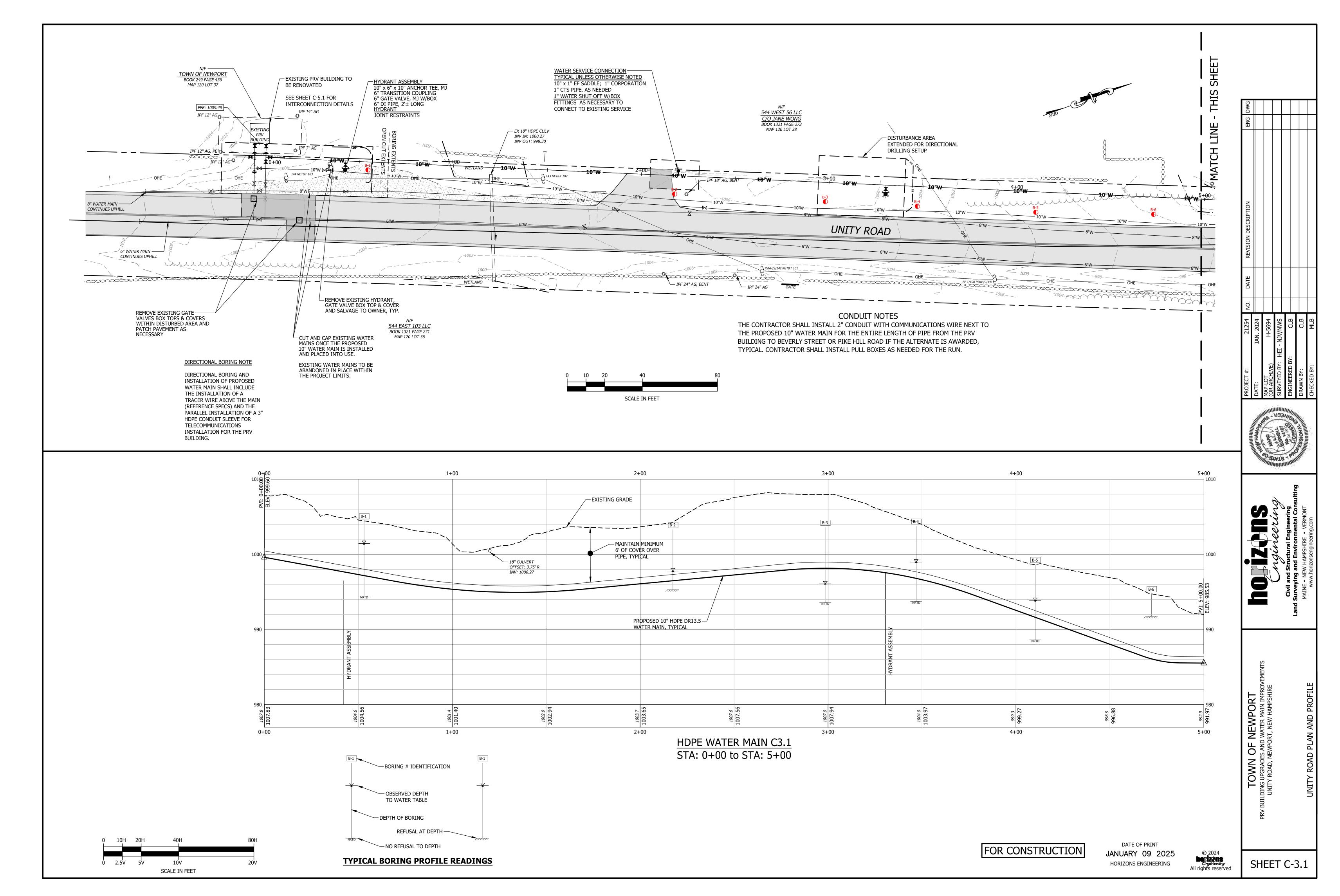
B72- HIT 10" AC WATER MAIN @ 6.5', DID NOT CONTINUE ON THAT SIDE OF ROAD DUE TO WATER LINES TO CLOSE TO EACH OTHER.

