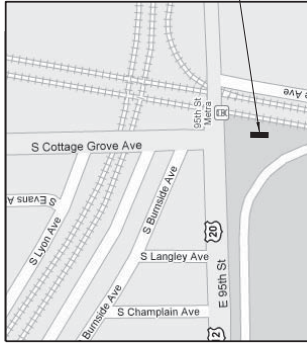
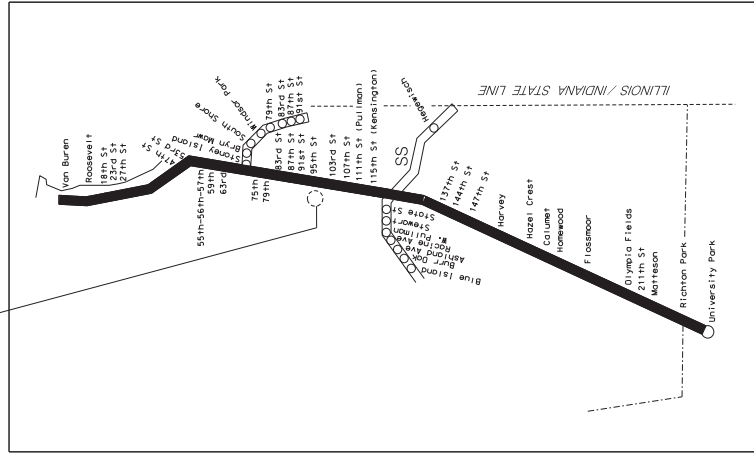


