

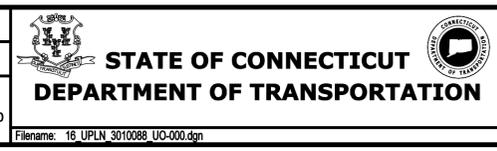
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 U-XXX UTILITY PLAN

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| REV. | DATE | REVISION DESCRIPTION | SHEET NO. | Plotted Date: 11/7/2014 |
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**WPD / JLW**  
 CHECKED BY:  
**JFK**  
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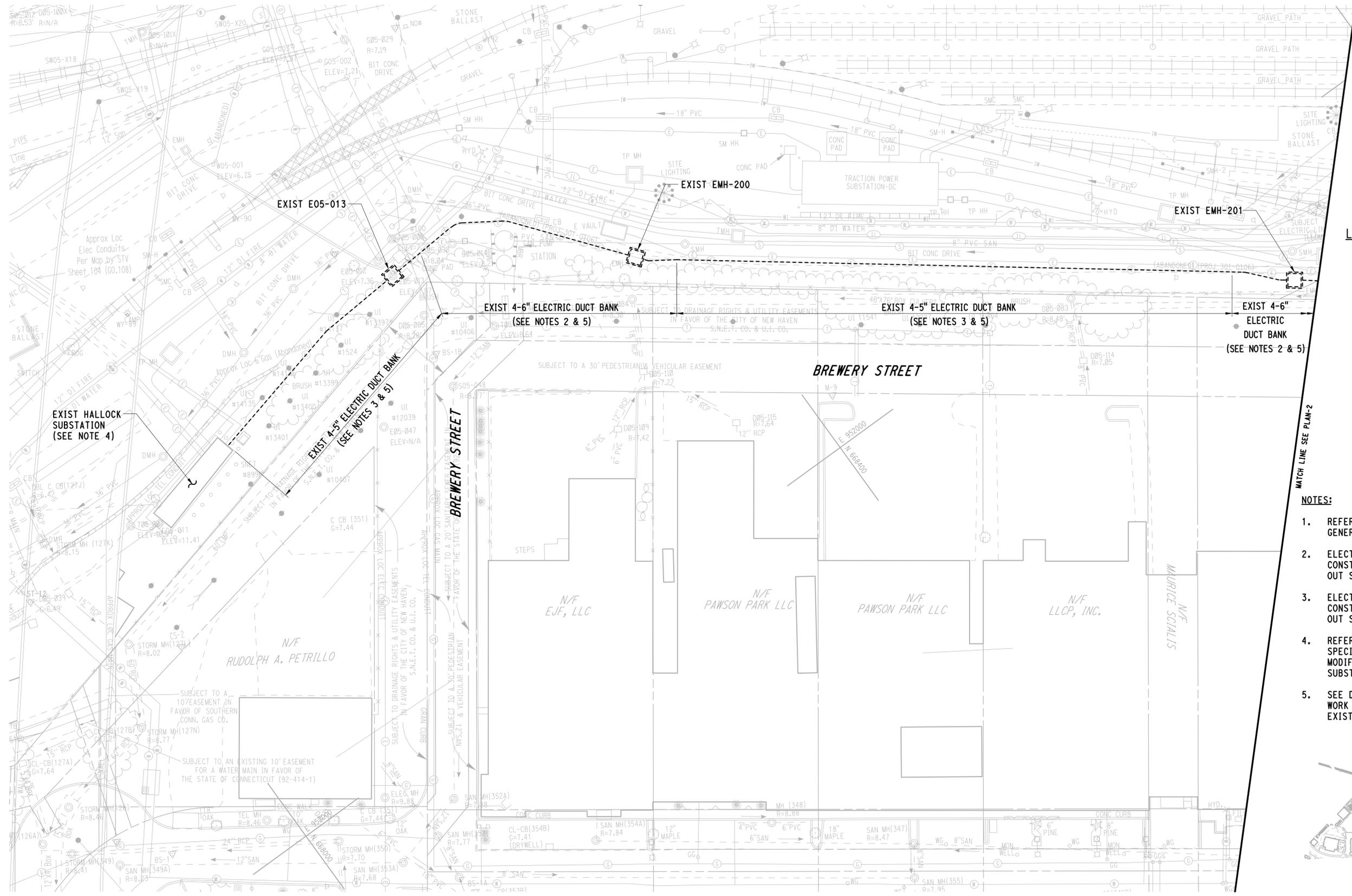
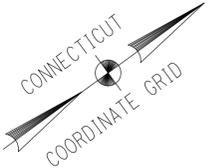
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 AI ENGINEERS, INC.  
 MIDDLETOWN, CT

PROJECT TITLE:  
**NEW HAVEN RAIL YARD  
 FACILITIES IMPROVEMENTS  
 YARD POWER UPGRADE**

TOWN:  
**NEW HAVEN**  
 DRAWING TITLE:  
**UTILITY  
 INDEX PLAN**

PROJECT NO.  
**301-0144**  
 DRAWING NO.  
**UO-000**  
 SHEET NO.  
**05.02**

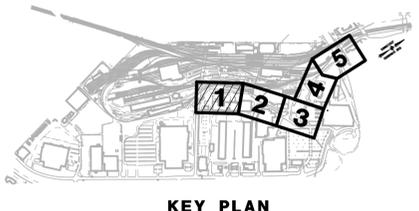




**LEGEND**

- ELECTRICAL/COMMUNICATIONS DUCT BANK
- ELECTRIC MANHOLE
- ELECTRIC/COMMUNICATIONS MANHOLE
- EXIST ELECTRICAL CONDUIT/DUCT BANK
- EXIST ELECTRIC MANHOLE

- NOTES:**
1. REFER TO DRAWING U-000 FOR UTILITY GENERAL NOTES.
  2. ELECTRIC DUCT BANK AND STRUCTURES CONSTRUCTED UNDER COMPONENT CHANGE OUT SHOP (PROJ NO 301-0106).
  3. ELECTRIC DUCT BANK AND STRUCTURES CONSTRUCTED PRIOR TO COMPONENT CHANGE OUT SHOP (PROJ NO 301-0106).
  4. REFER TO TRACTION POWER DWGS AND SPECIFICATIONS FOR REQUIRED MODIFICATIONS TO THE HALLOCK SUBSTATION.
  5. SEE DWG U-000 ELECTRIC NOTE 10 FOR WORK REQUIRED TO BE PERFORMED ON EXISTING DUCT BANKS.

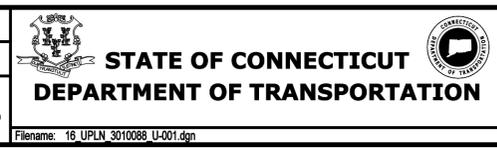


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| REV. | DATE | REVISION DESCRIPTION | SHEET NO. |
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DESIGNER/DRAFTER: **SG/SK**  
 CHECKED BY: **JWL**  
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SIGNATURE/BLOCK:

PROJECT TITLE:  
**NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS YARD POWER UPGRADE**

TOWN: **NEW HAVEN**  
 DRAWING TITLE: **UTILITY PLAN-1**

PROJECT NO. **301-0144**  
 DRAWING NO. **U-001**  
 SHEET NO. **05.04**

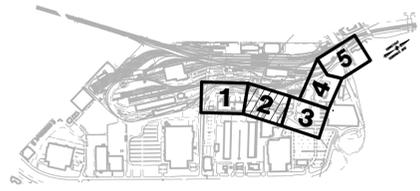


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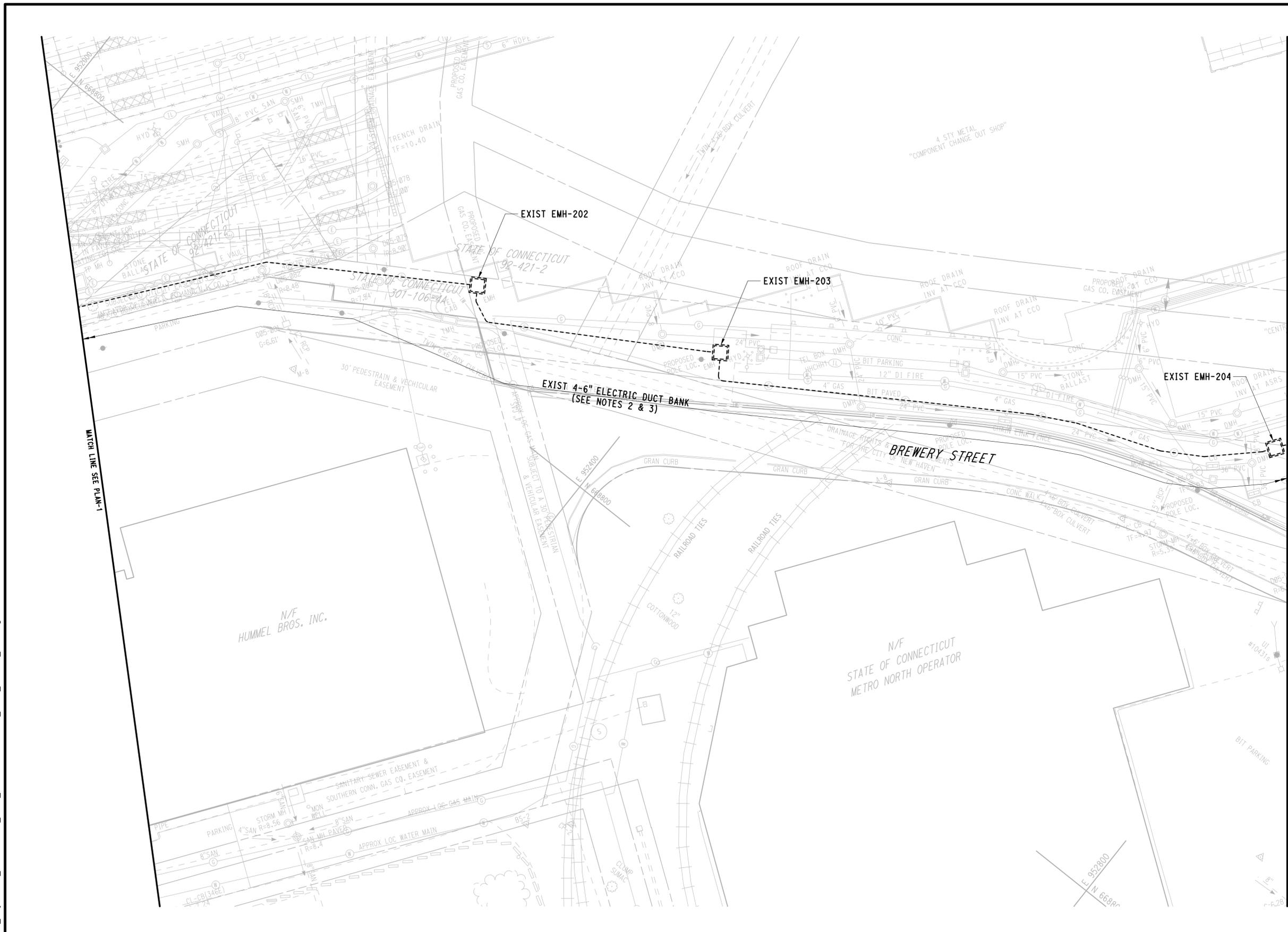
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-  ELECTRIC MANHOLE
-  ELECTRICAL/COMMUNICATIONS MANHOLE
-  EXIST ELECTRICAL CONDUIT/DUCT BANK
-  EXIST ELECTRIC MANHOLE

**NOTES:**

1. REFER TO DRAWING U-000 FOR UTILITY GENERAL NOTES.
2. ELECTRIC DUCT BANK AND STRUCTURES CONSTRUCTED UNDER COMPONENT CHANGE OUT SHOP (PROJ NO 301-0106).
3. SEE DWG U-000 ELECTRIC NOTE 10 FOR WORK REQUIRED TO BE PERFORMED ON EXISTING DUCT BANKS.



**KEY PLAN**

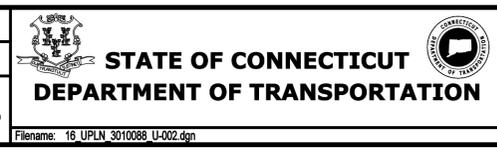


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| REV. | DATE | REVISION DESCRIPTION | SHEET NO. |
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**SG/SK**  
CHECKED BY:  
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SIGNATURE/BLOCK:  
  
AI ENGINEERS, INC  
MIDDLETOWN, CT

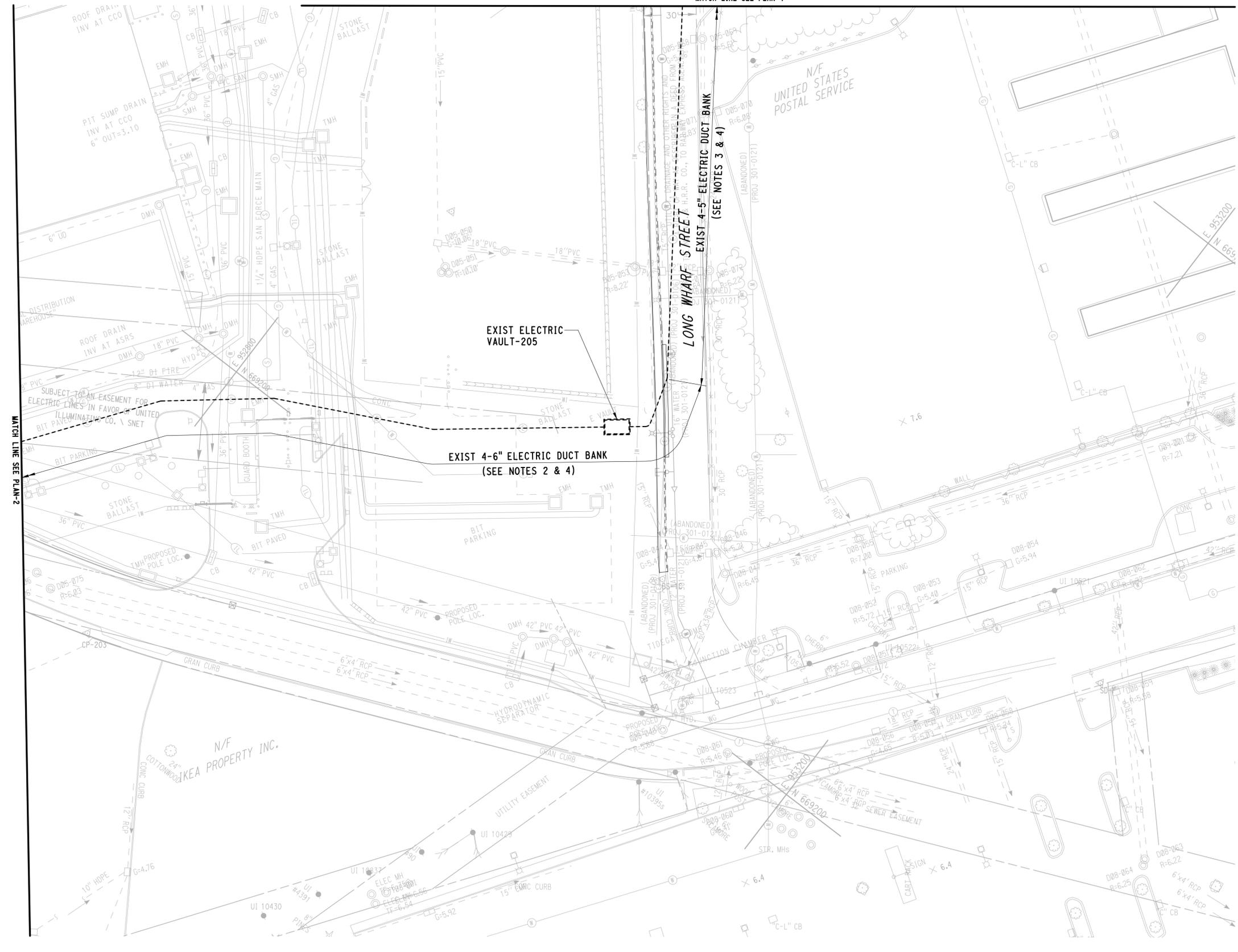
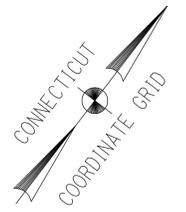
PROJECT TITLE:  
**NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS YARD POWER UPGRADE**

