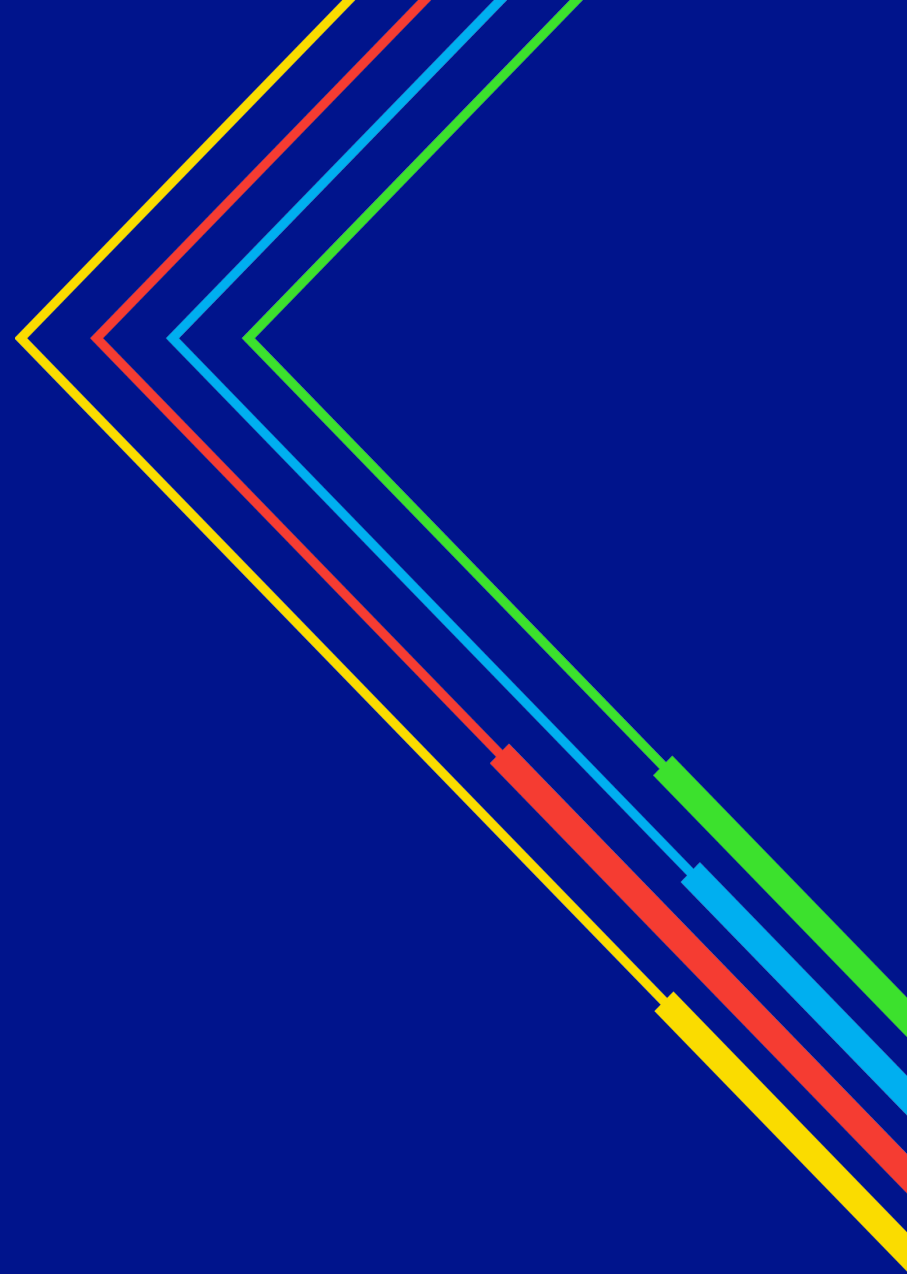


# Amesbury #5 Temporary Mobile Substation

Project Overview Presentation  
October 2025

nationalgrid



# Amesbury #5 Substation Location





# Amesbury #5 Substation Current Condition

- Retaining wall in poor/unstable condition.
- In 2022, moved T2 transformer off of lower retaining wall to expanded substation yard, and conducted close monitoring.
- In late 2024, geotechnical consultant discovered worsening conditions, including new area of soil loss underneath remaining transformer bank. Recent inspections show accelerated deterioration.
- Stabilization work not feasible due to safety, environmental and reliability concerns.
- Critical risk of retaining wall failing and/or soil subsidence causing damage to equipment and potential prolonged outage
- Temporary substation needed to mitigate reliability and safety risks posed by current situation at Amesbury #5.



# Amesbury #5 Temporary Substation Equipment



Transformer

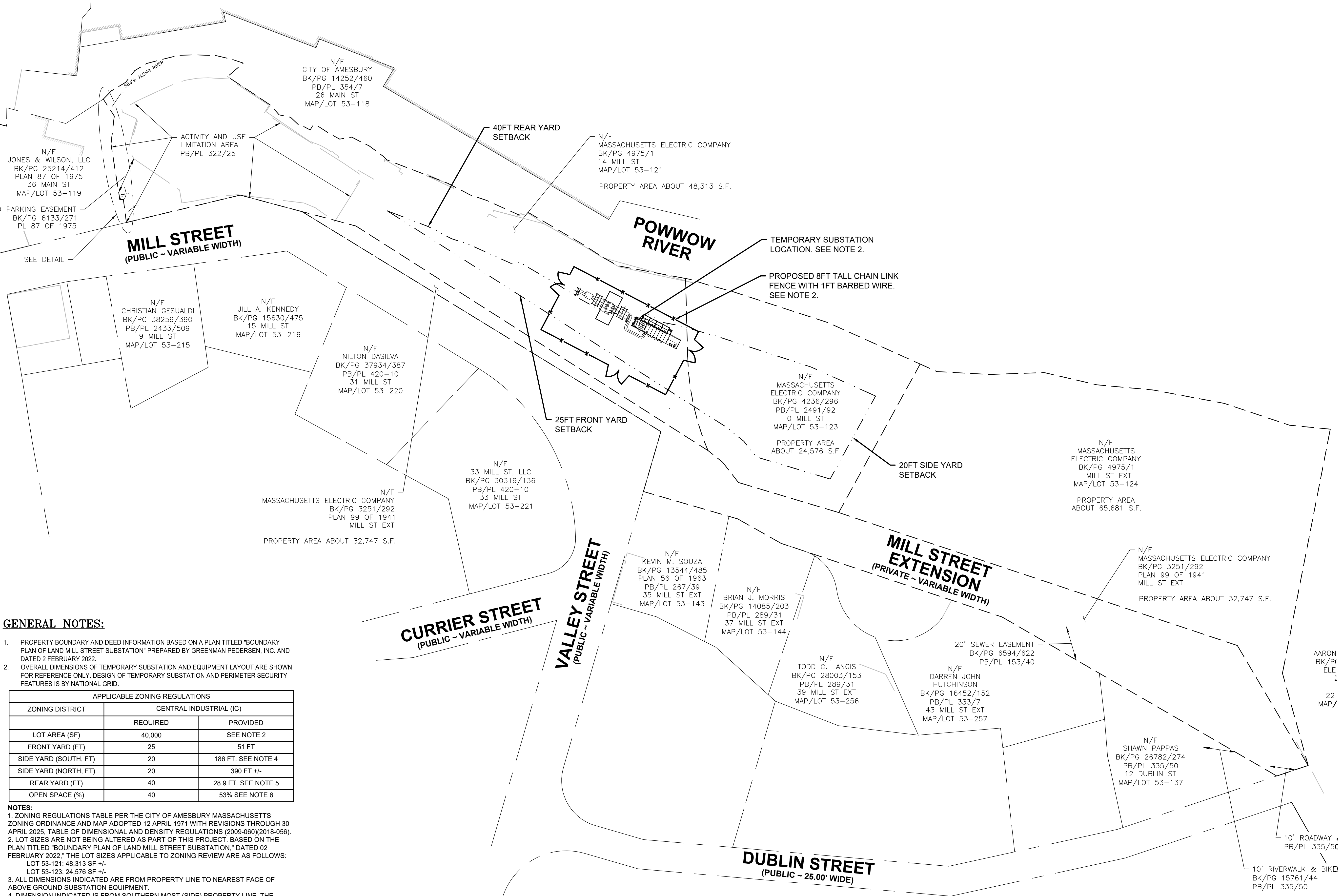
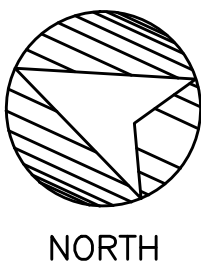