95TH. STREET SUBSTATION



SUBSTATION



SYSTEM MAP
ELECTRIC DISTRICT



95th STREET SUBSTATION

DRAWING LIST

CS-11.9-1000	COVER SHEET
SS-11.9-1001	TOPOGRAPHICAL SURVEY
SS-11.9-1001G	GENERAL NOTES
SS-11.9-1017	SITE PLAN
SS-11.9-1018	FRAMING PLAN AND DETAILS
SS-11.9-1019	DETAILS ON EQUIPMENT LAYOUT PLAN
SS-11.9-1020	DETAILS ON EQUIPMENT LAYOUT PLAN
SS-11.9-1071	ELECTRICAL SITE PLAN
SS-11.9-1072	DUCTBANK LAYOUT
SS-11.9-1073	DUCTBANK PROFILES
SS-11.9-1074	DUCTBANK DETAILS
SS-11.9-1075	SUBSTATION GROUNDING LAYOUT
SS-11.9-1080	ELECTRICAL NOTES & SYMBOLS
SS-11.9-1081	ELECTRICAL DETAILS
SS-11.9-1082	NEGATIVE AND DRAIN ENCLOSURES
SS-11.9-1085	ELE. STATION INCOMING FEEDER & CONTROL CABLES PLAN & SECTIONS
SS-11.9-4000	12.5KV AC SINGLE LINE DIAGRAM
SS-11.9-4002	NOT USED
SS-11.9-4003	TRACTION POWER ONE LINE DIAGRAM
SS-11.9-4004	NOT USED
SS-11.9-4005	TRANSF. S., RECTIFIERS & DC SWGR SINGLE LINE DIAGRAM
SS-11.9-4006	12.5KV AC THREE LINE DIAGRAM, SHEET 1 OF 3
SS-11.9-4101	12.5KV AC THREE LINE DIAGRAM, SHEET 2 OF 3
SS-11.9-4102	12.5KV AC THREE LINE DIAGRAM, SHEET 3 OF 3
SS-11.9-4103	NOT USED
SS-11.9-4104	12.5KV AC SCHEMATIC DIAGRAM INC. LINE BKRS. 152-1 & 152-2
SS-11.9-4105	12.5KV AC SCHEMATIC DIAGRAM BUS, TIE, BKR. 52BT
SS-11.9-4107	12.5KV AC SCHEMATIC DIAGRAM RECT., TRANSF., BKR. 52-T1 & 52-T2
SS-11.9-4108	NOT USED
SS-11.9-4109	12.5KV AC SCHEMATIC DIAGRAM BUS-1 DIFFERENTIAL LOCKOUT
SS-11.9-4110	12.5KV AC SCHEMATIC DIAGRAM BUS-2 DIFFERENTIAL LOCKOUT
SS-11.9-4111	1500V DC SCHEMATIC DIAGRAM RECTIFIER-1 POWER & AUXILIARIES
SS-11.9-4201	1500V DC SCHEMATIC DIAGRAM RECTIFIER-1 CONTROLS & ANNUNCIATOR
SS-11.9-4202	1500V DC SCHEMATIC DIAGRAM RECTIFIER-2 POWER & AUXILIARIES
SS-11.9-4203	1500V DC SCHEMATIC DIAGRAM RECTIFIER-2 CONTROLS & ANNUNCIATOR
SS-11.9-4205	RECTIFIER PLC LOGIC DIAGRAM SHEET 1
SS-11.9-4206	RECTIFIER PLC LOGIC DIAGRAM SHEET 2
SS-11.9-4207	RECTIFIER PLC LOGIC DIAGRAM SHEET 3
SS-11.9-4208	RECTIFIER PLC LOGIC DIAGRAM SHEET 4
SS-11.9-4209	1500V DC SCHEMATIC DIAGRAM RECTIFIER-1 BREAKER 72-1
SS-11.9-4210	1500V DC SCHEMATIC DIAGRAM DC SWITCHGEAR GROUND RELAY
SS-11.9-4226	1500V DC SCHEMATIC DIAGRAM DC SW. SEC. 135 CUB. NO. 9 SCHEMATIC DIAGRAM
SS-11.9-4300A	1500V DC SWITCHGEAR DC FDR BKR SEC. 136 CUB. NO. 9 SCHEMATIC DIAGRAM
SS-11.9-4300B	1500V DC SWITCHGEAR DC FDR BKR SEC. 136 CUB. NO. 7 SCHEMATIC DIAGRAM
SS-11.9-4302A	1500V DC SWITCHGEAR DC FDR BKR SEC. 137 CUB. NO. 4 SCHEMATIC DIAGRAM
SS-11.9-4303A	1500V DC SWITCHGEAR DC FDR BKR SEC. 138 CUB. NO. 6 SCHEMATIC DIAGRAM
SS-11.9-4304A	1500V DC SWITCHGEAR DC FDR BKR SEC. 139 CUB. NO. 1 SCHEMATIC DIAGRAM
SS-11.9-4305A	1500V DC SWITCHGEAR DC FDR BKR SEC. 140 CUB. NO. 5 SCHEMATIC DIAGRAM
SS-11.9-4306A	1500V DC SWITCHGEAR DC FDR BKR SEC. 141 CUB. NO. 2 SCHEMATIC DIAGRAM
SS-11.9-4307A	1500V DC SWITCHGEAR DC FDR BKR SEC. 141 CUB. NO. 2 SCHEMATIC DIAGRAM
SS-11.9-4308A	STATION CONTROL ARCHITECTURE NEW BUILDING AND INTERFACES
SS-11.9-5000	STATION CONTROL ARCHITECTURE EXISTING BUILDING AND INTERFACES
SS-11.9-5001	

COMED REFERENCE DOCUMENTS

COMED STANDARDS	
C4050	CONDUIT RUN TRENCH PREPARATION, PAGES 1 & 2
C4090	CONDUIT RUN INSTALLATIONS, PAGES 1 & 2
C4171	CONDUIT RUN INSTALLATION, PAGES 1 THRU 7
C2695	ESS INSTALLATION REQUIREMENTS, PAGES 1 THRU 3
C2699	ESS INSTALLATION REQUIREMENTS, PAGES 4 THRU 6
C3302	PAD MOUNTED SWITCHGEAR FOUNDATIONS, PAGES 1 THRU 12
C8550	GROUNDING INSTALLATION, PAGES 1 THRU 6
SERVICE ENTRANCE LOCATION SKETCHES	
SERVICE ENTRANCE LOCATION SKETCH 1 OF 5	
SERVICE ENTRANCE LOCATION SKETCH 2 OF 5	
SERVICE ENTRANCE LOCATION SKETCH 3 OF 5	
SERVICE ENTRANCE LOCATION SKETCH 4 OF 5	
SERVICE ENTRANCE LOCATION SKETCH 5 OF 5	