TOWN:  
**NEW HAVEN**  
DRAWING TITLE:  
**UTILITY PLAN-2**

PROJECT NO.  
**301-0144**  
DRAWING NO.  
**U-002**  
SHEET NO.  
**05.05**

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MATCH LINE SEE PLAN-4

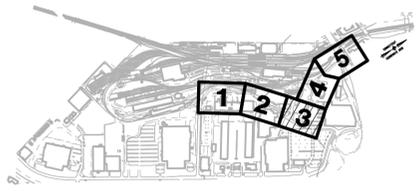


**LEGEND**

- ELECTRICAL/COMMUNICATIONS DUCT BANK
- ELECTRIC MANHOLE
- ELECTRIC/COMMUNICATIONS MANHOLE
- EXIST ELECTRICAL CONDUIT/DUCT BANK
- EXIST ELECTRIC MANHOLE

**NOTES:**

1. REFER TO DRAWING U-000 FOR UTILITY GENERAL NOTES.
2. ELECTRIC DUCT BANK AND STRUCTURES CONSTRUCTED UNDER COMPONENT CHANGE OUT SHOP (PROJ NO 301-0106).
3. ELECTRIC DUCT BANK AND STRUCTURES CONSTRUCTED PRIOR TO COMPONENT CHANGE OUT SHOP (PROJ NO 301-0106).
4. SEE DWG U-000 ELECTRIC NOTE 10 FOR WORK REQUIRED TO BE PERFORMED ON EXISTING DUCT BANKS.



**KEY PLAN**

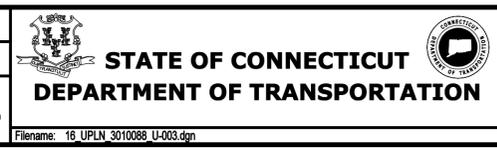
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DESIGNER/DRAFTER:  
**SG/SK**

CHECKED BY:  
**JWL**

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SCALE 1"=30'



SIGNATURE/BLOCK:

AI ENGINEERS, INC  
MIDDLETOWN, CT

PROJECT TITLE:  
**NEW HAVEN RAIL YARD  
FACILITIES IMPROVEMENTS  
YARD POWER UPGRADE**

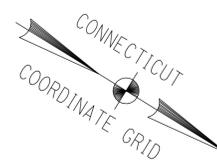
TOWN:  
**NEW HAVEN**

DRAWING TITLE:  
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PROJECT NO.  
**301-0144**

DRAWING NO.  
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SHEET NO.  
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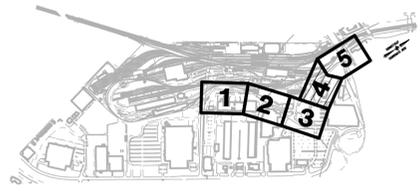


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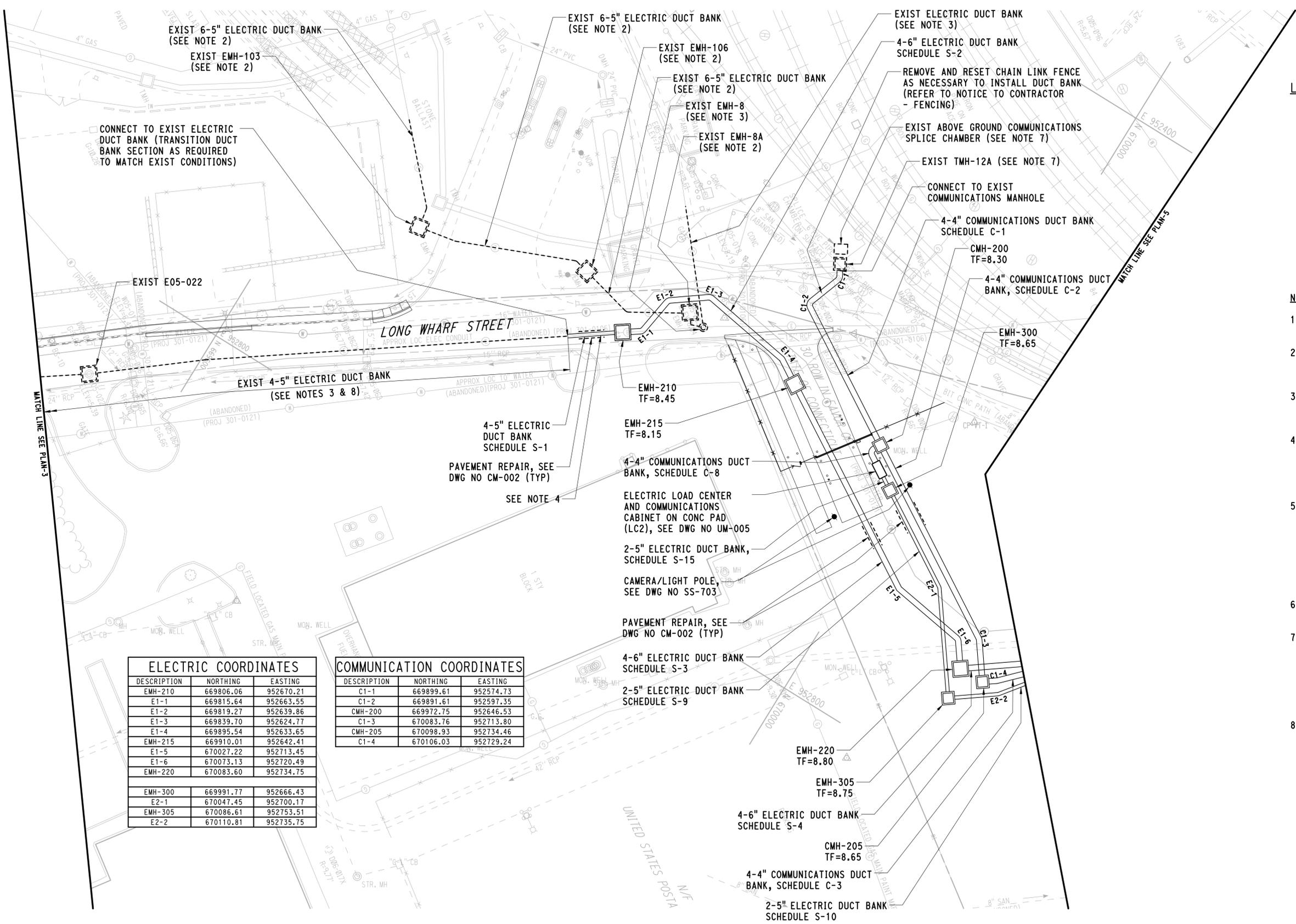
- ELECTRICAL/COMMUNICATIONS DUCT BANK
- ELECTRIC MANHOLE
- ELECTRIC/COMMUNICATIONS MANHOLE
- EXIST ELECTRICAL CONDUIT/DUCT BANK
- EXIST ELECTRIC MANHOLE

**NOTES:**

1. REFER TO DRAWING U-000 FOR UTILITY GENERAL NOTES.
2. ELECTRIC DUCT BANK AND STRUCTURES CONSTRUCTED UNDER COMPONENT CHANGE OUT SHOP (PROJ NO 301-0106).
3. ELECTRIC DUCT BANK AND STRUCTURES CONSTRUCTED PRIOR TO COMPONENT CHANGE OUT SHOP (PROJ NO 301-0106).
4. EXISTING 4-5" ELECTRIC DUCT BANK PREVIOUSLY ABANDONED BY OTHERS (PROJ NO 301-0106) SHALL BE REMOVED AS NECESSARY TO ALLOW THE CONSTRUCTION OF NEW DUCT BANK AND EMH-210.
5. EXCAVATION GREATER THAN ONE FOOT BELOW GRADE REQUIRED FOR ANY WORK SHOWN ON THIS SHEET MUST BE SCHEDULED TWO WEEKS IN ADVANCE WITH THE ENGINEER IN ORDER TO COORDINATE ARCHAEOLOGICAL MONITORING REQUIRED BY STATE HISTORIC PRESERVATION OFFICE (REFER TO NOTICE TO CONTRACTOR - ARCHAEOLOGICAL MONITORING).
6. REFER TO SITE SECURITY DWGS FOR DIRECT BURIED CONDUIT INFORMATION.
7. NEW COMMUNICATIONS CABLING SHALL BE ROUTED THRU SPARE CONDUITS FROM EXIST TMH-12A AND INTO EXIST SPLICE CHAMBER. NEW FIBER SHALL TERMINATE ON NEW FIBER PATCH PANEL ON EXIST RACK. NEW COPPER WIRE SHALL TERMINATE ON EXIST TELEPHONE PUNCH DOWN BLOCKS.
8. SEE DWG U-000 ELECTRIC NOTE 10 FOR WORK REQUIRED TO BE PERFORMED ON EXISTING DUCT BANKS.



**KEY PLAN**



| ELECTRIC COORDINATES |           |           |
|----------------------|-----------|-----------|
| DESCRIPTION          | NORTHING  | EASTING   |
| EMH-210              | 669806.06 | 952670.21 |
| E1-1                 | 669815.64 | 952663.55 |
| E1-2                 | 669819.27 | 952639.86 |
| E1-3                 | 669839.70 | 952624.77 |
| E1-4                 | 669895.54 | 952633.65 |
| EMH-215              | 669910.01 | 952642.41 |
| E1-5                 | 670027.22 | 952713.45 |
| E1-6                 | 670073.13 | 952720.49 |
| EMH-220              | 670083.60 | 952734.75 |
| EMH-300              | 669991.77 | 952666.43 |
| E2-1                 | 670047.45 | 952700.17 |
| EMH-305              | 670086.61 | 952753.51 |
| E2-2                 | 670110.81 | 952735.75 |

| COMMUNICATION COORDINATES |           |           |
|---------------------------|-----------|-----------|
| DESCRIPTION               | NORTHING  | EASTING   |
| C1-1                      | 669899.61 | 952574.73 |
| C1-2                      | 669891.61 | 952597.35 |
| CMH-200                   | 669972.75 | 952646.53 |
| C1-3                      | 670083.76 | 952713.80 |
| CMH-205                   | 670098.93 | 952734.46 |
| C1-4                      | 670106.03 | 952729.24 |

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| REV | DATE | REVISION DESCRIPTION | SHEET NO. |
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DESIGNER/DRAFTER:  
**SG/SK**

CHECKED BY:  
**JWL**

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SCALE 1"=30'



SIGNATURE/BLOCK:

AI ENGINEERS, INC  
MIDDLETOWN, CT

PROJECT TITLE:  
**NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS YARD POWER UPGRADE**

TOWN:  
**NEW HAVEN**

DRAWING TITLE:  
**UTILITY PLAN-4**

PROJECT NO.  
**301-0144**

DRAWING NO.  
**U-004**

SHEET NO.  
**05.07**

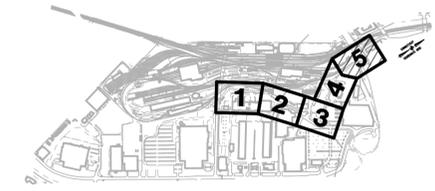


**LEGEND**

- ELECTRICAL/COMMUNICATIONS DUCT BANK
- ELECTRIC MANHOLE
- ELECTRIC/COMMUNICATIONS MANHOLE
- EXIST ELECTRICAL CONDUIT/DUCT BANK
- EXIST ELECTRIC MANHOLE