FOR CONSTRUCTION

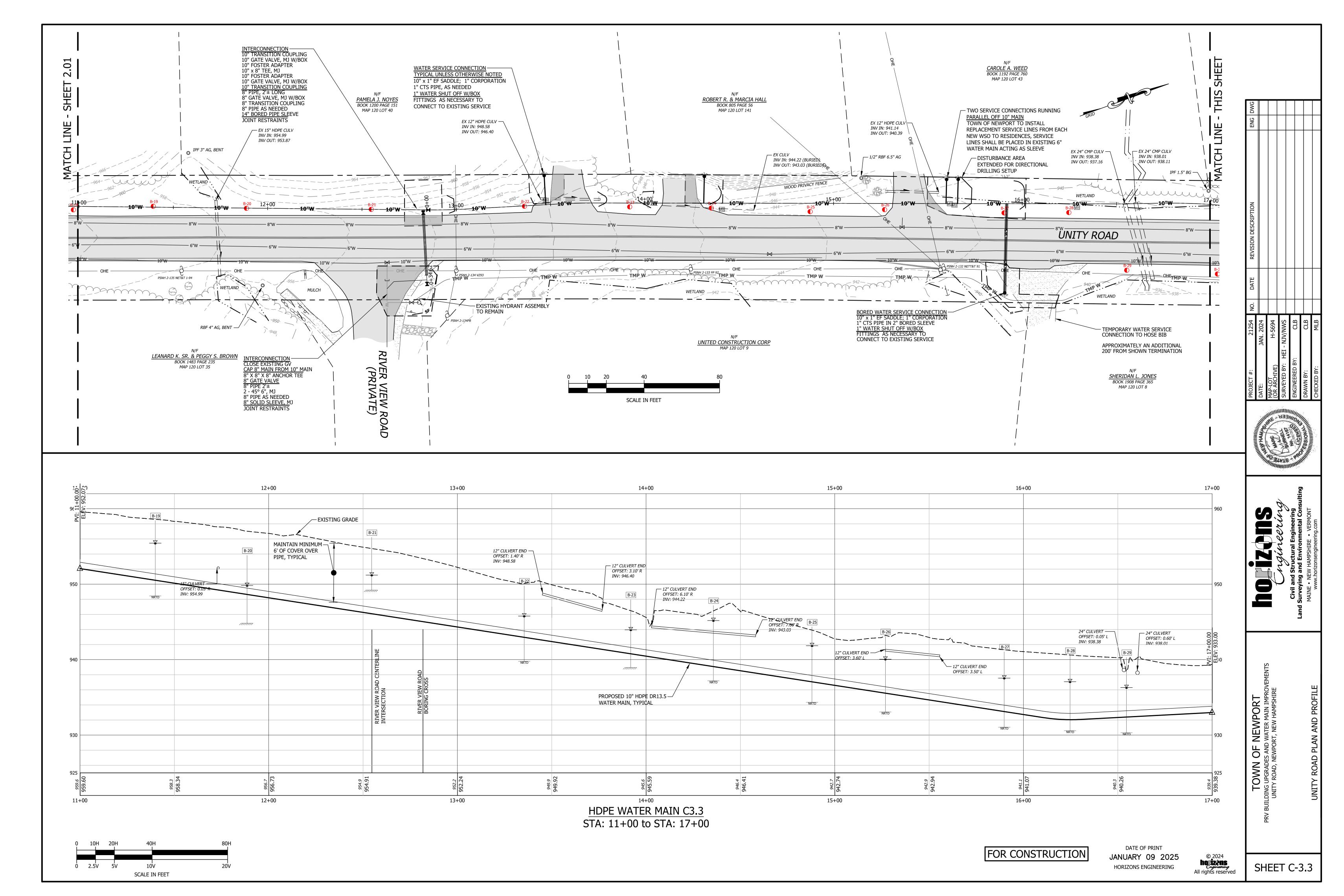
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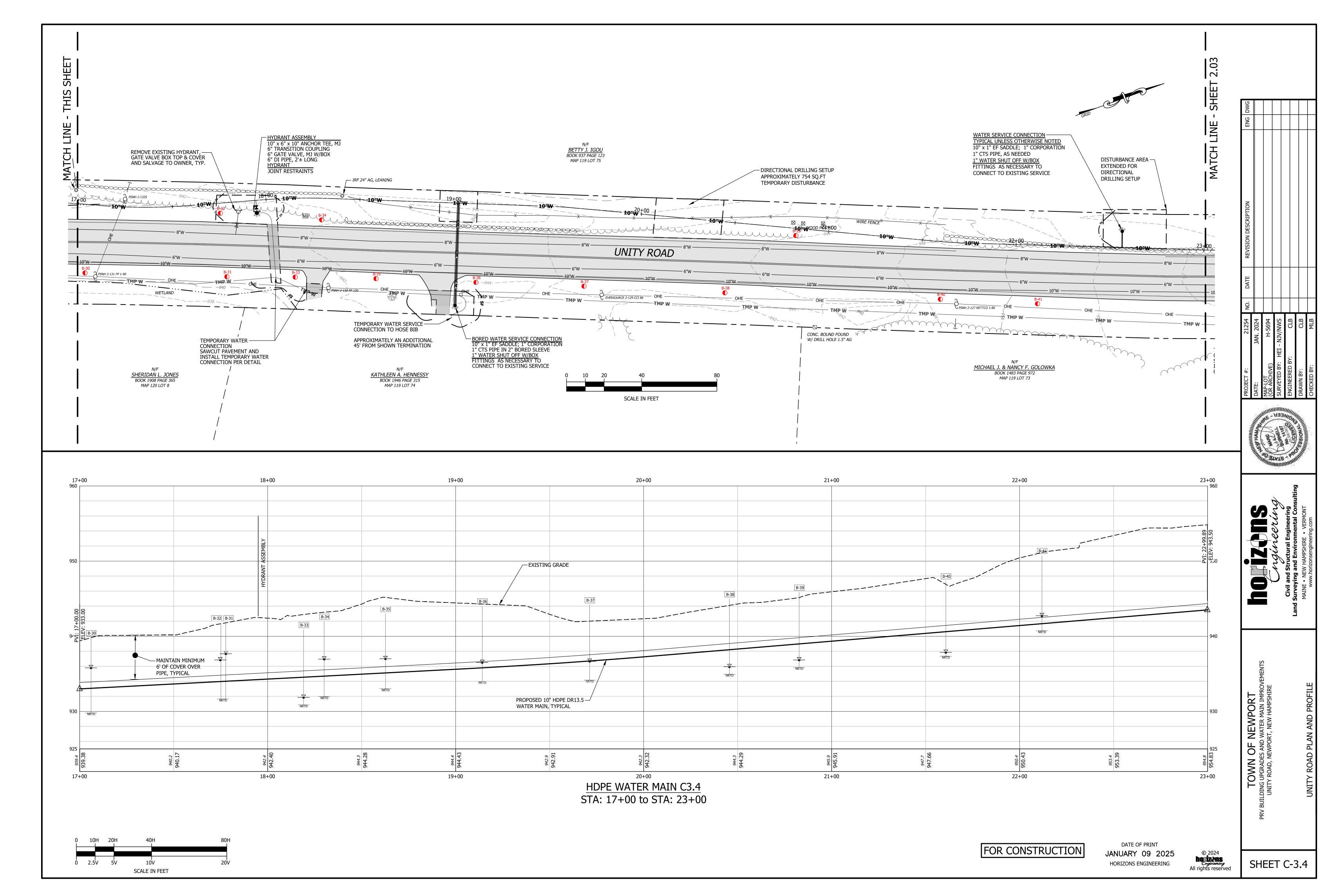
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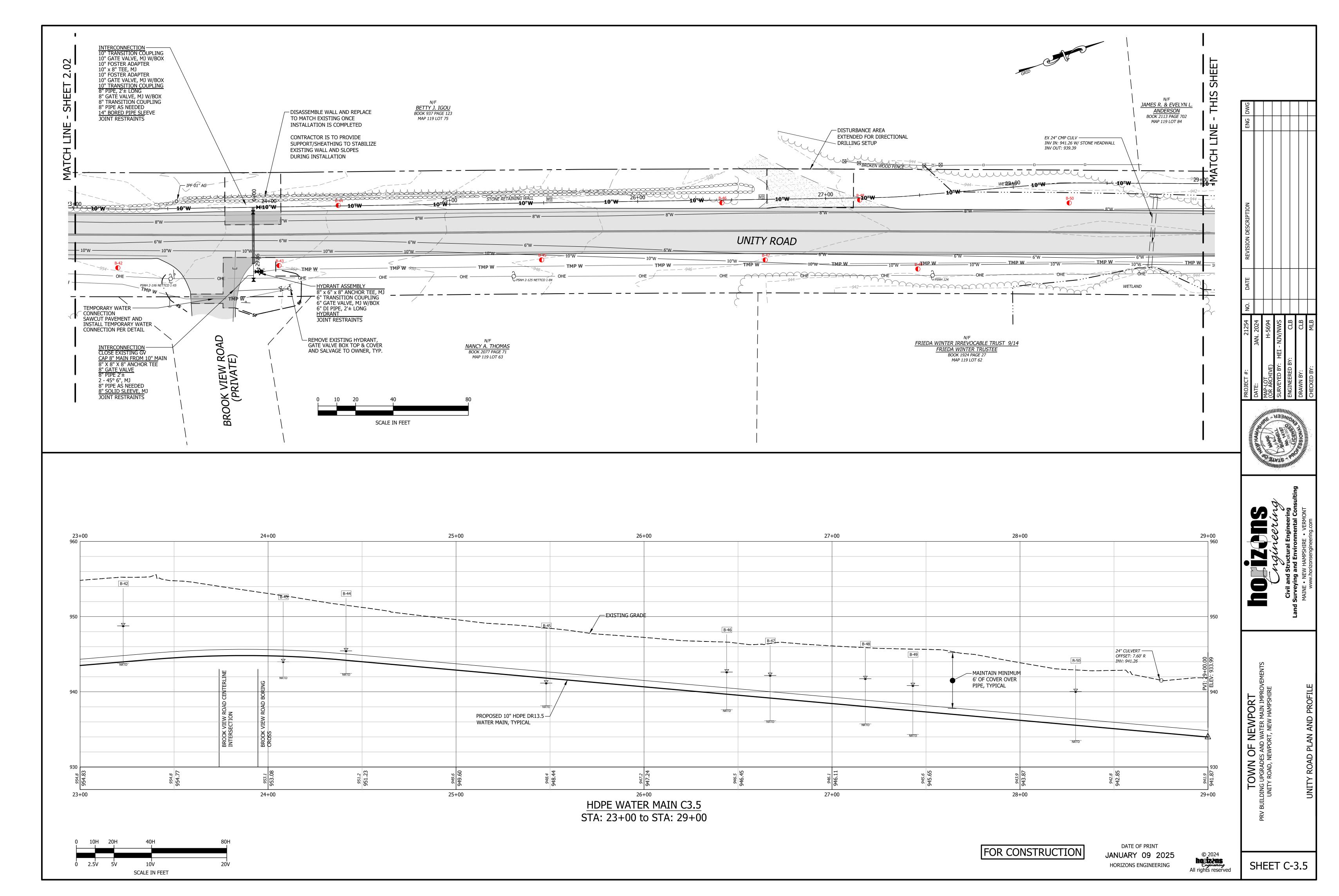
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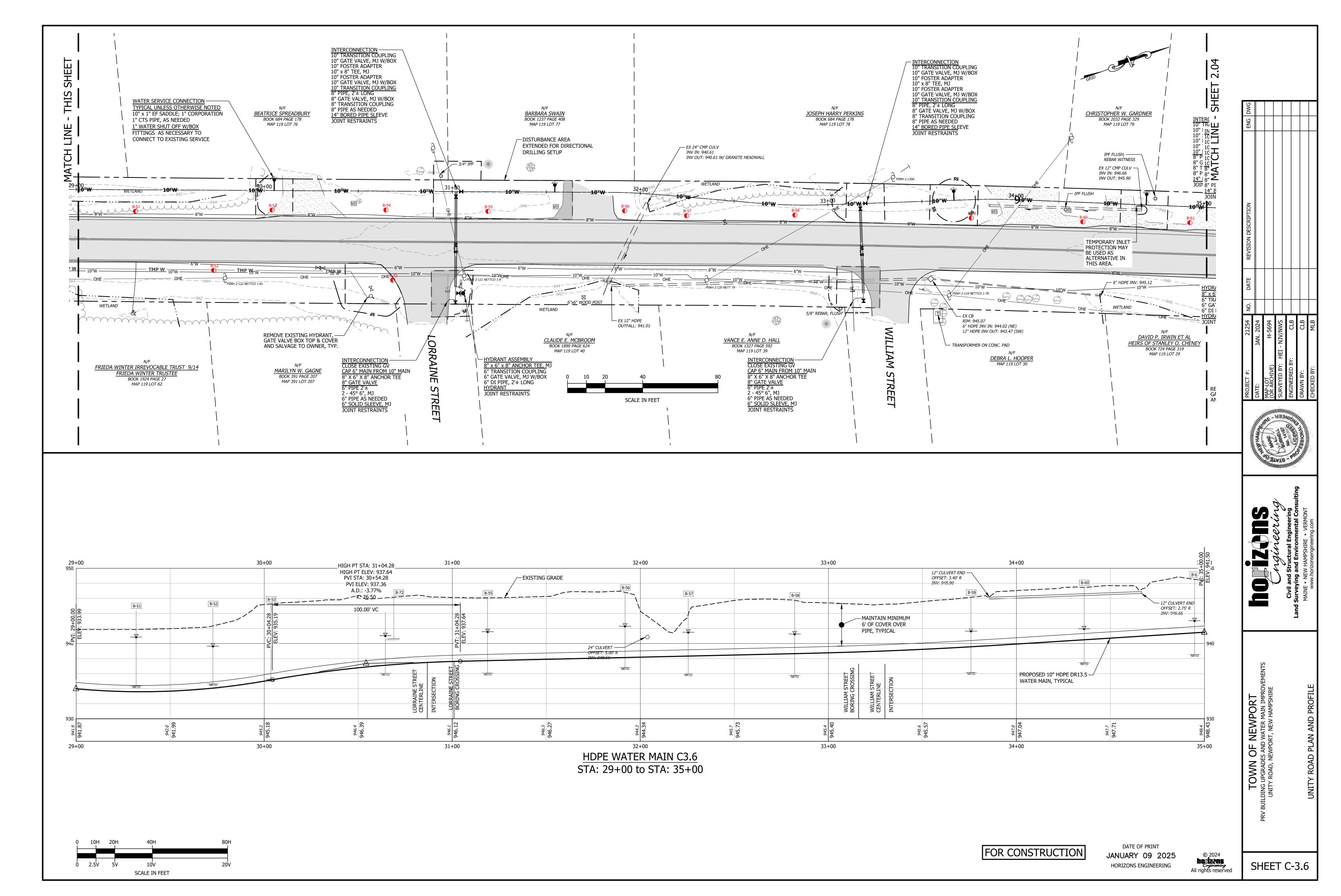
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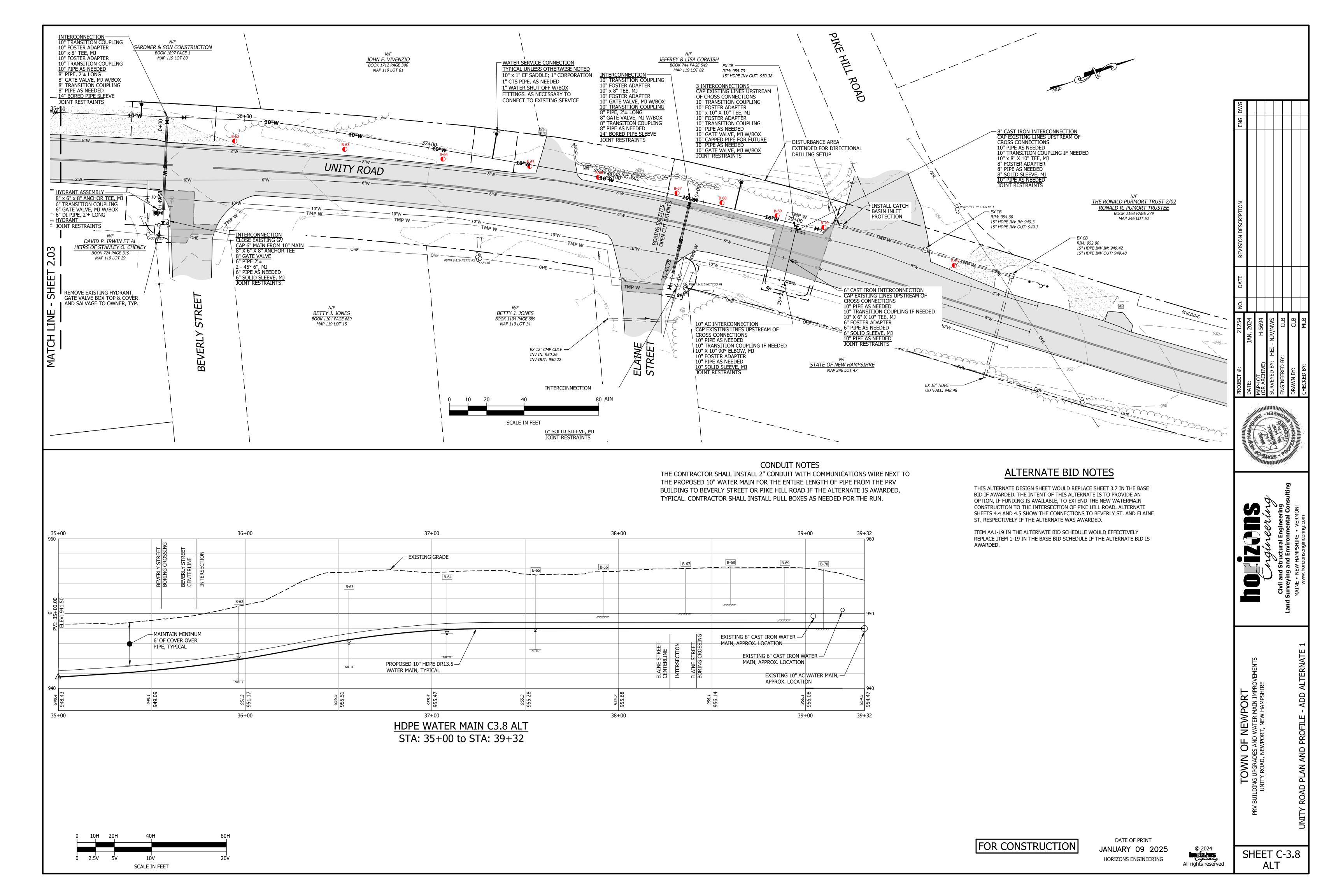
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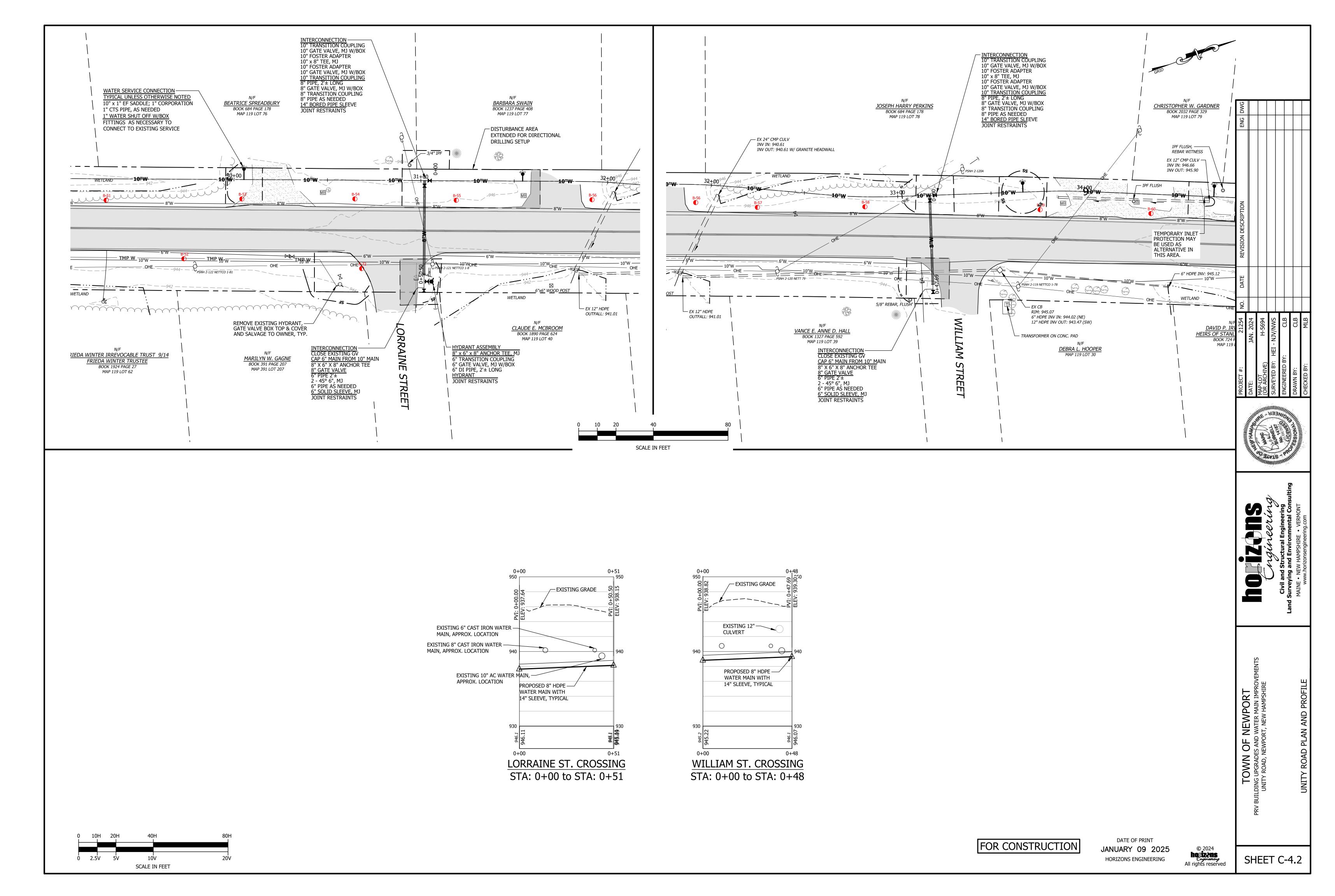