REV.	DATE	BY	APP	DATE	REV	DESCRIPTION

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LTK Engineering Services
 225 N. Wacker Dr., Ste. 1800 Chicago IL, 60606

KMI
 Kalsbaum Meibohm, Inc.
 201 N. Wacker Dr., Ste. 1800 Chicago IL, 60606

DP
 201 N. Wacker Dr., Ste. 1800 Chicago IL, 60606

Metra
 575 N. JACKSON BOULEVARD
 CHICAGO, ILLINOIS 60601

LOCATION NAME:
 95TH STREET SUBSTATION
 TITLE:
 COVER SHEET

CD FILE NUMBER: CS-11.9-1000.DGN	DISTRICT:
SCALE:	SHEET NO.:
PROJECT NO.:	CS-11.9-1000
MILE POST NO.:	

GENERAL NOTES:

1. ALL ITEMS OF THIS PROJECT SHALL BE COVERED BY THE CODES AND SPECIFICATIONS LISTED BELOW
 - A. INTERNATIONAL BUILDING CODE-2017
 - B. CHICAGO BUILDING CODE-2017
 - C. STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION PREPARED BY THE DEPARTMENT OF TRANSPORTATION OF THE STATE OF ILLINOIS AND ADOPTED BY SAID DEPARTMENT (LATEST VERSION)
 - D. SUPPLEMENTAL SPECIFICATIONS AND RECORDING SPECIAL PROVISIONS ADOPTED BY THE ILLINOIS DEPARTMENT OF TRANSPORTATION (LATEST VERSION)
 - E. STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL (LATEST VERSION)
 - F. STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN URBANS (LATEST VERSION)
2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS INCLUDING MUNICIPAL PERMITS.
3. ALL IMPROVEMENTS WILL BE SUBJECT TO OBSERVATION BY METRO AUTHORIZED REPRESENTATIVE AND/OR CHIEFED AGENTS ACTING ON BEHALF OF METRO BOTH DURING THE COURSE OF CONSTRUCTION AND AFTER CONSTRUCTION IS COMPLETE. THE AGENY SHALL HAVE AUTHORITY OVER MATERIALS OF CONSTRUCTION AND WORKMANSHIP TO INSURE COMPLIANCE WITH CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL PROVIDE FOR RESPONSIBLE CONSTRUCTION OR INSPECTION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND CONSENTS AT THE SITE AND MUST OBTAIN THE SIGNATURE OF THE METRO LOCAL OFFICIALS IN WRITING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND CONSENTS AT THE SITE AND MUST OBTAIN THE SIGNATURE OF THE METRO LOCAL OFFICIALS IN WRITING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND CONSENTS AT THE SITE AND MUST OBTAIN THE SIGNATURE OF THE METRO LOCAL OFFICIALS IN WRITING.

MINIMUM DESIGN LOADS:

- FLOOR LOADS: $L_L = 25$ LB/SQ.FT.
- ROOF LOADS: $W_E = 25$ LB/SQ.FT.
- WIND LOAD: $W_E = 25$ LB/SQ.FT.
- EQUIPMENT WEIGHT: $L_L = 30$ LB/SQ.FT.
- LI = 100 LB/SQ.FT.