**NOTES:**

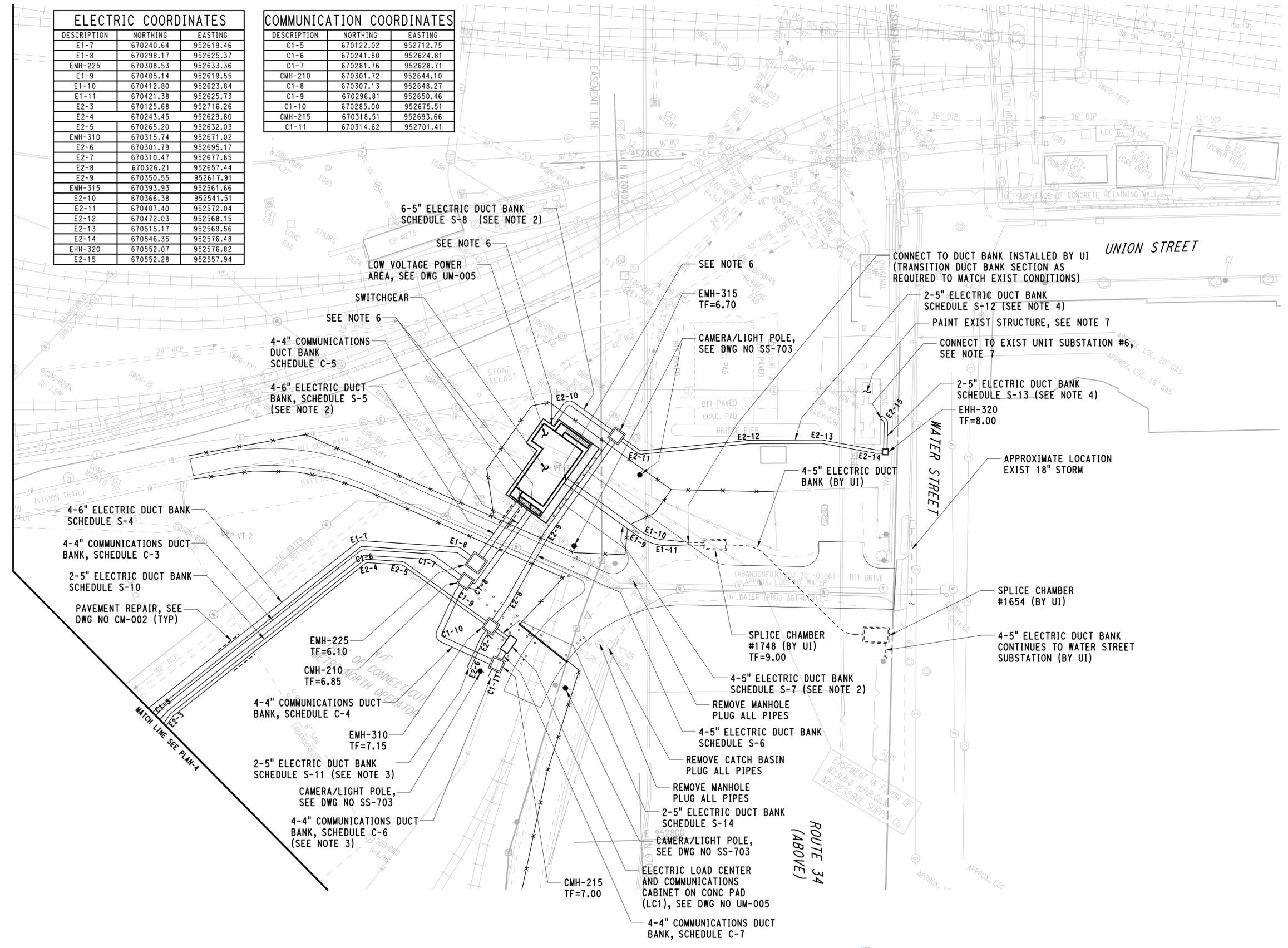
1. REFER TO DRAWING U-000 FOR UTILITY GENERAL NOTES.
2. CONDUITS SHALL BE RGS.
3. CONTRACTOR SHALL INSTALL AND CAP DUCT BANK AT THE LOCATION SHOWN. REFER TO DUCT BANK NOTES ON DWG NOS UM-001 & UM-002.
4. THE INSTALLATION OF THE CONCRETE DUCT BANKS ADJACENT TO UNIT SUBSTATION #6 AND THE ROUTE 34 BRIDGE PIER MAY REQUIRE HAND DIGGING OR THE USE OF A SMALL EXCAVATOR. THIS WORK WILL BE PAID UNDER THE RESPECTIVE TRENCH EXCAVATION CONTRACT ITEM. THE CONTRACTOR SHALL TAKE THIS INTO CONSIDERATION AT BID TIME.
5. REFER TO SITE SECURITY DWGS FOR DIRECT BURIED CONDUIT INFORMATION.
6. CONTRACTOR SHALL COORDINATE EXACT LOCATION OF DUCT BANKS AT CONCRETE PAD FOR SWITCHGEAR. REFER TO DWG NOS P-002 AND S12-003 FOR ADDITIONAL INFORMATION.
7. SEE SPECIAL PROVISION "MODIFICATIONS TO EXISTING SECONDARY UNIT SUBSTATION" FOR ADDITIONAL INFORMATION.



**KEY PLAN**

| ELECTRIC COORDINATES |           |           |
|----------------------|-----------|-----------|
| DESCRIPTION          | NORTHING  | EASTING   |
| E1-7                 | 670240.64 | 952619.46 |
| E1-8                 | 670298.17 | 952629.37 |
| EMH-225              | 670308.53 | 952633.36 |
| E1-9                 | 670405.14 | 952619.55 |
| E1-10                | 670412.80 | 952623.84 |
| E1-11                | 670421.38 | 952625.73 |
| E2-3                 | 670125.68 | 952716.26 |
| E2-4                 | 670243.45 | 952629.80 |
| E2-5                 | 670265.20 | 952632.03 |
| EMH-310              | 670315.74 | 952671.02 |
| E2-6                 | 670301.79 | 952695.17 |
| E2-7                 | 670310.47 | 952677.85 |
| E2-8                 | 670326.21 | 952657.44 |
| E2-9                 | 670350.55 | 952617.91 |
| EMH-315              | 670393.93 | 952561.66 |
| E2-10                | 670366.38 | 952541.51 |
| E2-11                | 670407.40 | 952572.04 |
| E2-12                | 670472.03 | 952568.15 |
| E2-13                | 670515.17 | 952569.56 |
| E2-14                | 670546.35 | 952576.48 |
| EMH-320              | 670552.07 | 952576.82 |
| E2-15                | 670552.28 | 952557.94 |

| COMMUNICATION COORDINATES |           |           |
|---------------------------|-----------|-----------|
| DESCRIPTION               | NORTHING  | EASTING   |
| C1-5                      | 670122.02 | 952712.75 |
| C1-6                      | 670241.80 | 952624.81 |
| C1-7                      | 670281.76 | 952628.71 |
| CMH-210                   | 670301.72 | 952644.10 |
| C1-8                      | 670307.13 | 952648.27 |
| C1-9                      | 670296.81 | 952650.46 |
| C1-10                     | 670285.00 | 952675.51 |
| CMH-215                   | 670318.51 | 952693.66 |
| C1-11                     | 670314.62 | 952701.41 |

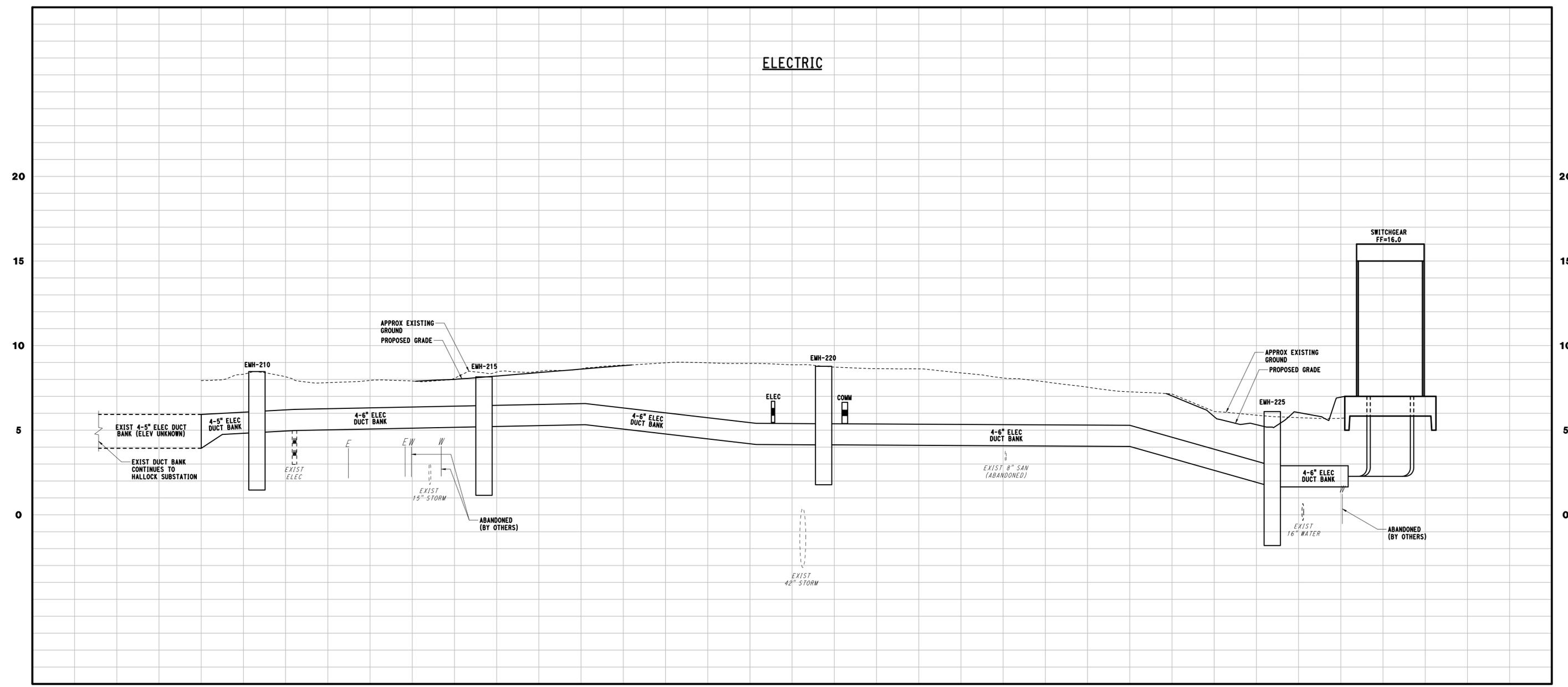


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| <p>DESIGNER/DRAFTER:<br/><b>SG/SK</b></p> <p>CHECKED BY:<br/><b>JWL</b></p> <p>SCALE IN FEET<br/>0 30 60<br/>SCALE 1"=30'</p>   | <p>STATE OF CONNECTICUT<br/>DEPARTMENT OF TRANSPORTATION</p> | <p>SIGNATURE/BLOCK:<br/></p> <p>AI ENGINEERS, INC<br/>MIDDLETOWN, CT</p> | <p>PROJECT TITLE:<br/><b>NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS YARD POWER UPGRADE</b></p> | <p>TOWN:<br/><b>NEW HAVEN</b></p> <p>DRAWING TITLE:<br/><b>UTILITY PLAN-5</b></p> | <p>PROJECT NO.<br/><b>301-0144</b></p> <p>DRAWING NO.<br/><b>U-005</b></p> <p>SHEET NO.<br/><b>05.08</b></p> |
| <p>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.</p> |  |  |   |   |  |
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**ELECTRIC**



**NOTE:**  
 ELEVATIONS FOR EXISTING PIPING SHOWN IN THE PROFILES ARE APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ACTUAL LOCATIONS AND ELEVATIONS, FOR POSSIBLE LINE AND GRADE CONFLICTS. ALL REQUIRED TEST PITS SHALL, WITH THE APPROVAL OF THE ENGINEER, BE EXCAVATED BEFORE COMMENCING THE PIPE INSTALLATION. IF REQUIRED, THE ENGINEER SHALL REVISE THE DESIGN AND ISSUE REVISED PLANS, WITHIN TEN (10) DAYS FROM RECEIVING THE TEST PIT INFORMATION.

| REV. | DATE | REVISION DESCRIPTION | SHEET NO. |
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DESIGNER/DRAFTER:  
**WPD / JLW**  
 CHECKED BY:  
**JFK**  
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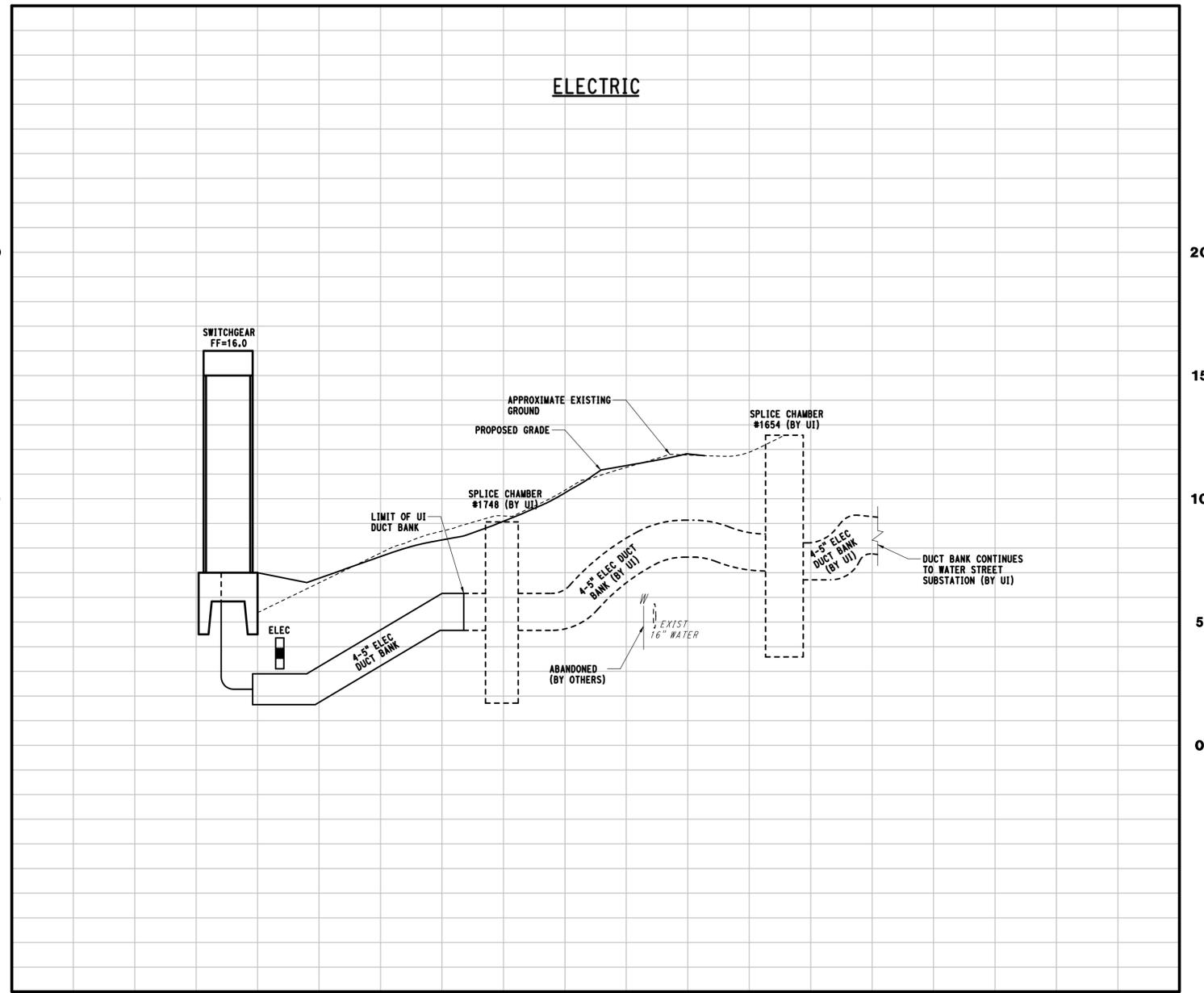
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 AI ENGINEERS, INC.  
 MIDDLETOWN, CT