Mobile Switchgear



Cabinet



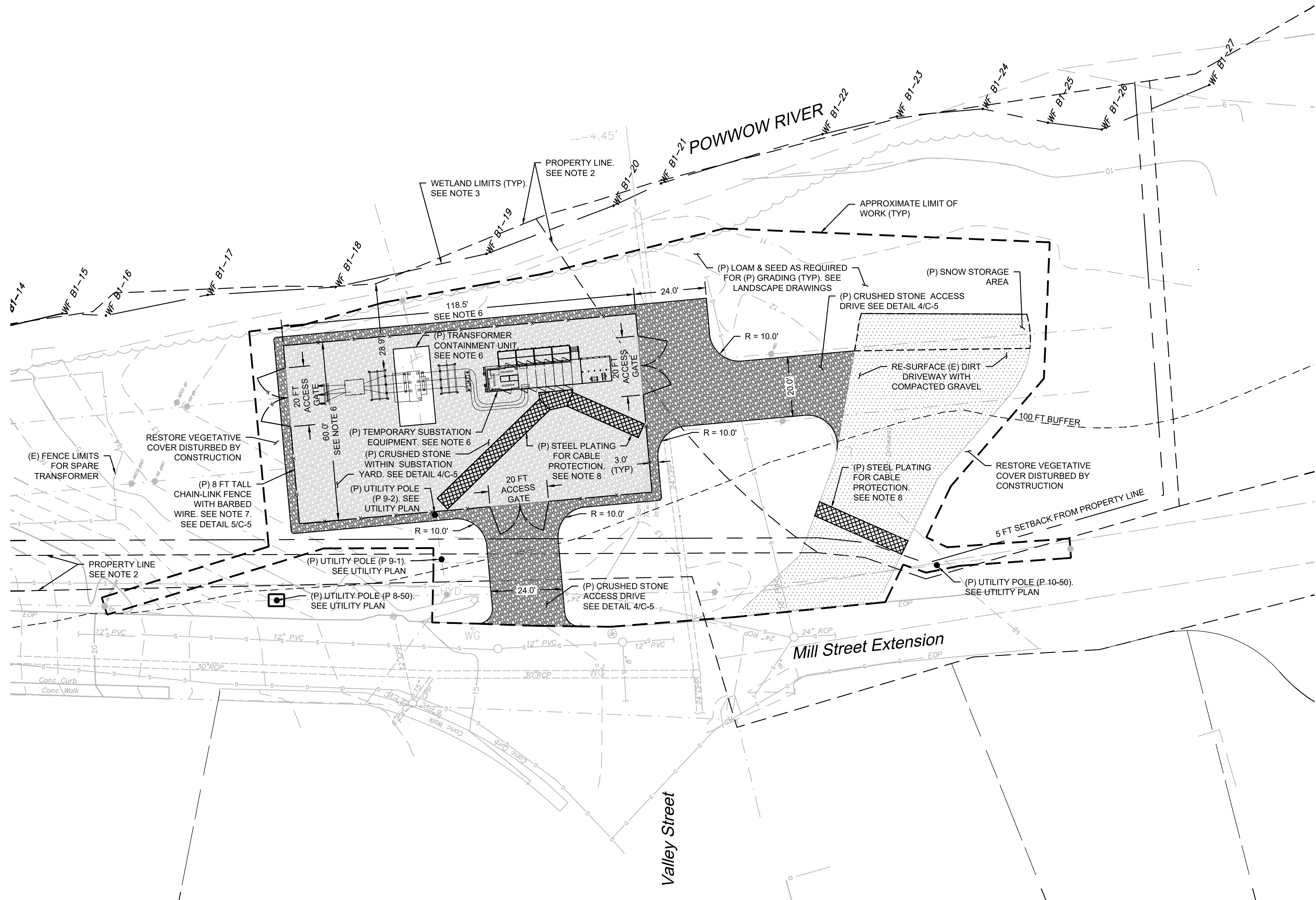


GENERAL NOTES:

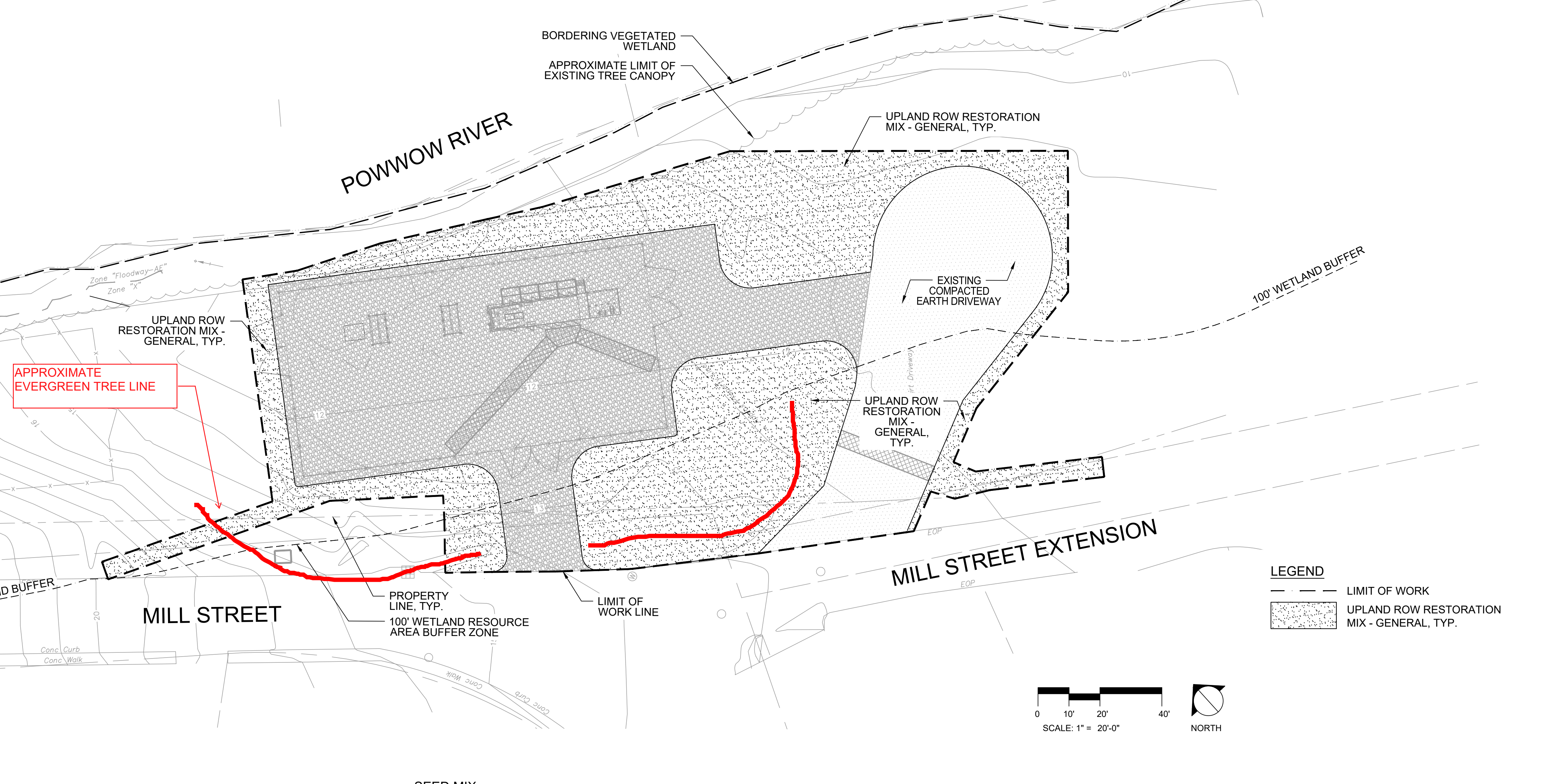
- 1. PROPERTY BOUNDARY AND DEED INFORMATION BASED ON A PLAN TITLED "BOUNDARY PLAN OF LAND MILL STREET SUBSTATION" PREPARED BY GREENMAN PEDERSEN, INC. AND DATED 2 FEBRUARY 2022.
- 2. OVERALL DIMENSIONS OF TEMPORARY SUBSTATION AND EQUIPMENT LAYOUT ARE SHOWN FOR REFERENCE ONLY. DESIGN OF TEMPORARY SUBSTATION AND PERIMETER SECURITY FEATURES IS BY NATIONAL GRID.

| APPLICABLE ZONING REGULATIONS |                         |                     |
|-------------------------------|-------------------------|---------------------|
| ZONING DISTRICT               | CENTRAL INDUSTRIAL (IC) |                     |
|                               | REQUIRED                | PROVIDED            |
| LOT AREA (SF)                 | 40,000                  | SEE NOTE 2          |
| FRONT YARD (FT)               | 25                      | 51 FT               |
| SIDE YARD (SOUTH, FT)         | 20                      | 186 FT. SEE NOTE 4  |
| SIDE YARD (NORTH, FT)         | 20                      | 390 FT +/-          |
| REAR YARD (FT)                | 40                      | 28.9 FT. SEE NOTE 5 |
| OPEN SPACE (%)                | 40                      | 53% SEE NOTE 6      |

- NOTES:
1. ZONING REGULATIONS TABLE PER THE CITY OF AMESBURY MASSACHUSETTS ZONING ORDINANCE AND MAP ADOPTED 12 APRIL 1971 WITH REVISIONS THROUGH 30 APRIL 2025, TABLE OF DIMENSIONAL AND DENSITY REGULATIONS (2009-060)(2018-056).
  2. LOT SIZES ARE NOT BEING ALTERED AS PART OF THIS PROJECT. BASED ON THE PLAN TITLED "BOUNDARY PLAN OF LAND MILL STREET SUBSTATION," DATED 02 FEBRUARY 2022," THE LOT SIZES APPLICABLE TO ZONING REVIEW ARE AS FOLLOWS:  
LOT 53-121: 48,313 SF +/-  
LOT 53-123: 24,576 SF +/-
  3. ALL DIMENSIONS INDICATED ARE FROM PROPERTY LINE TO NEAREST FACE OF ABOVE GROUND SUBSTATION EQUIPMENT.
  4. DIMENSION INDICATED IS FROM SOUTHERN MOST (SIDE) PROPERTY LINE, THE







BORDERING VEGETATED WETLAND

APPROXIMATE LIMIT OF EXISTING TREE CANOPY

UPLAND ROW RESTORATION MIX - GENERAL, TYP.

POWWOW RIVER

100' WETLAND BUFFER

EXISTING COMPACTED EARTH DRIVEWAY

UPLAND ROW RESTORATION MIX - GENERAL, TYP.

APPROXIMATE EVERGREEN TREE LINE

UPLAND ROW RESTORATION MIX - GENERAL, TYP.