EXCAVATION AND EARTHWORK:

1. ALL EXCAVATIONS SHALL BE INSPECTED, PRIOR TO BEING BACKFILLED BY A SOILS ENGINEER TO VERIFY SUITABLE BEARING CAPACITY OF SOILS.
2. NOTIFY THE AGENY OF EXCAVATIONS WHEN ADDITIONAL EXCAVATION IS REQUIRED TO REACH SUITABLE BEARING MATERIAL.
3. THE SOILS ENGINEER SHALL CARRY IN WRITING THAT ALL EXCAVATIONS WERE PLACED ON SOIL WITH THE BEARING VALUE AS SPECIFIED.
4. WHEN THE EXCAVATION AREA OF THE FOUNDATIONS, ALL VEGETATION, RAISED, ALL FOOTINGS TO BEAR ON FIRM SOIL OR PROPERLY PLACED AND COMPACTED UNDERLAYER FILL.
5. FOUNDATION DESIGN DOES NOT ACCOUNT FOR WINTER CONSTRUCTION. ANY EXCESSIVE HOT OR COOL TEMPERATURES, AND SHALL BE MAINTAINED WITHIN THE RANGE OF 32 TO 75 DEGREES FAHRENHEIT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER SETTING AND MAINTENANCE OF CONCRETE, OR FOR AT LEAST 7 DAYS.

CONCRETE NOTES:

1. MATERIAL NORMAL WEIGHT CONCRETE ($f_c = 4000$ PSI AT 28 DAYS)
1. ALL REINFORCED CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE ACI CONCRETE CODE 318, NORMAL WEIGHT CONCRETE AND SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS AND 301.
1. ALL REINFORCING BARS SHALL BE ASTM A618, GRADE 60, EPOXY COATED.
1. ALL WELDED WIRE FABRIC SHALL BE ASTM A185, EPOXY COATED.
1. THE ARRANGEMENT OF ACCESSORIES SHALL BE IN ACCORDANCE WITH THE ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES. ANY PART OF AN ACCESSORY WHICH WILL BE EXPRESSED OR PLACED TOPPED AFTER REMOVAL OF THE FORMS SHALL BE CEMENTED OR PLASTIC TYPED.
1. SUPPORT BARS SHALL BE MINIMUM #4 IN SIZE AND SPACED NOT MORE THAN 3'-0" O.C. HIGH CHAIRS SHALL BE PLACED NOT MORE THAN 3'-0" O.C. THERE SHALL BE A MINIMUM OF THREE CHAIRS PER BAR.
1. CONTINUOUS BARS SHALL BE LAPPED MIN. 40 BAR DIAMETERS AT ALL SPACES.
1. THE MINIMUM PROTECTIVE COVERINGS FOR MAIN REINFORCING STEEL SHALL BE AS FOLLOWS:
 - A. 3" WHERE THE CONCRETE IS PLACED AGAINST THE GROUND
 - B. 2" FOR STRIPS AND TIES
 - C. 1 1/2" FOR STRIPS AND TIES
1. ALL SLABS ON GRADE, EXCEPT AS SHOWN OR NOTED OTHERWISE, SHALL BE REINFORCED WITH #6-12 @ 18" ON CENTER WELDED WIRE FABRIC USING 1'-0" LAPS AT SPACES. REINFORCING SHALL BE PLACED 1 1/2" CLEAR FROM THE TOP OF THE SLAB.

UTILITY WARNING:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. OWNER MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. ANY UTILITY DEEPER THAN 4 FEET SHALL BE PROTECTED BY A SHIELDING SYSTEM. ANY UTILITY NOT SHOWN SHALL BE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION AVAILABLE. OWNER HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES CALL UTILITY (1-800-882-4123) AND/OR DIGGER (312-744-7000) PRIOR TO CONSTRUCTION OR EXCAVATION.

TEMPORARY EXCAVATION SUPPORT:

1. TEMPORARY EXCAVATION SUPPORT SHALL BE DESIGNED BY CONTRACTOR AND APPROVED BY THE BARBOARD OWNER. EXCAVATION SUPPORT IS SHOWN SYMBOLICALLY ON THE DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE TYPE, SIZE, AND LOCATION OF ALL REQUIRED SUPPORTS.
2. REFER TO SPECIFICATION SECTION 0220-EXCAVATION SUPPORT AND PROTECTION AND APPROVED "X"-METER SHIELDING GUIDELINES FOR ADDITIONAL REQUIREMENTS.