PROJECT TITLE:  
**NEW HAVEN RAIL YARD  
 FACILITIES IMPROVEMENTS  
 YARD POWER UPGRADE**

TOWN:  
**NEW HAVEN**  
 DRAWING TITLE:  
**UTILITY  
 PROFILES**

PROJECT NO.  
**301-0144**  
 DRAWING NO.  
**U-010**  
 SHEET NO.  
**05.09**

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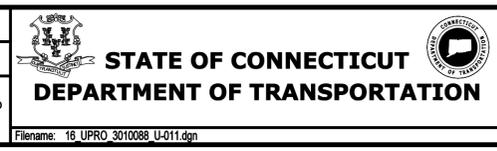


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**JFK**  
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 AI ENGINEERS, INC.  
 MIDDLETOWN, CT

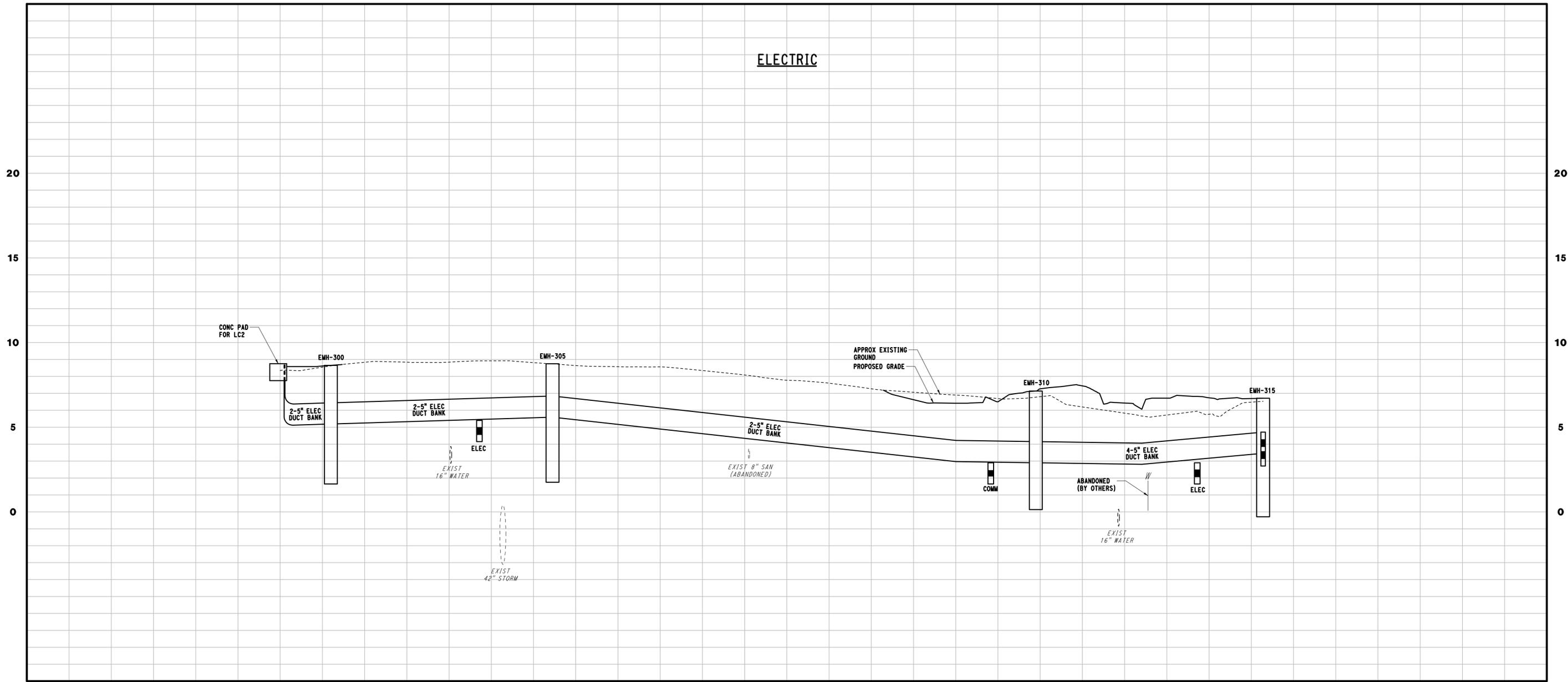
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**NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS YARD POWER UPGRADE**

TOWN:  
**NEW HAVEN**  
 DRAWING TITLE:  
**UTILITY PROFILES**

PROJECT NO.  
**301-0144**  
 DRAWING NO.  
**U-011**  
 SHEET NO.  
**05.10**

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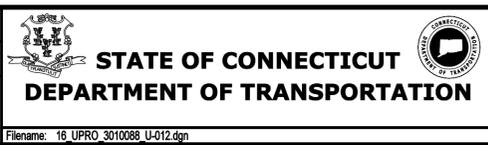


**NOTE:**  
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| REV. | DATE | REVISION DESCRIPTION | SHEET NO. |
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THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DESIGNER/DRAFTER:  
**WPD / JLW**  
 CHECKED BY:  
**JFK**  
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 VERT. SCALE IN FEET  
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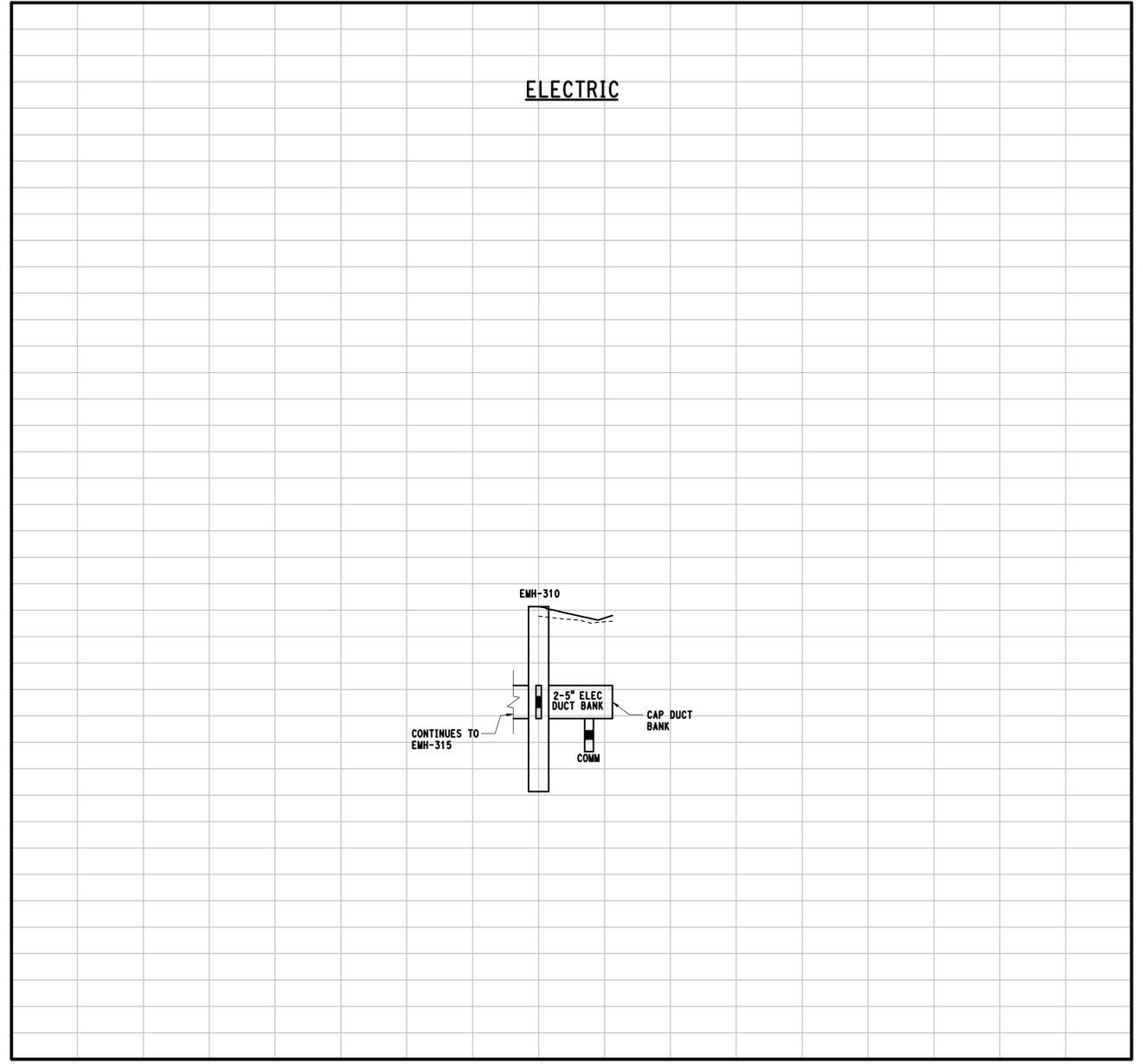
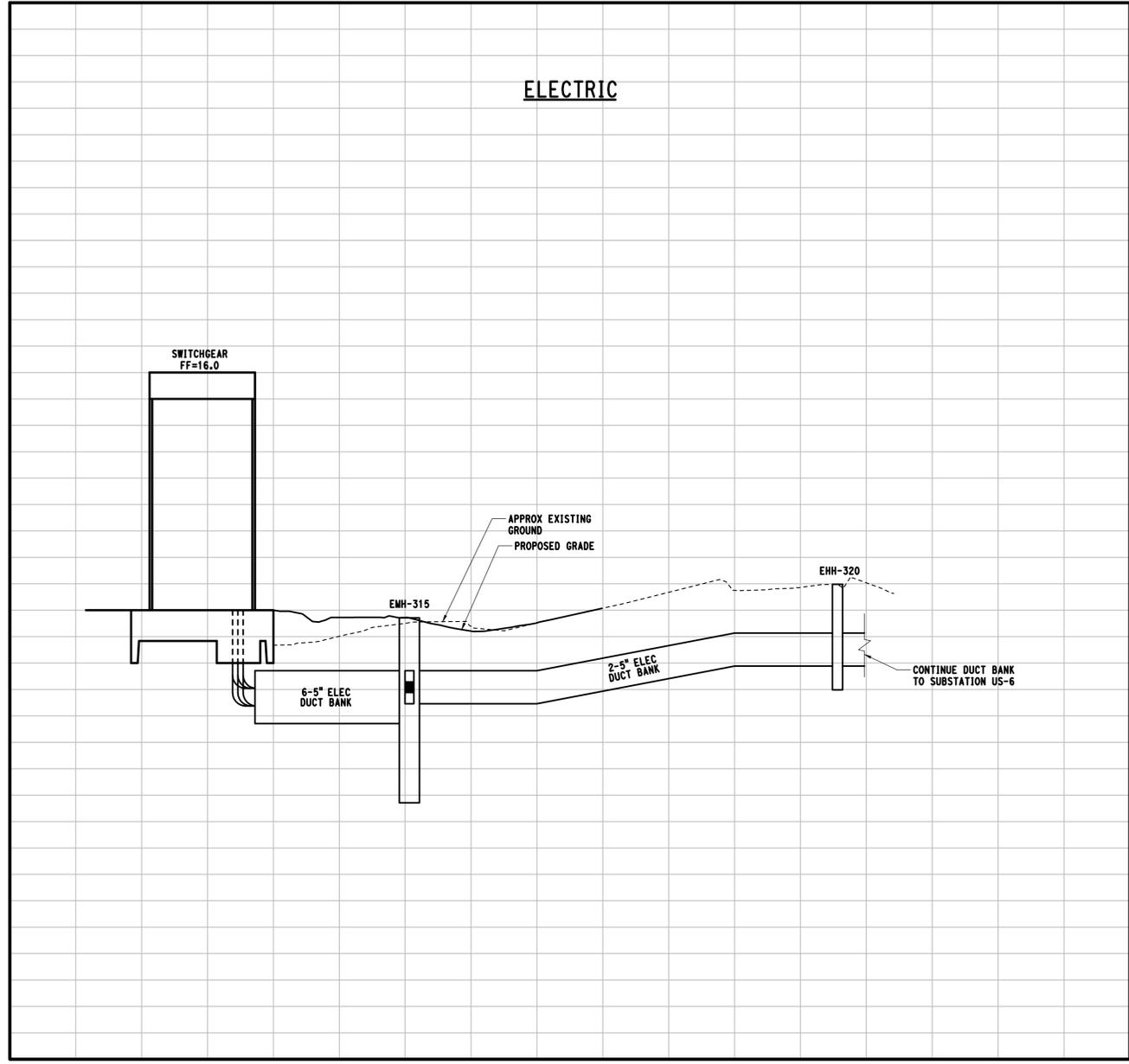
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 AI ENGINEERS, INC.  
 MIDDLETOWN, CT