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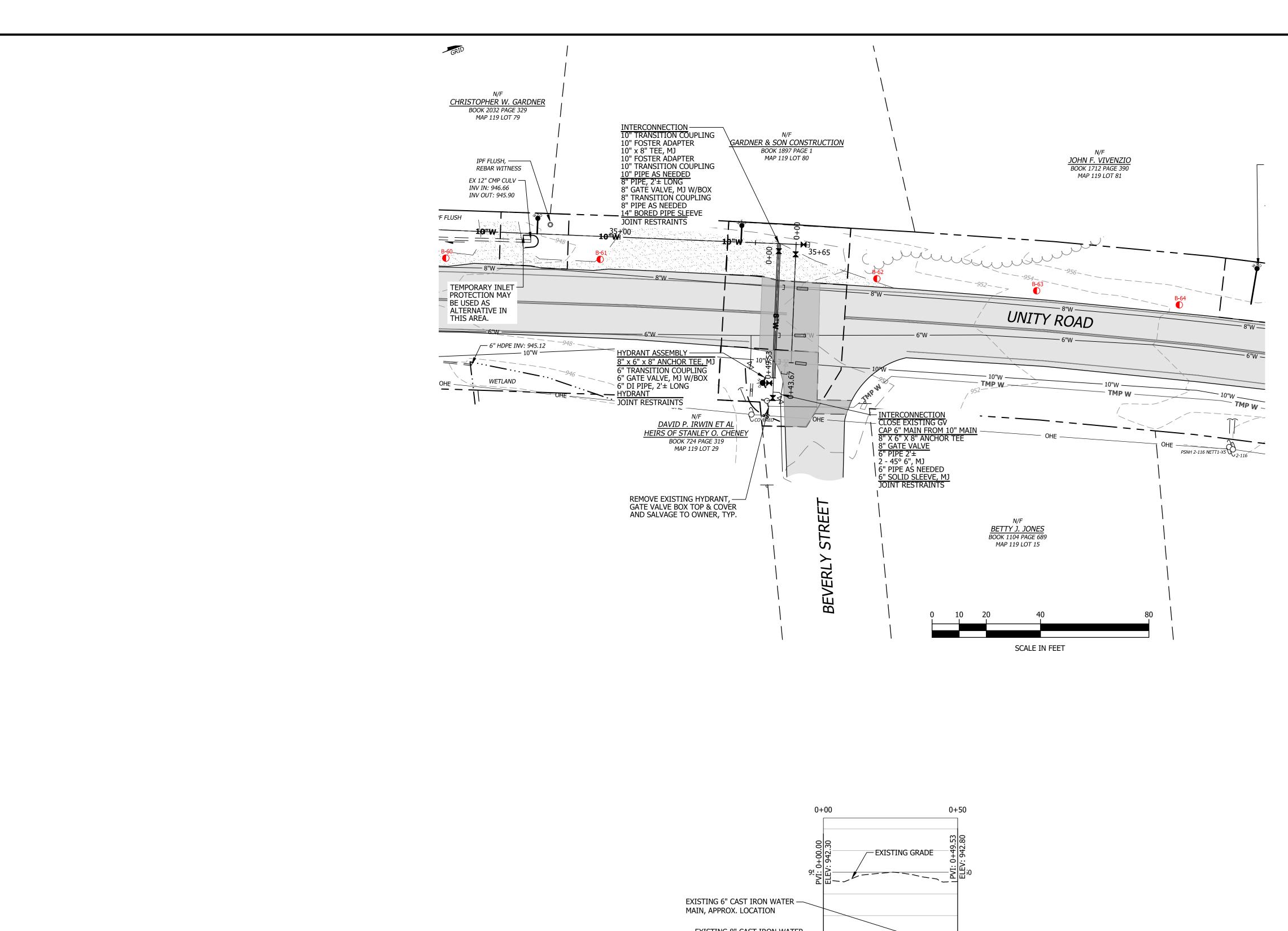


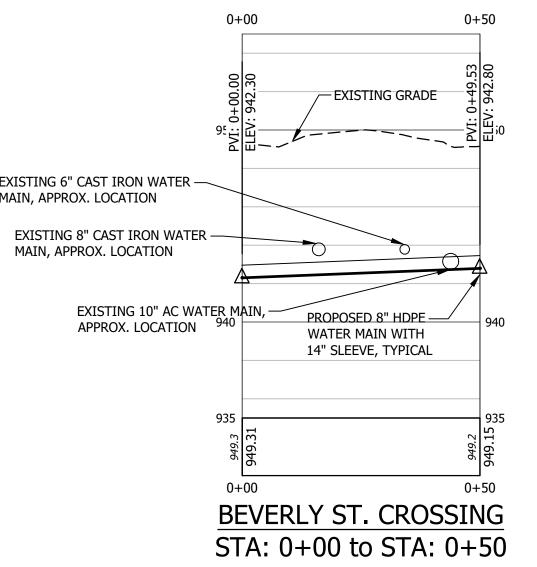


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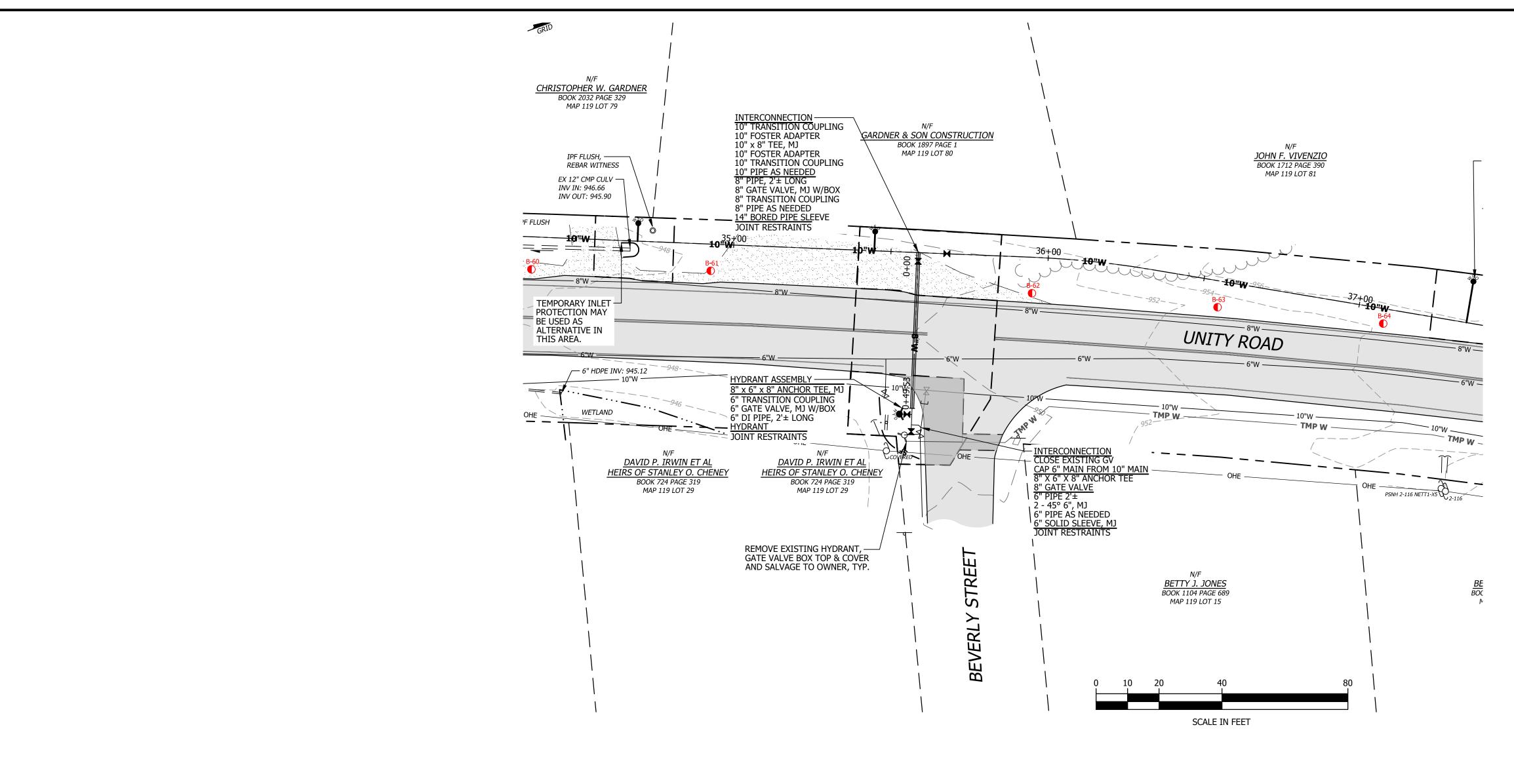
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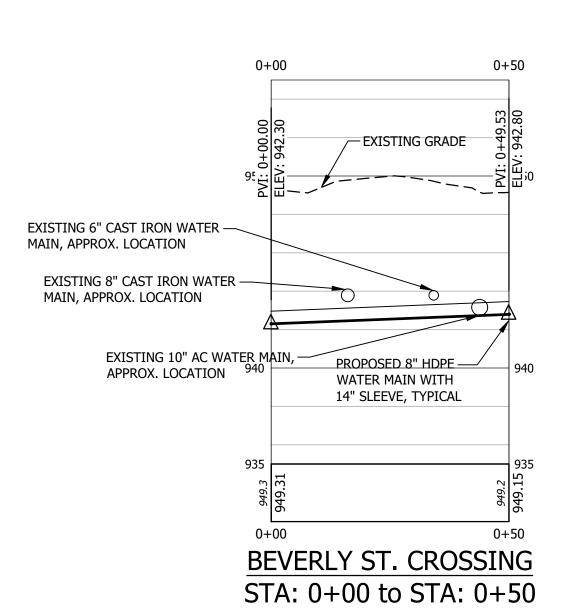
SCALE IN FEET



ALTERNATE BID NOTES

THIS ALTERNATE DESIGN SHEET WOULD REPLACE SHEET 4.3 IN THE BASE BID IF AWARDED. THE INTENT OF THIS ALTERNATE IS TO PROVIDE AN OPTION, IF FUNDING IS AVAILABLE, TO EXTEND THE NEW WATERMAIN CONSTRUCTION TO THE INTERSECTION OF PIKE HILL ROAD.

ITEM AA1-19 IN THE ALTERNATE BID SCHEDULE WOULD EFFECTIVELY REPLACE ITEM 1-19 IN THE BASE BID SCHEDULE IF THE ALTERNATE BID IS



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SHEET C-4.4

SCALE IN FEET

SCALE IN FEET

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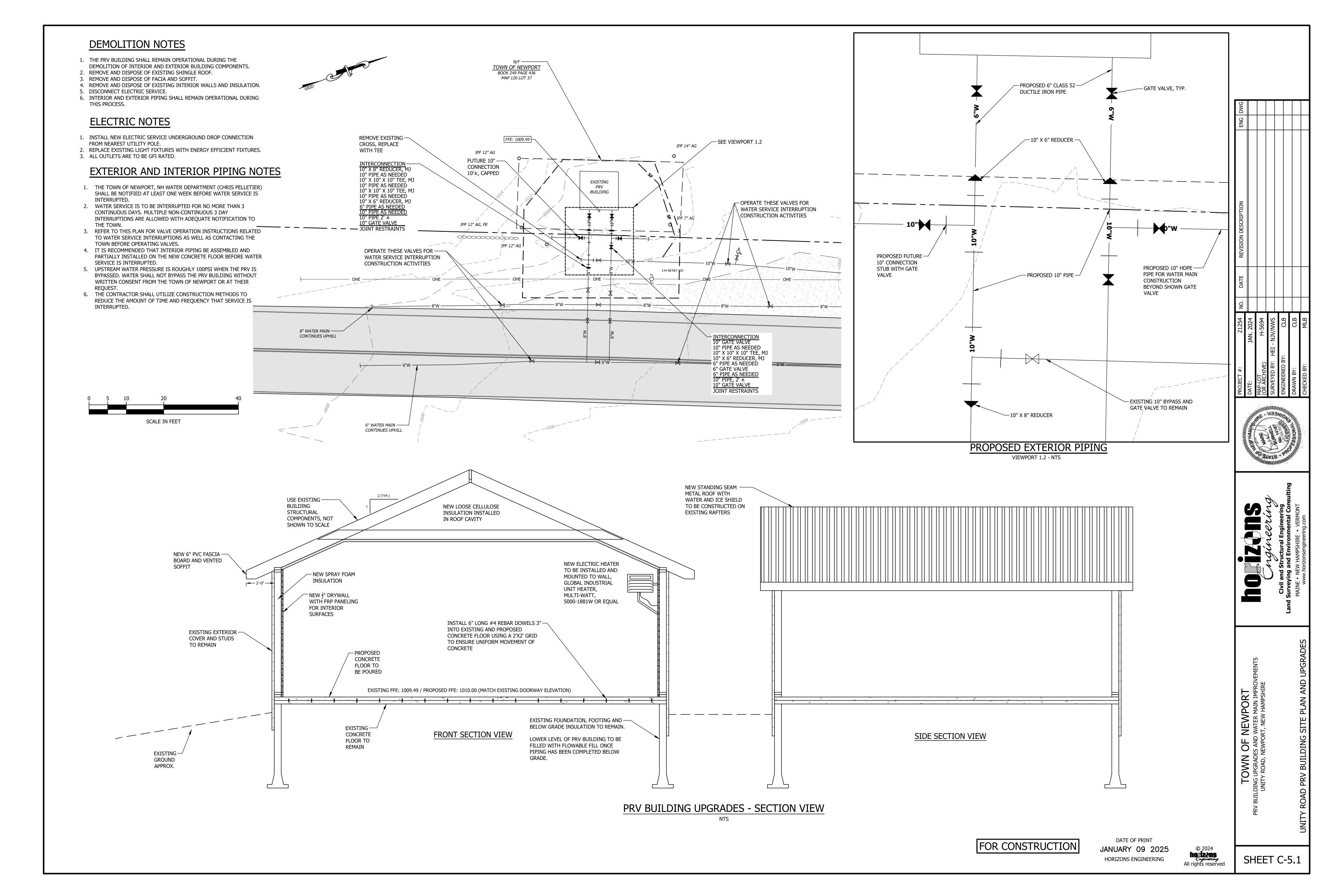
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SHEET C-4.5