MILL STREET EXTENSION

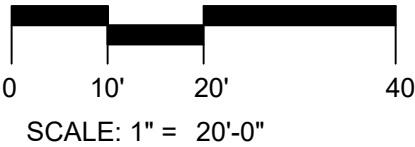
MILL STREET

PROPERTY LINE, TYP.  
100' WETLAND RESOURCE AREA BUFFER ZONE

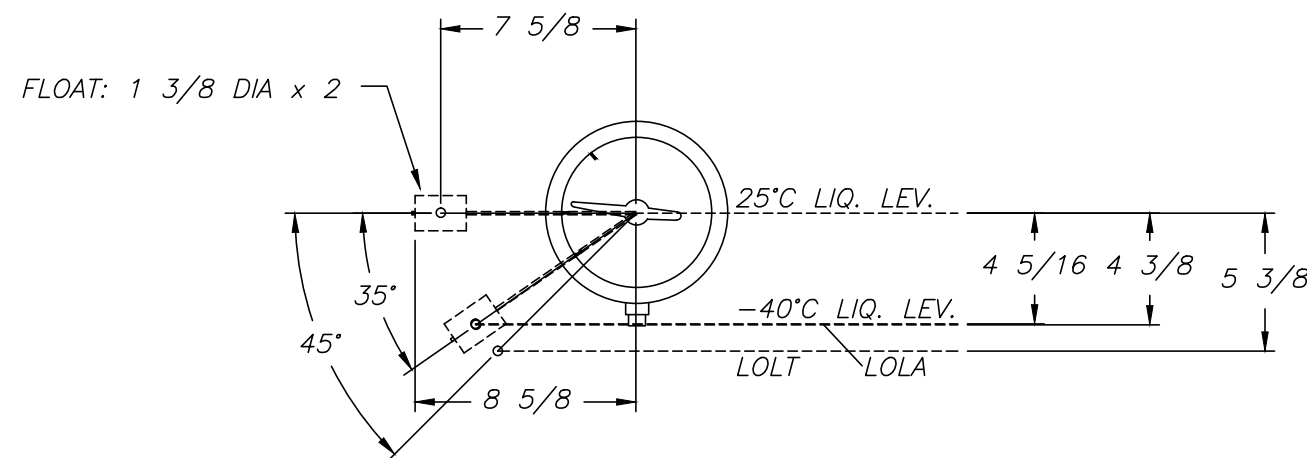
LIMIT OF WORK LINE

LEGEND

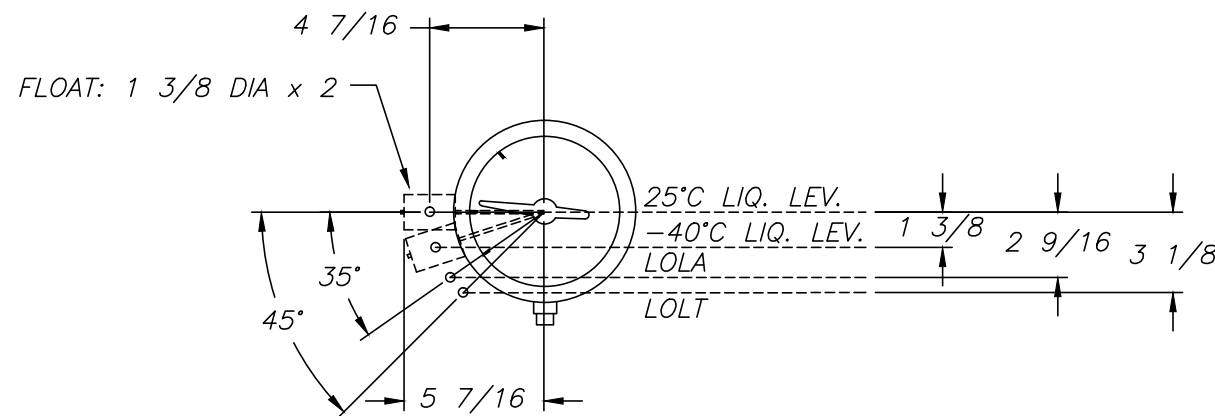
- — — — — LIMIT OF WORK
- [Stippled Box] UPLAND ROW RESTORATION MIX - GENERAL, TYP.



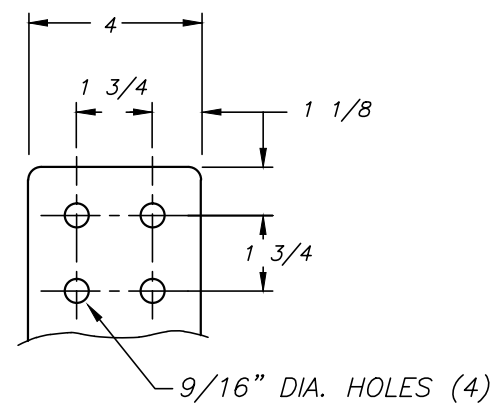
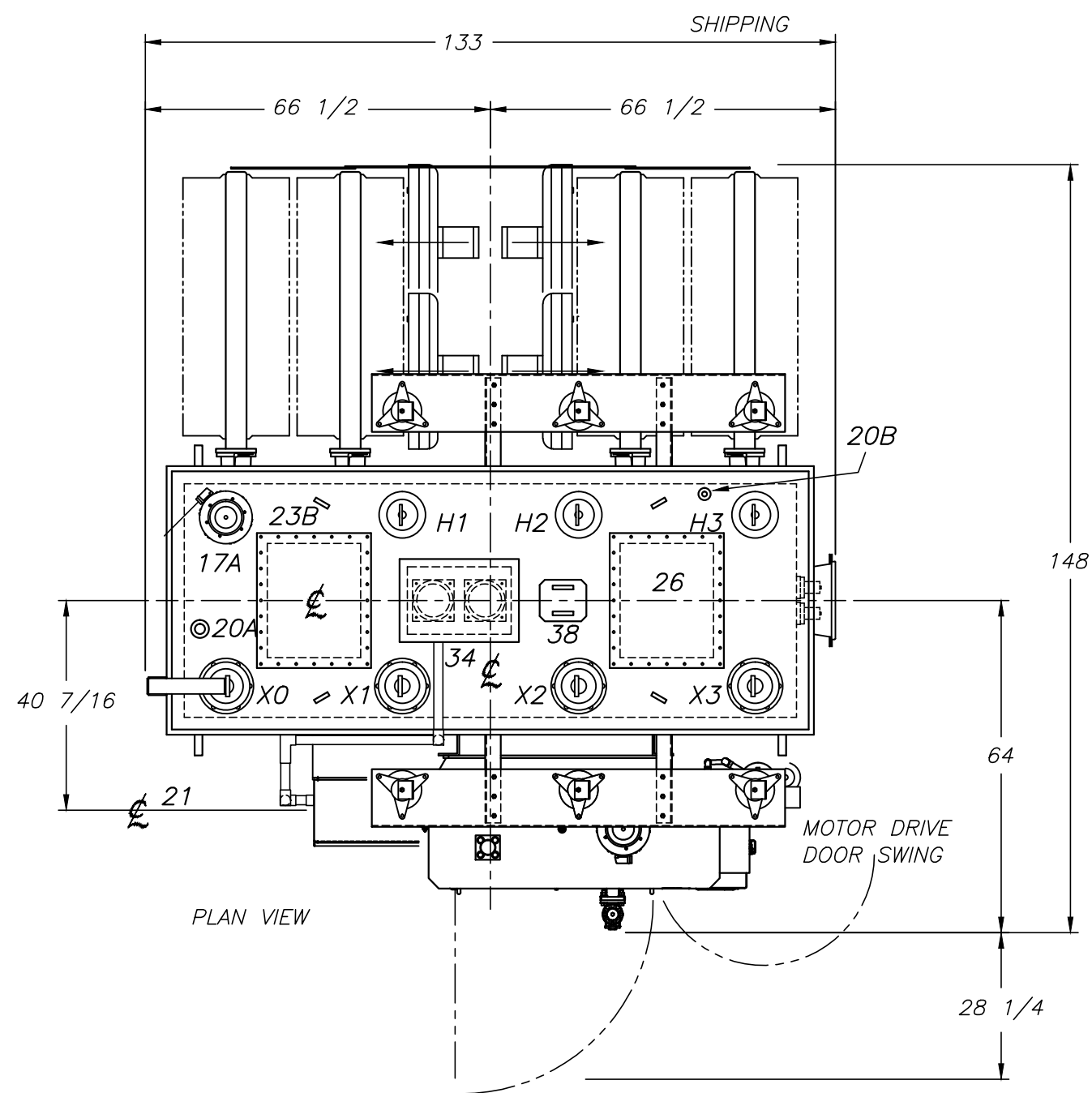