PROJECT TITLE:  
**NEW HAVEN RAIL YARD  
 FACILITIES IMPROVEMENTS  
 YARD POWER UPGRADE**

TOWN:  
**NEW HAVEN**  
 DRAWING TITLE:  
**UTILITY  
 PROFILES**

PROJECT NO.  
**301-0144**  
 DRAWING NO.  
**U-012**  
 SHEET NO.  
**05.11**

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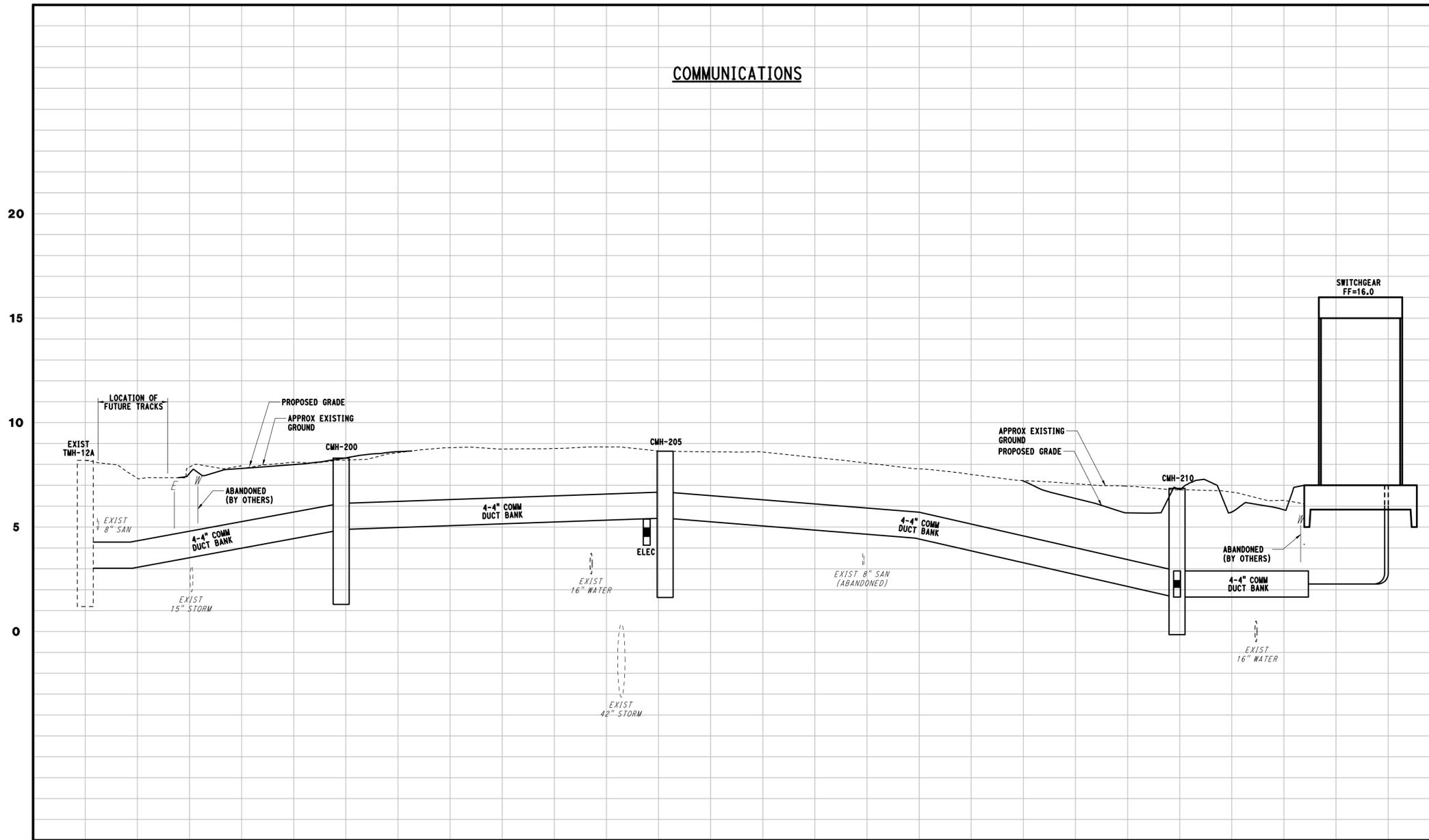
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 FACILITIES IMPROVEMENTS  
 YARD POWER UPGRADE**

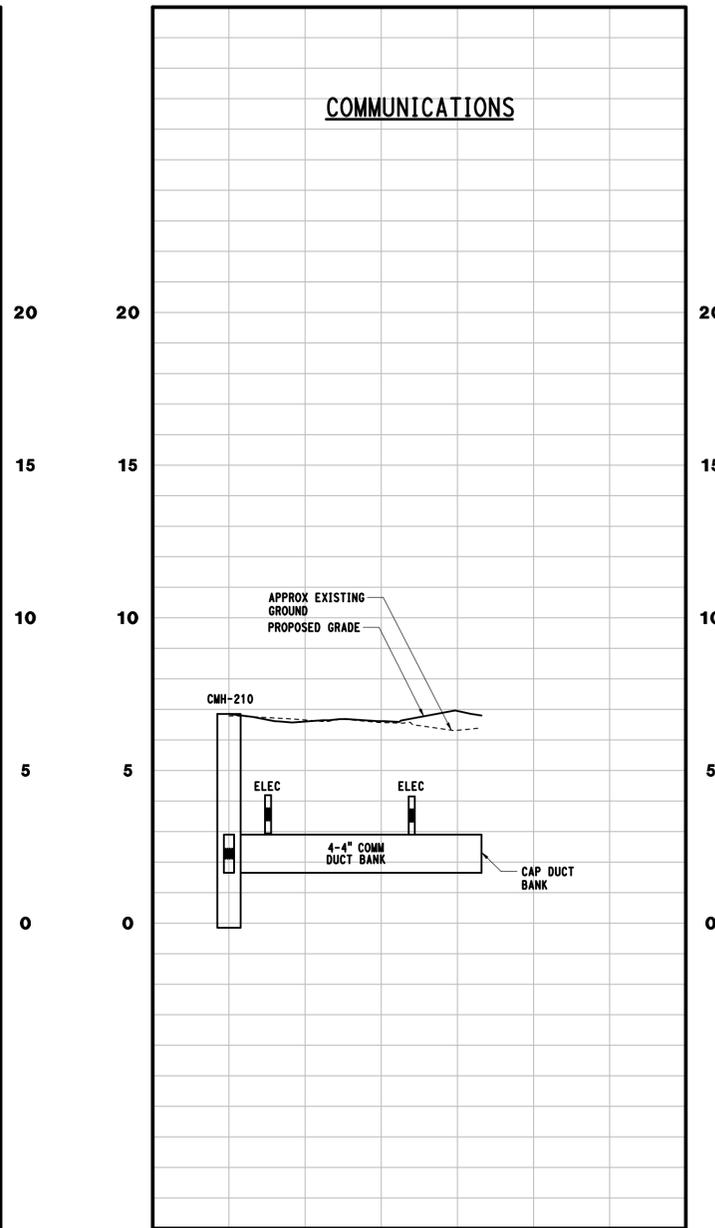
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**NEW HAVEN**  
 DRAWING TITLE:  
**UTILITY  
 PROFILES**

PROJECT NO.  
**301-0144**  
 DRAWING NO.  
**U-013**  
 SHEET NO.  
**05.12**

COMMUNICATIONS



COMMUNICATIONS

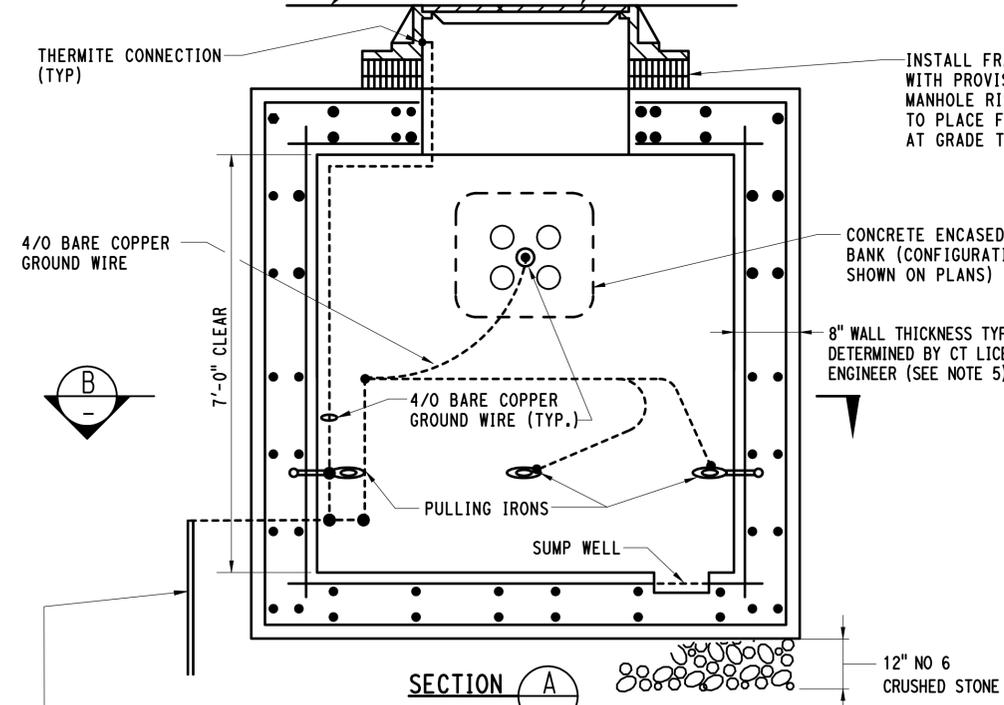
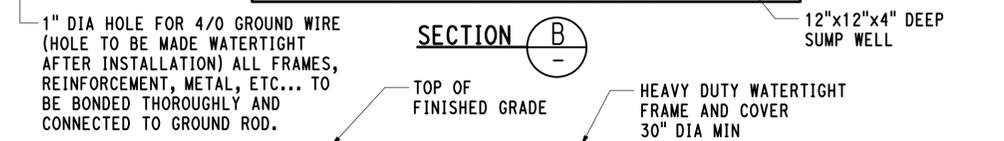
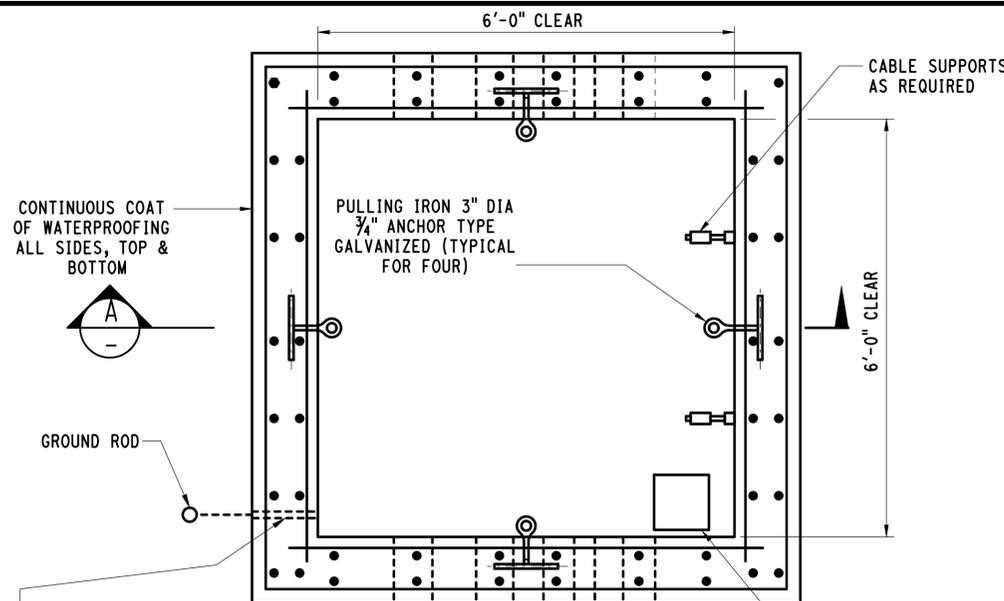


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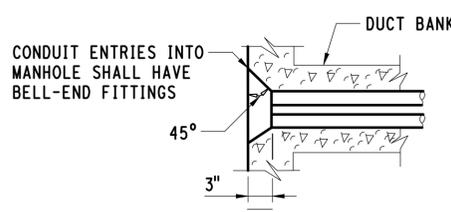
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| REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 11/4/2014 |  |   |   |   |  |   |  |  |



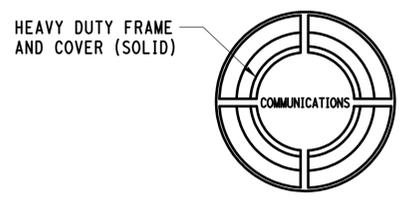


- NOTES:**
1. ALL MANHOLES SHALL BE WATERTIGHT, FLOOD PROOFED USING GASKETED COVERS & CABLE SEALS AT CONDUIT ENTRANCES TO MANHOLES.
  2. ALL CABLES IN MANHOLE SHALL BE SUPPORTED BY CABLE RACKS, AND MARKED WITH BRASS TAG WITH CIRCUIT IDENTIFICATION.
  3. CONDUIT ENTRIES INTO MANHOLE SHALL HAVE BELL ENDS FLUSH WITH INSIDE OF THE MANHOLE.
  4. COMMUNICATIONS MANHOLE SHALL BE PAID UNDER ITEM "CONCRETE MANHOLE".
  5. ALL MANHOLES SHALL BE DESIGNED BY A CT LICENSED ENGINEER FOR COOPER E-80 LOADINGS.