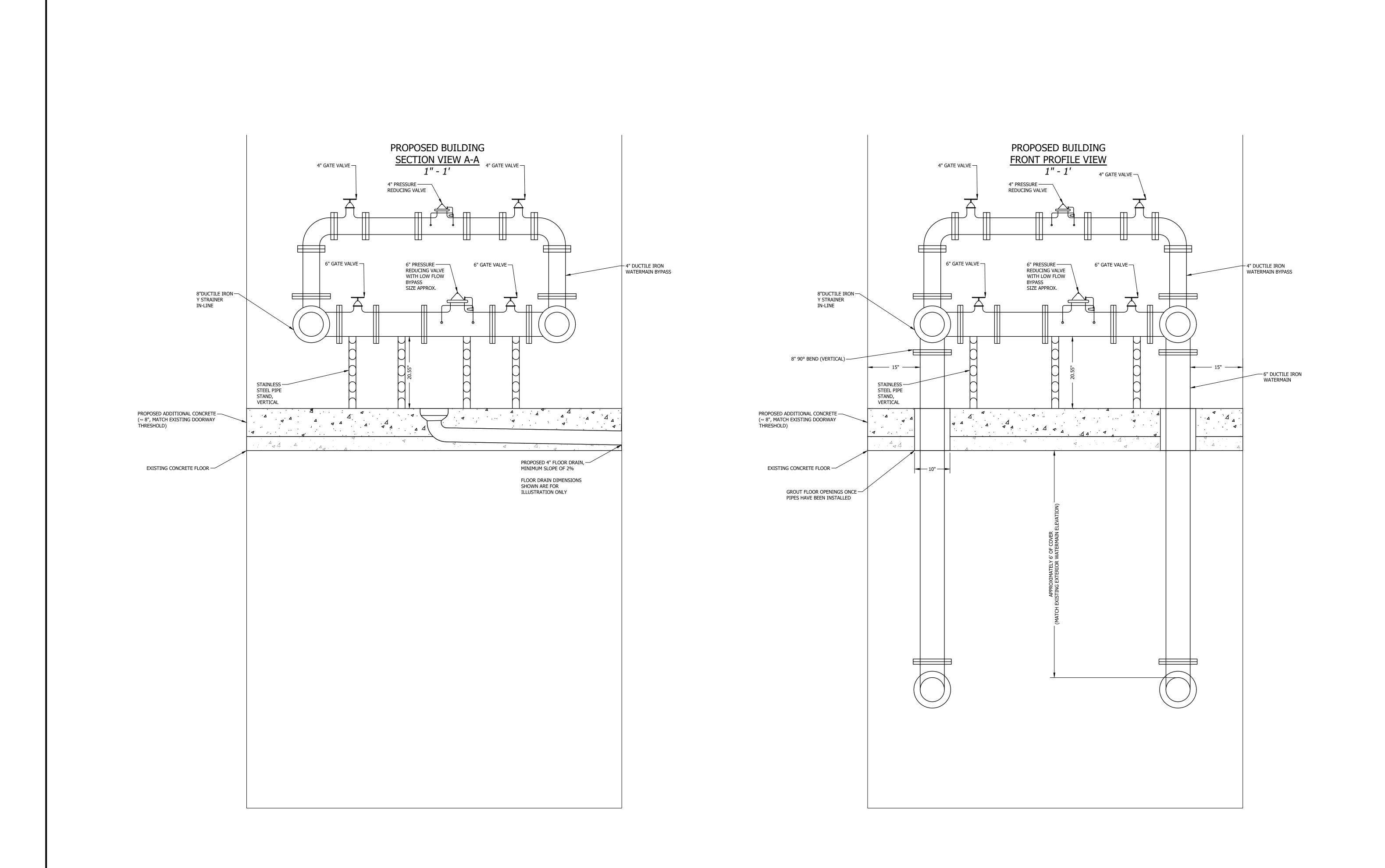
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SHEET C-5.2

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SHEET C-5.3

2. SEEDBED PREPARATION

A. SURFACE AND SEEPAGE WATER SHOULD BE DRAINED OR DIVERTED FROM THE SITE TO PREVENT DROWNING OR WINTER KILLING OF THE PLANTS.

B. STONES LARGER THAN 4 INCHES AND TRASH SHOULD BE REMOVED BECAUSE THEY INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF ABOUT 4 INCHES TO PREPARE A SEEDBED AND MIX FERTILIZER AND LIME THOROUGHLY INTO THE SOIL. THE SEEDBED SHOULD BE LEFT IN A REASONABLY FIRM AND SMOOTH CONDITION. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHEREVER PRACTICAL.

A. LIME AND FERTILIZER SHOULD BE APPLIED PRIOR TO OR AT THE TIME OF SEEDING AND INCORPORATED INTO THE SOIL. KINDS AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:

-AGRICULTURAL LIMESTONE, 2 TONS PER ACRE OR 100 LBS. PER 1,000 SQ. FT. -NITROGEN (N), 50 LBS., PER ACRE OR 1.1 LBS. PER 1,000 SQ. FT. -PHOSPHATE (P₂O₅), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ. FT. -POTASH (K₂0), 100 LBS. PER ACRE OR 2.2 LBS. PER 1,000 SQ. FT.

(NOTE: THIS IS THE EQUIVALENT OF 500 LBS. PER ACRE OF 10-20-20 FERTILIZER OR 1,000 LBS. PER ACRE OF

B. SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING, AND HYDROSEEDING, WHERE BROADCASTING IS USED, COVER SEED WITH .25 INCH OF SOIL OR LESS, BY CULTIPACKING OR RAKING.

C	. SEEDING GUIDE:	1	1			
		SEEDING	SOIL TYPE			
	USE	MIXTURE (SEE 3D)	DROUGHTY	WELL DRAINED	MOD. WELL DRAINED	POORLY DRAINED
	STEEP CUTS AND FILLS,	Α	FAIR	GOOD	GOOD	FAIR
	BORROW AND DISPOSAL AREAS	В	POOR	GOOD	FAIR	FAIR
		С	FAIR	EXCELLENT	EXCELLENT	POOR
	WATERWAYS, EMERGENCY SPILL- WAYS, AND OTHER CHANNELS WITH FLOWING WATER	А	GOOD	GOOD	GOOD	FAIR
	LIGHTLY USED PARKING LOTS, ODD	Α	GOOD	GOOD	GOOD	FAIR
	AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES	В	GOOD	GOOD	FAIR	POOR

D. SE	EEDING RATES:		
	MIXTURE	POUNDS PER ACRE	POUNDS PER 1,000 SQ. FT.
A	TALL FESCUE CREEPING RED FESCUE REDTOP TOTAL:	20 20 2 42	0.45 0.45 0.05 0.95
В	TALL FESCUE CREEPING RED FESCUE CROWN VETCH OR FLATPEA TOTAL:	15 10 15 OR 30 40 OR 55	0.35 0.25 0.35 OR 0.75 0.95 OR 1.35
С	TALL FESCUE	20	0.45

E. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS MAY BE MADE FROM EARLY SPRING TO SEPTEMBER 15. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20 OR FROM AUGUST 10 TO SEPTEMBER 1.

F. TEMPORARY SEEDING RATES:

	SPECIES	POUNDS PER ACRE	POUNDS PER 1,000 SQ. FT.	REMARKS	
	WINTER RYE	112	2.5	BEST FOR FALL SEEDING. SEED FROM AUGUST TO SEPTEMBER 5TH FOR BEST COVER. SEED TO A DEPTH OF 1 INCH.	
	OATS	80	2.0	BEST FOR SPRING SEEDING. SEED NO LATER THAN MAY 15TH FOR SUMMER PROTECTION. SEED TO A DEPTH OF 1 INCH.	
	ANNUAL RYEGRASS	40	1.0	GROWS QUICKLY, BUT IS OF SHORT DURATION. USE WHERE APPEARANCES ARE IMPORTANT. SEED EARLY SPRING AND/OR BETWEEN AUGUST 15TH AND SEPTEMBER 15TH. COVER SEED WITH NO MORE THAN 0.25 INCH OF SOIL.	
-	PERENNIAL RYEGRASS	30	0.7	GOOD COVER WHICH IS LONGER LASTING THAN ANNUAL RYEGRASS. SEED BETWEEN APRIL 1ST AND JUNE 1ST AND/OR BETWEEN AUGUST 15TH AND SEPTEMBER 15TH. MULCHING WILL ALLOW SEEDING THROUGHOUT THE GROWING SEASON. SEED TO A DEPTH OF APPROXIMATELY 0.5 INCH.	

4. MULCH

A. HAY, STRAW, OR OTHER MULCH, WHEN NEEDED, SHOULD BE APPLIED IMMEDIATELY AFTER SEEDING.

B. MULCH WILL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE BEST MANAGEMENT PRACTICE

5. MAINTENANCE TO ESTABLISH A STAND

A. PLANTED AREAS SHOULD BE PROTECTED FROM DAMAGE BY FIRE, GRAZING, TRAFFIC, AND DENSE WEED

B. FERTILIZATION NEEDS SHOULD BE DETERMINED BY ON SITE INSPECTIONS. SUPPLEMENTAL FERTILIZER IS USUALLY THE KEY TO FULLY COMPLETE THE ESTABLISHMENT OF THE STAND BECAUSE MOST PERENNIALS TAKE

C. IN WATERWAYS, CHANNELS, OR SWALES WHERE UNIFORM FLOW CONDITIONS ARE ANTICIPATED, OCCASIONAL MOWING MAY BE NECESSARY TO CONTROL GROWTH OF WOODY VEGETATION.

EROSION CONTROL GENERAL NOTES

A. KEEP SITE MODIFICATION TO A MINIMUM

1. CONSIDER FITTING THE BUILDINGS AND STREETS TO THE NATURAL TOPOGRAPHY. THIS REDUCES THE NEED FOR CUTS AND FILLS. AVOID EXTENSIVE GRADING THAT WOULD ALTER DRAINAGE PATTERNS OR CREATE VERY STEEP SLOPES.

2. EXPOSE AREAS OF BARE SOIL TO EROSIVE ELEMENTS FOR THE SHORTEST TIME POSSIBLE.

- 3. SAVE AND PROTECT DESIRABLE EXISTING VEGETATION WHERE POSSIBLE. ERECT BARRIERS TO PREVENT DAMAGE FROM CONSTRUCTION EQUIPMENT.
- 4. LIMIT THE GRADES OF SLOPES SO VEGETATION CAN BE EASILY ESTABLISHED AND MAINTAINED.
- 5.0 AVOID SUBSTANTIAL INCREASE IN RUNOFF LEAVING THE SITE.

B. MINIMIZE POLLUTION OF WATER DURING CONSTRUCTION ACTIVITIES

- 1. STOCKPILE TOPSOIL REMOVED FROM CONSTRUCTION AREA AND SPREAD OVER ANY DISTURBED AREAS PRIOR TO REVEGETATION. TOPSOIL STOCKPILES MUST BE PROTECTED FROM EROSION.
- 2. PROTECT BARE SOIL AREAS EXPOSED BY GRADING ACTIVITIES WITH TEMPORARY VEGETATION OR MULCHES.
- 3. USE SEDIMENT BASINS TO TRAP DEBRIS AND SEDIMENT WHICH WILL PREVENT THESE MATERIALS FROM MOVING OFF SITE.
- 4. USE DIVERSIONS TO DIRECT WATER AROUND THE CONSTRUCTION AREA AND AWAY FROM EROSION PRONE AREAS TO POINTS OF SAFE DISPOSAL.
- 5. USE TEMPORARY CULVERTS OR BRIDGES WHEN CROSSING STREAMS WITH EQUIPMENT.
- 6. PLACE CONSTRUCTION FACILITIES, MATERIALS, AND EQUIPMENT STORAGE AND MAINTENANCE AREAS AWAY FROM DRAINAGE WAYS.

C. PROTECT AREA AFTER CONSTRUCTION.

- 1. ESTABLISH GRASS OR OTHER SUITABLE VEGETATION ON ALL DISTURBED AREAS. SELECT SPECIES ADAPTED TO THE SITE CONDITIONS AND THE FUTURE USE OF THE AREA. FINAL GRADES SHALL BE SEEDED WITHIN 72 HOURS. STABILIZATION SHALL BE DEFINED AS 85% VEGETATIVE COVER.
- 2. MAINTAIN VEGETATED AREAS USING PROPER VEGETATIVE 'BEST MANAGEMENT PRACTICES' DURING THE CONSTRUCTION PERIOD.
- 3. MAINTAIN NEEDED STRUCTURAL 'BEST MANAGEMENT PRACTICES' AND REMOVE SEDIMENT FROM DETENTION PONDS AND SEDIMENT BASINS AS NEEDED.
- 4. DETERMINE RESPONSIBILITY FOR LONG TERM MAINTENANCE OF PERMANENT 'BEST MANAGEMENT PRACTICES'.
- 5. IF CONSTRUCTION IS ANTICIPATED DURING WINTER MONTHS, GRADED AREAS ARE TO BE STABILIZED WITH NORTH AMERICAN GREEN DS150 MATTING OR EQUAL.