DETAIL 2: MAIN TANK LIQUID LEVEL GAUGE - ALARM & TRIP LIQUID LEVELS



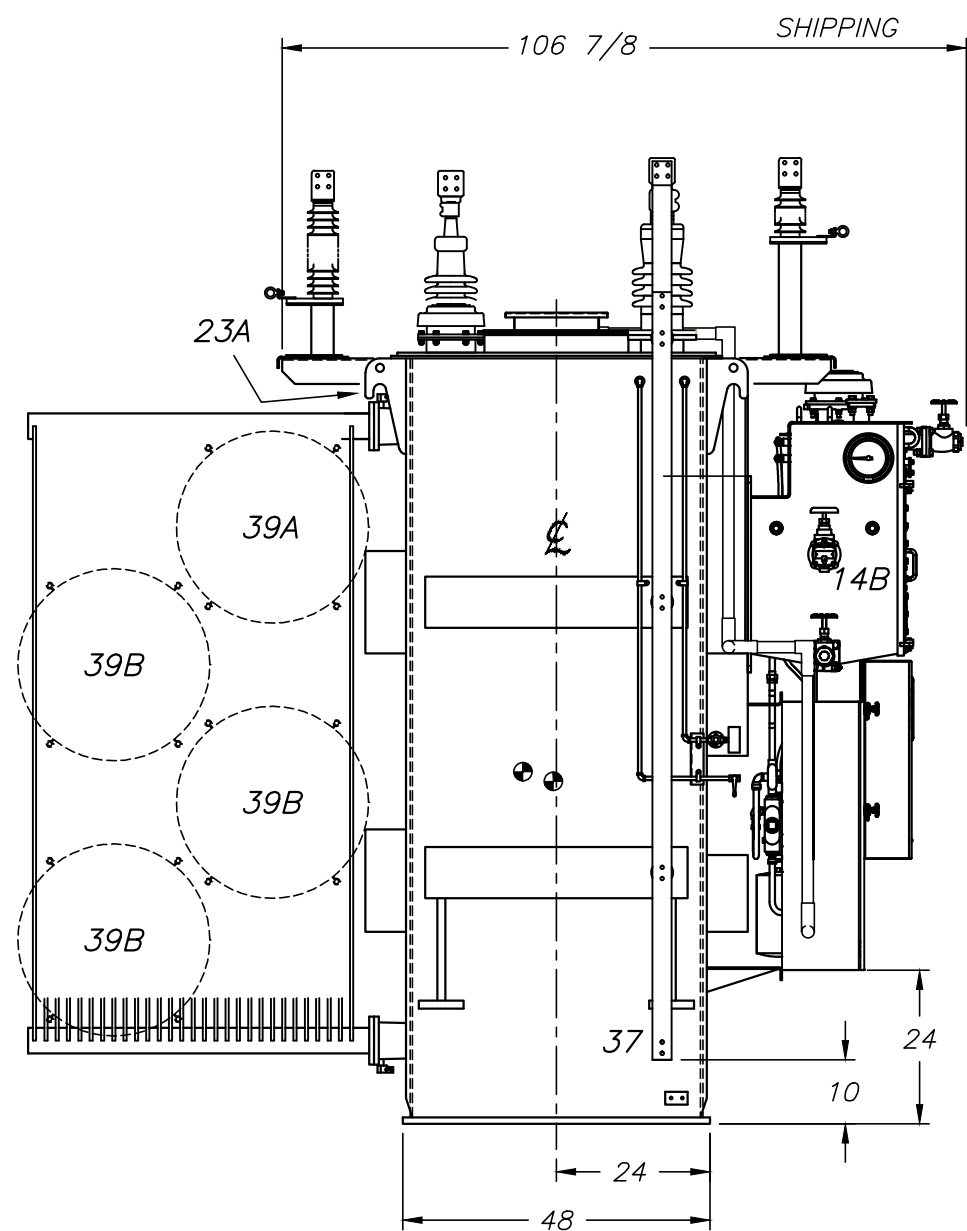
DETAIL 3: LTC TANK LIQUID LEVEL GAUGE - ALARM & TRIP LIQUID LEVELS



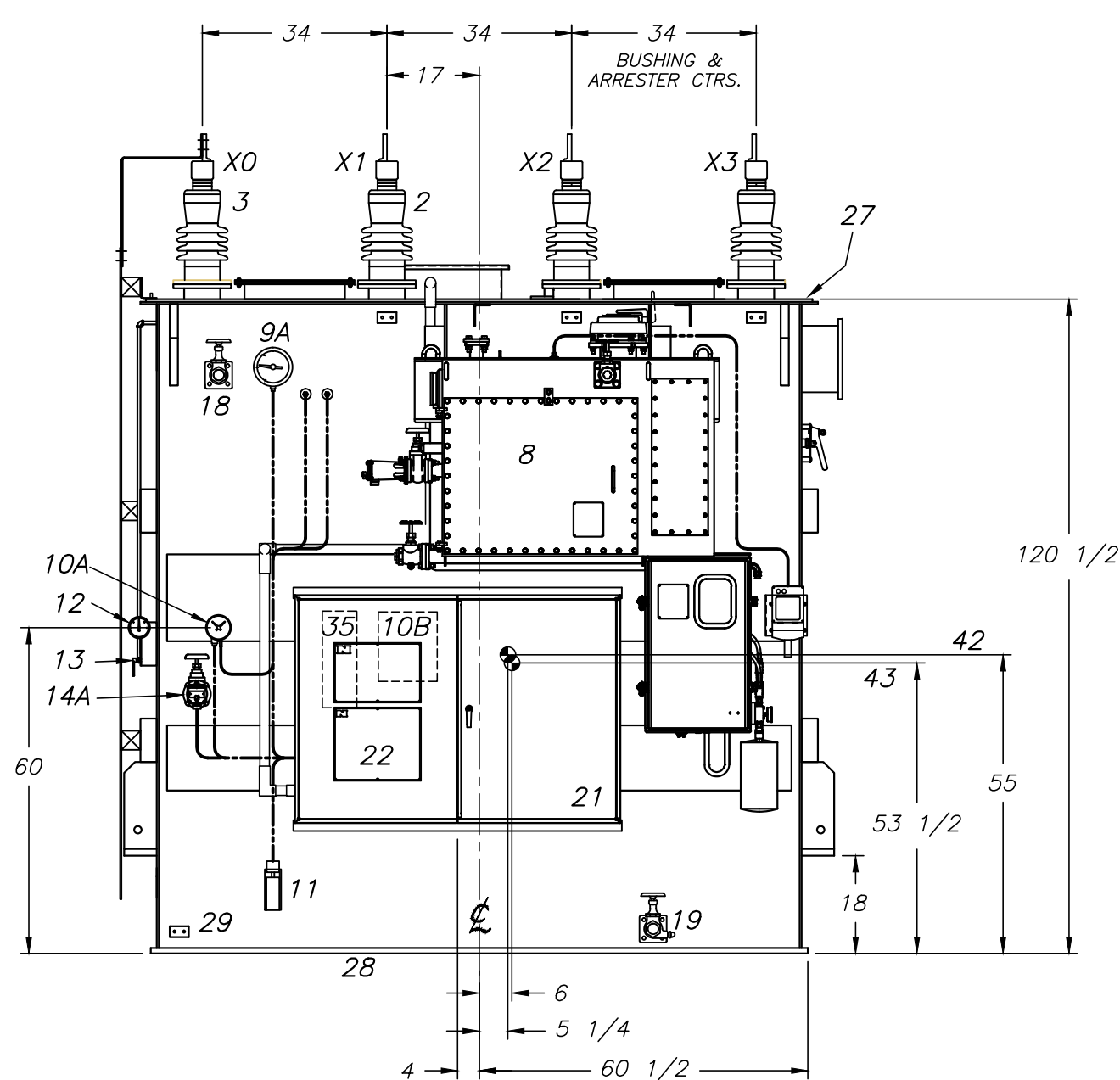
DETAIL 1: HV & LV SPADES (BUSHING LUGS)  
BRONZE, SILVER-PLATED CONTACT SURFACE  
LV SPADE THICKNESS: 1/2  
HV SPADE THICKNESS: 3/4