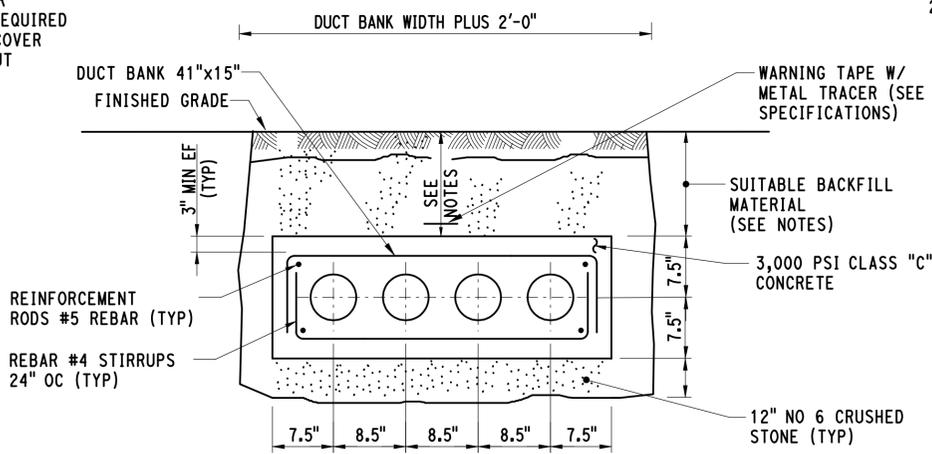
**COMMUNICATIONS MANHOLE**



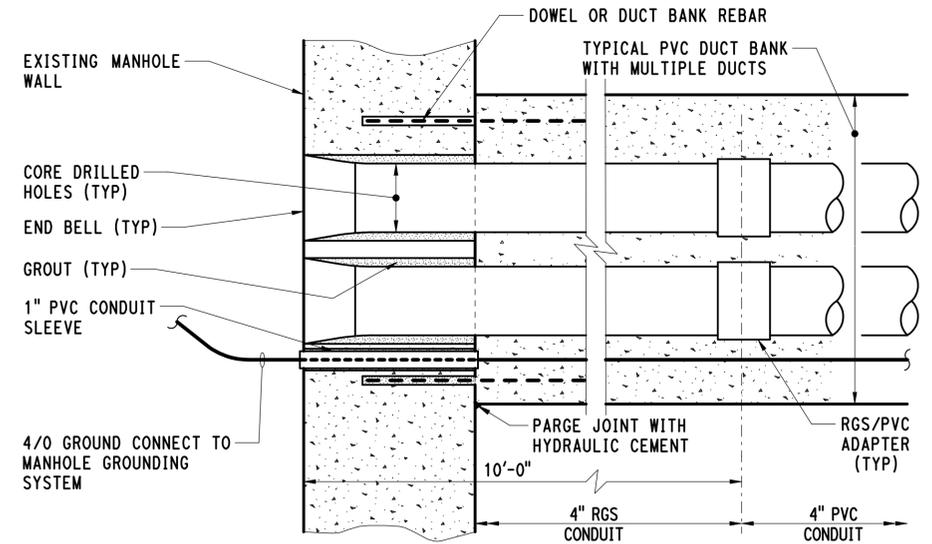
**CONNECTION DETAIL**



**TOP VIEW - COMMUNICATIONS MANHOLE FRAME AND COVER DETAIL**



**4-4" DUCT BANK COMMUNICATIONS TRENCH AND DUCT BANK CROSS SECTION**



**NOTES:**

1. WHERE CONDUITS ENTER EXISTING MANHOLES, PROVIDE END BELLS FLUSH WITH INSIDE WALL OF MANHOLE. EACH CONDUIT WALL PENETRATION SHALL BE MADE WATERTIGHT. ALL PENETRATIONS SHALL BE CORE-DRILLED LARGE ENOUGH TO ACCOMMODATE CONDUIT PLUS FLUSH MOUNTED END BELL. THE DUCT BANK SHALL BE SUFFICIENTLY DOWELLED (OR USE DUCT BANK REINFORCING) TO THE MANHOLE USING EPOXY BONDED #5 REBAR TO IMPROVE SHEAR STRESS AT THE POINT OF ENTRANCE. FULLY GROUT AROUND CONDUITS AND SEAL AGAINST END BELLS. BEFORE DUCT BANK IS POURED THE EXTERIOR OF THE EXISTING MANHOLE SHALL BE TREATED WITH AN APPROPRIATE TYPE OF WATERSTOP TO PROVIDE A WATERTIGHT JOINT.
2. PROVIDE CABLE SEALS AT CONDUIT ENTRANCES TO MANHOLES.

**DUCT BANK CONNECTION TO EXISTING MANHOLE DETAIL**

**DUCT BANK NOTES:**

1. PLACE COMPACTED GRANULAR FILL TO SEASONAL HIGH GROUND WATER ELEV 5.0.
2. SEE DEWATERING SPECIAL PROVISIONS.
3. SUITABLE BACKFILL MATERIAL SHALL BE ANY SUITABLE BACKFILL MATERIAL EXCAVATED FROM THE RESPECTIVE TRENCH OR REUSABLE CONTROLLED MATERIAL FROM THE WSA. GRANULAR FILL SHOULD BE USED IN ABSENCE OF SUITABLE BACKFILL MATERIAL AS DIRECTED BY THE ENGINEER.
4. THE CONTRACTOR SHALL TAKE ANY SURPLUS EXCAVATED MATERIAL FROM RESPECTIVE TRENCH TO THE WSA FOR TESTING AT THE END OF EACH DAY. THIS UNTESTED MATERIAL CANNOT BE USED AS BACKFILL ANYWHERE ELSE BUT THE TRENCH FROM WHICH IT WAS EXCAVATED. FOR ADDITIONAL INFORMATION REFER TO THE SPECIAL PROVISIONS.
5. FOR GENERAL CONDITIONS, THE MINIMUM BURIAL DEPTH FROM FINISHED GRADE TO TOP OF CONCRETE IS 18". FOR SPECIAL CONDITIONS (UNDER TRACKS) THE MINIMUM BURIAL DEPTH FROM THE BOTTOM OF TIE TO TOP OF CONCRETE IS 36". REFER TO UTILITY PROFILES FOR ADDITIONAL INFORMATION.
6. WARNING TAPE WITH METAL TRACER SHALL BE LAID 12" BELOW GRADE. REFER TO SPECIAL PROVISIONS.
7. THE HORIZONTAL PAY LIMITS FOR TRENCH EXCAVATION SHALL BE THE DUCT BANK WIDTH PLUS 24".
8. THE VERTICAL PAY LIMITS FOR TRENCH EXCAVATION SHALL BE 12" BELOW THE BOTTOM OF DUCT BANK.
9. ALL EMPTY OR UNUSED CONDUITS SHALL HAVE PLASTIC PULL ROPES INSTALLED.
10. DUCT BANKS CALLED OUT TO BE CAPPED SHALL BE CONSTRUCTED TO THE LOCATION SHOWN ON THE PLANS. THE CONTRACTOR SHALL EXTEND AND CAP EACH CONDUIT APPROXIMATELY 1 FOOT PAST THE END OF THE CONCRETE DUCT BANK. METAL MARKER TAPE SHALL BE INSTALLED 6 INCHES ABOVE THE ENTIRE LENGTH OF THE DUCT BANK TO BE CAPPED. METAL MARKER TAPE SHALL CONTINUE VERTICALLY TO FINISHED GRADE ELEVATION AND THE LAST 6 INCHES SHALL BE PAINTED ORANGE.

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 CHECKED BY: **JWL**  
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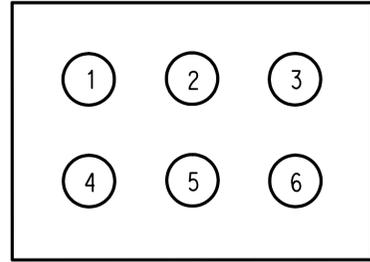
**STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION**

SIGNATURE/BLOCK: *[Signature]*  
 AI ENGINEERS, INC. MIDDLETOWN, CT

PROJECT TITLE: **NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS YARD POWER UPGRADE**

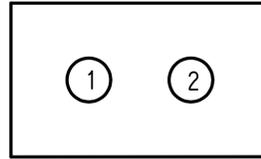
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 DRAWING TITLE: **UTILITY MISCELLANEOUS DETAILS**

PROJECT NO. **301-0144**  
 DRAWING NO. **UM-002**  
 SHEET NO. **05.15**



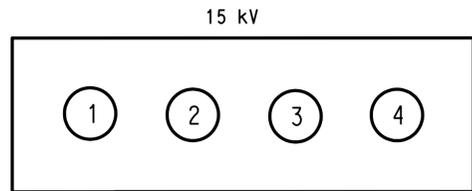
6-5" CONCRETE ELECTRIC DUCT BANK, S-8

| NO | CIRCUIT (CABLE)              |
|----|------------------------------|
| 1  | 4#1/0 + 1#6 GROUND FROM US-6 |
| 2  | SPARE                        |
| 3  | 3#6 + 1#6 GROUND TO EMH 310  |
| 4  | SPARE                        |
| 5  | 3#4 + 1#6 GROUND TO EMH 300  |
| 6  | SPARE                        |



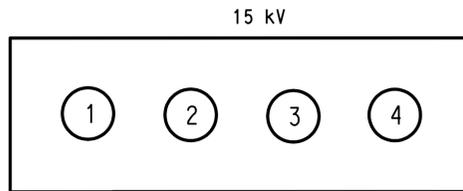
2-5" CONCRETE ELECTRIC DUCT BANK, S-9, S-10, S-11, S-12, S-13, S-14, S-15

| NO | CIRCUIT (CABLE)              |
|----|------------------------------|
| 1  | 4#1/0 + 1#6 GROUND FROM US-6 |
| 2  | SPARE                        |



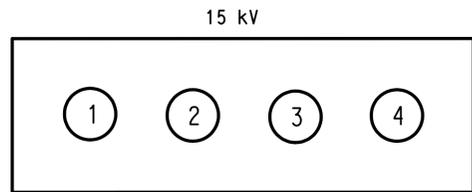
4-5" CONCRETE ELECTRIC DUCT BANK, S-1

| NO | CIRCUIT (CABLE) |
|----|-----------------|
| 1  | 15KV FEEDER     |
| 2  | 15KV FEEDER     |
| 3  | 15KV FEEDER     |
| 4  | 15KV FEEDER     |



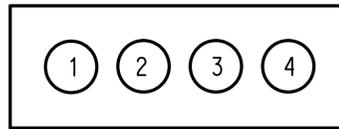
4-6" CONCRETE ELECTRIC DUCT BANK, S-2, S-3, S-4, S-5

| NO | CIRCUIT (CABLE) |
|----|-----------------|
| 1  | 15KV FEEDER     |
| 2  | 15KV FEEDER     |
| 3  | 15KV FEEDER     |
| 4  | 15KV FEEDER     |



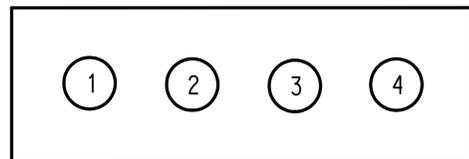
4-5" CONCRETE ELECTRIC DUCT BANK, S-7

| NO | CIRCUIT (CABLE) |
|----|-----------------|
| 1  | BY UI           |
| 2  | BY UI           |
| 3  | BY UI           |
| 4  | BY UI           |



4-4" COMMUNICATION DUCT BANK, C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8

| NO | CIRCUIT (CABLE)                   |
|----|-----------------------------------|
| 1  | 12 STRAND SINGLE MODE FIBER CABLE |
| 2  | SPARE                             |
| 3  | 12 PAIR COPPER TELEPHONE CABLE    |
| 4  | SPARE                             |



4-5" CONCRETE ELECTRIC DUCT BANK, S-6

| NO | CIRCUIT (CABLE)                              |
|----|--|
| 1  | 3#6 + 1#6 GROUND TO EMH 310 GATE LOCATION #1 |
| 2  | SPARE  |
| 3  | 3#4 + 1#6 GROUND TO EMH 300 GATE LOCATION #2 |
| 4  | SPARE  |

| CONDUIT NO | CONDUIT SIZE & KIND | FROM                 | TO                 | CABLE           |                 |              | USED FOR                          |
|------------|---------------------|----------------------|--------------------|-----------------|-----------------|--------------|-----------------------------------|
|            |                     |                      |                    | NO              | CONDUCTOR SIZE  | INSULATION   |                                   |
| S-1        | 5" PVC              | EMH 210              | HALLOCK SUBSTATION | 3 1/C TRIPLEXED | 500 kcmil 15KV  | OKOGUARD-EPR | SEE TRACTION POWER DWGS           |
| S-2        | 6" PVC              | EMH 215              | EMH 210            | 3 1/C TRIPLEXED | 500 kcmil 15KV  | OKOGUARD-EPR | SEE TRACTION POWER DWGS           |
| S-3        | 6" PVC              | EMH 220              | EMH 215            | 3 1/C TRIPLEXED | 500 kcmil 15KV  | OKOGUARD-EPR | SEE TRACTION POWER DWGS           |
| S-4        | 6" PVC              | EMH 225              | EMH 220            | 3 1/C TRIPLEXED | 500 kcmil 15KV  | OKOGUARD-EPR | SEE TRACTION POWER DWGS           |
| S-5        | 6" RGS              | EMH 225              | SWITCHGEAR         | 3 1/C TRIPLEXED | 500 kcmil 15KV  | OKOGUARD-EPR | SEE TRACTION POWER DWGS           |
| S-6        | 5" PVC              | EMH 315              | EMH 310            | 3 1/C           | #6              | RHW          | GATE POWER                        |
|            |                     |                      |                    | 1 1/C           | #6              | RHW          | GROUND                            |
|            |                     |                      |                    | 3 1/C           | #4              | RHW          | GATE POWER                        |
|            |                     |                      |                    | 1 1/C           | #6              | RHW          | GROUND                            |
| S-7        | 5" RGS              | SPLICE CHAMBER #1748 | SWITCHGEAR         | BY UI           |                 |              | SEE TRACTION POWER DWGS           |
| S-8        | 5" RGS              | EMH 315              | SWITCHGEAR         | 4 1/C           | #1/0            | RHW          | GATE POWER                        |
|            |                     |                      |                    | 1 1/C           | #6              | RHW          | GROUND                            |
|            |                     |                      |                    | 3 1/C           | #6              | RHW          | AUX. POWER                        |
|            |                     |                      |                    | 1 1/C           | #6              | RHW          | GROUND                            |
| S-9        | 5" PVC              | EMH 305              | EMH 300            | 4 1/C           | #1/0            | RHW          | GATE POWER                        |
|            |                     |                      |                    | 1 1/C           | #6              | RHW          | GROUND                            |
| S-10       | 5" PVC              | EMH 310              | EMH 305            | 4 1/C           | #1/0            | RHW          | GATE POWER                        |
| S-11       | 5" PVC              | EMH 310              | FUTURE             | 4 1/C           | ----            | ----         | FUTURE                            |
|            |                     |                      |                    | 1 1/C           | ----            | ----         | ----                              |
| S-12       | 5" PVC              | EHH 320              | EMH 315            | 4 1/C           | #1/0            | RHW          | AUX POWER                         |
| S-13       | 5" PVC              | US-6                 | EHH 320            | 4 1/C           | #1/0            | RHW          | AUX POWER                         |
|            |                     |                      |                    | 1 1/C           | #6              | RHW          | GROUND                            |
| S-14       | 5" PVC              | LC1                  | EMH 310            | 4 1/C           | #1/0            | RHW          | GATE POWER                        |
|            |                     |                      |                    | 1 1/C           | #6              | RHW          | GROUND                            |
| S-15       | 5" PVC              | LC2                  | EMH 300            | 4 1/C           | #1/0            | RHW          | GATE POWER                        |
|            |                     |                      |                    | 1 1/C           | #6              | RHW          | GROUND                            |
| C-1        | 4" PVC              | EXIST TMH-12A        | CMH 200            | 1 EACH          | 12 STRAND FIBER | ----         | USED FOR COMMUNICATION / SECURITY |
| C-2        | 4" PVC              | CMH 200              | CMH 205            | 1 EACH          | 12 STRAND FIBER | ----         |                                   |
| C-3        | 4" PVC              | CMH 205              | CMH 210            | 1 EACH          | 12 STRAND FIBER | ----         |                                   |
| C-4        | 4" PVC              | CMH 210              | CMH 215            | 1 EACH          | 12 STRAND FIBER | ----         |                                   |
| C-5        | 4" PVC              | CMH 210              | SWITCHGEAR         | 1 EACH          | 12 PAIR COPPER  | ----         |                                   |
| C-6        | 4" PVC              | CMH 215              | FUTURE             | 1 EACH          | ----            | ----         | FUTURE                            |
| C-7        | 4" PVC              | LC1                  | CMH 215            | 1 EACH          | 12 STRAND FIBER | ----         | USED FOR COMMUNICATION / SECURITY |
| C-8        | 4" PVC              | LC2                  | CMH 200            | 1 EACH          | 12 STRAND FIBER | ----         | USED FOR COMMUNICATION / SECURITY |