D. INVASIVE SPECIES MONITORING / ELIMINATION

1. PRECAUTIONS SHALL BE TAKEN TO PREVENT IMPORT OR TRANSPORT OF SOIL OR SEED STOCK CONTAINING NUISANCE OR INVASIVE SPECIES SUCH AS PURPLE LOOSESTRIFE, KNOTWEED OR PHRAGMITES. THE CONTRACTOR SHALL ADDRESS INVASIVE SPECIES IN ACCORDANCE WITH THE REPORT "NH DOT BEST MANAGEMENT PRACTICES FOR ROADSIDE INVASIVE PLANTS (2008)".

- 2. TO PREVENT THE INTRODUCTION OF INVASIVE PLANT SPECIES TO THE SITE, THE CONTRACTOR SHALL CLEAN ALL SOILS AND VEGETATION FROM CONSTRUCTION EQUIPMENT AND MATTING BEFORE SUCH EQUIPMENT IS MOVED TO THE SITE.
- 3. IF ANY INVASIVE OR NUISANCE SPECIES ARE FOUND DURING CONSTRUCTION OR DURING THE EARLY STAGES OF VEGETATIVE ESTABLISHMENT. THE CONTRACTOR WILL COORDINATE WITH NHOOT AND THE NH WETLANDS BUREAU TO DETERMINE AGREED TO CONTROL

E. POST CONSTRUCTION MONITORING

1. AFTER CONSTRUCTION IS COMPLETE THE DISTURBED AREAS WILL BE MONITORED FOR INVASIVE SPECIES DURING THE FIRST GROWING SEASON BUT BEFORE SEED SET. ANY INVASIVE SPECIES WILL BE MECHANICALLY REMOVED AND DISPOSED OF ACCORDING TO STANDARDS IN THE REPORT "NH DOT BEST MANAGEMENT PRACTICES FOR ROADSIDE INVASIVE PLANTS (2008)"

HORIZONS ENGINEERING, INC. WILL BE RESPONSIBLE FOR POST CONSTRUCTION MONITORING OF EROSION CONTROL, REVEGETATION, AND INVASIVE SPECIES. A MONITORING REPORT WITH PHOTOS AND RECOMMENDED REMEDIAL ACTIONS, IF ANY, WILL BE SUBMITTED TO THE NH WETLANDS BUREAU WITH COPIES SENT TO NHDOT, AND THE TOWN OF NEWPORT. THE REPORT WILL BE SUBMITTED WITH 30 DAYS OF NOTIFICATION OF PROJECT COMPLETION.

PROVIDE THREE FOOT WIDE STRIP OF

(OR EQUAL) OVER LOAM AND SEED IN

BOTTOM OF DITCH

GRASS LINED DITCH DETAIL

NORTH AMERICAN GREEN DS 150 NETTING

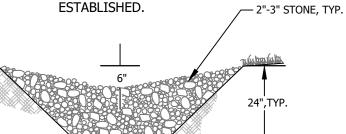
COLD WEATHER SITE STABILIZATION REQUIREMENTS

TO ADEQUATELY PROTECT WATER QUALITY DURING COLD WEATHER AND DURING SPRING RUNOFF, THE FOLLOWING ADDITIONAL STABILIZATION TECHNIQUES SHALL BE EMPLOYED DURING THE PERIOD FROM OCTOBER 15 THROUGH MAY 1:

- 1. THE AREA OF EXPOSED, UNSTABILIZED SOIL SHALL BE LIMITED TO 1 ACRE AND SHALL BE PROTECTED AGAINST EROSION BY THE METHODS DESCRIBED IN THIS SECTION PRIOR TO ANY THAW OR SPRING MELT EVENT. THE ALLOWABLE AREA OF EXPOSED SOIL MAY BE INCREASED IF A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY NHDES.
- 2. ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF LESS THAN 15% WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH 3 TO 4 TONS OF HAY OR STRAW MULCH PER ACRE, SECURED WITH ANCHORED NETTING OR TACKIFIER, OR 2 INCHES OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV-WQ 1506.05(D) THROUGH (H).
- 3. ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF GREATER THAN 15% WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH PROPERLY INSTALLED AND ANCHORED EROSION CONTROL MATTING OR WITH A MINIMUM 4 INCH THICKNESS OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV-WQ 1506.05(D) THROUGH (H).
- 4. INSTALLATION OF ANCHORED HAY MULCH OR EROSION CONTROL MIX, MEETING THE CRITERIA OF ENV-WQ 1506.05(D) THROUGH (H), SHALL NOT OCCUR OVER SNOW OF GREATER THAN 1 INCH IN DEPTH.
- 5. INSTALLATION OF EROSION CONTROL MATTING SHALL NOT OCCUR OVER SNOW OF GREATER THAN ONE INCH IN DEPTH OR ON FROZEN GROUND.
- ALL PROPOSED STABILIZATION IN ACCORDANCE WITH NOTES 2 OR 3 ABOVE, SHALL BE COMPLETED WITHIN 1 DAY OF ESTABLISHING THE GRADE THAT IS FINAL OR THAT OTHERWISE WILL EXIST FOR MORE THAN 5 DAYS.
- 7. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15. OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS, AS DETERMINED BY THE OWNER'S ENGINEERING CONSULTANT.
- AFTER OCTOBER 15, INCOMPLETE ROAD OR PARKING AREAS WHERE ACTIVE CONSTRUCTION OF THE ROAD OR PARKING AREA HAS STOPPED FOR THE WINTER SEASON SHALL BE PROTECTED WITH A MINIMUM 3 INCH LAYER OF BASE COURSE GRAVELS MEETING THE GRADATION REQUIREMENTS OF NHDOT STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM NO. 304.1 OR 304.2.

CONSTRUCTION SEQUENCE

- 1. CUT AND CLEAR TREES WITHIN THE CLEARING LIMITS.
- 2. PREPARE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND NOTICE OF INTENT (NOI) FOR THE PROJECT.
- 3. INSTALL SEDIMENT FENCES, ROCK CHECK DAMS, AND OTHER APPROPRIATE EROSIONS CONTROL MEASURES AT LOCATIONS SHOWN ON THE PLANS AND AS NEEDED.
- 4. PROCEED WITH WORK, LIMITING THE DURATION OF DISTURBANCE. THE MAXIMUM WORK UNIT AREA SHALL BE ONE ACRE IN SIZE. THE MAXIMUM LENGTH OF TIME THAT A WORK UNIT MAY BE LEFT UNSTABILIZED IS 30 DAYS.
- 5. BEGIN SEEDING AND MULCHING IMMEDIATELY AFTER GRADING. ALL DISTURBED AREAS SHALL BE STABILIZED WITH APPROVED METHODS WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
- AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED: A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED; B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED; C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED; OR
- D) EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
- 6. INSPECT ALL EROSION CONTROL MEASURES ON A DAILY BASIS AND AFTER EVERY 0.5 INCHES OF PRECIPITATION. MAINTAIN SEDIMENT FENCE, SEDIMENT TRAPS, HAY BALES, ETC., AS
- 7. PLACE TOPSOIL, SEED AND MULCH.
- 8. COMPLETE ALL REMAINING PERMANENT EROSION CONTROL STRUCTURES.
- 9. MONITOR THE SITE AND MAINTAIN STRUCTURES AS NEEDED UNTIL FULL VEGETATION IS



SECTION VIEW

3. THE MAXIMUM SPACING BETWEEN THE STRUCTURES SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM STRUCTURE IS AT THE SAME ELEVATION AS THE SPILLWAY ELEVATION OF THE DOWNSTREAM STRUCTURE, THIS WILL VARY DEPENDING ON THE

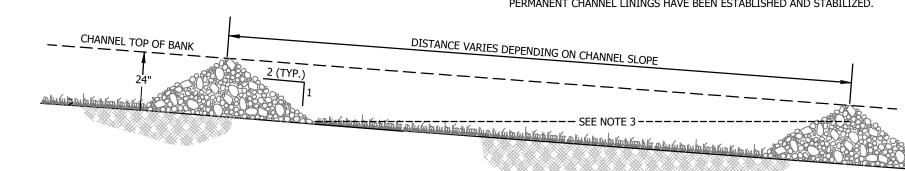
NOTES

1. CONSTRUCT ROCK CHECK DAMS WHERE INDICATED ON THE PLANS OR AS NECESSARY.

2. CONSTRUCT SPILLWAY IN CENTER OF ROCK CHECK DAM 6" BELOW TOP OF CHANNEL.

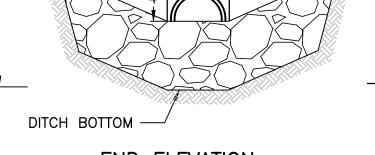
4. ROCK CHECK DAMS SHALL CONSIST OF A WELL GRADED MIXTURE OF 2" - 3" STONE.

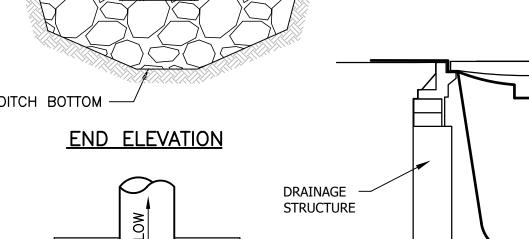
5. REMOVE ROCK CHECK DAMS AND ANY ACCUMULATED SILT IN CHANNEL ONCE PERMANENT CHANNEL LININGS HAVE BEEN ESTABLISHED AND STABILIZED.

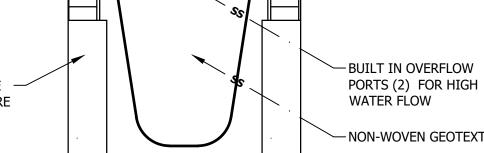


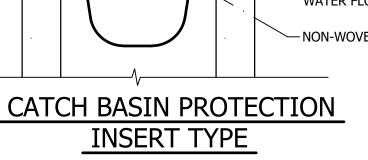
PROFILE VIEW

ROCK CHECK DAM DETAIL

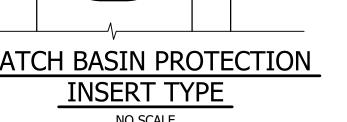




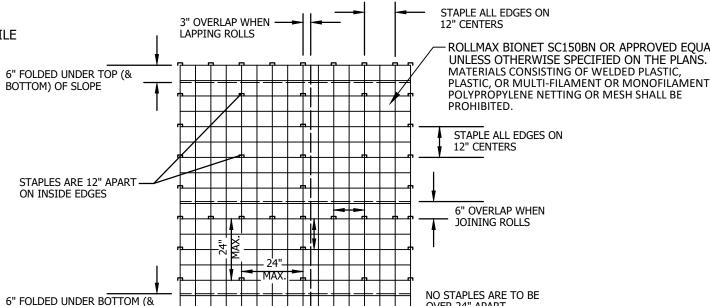






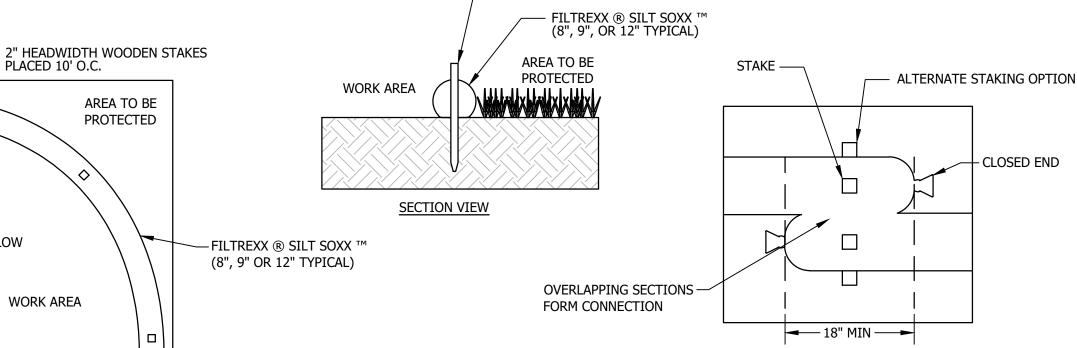






MULCH NETTING DETAIL NO SCALE

2" HEADWIDTH WOODEN STAKES PLACED 10' ON CENTER FILTREXX ® SILT SOXX ™



TOP VIEW

ALL MATERIAL TO MEET FILTREXX ® SPECIFICATIONS

SILT SOXX ™ FILL TO MEET APPLICATION REQUIREMENTS 3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

FILTREXX® SILT SOXX™ DETAILS NOT TO SCALE

FOR CONSTRUCTION

COMPOST SOCK CONNECTION/ATTACHMENT DETAIL

WWW.FILTREXX.COM

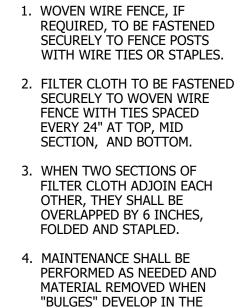
FILTREXX INTERNATIONAL 35481 GRAFTON EASTERN RD. GRAFTON, OH 44044 420-926-2607

let nature do it.

horizonsCognitiving

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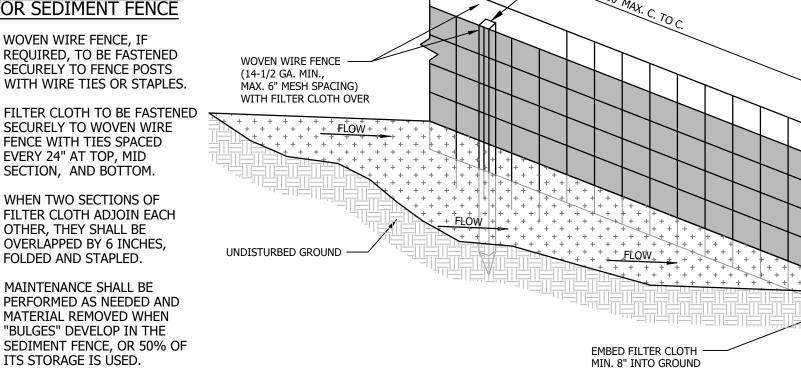
SHEET D-1

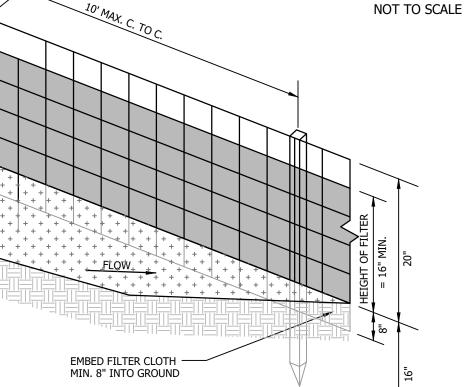


ITS STORAGE IS USED.