CONCRETE NOTES CONTINUED:

1. SIZE OF THE CONCRETE POUR SHALL NOT EXCEED 2000 S.F. FOR SLABS ON GRADE AND 90 FEET FOR WALLS UNLESS CONSTRUCTION JOBS ARE PROVIDED.
1. EACH CONTRACTOR AND SUBCONTRACTOR SHALL PROVIDE ACCESS TO CONCRETE PLACEMENT, INCLUDING THE REVISIONS OF THE CONSTRUCTION DOCUMENTS. ALL REVISIONS SHALL BE MAINTAINED CONSISTENT WITH THE ORIGINAL CONTRACT DOCUMENTS.
1. NO WORK SHALL BE DONE ON CONCRETE SURFACES UNTIL THE CONCRETE HAS GAINED SUFFICIENT STRENGTH TO SUPPORT THE NEXT CONCRETE POUR.
1. PRIOR TO POURING CONCRETE, CONTRACTORS SHALL ALLOWANCE FOR AN INSPECTION OF REINFORCING STEEL (REBAR) BY THE STRUCTURAL ENGINEER. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A MINIMUM OF 48 HOUR NOTICES AS TO WHEN THE REBAR SHALL BE READY FOR INSPECTION. THIS REQUIREMENT DOES NOT APPLY FOR SLABS ON GRADE.
1. PROVIDE TO THE ARCHITECTOR OF ANY PILE, BENCH, OR OTHER SLAB FORMWORKS, OR MECHANICAL OR ELECTRICAL TRUNK SHALL PREPARE AND SUBMIT SHOP DRAWINGS OF PROPOSED SLEVE LAYOUT FOR STRUCTURAL ENGINEER'S REVIEW AND APPROVAL. NO CORING OF THE COMPLETED REINFORCED CONCRETE SHALL BE PERMITTED WITHOUT WRITTEN AUTHORIZATION OF THE ENGINEER.
1. ALL CONCRETE SURFACES EXPOSED TO WEATHERING SHALL BE SEALED AS SPECIFIED IN SPECIFICATIONS.
1. FRESHLY PLACED CONCRETE SHALL BE PROTECTED FROM PREMATURE DRYING AND EXCESSIVE HOT OR COOL TEMPERATURES, AND SHALL BE MAINTAINED WITHIN THE RANGE OF 32 TO 75 DEGREES FAHRENHEIT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER SETTING AND MAINTENANCE OF CONCRETE, OR FOR AT LEAST 7 DAYS.
1. REINFORCING BAR PRESSURE IS REQUIRED TO BE 3000 PSI, PER ACTUAL SPECIFIC GRAVE.
1. CONCRETE SLAB ON GRADE SHALL HAVE A MINIMUM OF 600 PSF LOADING CAPACITY.

EROSION CONTROL NOTES:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND OPERATIONAL PRIOR TO ANY GROUND DISTURBANCE.
1. SILT FILTER FABRIC SHALL BE PLACED BETWEEN FRAME AND GRADE OF SEWER STRUCTURES UNTIL VEGETATION IS ESTABLISHED.
1. ALL DISTURBED AREAS SHALL BE TEMPORARILY STABILIZED WITHIN 7 DAYS OF ACTIVE DISTURBANCE.
1. UTILITY EXPOSURE BLANKET ON ALL SLOPES OF 4:1 OR GREATER.
1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED AND REPAIRED AS NEEDED TO ENSURE EFFECTIVE PERFORMANCE OF THE REQUIRED EROSION CONTROL MEASURES.