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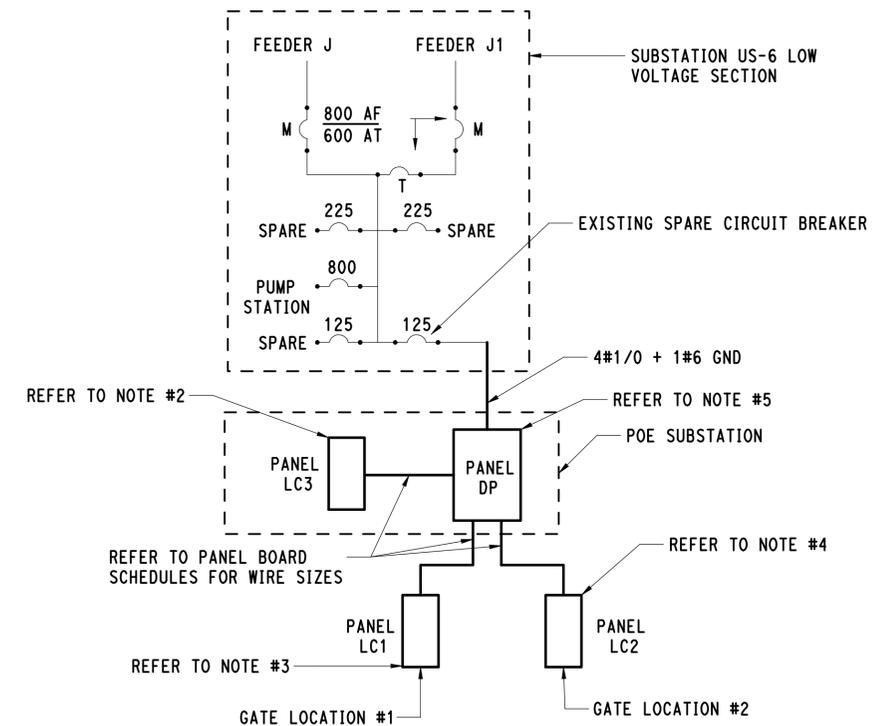
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| REV. DATE REVISION DESCRIPTION SHEET NO. Plotted Date: 11/6/2014  |  |   |  |   |                           |   |

|            |             | VOLTAGE: 480 PHASE: 3 WIRE: 4        |              | VA, L1  | 8,100  | PANEL NAME. DP                            |      |      |      |      |         |       |       |                     |              |            |            |
|------------|-------------|--------------------------------------|--------------|---------|--------|---|------|------|------|------|---------|-------|-------|---------------------|--------------|------------|------------|
|            |             | MAIN BUS: 225 AMPS --- MLO           |              | VA, L2  | 5,350  | LOC. EXTERIOR - POE SWGR PLATFORM         |      |      |      |      |         |       |       |                     |              |            |            |
|            |             | MAIN BREAKER: 125 A FRAME 125 A TRIP |              | VA, L3  | 3,350  | NOTES: EXTERIOR STAINLESS STEEL ENCLOSURE |      |      |      |      |         |       |       |                     |              |            |            |
|            |             | MOUNTING: SURFACE KAIC: 22           |              | TOT. VA | 16,800 |   |      |      |      |      |         |       |       |                     |              |            |            |
| PHASE/POLE | WIRE SIZE   | CONDUIT SIZE                         | DIRECTORY    | VA LOAD |        |   | CKT. | AMPS | AMPS | CKT. | VA LOAD |       |       | DIRECTORY           | CONDUIT SIZE | WIRE SIZE  | PHASE/POLE |
|            |             |                                      |              | L1      | L2     | L3  |      |      |      |      | L1      | L2    | L3    |                     |              |            |            |
| 1          | 2#4 & 1#10G | 1 1/2"                               | LC3 - 15 KVA | 4,800   |        |   | 1    | 60   | 45   | 2    | 2,150   |       |       | LC2 - 15 KVA        | 1 1/2"       | 3#4 & 1#6G | 3          |
| -          | -           | -                                    | I            |         | 3,000  |   | 3    | I    | I    | 4    |         | 1,150 |       | I                   | -            | -          | -          |
| 3          | 3#6 & 1#6G  | 1 1/2"                               | LC1 - 15 KVA |         |        | 2,150                                     | 5    | 45   | I    | 6    |         |       | 1,200 | I                   | -            | -          | -          |
| -          | -           | -                                    | I            | 1,150   |        |   | 7    | I    | I    | 8    |         |       |       | Future LC4 - 30 KVA | -            | -          | 3          |
| -          | -           | -                                    | I            |         | 1,200  |   | 9    | I    | I    | 10   |         |       |       | I                   | -            | -          | -          |
| -          | -           | -                                    | Space        |         |        |   | 11   | -    | I    | 12   |         |       |       | I                   | -            | -          | -          |
| -          | -           | -                                    | Space        |         |        |   | 13   | -    | -    | 14   |         |       |       | Space               | -            | -          | -          |
| -          | -           | -                                    | Space        |         |        |   | 15   | -    | -    | 16   |         |       |       | Space               | -            | -          | -          |
| -          | -           | -                                    | Space        |         |        |   | 17   | -    | -    | 18   |         |       |       | Space               | -            | -          | -          |
| -          | -           | -                                    | Space        |         |        |   | 19   | -    | -    | 20   |         |       |       | Space               | -            | -          | -          |
| SUBTOTAL   |             |                                      |              | 5,950   | 4,200  | 2,150                                     |      |      |      |      | 2,150   | 1,150 | 1,200 | SUBTOTAL            |              |            |            |

|          |              | VOLTAGE: 240 PHASE: 1 WIRE: 3       |                 | VA, L1  | 4,800 | PANEL NAME. LC3                          |      |      |      |      |         |       |    |             |              |              |       |
|----------|--------------|-------------------------------------|-----------------|---------|-------|--|------|------|------|------|---------|-------|----|-------------|--------------|--------------|-------|
|          |              | MAIN BUS: 125 AMPS --- MLO          |                 | VA, L2  | 3,000 | LOC. POE SWGR PLATFORM                   |      |      |      |      |         |       |    |             |              |              |       |
|          |              | MAIN BREAKER: 70 A FRAME 125 A TRIP |                 | VA, L3  |       | NOTES: 15KVA INTEGRAL XFMR & LOAD CENTER |      |      |      |      |         |       |    |             |              |              |       |
|          |              | MOUNTING: SURFACE KAIC: 10          |                 | TOT. VA | 7,800 | EXTERIOR WALL MOUNT                      |      |      |      |      |         |       |    |             |              |              |       |
| PHASE    | WIRE SIZE    | CONDUIT SIZE                        | DIRECTORY       | VA LOAD |       |  | CKT. | AMPS | AMPS | CKT. | VA LOAD |       |    | DIRECTORY   | CONDUIT SIZE | WIRE SIZE    | PHASE |
|          |              |                                     |                 | L1      | L2    | L3                                       |      |      |      |      | L1      | L2    | L3 |             |              |              |       |
| 1        | 2#12 & 1#12G | 1"                                  | Lineup Lighting | 600     |       |  | 1    | 20   | 20   | 2    | 1,200   |       |    | Lineup 120V | 1"           | 2#12 & 1#12G | 1     |
| 1        | 3#12 & 1#12G | 1"                                  | Lineup Htrs     |         | 1,500 |  | 3    | 20   | 20   | 4    |         | 1,500 |    | Lineup Htrs | 1"           | 3#12 & 1#12G | 1     |
| -        | -            | -                                   | -               | 1,500   |       |  | 5    | I    | I    | 6    | 1,500   |       |    | -           | -            | -            | -     |
| -        | -            | -                                   | Spare           |         |       |  | 7    | -    | -    | 8    |         |       |    | Spare       | -            | -            | -     |
| -        | -            | -                                   | Spare           |         |       |  | 9    | -    | -    | 10   |         |       |    | Spare       | -            | -            | -     |
| -        | -            | -                                   | Spare           |         |       |  | 11   | -    | -    | 12   |         |       |    | Spare       | -            | -            | -     |
| SUBTOTAL |              |                                     |                 | 2,100   | 1,500 |  |      |      |      |      | 2,700   | 1,500 |    | SUBTOTAL    |              |              |       |

|            |              | VOLTAGE: 208 PHASE: 3 WIRE: 4        |                     | VA, L1  | 2,150 | PANEL NAME. LC1                          |      |      |      |      |         |     |     |                 |              |              |            |
|------------|--------------|--------------------------------------|---------------------|---------|-------|--|------|------|------|------|---------|-----|-----|-----------------|--------------|--------------|------------|
|            |              | MAIN BUS: 125 AMPS --- MLO           |                     | VA, L2  | 1,150 | LOC. GATE LOC. #1 - PAD MTD.             |      |      |      |      |         |     |     |                 |              |              |            |
|            |              | MAIN BREAKER: 100 A FRAME --- A TRIP |                     | VA, L3  | 1,200 | NOTES: 15KVA INTEGRAL XFMR & LOAD CENTER |      |      |      |      |         |     |     |                 |              |              |            |
|            |              | MOUNTING: SURFACE KAIC: 10           |                     | TOT. VA | 4,500 | EXTERIOR PAD MOUNT                       |      |      |      |      |         |     |     |                 |              |              |            |
| PHASE/POLE | WIRE SIZE    | CONDUIT SIZE                         | DIRECTORY           | VA LOAD |       |  | CKT. | AMPS | AMPS | CKT. | VA LOAD |     |     | DIRECTORY       | CONDUIT SIZE | WIRE SIZE    | PHASE/POLE |
|            |              |                                      |                     | L1      | L2    | L3                                       |      |      |      |      | L1      | L2  | L3  |                 |              |              |            |
| 1          | 2#12 & 1#12G | 3/4"                                 | Pole Lighting       | 300     |       |  | 1    | 20   | 20   | 2    | 1,500   |     |     | Comm. Cab. 120V | 3/4"         | 2#12 & 1#12G | 1          |
| -          | -            | -                                    | I                   |         | 300   |  | 3    | I    | 20   | 4    |         | 350 |     | Gate Power      | 3/4"         | 2#12 & 1#12G | 1          |
| 1          | 2#12 & 1#12G | 3/4"                                 | Gate Power - 1/2 HP |         |       | 350                                      | 5    | 20   | I    | 6    |         |     | 350 | I               | -            | -            | -          |
| -          | -            | -                                    | I                   | 350     |       |  | 7    | I    | 20   | 8    |         |     |     | Spare           | -            | -            | -          |
| 1          | 2#12 & 1#12G | 3/4"                                 | Access Control 120V |         | 500   |  | 9    | 20   | 20   | 10   |         |     |     | Spare           | -            | -            | -          |
| 1          | 2#12 & 1#12G | 3/4"                                 | Ext. outlet 120V    |         |       | 500                                      | 11   | 20   | 20   | 12   |         |     |     | Spare           | -            | -            | -          |
| SUBTOTAL   |              |                                      |                     | 650     | 800   | 850                                      |      |      |      |      | 1,500   | 350 | 350 | SUBTOTAL        |              |              |            |

|            |              | VOLTAGE: 208 PHASE: 3 WIRE: 4       |                     | VA, L1  | 2,150 | PANEL NAME. LC2                          |      |      |      |      |         |     |     |                 |              |              |            |
|------------|--------------|-------------------------------------|---------------------|---------|-------|--|------|------|------|------|---------|-----|-----|-----------------|--------------|--------------|------------|
|            |              | MAIN BUS: 125 AMPS --- MLO          |                     | VA, L2  | 1,150 | LOC. GATE LOC. #2 - PAD MTD.             |      |      |      |      |         |     |     |                 |              |              |            |
|            |              | MAIN BREAKER: 50 A FRAME --- A TRIP |                     | VA, L3  | 1,200 | NOTES: 15KVA INTEGRAL XFMR & LOAD CENTER |      |      |      |      |         |     |     |                 |              |              |            |
|            |              | MOUNTING: SURFACE KAIC: 10          |                     | TOT. VA | 4,500 | EXTERIOR PAD MOUNT                       |      |      |      |      |         |     |     |                 |              |              |            |
| PHASE/POLE | WIRE SIZE    | CONDUIT SIZE                        | DIRECTORY           | VA LOAD |       |  | CKT. | AMPS | AMPS | CKT. | VA LOAD |     |     | DIRECTORY       | CONDUIT SIZE | WIRE SIZE    | PHASE/POLE |
|            |              |                                     |                     | L1      | L2    | L3                                       |      |      |      |      | L1      | L2  | L3  |                 |              |              |            |
| 1          | 2#12 & 1#12G | 3/4"                                | Pole Lighting       | 300     |       |  | 1    | 20   | 20   | 2    | 1,500   |     |     | Comm. Cab. 120V | 3/4"         | 2#12 & 1#12G | 1          |
| -          | -            | -                                   | -                   |         | 300   |  | 3    | I    | 20   | 4    |         | 350 |     | Gate Power      | 3/4"         | 2#12 & 1#12G | 1          |
| 1          | 2#12 & 1#12G | 3/4"                                | Gate Power - 1/2 HP |         |       | 350                                      | 5    | 20   | I    | 6    |         |     | 350 | -               | -            | -            | -          |
| -          | -            | -                                   | -                   | 350     |       |  | 7    | I    | 20   | 8    |         |     |     | Spare           | -            | -            | -          |
| 1          | 2#12 & 1#12G | 3/4"                                | Access Control 120V |         | 500   |  | 9    | 20   | 20   | 10   |         |     |     | Spare           | -            | -            | -          |
| 1          | 2#12 & 1#12G | 3/4"                                | Ext. outlet 120V    |         |       | 500                                      | 11   | 20   | 20   | 12   |         |     |     | Spare           | -            | -            | -          |
| SUBTOTAL   |              |                                     |                     | 650     | 800   | 850                                      |      |      |      |      | 1,500   | 350 | 350 | SUBTOTAL        |              |              |            |