CONSTRUCTION NOTES

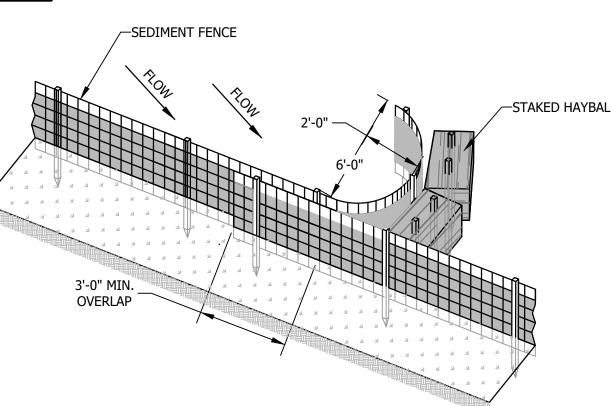
FOR SEDIMENT FENCE





UNLESS OTHERWISE

SPECIFIED



TOP OF DITCH

SIDE SLOPE

SEDIMENT FENCE POCKET

SEDIMENT FENCE NO SCALE

MIN. 16" INTO GROUND

TEMPORARY INLET PROTECTION DETAIL

NOT TO SCALE

FLOW

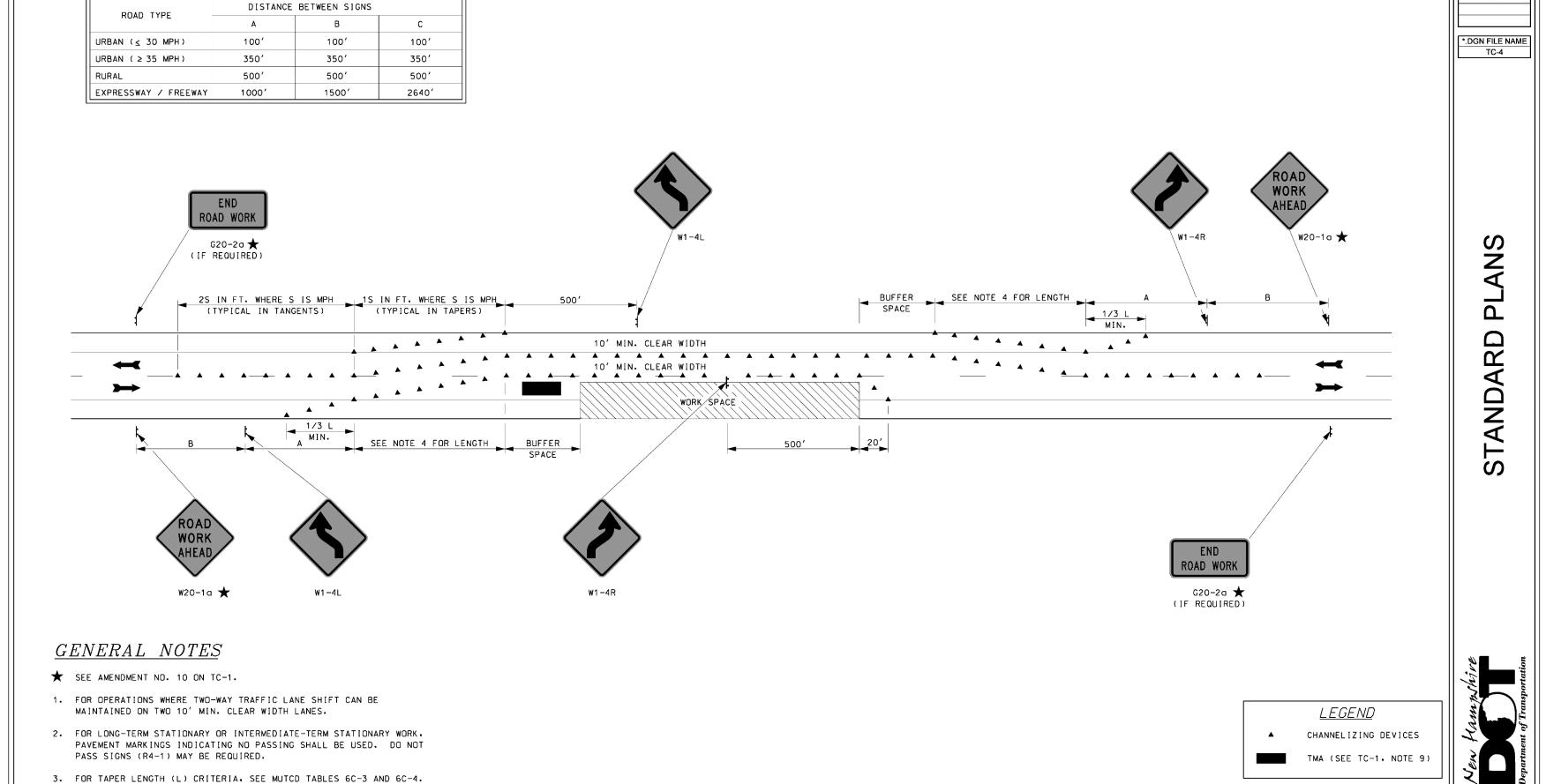
SOURCE: https://www.filtrexx.com/en/resources/design-specs-cads/filtrexx-cad-files THIS DETAIL IS ADAPTED FROM "FILTREXX® SILT SOXX™ & SEDIMENT TRAPP ™ JANUARY 09 2025

DETAILS" SHEET AND IS THE SOLE PROPERTY OF FILTREXX INTERNATIONAL, LLC. HORIZONS ENGINEERING

1. CONTRACTOR TO NOTIFY LOCAL EMERGENCY

SERVICES, NHDOT DISTRICT ONE OFFICE AND ROAD

FORMAN 24 TO 48 HOURS PRIOR TO CONSTRUCTION OF WORK WITHIN THE RIGHT OF WAY. TYPICAL APPLICATION TWO WAY TRAFFIC LANE SHIFT RECOMMENDED ADVANCE WARNING SIGN MINIMUM SPACING TABLE 6-1C FROM MUTCD (2009 EDITION) DISTANCE BETWEEN SIGNS



NOT TO SCALE

tc-04.dgn Default 3/16/2017 4:47:58 PM "n34lms"

4. FOR SPEEDS > 50 MPH, LENGTH = L. FOR SPEEDS ≤ 50 MPH LENGTH = 1/2L.

5. FOR BUFFER SPACE CRITERIA. SEE STOPPING SIGHT DISTANCE. MUTCD TABLE 6C-2.

FOR CONSTRUCTION

STANDARD NO. TC-4

REVISION DATE

STANDARD

NO. TC-4

WORK ZONE TRAFFIC CONTROL

TWO WAY TRAFFIC

LANE SHIFT

DATE OF PRINT JANUARY 09 2025 HORIZONS ENGINEERING

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SHEET D-2

STANDARD TRENCH NOTES - WATER

- ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE SHALL BE REPLACED WITH BEDDING MATERIAL. SEE ALSO NOTE 4.
- <u>BEDDING</u>: SCREENED GRAVEL AND/OR CRUSHED STONE FREE FROM ORGANIC MATTER, CLAY, AND/OR LOAM MEETING ASTM C33 STONE SIZE NO. 67.

1 INCH SCREEN 100% PASSING 90-100% PASSING ³∕₄ INCH SCREEN 20-55% PASSING 3/4 INCH SCREEN 0-10% PASSING #4 SIEVE 0-5% PASSING #8 SIEVE

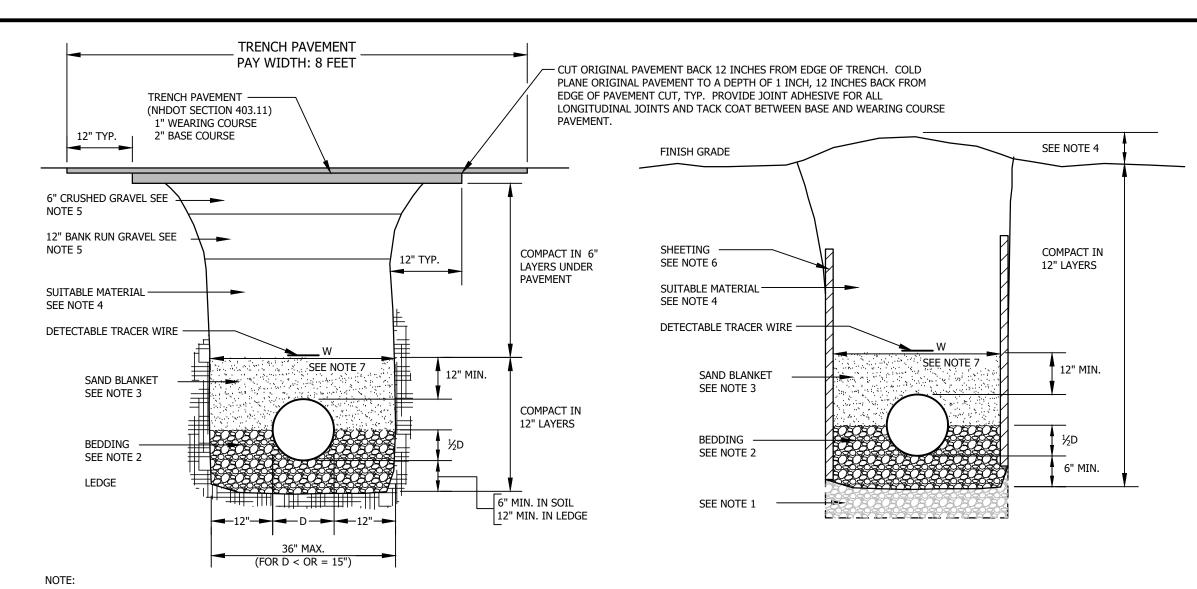
- SAND BLANKET: CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 100% PASSES A 1/2 INCH SIEVE AND NOT MORE THAN 15% PASSES A #200 SIEVE.
- . SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS, AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED FROM THE TRENCH DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, WET OR SOFT MUCK, PEAT OR CLAY NOT APPROVED BY THE ENGINEER EXCAVATED LEDGE MATERIAL, AND ALL ROCKS OVER SIX INCHES IN LARGEST DIMENSION, OR ANY MATERIAL NOT APPROVED BY THE ENGINEER.

TRENCH BACKFILL IN CROSS-COUNTRY LOCATIONS SHALL BE SUITABLE MATERIAL AS DESCRIBED ABOVE, EXCEPT THAT TOP SOIL, LOAM, MUCK, OR PEAT MAY BE USED PROVIDED THAT THE COMPLETED CONSTRUCTION WILL BE STABLE AND ACCESS TO THE PIPE FOR MAINTENANCE AND RECONSTRUCTION IS PRESERVED. BACKFILL SHALL BE MOUNDED TO A HEIGHT OF SIX INCHES ABOVE THE ORIGINAL GROUND SURFACE

- BASE COURSE FOR TRENCH REPAIR SHALL MEET THE REQUIREMENTS OF SECTION 300 OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION OF THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION.
- SHEETING: ALL TRENCH SUPPORTS SHALL CONFORM TO OSHA STANDARDS. CONTRACTOR IS RESPONSIBLE FOR OSHA COMPLIANCE AND WORKER SAFETY THROUGHOUT CONSTRUCTION.
- TRENCH DIMENSIONS: W = MAXIMUM ALLOWABLE TRENCH WIDTH MEASURED 12 INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER (D) OR LESS, W SHALL BE NO MORE THAN 36 INCHES; FOR PIPES GREATER THAN 15 INCHES NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS THE PIPE OUTSIDE DIAMETER. W SHALL ALSO BE THE PAYMENT WIDTH FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE. THE MAXIMUM ALLOWABLE TRENCH PAVEMENT PAYMENT WIDTH SHALL BE 8 FEET CENTERED OVER PIPE.
- WATER/SEWER SEPARATION: WATER MAINS SHALL BE SEPARATED FROM SANITARY SEWER BY A MINIMUM OF 10 FEET HORIZONTALLY AND A MINIMUM OF 18 INCHES VERTICALLY, WITH THE WATER MAIN ABOVE THE SEWER.
- <u>PIPE COVER:</u>
 COVER OVER WATER SHALL BE 5.5 FEET MINIMUM IN ALL LOCATIONS. EXCEPT AS MAY BE NOTED ON PLANS.