CONCRETE NOTES CONTINUED:

1. SUBSISTANCE EXCAVATION IS NOT AVAILABLE. CONTRACTOR SHALL CONDUCT ALL NECESSARY SUBSISTANCE INVESTIGATIONS AND MAKE BEARING CAPACITY SHOWN ON PLANS. FOR BEARING CAPACITY, THE CONTRACTOR SHALL ASSUME A MINIMUM OF 20'-0" CASSON SETTLEMENT UNDER UNIFORM LOADING CONDITIONS. A MINIMUM OF 15% EXCESSIVE STRENGTH SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
1. CONTRACTOR SHALL OBTAIN THE RECORDS OF TEST BORINGS FOR REVIEW AND EXAMINATION PRIOR TO CONSTRUCTION.
1. IF ANY EXISTING SERVICE LINES, UTILITIES AND UTILTY STRUCTURES EXIST TO REMAIN WITHIN THE EXCAVATION AREA, CONTRACTOR SHALL INVESTIGATE AND LOCATE ALL SUCH UTILITIES AND PROTECT THEM FROM DAMAGE. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL SUCH UTILITIES AND STRUCTURES FROM DAMAGE.
1. CONTRACTOR SHALL NOTIFY THE ENGINEER IN THE EVENT OF ANY EXISTING UTILITIES, UTILTY STRUCTURES OR ANY OBSTRUCTION WHICH INTERFERES WITH THE PROPER INSTALLATION OF THE FOUNDATION WORK.
1. CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL, THE CASSON CONSTRUCTION METHOD INCLUDING THE SOURCE OF APPROVAL, THE CASSON CONSTRUCTION DETAILS OF CASING AND LIGHT REQUIRED, METHOD OF POURING CONCRETE, ETC.
1. ALL TEMPORARY AND PERMANENT CASINGS SHALL EXTEND ABOVE THE GROUND. TEMPORARY CASINGS MUST BE STAYED UNIFORM SPACING AND SUPPORTED BY BRACE.
1. ALL CASSONS SHALL BEAR ON THE MATERIAL CAPABLE OF SURELY SUPPORTING THE CASSON LOAD LISTED ON DRAWINGS. SEE TYPICAL CASSON DETAILS.
1. ALL CASSON CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 P.S.I. AT 28 DAYS.
1. ALL REINFORCING BARS SHALL BE ASTM A618, GRADE 60, EPOXY COATED.
1. THE CASSON SHALL BE VIBRATED IN UPPER 40'-0" OF CASSON SHAFT.
1. THE CONTRACTOR SHALL REMOVE ALL LAFTIME FROM THE TOP OF THE CASSON SHAFT A MINIMUM OF 24 HOURS AFTER THE CONCRETE POUR FOR EACH EXCAVATION. CONTRACTOR SHALL MAINTAIN THE TOP OF THE CASSON AT A MINIMUM OF 1'-0" ABOVE THE GROUND SURFACE AT ALL TIMES TO PREVENT DAMAGE TO THE CONCRETE BELOW.
1. SUBMIT THE ACTUAL CASSON LOCATION PLAN PREPARED BY A REGISTERED SURVEYOR IN ACCORDANCE WITH THE ILLINOIS SURVEYING ACT AND ILLINOIS BOARD OF SURVEYING AND LAND SURVEYING TO THE ENGINEER FOR APPROVAL.
1. THE CONTRACTOR SHALL SET UP REFERENCE POINTS FOR OBSERVING OF FOUNDATION SETTLEMENT ON ALL BUILDINGS CLOSER THAN 50 FEET PRIOR TO ANY CASSON CONSTRUCTION. CONTRACTOR SHALL MAINTAIN THESE REFERENCE POINTS THROUGHOUT CASSON INSTALLATION AND SHALL REPORT ALL TENDRONS TO THE ENGINEER.
1. PUMPING OF WATER FROM THE CASSON SHAFT SHALL NOT BE FORMITTED UNLESS APPROVED BY THE GEOLOGICAL ENGINEER.