NOTES:

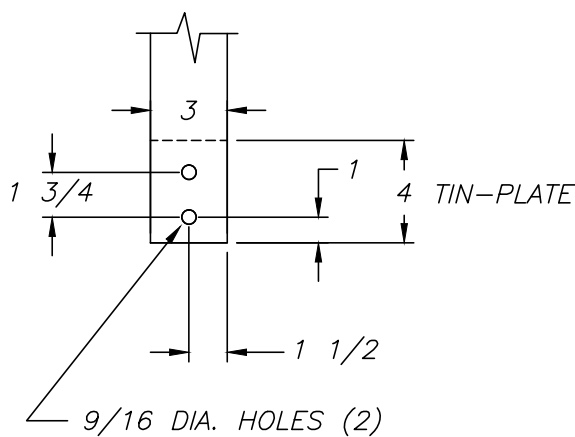
- SEE INSTRUCTION BOOK 600 FOR INSTALLATION AND MAINTENANCE.
- THIS OUTLINE CAN BE USED FOR INSTALLATION PURPOSES. IT IS NOT TO BE REGARDED AS INDICATING THE EXACT DETAILS OF CONSTRUCTION.
- ALL VALVES HAVE THREADED ENDS UNLESS OTHERWISE SPECIFIED.
- THE TANK COVER MUST BE FASTENED IN PLACE WHEN LIFTING THE TRANSFORMER TANK AND THE CORE/COIL ASSEMBLIES TOGETHER.
- THE TRANSFORMER TANK AND LTC TANK ARE BOTH DESIGNED WITHSTAND FULL VACUUM AND PRESSURE TO 10 PSI POSITIVE. VACUUM CAN BE PULLED ON THE TRANSFORMER TANK WITH ATMOSPHERIC PRESSURE IN THE LTC TANK, AND VACUUM CAN BE PULLED ON THE LTC TANK WITH ATMOSPHERIC PRESSURE IN THE TRANSFORMER TANK. VACUUM FILLING OF THE LTC COMPARTMENT IS NOT REQUIRED.
- THE COOLING RADIATORS ARE DESIGNED TO WITHSTAND VACUUM FILLING.
- TRANSFORMER AND ON-LOAD TAP-CHANGER ARE FILLED WITH ASTM D 3487 TYPE 2 INHIBITED MINERAL OIL CONTAINING NO DETECTABLE LEVEL OF PCB (LESS THAN 2 PPM) AT TIME OF MANUFACTURE.
- SEALED TANK CONSTRUCTION PER ANSI C-57-12.10 WITH DRY NITROGEN BLANKET ABOVE OIL.
- PAINT: EXTERNAL FINISH IS ANSI 70 LIGHT GRAY, 2 PART EPOXY. PROCESS: SHOT BLAST PREP., 1 PRIME COAT AND 2 FINISH COATS EACH HAVING A DFT OF 3 MIL. A NON-SKID FINISH IS PROVIDED ON TANK COVER. COOLING RADIATOR MATERIAL IS CRS WITH ANSI 70 EPOXY FINISH. THE INSIDE SURFACES OF THE TRANSFORMER TANK AND CONTROL BOX ARE PAINTED WHITE.
- INTERNAL CURRENT TRANSFORMERS (BUSHING TYPE):  
HV LINE: ONE (1) MULTI-RATIO CT (600/5A) PROVIDED ON EACH OF H1, H2 & H3 BUSHINGS.  
LV LINE: ONE (1) MULTI-RATIO CT (1200/5A) PROVIDED ON EACH OF X1, X2 & X3 BUSHINGS.  
ONE (1) MULTI-RATIO CT (3000/5A) PROVIDED ON EACH OF X1, X2 & X3 BUSHINGS.  
ONE (1) SINGLE-RATIO CT (800/5A) PROVIDED ON EACH OF X1, X2 & X3 BUSHINGS.  
LV NEUTRAL: ONE (1) MULTI-RATIO CTs (1200/5A) PROVIDED ON THE X0 BUSHING.  
LDC: ONE (1) SINGLE RATIO (2170/5A) CT PROVIDED ON THE X1 BUSHING.  
REFER TO NAMEPLATE AND WIRING DIAGRAMS FOR ADDITIONAL INFORMATION.
- EXTERNAL WIRING FROM DEVICES TO CONTROL BOX ARE IN RIGID OR INTERMEDIATE METALLIC CONDUIT WITH SHORT LENGTHS OF FLEXIBLE LIQUID-TIGHT CONDUIT OR WEATHERPROOF "SO" RUBBER JACKET CABLE AT THE DEVICE ENDS. WEATHERPROOF PLUG AND RECEPTACLE CONNECTIONS ARE PROVIDED WITHIN 18" OF EACH FAN MOTOR.
- ALL BUSHINGS ARE BOTTOM CONNECTED.  
393 GALLONS OF OIL MUST BE REMOVED TO GET 1" BELOW HV BUSHINGS (355 GALLONS IF RADIATORS ARE CLOSED OR REMOVED).  
521 GALLONS OF OIL MUST BE REMOVED TO GET 1" BELOW LV BUSHINGS (471 GALLONS IF RADIATORS ARE CLOSED OR REMOVED).
- TRANSFORMER IS DESIGNED FOR OPERATION AT AN ALTITUDE OF 3300 FT OR LESS, IN A NON-HAZARDOUS LOCATION, SEISMIC ZONE 2A.
- MAXIMUM SOUND LEVELS: ONAN: 59 dBA, ONAF: 61 dBA.
- SHIPPING NOTE: COOLING RADIATORS, OIL IN RADIATORS, BUSHING LUGS, ARRESTERS AND BRACKETS ARE REMOVED FOR SHIPPING.
- TANK CORNERS ARE WELDED USING OVERLAPPING "T" JOINTS.
- EXTERNAL DEVICES AND GAUGES ARE IDENTIFIED WITH WEATHERPROOF STAINLESS STEEL NAMEPLATES.
- THE POTENTIAL TRANSFORMER FOR LTC CONTROL SENSING VOLTAGE IS SUPPLIED BY THE CUSTOMER.
- EXTERNAL HARDWARE IS STAINLESS STEEL WITH SILICON BRONZE NUTS.