TRENCH PATCH NOTES

- 1. ROADWAY CROSSINGS SHALL HAVE TEMPORARY ASPHALT BEFORE THE END OF LAST WORKDAY OF
- 2. ANY DISTURBANCE WITHIN 2 FEET FROM EDGE OF PAVEMENT SHALL RECEIVE 1 FOOT DEPTH OF CRUSHED SHOULDER GRAVEL.



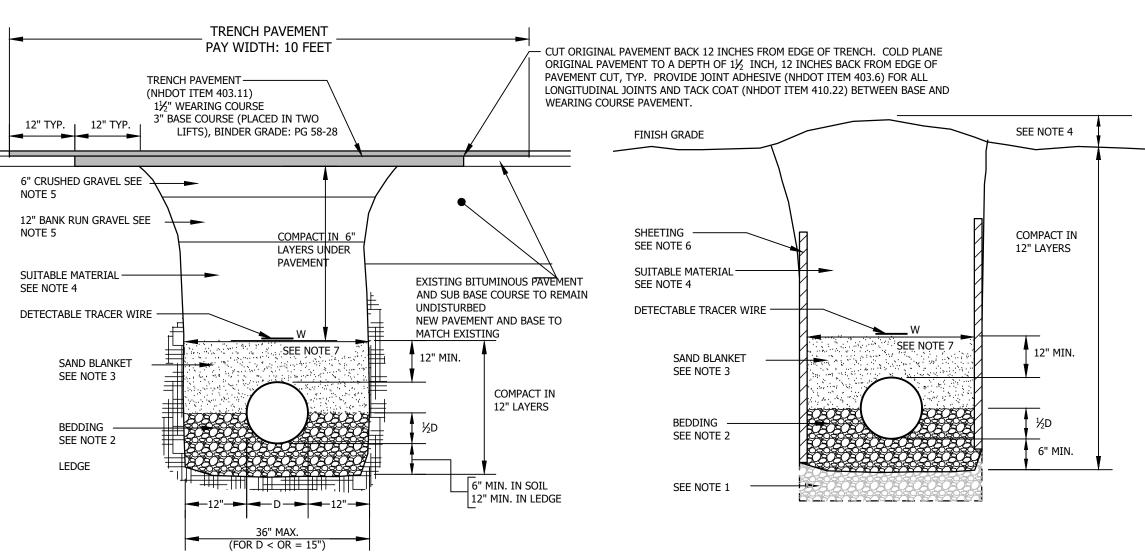
MINIMUM BEDDING DEPTH AND MAXIMUM PAYMENT LIMIT FOR LEDGE EXCAVATION = $\frac{1}{4}$ D

LEDGE/SUB PAVEMENT CONSTRUCTION

EARTH CONSTRUCTION WITH OR WITHOUT SHEETING

STANDARD TRENCH SECTIONS (TOWN ROADS)

NOT TO SCALE



MINIMUM BEDDING DEPTH AND MAXIMUM PAYMENT LIMIT FOR LEDGE EXCAVATION = $\frac{1}{4}$ D

(12" MINIMUM)

EARTH CONSTRUCTION WITH OR WITHOUT SHEETING

LEDGE/SUB PAVEMENT CONSTRUCTION NHDOT TIER 3 ROADS - STANDARD TRENCH SECTIONS (UNITY ROAD)

NOT TO SCALE

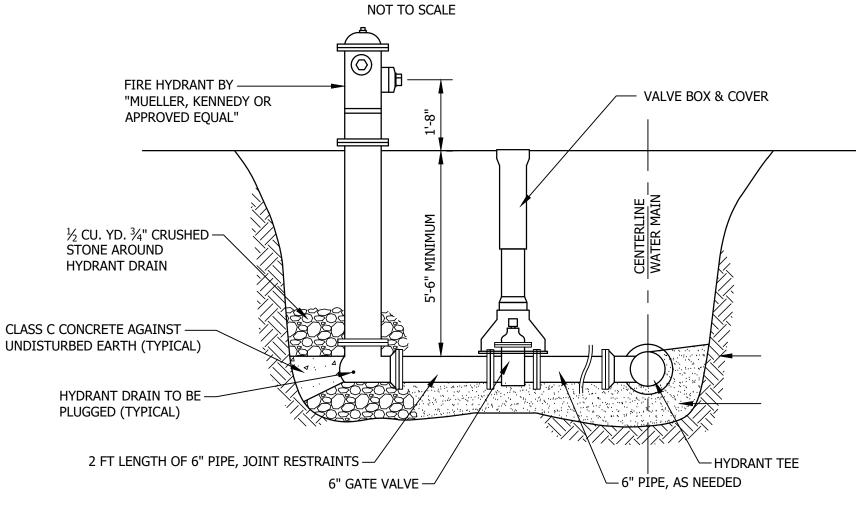
TRENCH PAVEMENT PAY WIDTH: 6 FEET TRENCH PAVEMENT ----(NHDOT SECTION 403.11) 1" WEARING COURSE 12" TYP. 2" BASE COURSE 6" CRUSHED GRAVEL SEE \ 12" BANK RUN GRAVEL SEE _ NOTE 5 COMPACT IN 6" LAYERS UNDER SUITABLE MATERIAL -SEE NOTE 4 - CUT ORIGINAL PAVEMENT BACK 12 INCHES FROM DETECTABLE TRACER WIRE -EDGE OF TRENCH. COLD PLANE ORIGINAL PAVEMENT TO A DEPTH OF 1 INCH, 12 INCHES BACK FROM EDGE OF PAVEMENT CUT, TYP. PROVIDE JOINT ADHESIVE SEE NOTE 7 FOR ALL LONGITUDINAL JOINTS AND TACK COAT SAND BLANKET BETWEEN BASE AND WEARING COURSE PAVEMENT. SEE NOTE 3 COMPACT IN 12" LAYERS BEDDING SEE NOTE 2 LEDGE 6" MIN. IN SOIL 12" MIN. IN LEDGE -12"-**>**-12" ▶ (FOR D < OR = 15")

MINIMUM BEDDING DEPTH AND MAXIMUM PAYMENT LIMIT FOR LEDGE EXCAVATION = $\frac{1}{4}$ D

> LEDGE/SUB PAVEMENT CONSTRUCTION STANDARD WATER SERVICE TRENCH

NOT TO SCALE

ADJUSTABLE CURB BOX AND TOP — CURB STOP SET ON A CEMENT BRICK TÒ USER IPS HDPE DR11 WATER SERVICE WITH -COMPRESSION PACK JOINTS ONLY CORPORATION STOP AND SADDLE WATER SERVICE CONNECTION



FIRE HYDRANT DETAIL

HYDRANT TO BE MINIMUM 8 FEET FROM EDGE OF PAVEMENT ON UNITY ROAD

BLOCKS MUST BE POURED AGAINST UNDISTURBED SOIL THE PIPE JOINT AND BOLTS MUST BE ACCESSIBLE. CONCRETE SHOULD BE CURED FOR AT LEAST 5 DAYS AND SHOULD HAVE A COMPRESSION STRENGTH OF 3,000 LBS. AT 28 DAYS. - BLOCKS MUST BE POSITIONED TO COUNTERACT THE DIRECTION OF THE RESULTANT THRUST FORCE.

FINISH GRADE

RESTRAINED JOINTS MAY BE USED FOR RESISTING THRUST FORCES WHERE THERE IS A SHORTAGE OF SPACE OR WHERE THE SOIL BEHIND A FITTING WILL NOT PROVIDE ADEQUATE SUPPORT. THIS RESTRAINING METHOD INVOLVES PLACEMENT OF THESE SPECIAL JOINTS AT APPROPRIATE FITTINGS AND FOR A PREDETERMINED NUMBER OF PIPE

ENGTHS ON EACH SIDE, (MINIMUM 15 FEET).						
RESULTAI	RESULTANT THRUST AT FITTINGS AT 100 PSI WATER PRESSURE					
NOMINAL	AL TOTAL THRUST (POUNDS)					
PIPE DIA. (INCHES)	DEAD END	90° BEND	45° BEND	22½° BEND	11 1 0 BEN	
4	1,810	2,559	1,385	706	355	
6	3,739	5,288	2,862	1,459	733	
8	6,433	9,097	4,923	2,510	1,261	
10	9,677	13,685	7,406	3,776	1,897	
12	13,685	19,353	10,474	5,340	2,683	
14	18,385	26,001	14,072	7,174	3,604	
16	23,779	33,628	18,199	9,278	4,661	
18	29,865	42,235	22,858	11,653	5,855	
20	36,644	51,822	28,046	14,298	7,183	
24	52,279	73,934	40,013	20,398	10,249	

TO DETERMINE THRUST AT PRESSURES OTHER THAN 100 PSI, MULTIPLY THE THRUST OBTAINED IN

THE TABLE BY THE RATIO OF THE PRESSURE TO 100. FOR EXAMPLE, THE THRUST ON A 12 INCH, 90° BEND AT 125 PSI IS: <u>19,353 x 125</u> = 24,191 POUNDS

TOTAL THRUST (POUNDS)		•					
90° BEND 45° BEND 22½° BEND 11½° BEND 2,559 1,385 706 355 5,288 2,862 1,459 733 9,097 4,923 2,510 1,261 13,685 7,406 3,776 1,897 19,353 10,474 5,340 2,683 26,001 14,072 7,174 3,604 33,628 18,199 9,278 4,661 42,235 22,858 11,653 5,855 51,822 28,046 14,298 7,183	FITTINGS AT 100 PSI WATER PRESSURE						
2,559 1,385 706 355 5,288 2,862 1,459 733 9,097 4,923 2,510 1,261 13,685 7,406 3,776 1,897 19,353 10,474 5,340 2,683 26,001 14,072 7,174 3,604 33,628 18,199 9,278 4,661 42,235 22,858 11,653 5,855 51,822 28,046 14,298 7,183	TOTAL THRUST (POUNDS)						
5,288 2,862 1,459 733 9,097 4,923 2,510 1,261 13,685 7,406 3,776 1,897 19,353 10,474 5,340 2,683 26,001 14,072 7,174 3,604 33,628 18,199 9,278 4,661 42,235 22,858 11,653 5,855 51,822 28,046 14,298 7,183	90° BEND	45° BEND	22½° BEND	11 ¹ / ₄ ° BEND			
9,097 4,923 2,510 1,261 13,685 7,406 3,776 1,897 19,353 10,474 5,340 2,683 26,001 14,072 7,174 3,604 33,628 18,199 9,278 4,661 42,235 22,858 11,653 5,855 51,822 28,046 14,298 7,183	2,559	1,385	706	355			
13,685 7,406 3,776 1,897 19,353 10,474 5,340 2,683 26,001 14,072 7,174 3,604 33,628 18,199 9,278 4,661 42,235 22,858 11,653 5,855 51,822 28,046 14,298 7,183	5,288	2,862	1,459	733			
19,353 10,474 5,340 2,683 26,001 14,072 7,174 3,604 33,628 18,199 9,278 4,661 42,235 22,858 11,653 5,855 51,822 28,046 14,298 7,183	9,097	4,923	2,510	1,261			
26,001 14,072 7,174 3,604 33,628 18,199 9,278 4,661 42,235 22,858 11,653 5,855 51,822 28,046 14,298 7,183	13,685	7,406	3,776	1,897			
33,628 18,199 9,278 4,661 42,235 22,858 11,653 5,855 51,822 28,046 14,298 7,183	19,353	10,474	5,340	2,683			
42,235 22,858 11,653 5,855 51,822 28,046 14,298 7,183	26,001	14,072	7,174	3,604			
51,822 28,046 14,298 7,183	33,628	18,199	9,278	4,661			
	42,235	22,858	11,653	5,855			
73,934 40,013 20,398 10,249	51,822	28,046	14,298	7,183			
	73,934	40,013	20,398	10,249			

TO DETERMINE THE SIZE OF A CONCRETE THRUST BLOCK, DIVIDE THE TOTAL FORCE BY THE BEARING VALUE OF THE SOIL. THE QUOTIENT WILL BE THE SIZE OF THE BEARING AREA OF THE THRUST BLOCK IN SQUARE FEET. APPROXIMATE VALUES FOR VARIOUS TYPES OF SOIL ARE LISTED BELOW. BEARING LOAD (LBS./SQ. FT. SOFT CLAY

3,000

4,000

HORIZONTAL TEE

HORIZONTAL BEND

3000 LB. CONCRETE, TYPICAL UNDISTURBED SOIL, DEAD END TYPICAL TIE DOWN, TYPICAL

VERTICAL BEND

THRUST BLOCK NOTES & DETAILS

PAYMENT LENGTH FOR SLEEVE -EDGE OF PAVEMENT EDGE OF PAVEMENT **G** ROADWAY ■ 10'-0"
■ WIDTH VARIES
■ WIDTH VARIES
■ VIDTH VARIES SHOULDER GRAVEL SHALL NOT BE DISTURBED BY CONSTRUCTION SEAL ENDS OF SLEEVE WITH SPRAY FOAM INSULATION, TYPICAL PAVEMENT SHALL NOT BE DISTURBED BY CONSTRUCTION SLEEVE FOR WATER SERVICE 1" DR11 HDPE WATER SERVICE — 2" HDPE SLEEVE