STRUCTURAL STEEL NOTES:

1. ALL STRUCTURAL STEEL SHALL BE REINFORCED, FABRICATED AND CREATED IN ACCORDANCE WITH THE LATEST AISC SPECIFICATIONS AND AISC CHAPTER 15.
1. BRACING SHALL BE PROVIDED FOR STRUCTURAL STEEL AS PER THE TOP.
1. STRUCTURAL STEEL WITH FLANGE SHAPES SHALL BE ASTM A992 (F=60 KSI) STRUCTURAL STEEL SHALL BE ASTM A588, GRADE B (F=65 KSI) STRUCTURAL STEEL SHALL BE ASTM A588, GRADE B (F=65 KSI) ALL OTHER STRUCTURAL STEEL SHALL BE ASTM A588 (F=60 KSI).
1. ALL STEEL SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.
1. ALL BOLTS SHALL BE ASTM A325, ALL BOLTS SHALL BE 3/4" DIA. UNLESS NOTED OTHERWISE.
1. WELDS SHALL BE MADE BY METRO APPROVED WELDING PROCESSES. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND CONSENTS AT THE SITE AND MUST OBTAIN THE SIGNATURE OF THE METRO LOCAL OFFICIALS IN WRITING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND CONSENTS AT THE SITE AND MUST OBTAIN THE SIGNATURE OF THE METRO LOCAL OFFICIALS IN WRITING.
1. WELDS NOT OTHERWISE SPECIFIED SHALL BE CONTINUOUS (1/4" THICK WELDS BUT NOT LESS THAN MINIMUM SIZE REQUIRED BY AISC SPECIFICATIONS).
1. NO CONNECTION SHALL CONSIST OF LESS THAN 2'-0" DIA. BOLTS OR RED GROUT FILLING SPACES. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND CONSENTS AT THE SITE AND MUST OBTAIN THE SIGNATURE OF THE METRO LOCAL OFFICIALS IN WRITING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND CONSENTS AT THE SITE AND MUST OBTAIN THE SIGNATURE OF THE METRO LOCAL OFFICIALS IN WRITING.
1. GROUT FILLING SPACES, ETC., REQUIRED IN STRUCTURAL STEEL CONNECTIONS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL SUCH SPACES AND PROTECTING THEM FROM DAMAGE.

STRUCTURAL STEEL NOTES CONTINUED:

1. SHOP AND FIELD BENDING OF WELLS SHALL BE AS FOLLOWS:
 - A. WELD INSPECTION SHALL BE MADE ON TOPS OF ALL WELDS. WELDS SHALL BE MADE ON TOPS OF ALL WELDS.
 - B. WELDING SHALL BE MADE ON TOPS OF ALL CONNECTION WELLS.
 - C. WELDING SHALL BE MADE ON TOPS OF ALL CONNECTION WELLS.
 - D. WELDS SHALL BE MADE ON TOPS OF ALL CONNECTION WELLS.
 - E. WELDS SHALL BE MADE ON TOPS OF ALL CONNECTION WELLS.
 - F. WELDS SHALL BE MADE ON TOPS OF ALL CONNECTION WELLS.
1. SUBMIT REQUIRED CALCULATIONS AND SHOP DRAWINGS PREPARED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF ILLINOIS FOR REVIEW AND APPROVAL BY THE ENGINEER.
1. SHOP DRAWINGS SHALL BE PREPARED USING ACTUAL FIELD SURVEY OF CASSON LOCATIONS. CONTACT METRO FOR ANY DISCREPANCIES BETWEEN FIELD LOCATION OF CASSONS AND DESIGN DRAWINGS.

STANDARD ABBREVIATIONS:

- C.C. - BACK OF CURB
- C.D. - CENTER OF DEPTH
- C.E. - CENTER OF GRAVITY
- C.L. - CENTER OF GRAVITY
- C.P.C. - CONCRETE
- C.O.M. - CONTINUOUS
- C.O.S. - CENTER OF GRAVITY
- E.L.C. - ELEVATION
- E.L.E. - ELEVATION
- E.S.D. - END OF STUDY
- E.T. - EXTERIOR
- F.O. - FOOT/FEET
- G.A.V. - GALVANIZED
- B.O.T. - BOTTOM
- L.L.S. - ILLINOIS DEPARTMENT OF TRANSPORTATION
- M.A.K. - MAXIMUM
- M.C. - MATCH EXISTING
- M.H. - MINIMUM
- M.O. - MORE OR
- N.L.S. - NOT TO SCALE
- P.C.C. - PORTLAND CEMENT CONCRETE
- R.O.C. - REINFORCED CONCRETE
- R.R. - RAILROAD
- R. - RIGHT
- S.T. - STATION
- S.T.D. - STANDARD
- S.T.L. - STEEL
- T.C. - TOP OF CURB
- T.L. - TRACK
- T.P. - TYPICAL
- V.P. - VERT. IN FIELD
- W. - WITH