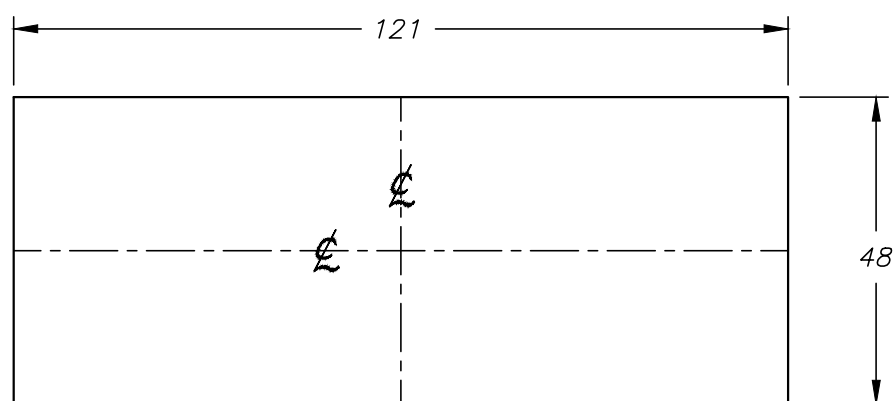
SEGMENT 2 - LEFT END VIEW



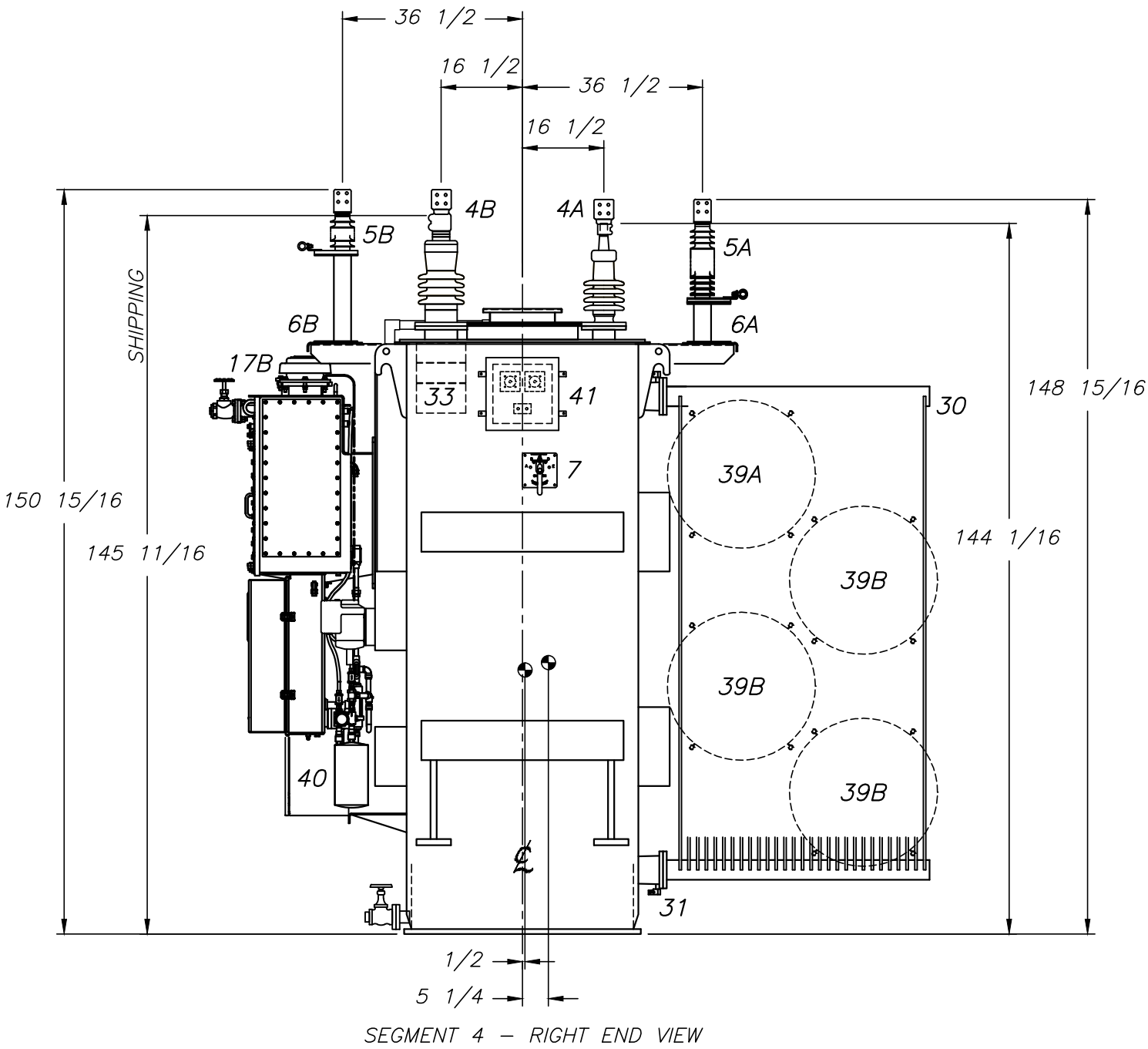
SEGMENT 1 - FRONT VIEW (LTC SIDE)  
(LV ARRESTERS & HV BUSHINGS NOT SHOWN)