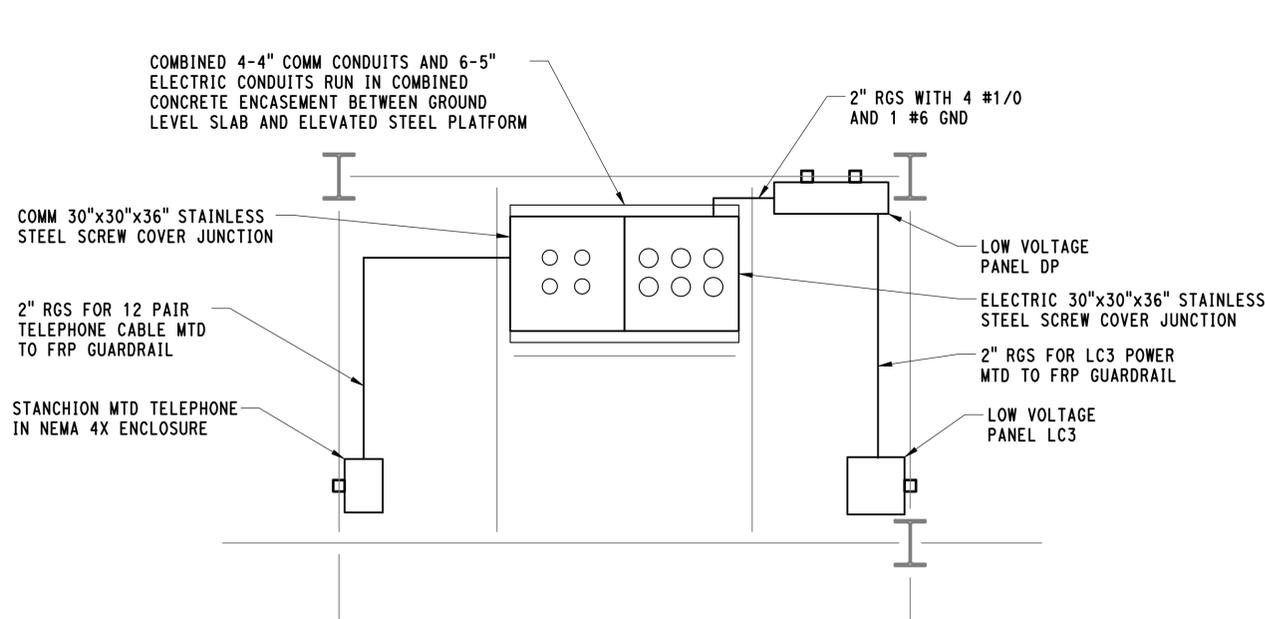


LOW VOLTAGE ONE LINE DIAGRAM

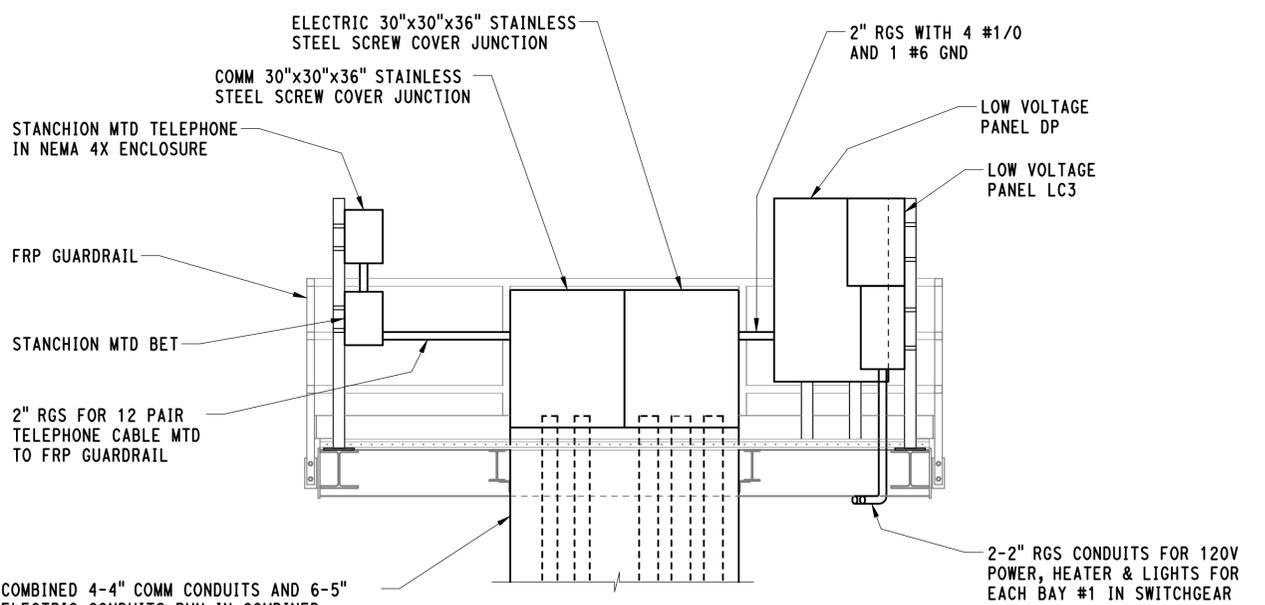
- NOTES:
1. WIRE SIZES SHOWN ON THE ONE LINE DIAGRAM AND IN THE PANEL BOARD SCHEDULES INCLUDE VOLTAGE DROP CALCULATIONS. PROVIDE LUGS AND ADAPTERS AS REQUIRED TO TERMINATE WIRING AS SHOWN.
  2. PROVIDE #4 COPPER GROUND FROM LC3 TRANSFORMER SECONDARY TO POE SUBSTATION GROUND GRID.
  3. PROVIDE 3/4" x 10' DRIVEN GROUND ROD ADJACENT PANEL LC1. PROVIDE #4 COPPER GROUND FROM LC1 TRANSFORMER SECONDARY TO GROUND ROD.
  4. PROVIDE 3/4" x 10' DRIVEN GROUND ROD ADJACENT PANEL LC2. PROVIDE #4 COPPER GROUND FROM LC2 TRANSFORMER SECONDARY TO GROUND ROD.
  5. BOND PANEL DP TO POE SUBSTATION GROUND GRID WITH #4 GROUND CONDUCTOR.

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|      |      |                      |           |                         |  |                 |  |  |   |                              |                                |
|------|------|----------------------|-----------|-------------------------|--|-----------------|--|--|---|------------------------------|--------------------------------|
| REV. | DATE | REVISION DESCRIPTION | SHEET NO. | Plotted Date: 11/5/2014 | DESIGNER/DRAFTER: SG/MA  | CHECKED BY: JWJ | <p>STATE OF CONNECTICUT<br/>DEPARTMENT OF TRANSPORTATION</p> | <p>AI ENGINEERS, INC.<br/>MIDDLETOWN, CT</p>               | PROJECT TITLE:<br><b>NEW HAVEN RAIL YARD<br/>FACILITIES IMPROVEMENTS<br/>YARD POWER UPGRADE</b> | TOWN:<br><b>NEW HAVEN</b>    | PROJECT NO.<br><b>301-0144</b> |
|      |      |                      |           |                         | <p>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.</p> |                 |  | DRAWING TITLE:<br><b>UTILITY MISCELLANEOUS<br/>DETAILS</b> |   | DRAWING NO.<br><b>UM-004</b> | SHEET NO.<br><b>05.17</b>      |



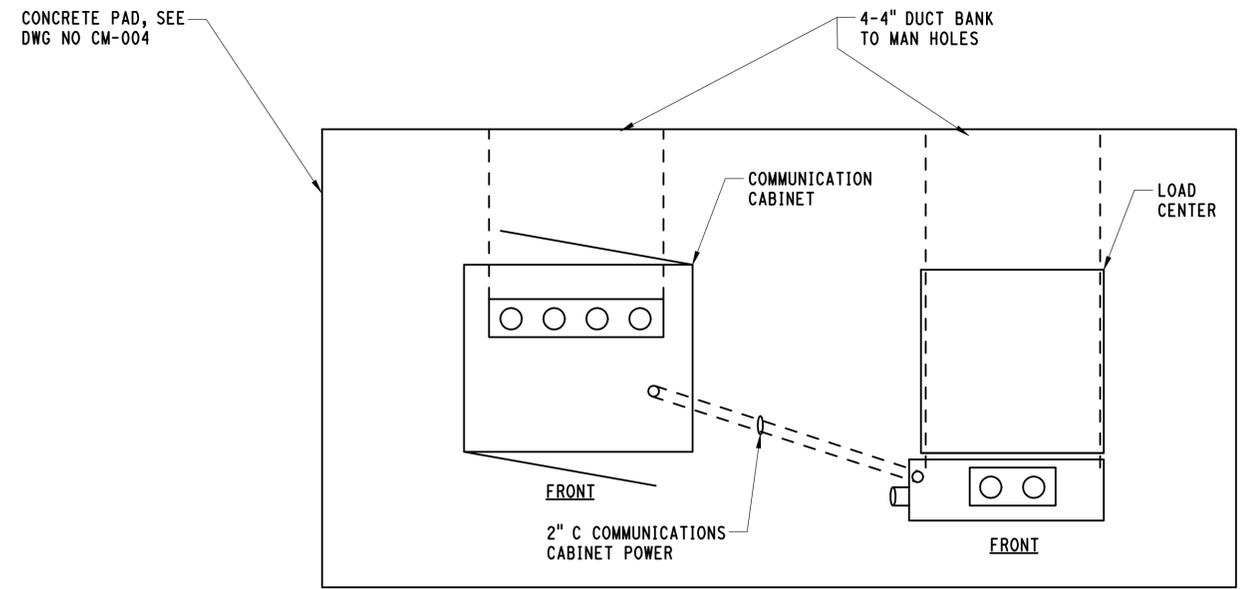
PLAN



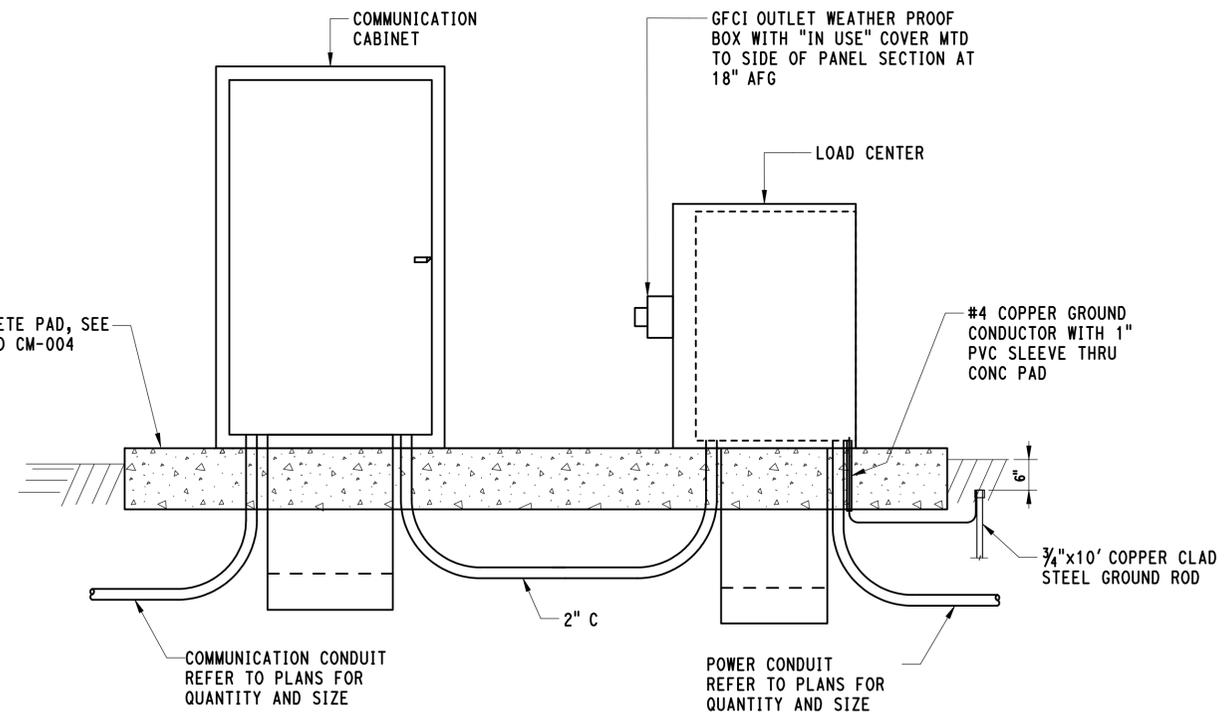
ELEVATION

**NOTE:**  
REFER TO DWGS UM-004 AND P-002 FOR ADDITIONAL INFORMATION.

**LOW VOLTAGE POWER AREA ELEVATION**  
SCALE: 1/2"=1'-0"



PLAN



ELEVATION

**NOTES:**

1. COST OF ELECTRIC LOAD CENTER SHALL BE PAID UNDER ITEM "ELECTRIC LOAD CENTER".
2. COST OF COMMUNICATIONS CABINET SHALL BE PAID UNDER ITEM "ACCESS CONTROL SYSTEM".
3. REFER TO DWGS UM-004 AND P-002 FOR ADDITIONAL INFORMATION.

**ELECTRIC LOAD CENTER AND COMMUNICATION CABINET**  
SCALE: 1"=1'-0"

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| REV. | DATE | REVISION DESCRIPTION | SHEET NO. | Plotted Date: 11/7/2014 |
|------|------|----------------------|-----------|-------------------------|
|      |      |                      |           |                         |

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DESIGNER/DRAFTER: **SG/MA**  
CHECKED BY: **JWL**  
SCALE AS NOTED



SIGNATURE/BLOCK: AI ENGINEERS, INC. MIDDLETOWN, CT

PROJECT TITLE:  
**NEW HAVEN RAIL YARD FACILITIES IMPROVEMENTS YARD POWER UPGRADE**

TOWN: **NEW HAVEN**  
DRAWING TITLE: **UTILITY MISCELLANEOUS DETAILS**

PROJECT NO. **301-0121**  
DRAWING NO. **UM-005**  
SHEET NO. **05.18**