SANDY SILT

SANDY CLAY

SAND

BORED SERVICE DETAIL

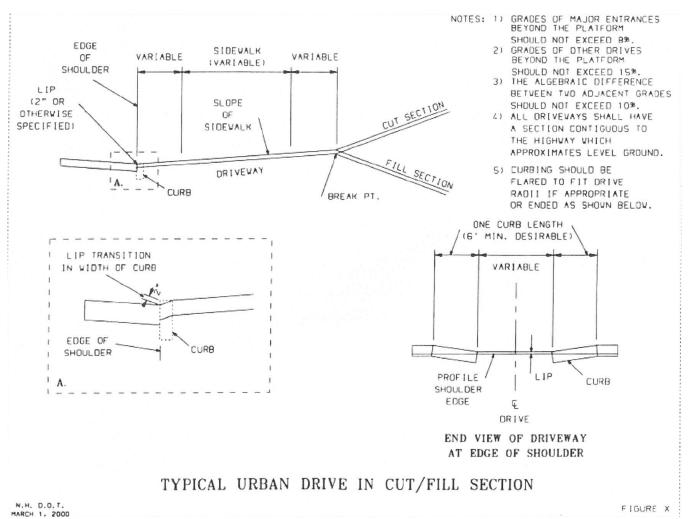
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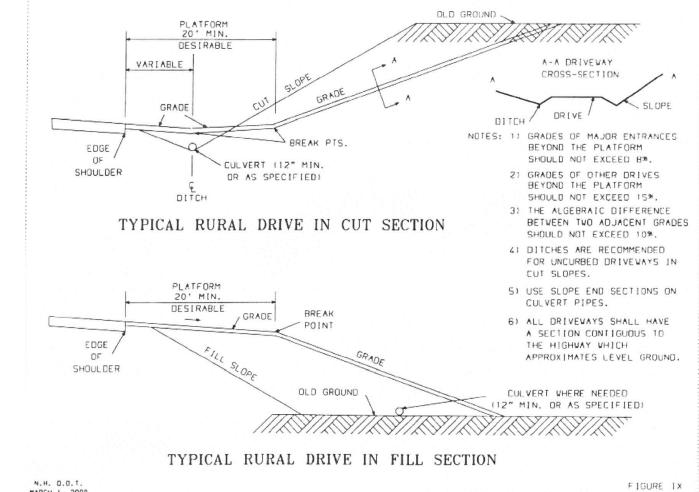
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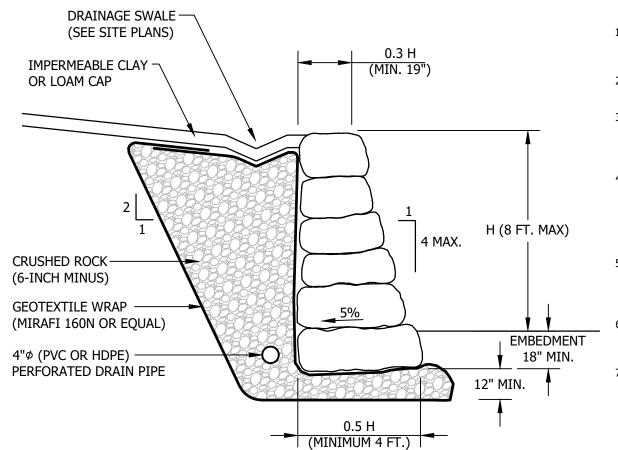
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SHEET D-3







ROCKERY WALL DETAIL

NOT TO SCALE

PROPOSED PAVEMENT

(NHDOT SECTION 403.11)

1 1/2" WEARING COURSE

3" BASE COURSE

(SEE TYPICAL PAVEMENT SECTION)

(SEE TYPICAL PAVEMENT SECTION)

ROCKERY WALL NOTES

- 1. THE WALL DETAIL(S) DEPICTED ON THESE PLANS ARE CONCEPTUAL. SITE SPECIFIC DESIGN SHOULD BE COMPLETED BY A GEOTECHNICAL ENGINEER BASED ON SITE SPECIFIC SOIL AND GROUNDWATER CONDITIONS AT THE WALL LOCATIONS. 2. WALL CONSTRUCTION AND INSPECTION SHOULD BE COMPLETED
- IN ACCORDANCE WITH ROCKERY DESIGN AND CONSTRUCTION GUIDELINES, FHWA-CFL/TD-06-006, NOVEMBER 2006. 3. EXCAVATIONS SHALL BE EXTENDED TO AT LEAST 2.5 FEET BELOW FINISH GRADE TO ALLOW FOR WALL EMBEDMENT AND LEVELING COURSE. THE BASE OF THE EXCAVATION SHALL BE INCLINED BACK AWAY FROM THE FACE OF THE ROCKERY, AT 5
- 4. ROCKS SHOULD BE PLACED IN ROWS SUCH THAT BASE ROCKS CONSIST OF LARGEST DIAMETER AND WEIGHT ROCKS AND EACH SUCCEEDING ROW CONSISTS OF SMALLER DIAMETER ROCKS. BASE ROCKS SHALL BE EQUAL TO ABOUT 1/2 THE WALL HEIGHT AND NOT LESS THAN 4 FEET IN DIAMETER. CAP ROCKS SHALL BE EQUAL TO ABOUT 1/3 THE WALL HEIGHT AND NOT LESS THAN 19
- 5. ROCKS SHALL BE HARD, ANGULAR AND DURABLE. THEY MUST BE ABLE TO RESIST PHYSICAL, CLIMATIC, AND CHEMICAL DECOMPOSITION. ROCKS SHOULD BE ROUGHLY RECTANGULAR, TABULAR OR CUBIC IN SHAPE. ROUNDED COBBLES OR BOULDERS MUST NOT BE USED. 6. ROCKS SHOULD BE PLACED WITH LONGEST DIMENSION PERPENDICULAR TO ROCKERY FACE. THE ROCKS SHOULD BE

INCHES IN DIAMETER.

- PLACED SUCH THAT THEY SLOPE DOWNWARD AT LEAST 5 PERCENT TOWARDS THE BACK OF THE ROCKERY. 7. THE ROCKERY FACE BATTER SHOULD BE 4V:1H OR FLATTER. o EACH ROCK SHOULD BEAR ON AT LEAST TWO OTHER
- o EACH ROCK SHOULD HAVE AT LEAST THREE BEARING POINTS – TWO IN FRONT AND ONE IN BACK. o THE FRONT-MOST BEARING POINTS FOR EACH ROCK
- o THE REAR OF THE ROCKS SHOULD BE ALIGNED ALONG AN IMAGINARY VERTICAL PLANE. IF ROCKS LARGER THAN THE MINIMUM SPECIFIED BASE WIDTH (B) ARE USED, THEY CAN EXTEND BEYOND THIS IMAGINARY PLANE PROVIDED THEY DO NOT INTERFERE WITH ROCKERY DRAINAGE OR

SHOULD BEWITHIN 150MM (6IN) OF THE AVERAGE FACE OF

8. THERE SHOULD BE NO VERTICAL COLUMNS OF ROCK OR CONTINUOUS VERTICAL JOINTS BETWEEN MULTIPLE ROWS OF

- 9. ROCK WIDTH SHALL BE LARGE ENOUGH TO EXTEND FROM THE FRONT FACE TO THE BACK OF THE ROCKERY AT EACH LEVEL. 10. PLACE BASE, FACING AND CAP ROCKS SO THAT THEIR HEIGHT DIMENSION IS NOT GREATER THAN THEIR WIDTH. THE LONGEST DIMENSION OF THE BASE, FACING, AND CAP ROCKS IS PERPENDICULAR TO FACE OF ROCKERY.
- 11. VOIDS BETWEEN ROCKS SHOULD BE AVOIDED AS MUCH AS POSSIBLE. HOWEVER, IN AREAS WHERE VOIDS EXIST, THE VOIDS SHALL BE CHINKED. CHINK ROCKS SHOULD CONSIST OF SPALLS FROM THE PARENT (FACING) ROCK. CHINK ROCKS SHOULD NOT BE MOVABLE BY HAND AND SHOULD BE GROUTED IN PLACE WHERE APPROPRIATE. CHINKING ROCKS SHOULD NOT BE USED AS A MEANS OF SUPPORT FOR OVERLYING FACING
- 12. CAP ROCKS ARE THE TOP ROW OF FACING ROCKS FOR ROCKERIES. CAP ROCKS ARE TYPICALLY SMALLER AND FLATTER THAN THE OTHER FACING ROCKS USED IN THE ROCKERY. CAP ROCKS SHALL HAVE A WEIGHT OF AT LEAST 200 POUNDS. CAP ROCKS SHOULD NOT BE MOVABLE BY HAND. REGARDLESS OF SIZE, CAP ROCKS SHALL BE GROUTED IN PLACE TO REDUCE THE
- POTENTIAL FOR DISLODGING. 13. CRUSHED ROCK SHOULD CONSIST OF CRUSHED, WASHED, HARD, DURABLE ROCK MEETING THE FOLLOWING GRADATION REOUIREMENTS:

100MM (4 IN) 0.0 - 25 19.0MM (3/4 IN) 0.0 - 154.75MM (NO. 4) 0.0 - 5.075MM (NO. 200)

- 14. WHERE LOOSE, SOFT, OR OTHERWISE UNSUITABLE FOUNDATION SOIL CONDITIONS ARE ENCOUNTERED, CONTACT THE ENGINEER
- 15. DISCHARGE OUTLET PIPES TO A PROTECTED OUTLET OR OTHER PERMANENET DRAINAGE STRUCTURE AT LOW POINTS IN THE ROCKERY. DRAIN OUTLETS SHOULD NOT EMPTY INTO STORM DRAINS THAT ARE DESIGNED TO BACK-UP DURING HEAVY 16. STABILITY OF TEMPORARY CUT SLOPES IS THE RESPONSIBILITY
- OF THE CONTRACTOR. 17. DO NOT CONSTRUCT ROCKERIES OR SLOPES EXCEEDING THE HEIGHTS SHOWN ON THE PLAN.

SWEEP EXISTING PAVEMENT SURFACE AND EDGES -CLEAN AND APPLY TACK COAT OF EMULSIFIED ASPHALT COLD PLANE ORIGINAL PAVEMENT TO A DEPTH — OF 1 INCH, 12 INCHES BACK FROM EDGE OF PROPOSED PAVEMENT PAVEMENT WHERE NEW PAVEMENT JOINS (NHDOT SECTION 403.11) ORIGINAL PAVEMENT, TYPICAL. 1" WEARING COURSE 2" BASE COURSE 6" CRUSHED GRAVEL — 12" BANK RUN GRAVEL — 🏯 EXISTING BITUMINOUS PAVEMENT — AND BASE COURSE TO REMAIN

PAVEMENT JOINING DETAIL - UNITY ROAD

NOT TO SCALE

UNDISTURBED

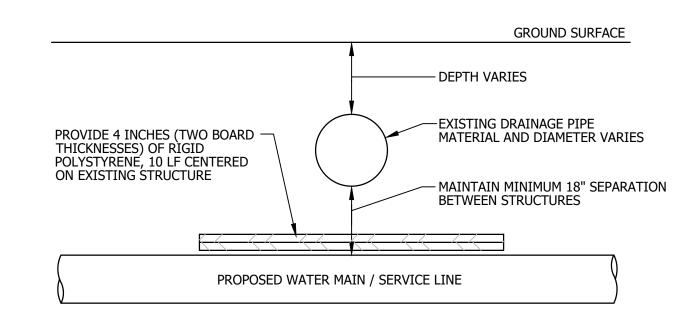
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PAVEMENT JOINING DETAIL - TOWN ROADS

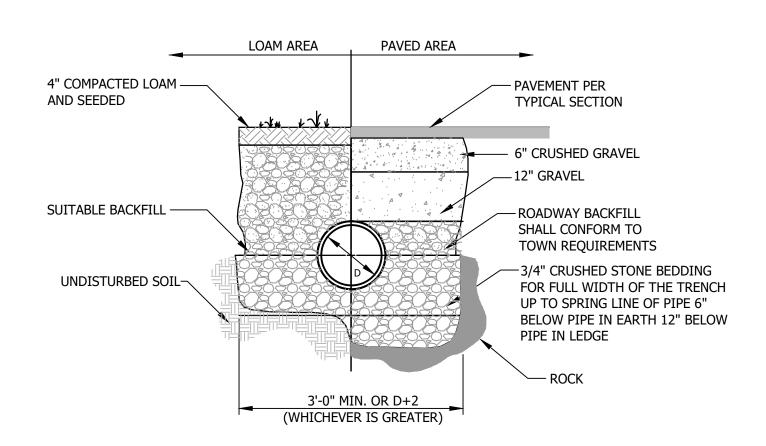
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DRAINAGE CROSSING NOTES

- 1. INSULATION THICKNESS AT DRAINAGE CROSSINGS SHALL BE 4 INCHES (TWO BOARD THICKNESS OF RIGID POLYSTYRENE) UNLESS DIRECTED OTHERWISE IN FIELD. THE CONTRACTOR SHALL NOTIFY TOWN AT LEAST 24 HOURS IN ADVANCE OF ANY CROSSING OF ANY DRAINAGE STRUCTURE.
- 2. MINIMUM SEPARATION BETWEEN EXISTING DRAINAGE STRUCTURES AND NEW WATER MAIN AND APPURTENANCES SHALL BE 18 INCHES.



TYPICAL DRAINAGE CROSSING DETAIL



TYPICAL CULVERT TRENCH DETAIL

NOT TO SCALE

FOR CONSTRUCTION

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SHEET D-4