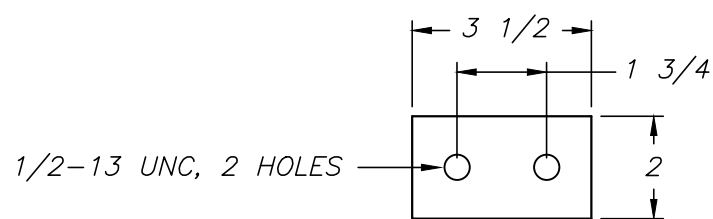
DETAIL 4: NEUTRAL BUS DRILLING



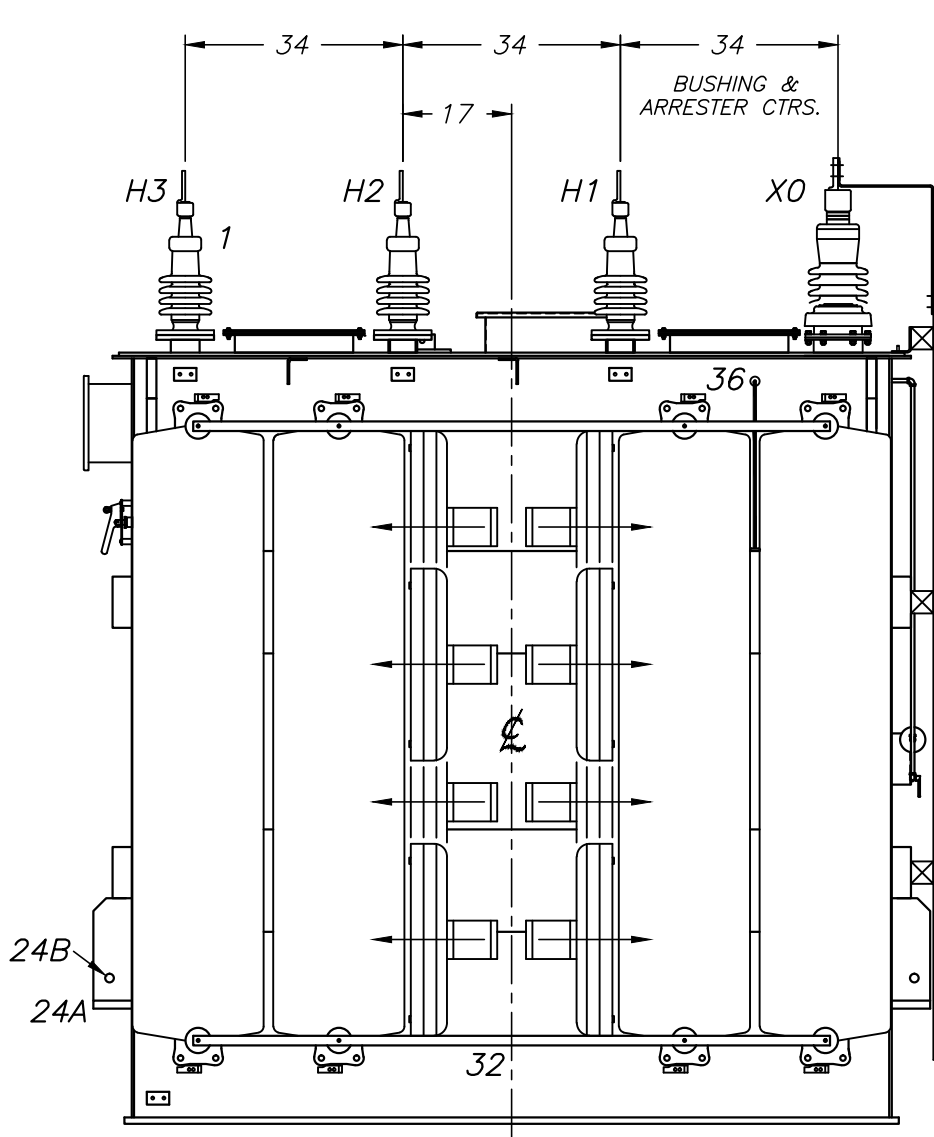
TRANSFORMER BASE PLATE



SEGMENT 4 - RIGHT END VIEW



DETAIL 3: GROUND PAD  
1/2 THICK 304 SS, WITH COPPER FACE



SEGMENT 3 - REAR VIEW - RADIATOR WALL  
(HV ARRESTERS & LV BUSHINGS NOT SHOWN)

TANK SIZE: 45 x 118 x 119 H

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION WHICH CAN NOT BE REPRODUCED, TRANSMITTED OR DISCLOSED IN WHOLE OR IN PART WITHOUT THE WRITTEN AUTHORIZATION OF NIAGARA TRANSFORMER CORPORATION.

UNITS OF MEASURE:  
INCHES, POUNDS, US GALLONS  
UNLESS OTHERWISE NOTED.

PROJECTION:

REVISIONS

Rev.A TPJ 12-18-12  
- Updated Fans and Radiators to Comply with Overload Requirements  
- Updated Weights, Gallons and Dimensions  
Rev.B TPJ 2-22-13  
- Updated Radiators for new Electrical Design  
- Moved Components to Compact Unit  
- Updated Weights, Gallons and Dimensions

Rev.C TPJ 3-26-13  
- Updated Fans and Radiators to Comply with Overload Requirements  
- Relocated Accessories  
- Updated Weights, Gallons and Dimensions  
- Updated Liquid Level Gauge Details  
- Updated Sound Levels

ESTIMATED MASS

CORE & COILS: MAIN: 23460 LB; SERIES-AUTO: 3050 LB 26510 LB  
TANK & FITTINGS: 15425 LB  
REMOVABLE RADS: 5900 LB  
LIQUID IN TRANSFORMER TANK 1955 USG 14275 LB  
LIQUID IN REMOVABLE RADIATORS: 262 USG 1910 LB  
LIQUID IN ON-LOAD TAP-CHANGER: 100 USG 730 LB  
APPROXIMATE TOTAL MASS 64750 LB  
TRANSPORTATION MASS (HEAVIEST PIECE) 56100 LB

NATIONAL GRID EQUIPMENT REFERENCE: 026728

LIQUID FILLED ON-LOAD TAP-CHANGING TRANSFORMER  
DIELECTRIC FLUID: MINERAL OIL, INHIBITED TYPE 2  
7500/9375 KVA 3 PHASE 60 Hz 65°C RISE  
COOLING CLASS: ONAN/ONAF  
PRIMARY VOLTAGE: 22900 Δ 150 KV BIL  
SECONDARY VOLTAGE: 4160 Y 110 KV BIL  
DE-ENERGIZED (NO-LOAD) TAPS: 24100, 23500, 22900, 22300, 21700V  
ON-LOAD TAPS: FULL CAPACITY, 0.625% STEP, 16 STEPS ABOVE & BELOW 4160V

CUSTOMER NATIONAL GRID  
CUSTOMER PO 183470  
PROJECT CODDING AVE SPARE  
NIAGARA REF. 35843  
TRANSFORMER OUTLINE DXL35843  
REFERENCE TRANSFORMER NAMEPLATE DNL35843

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TRANSFORMER OUTLINE  
Dwn W. Holly Date 3-Dec-12 Dwg No. Rev  
Ch TPJ Plot Scale 1/30 DXL35843-1 C

FOR BILL OF MATERIAL REFER TO DXL35843-2 (SHEET 2 OF 2)

SHEET 1 of 2



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