CONCRETE NOTES CONTINUED:

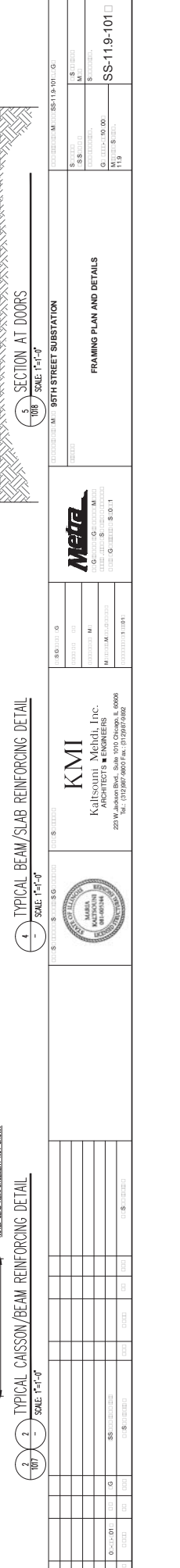
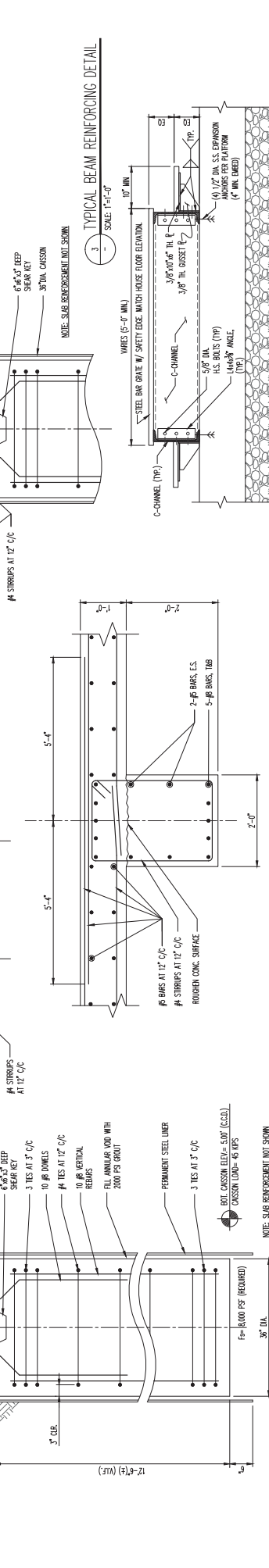
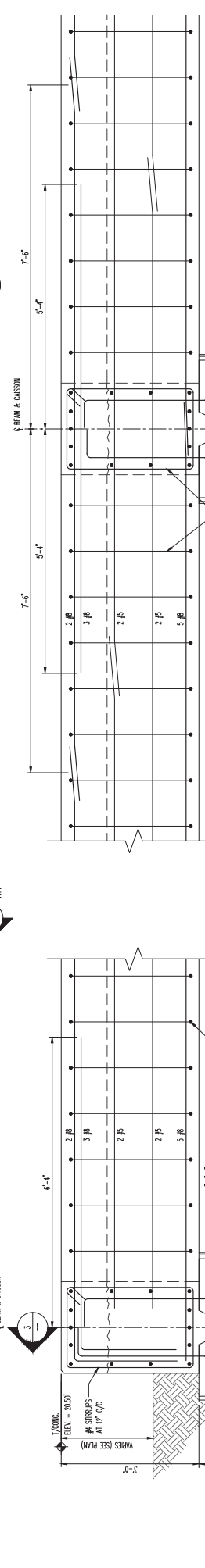
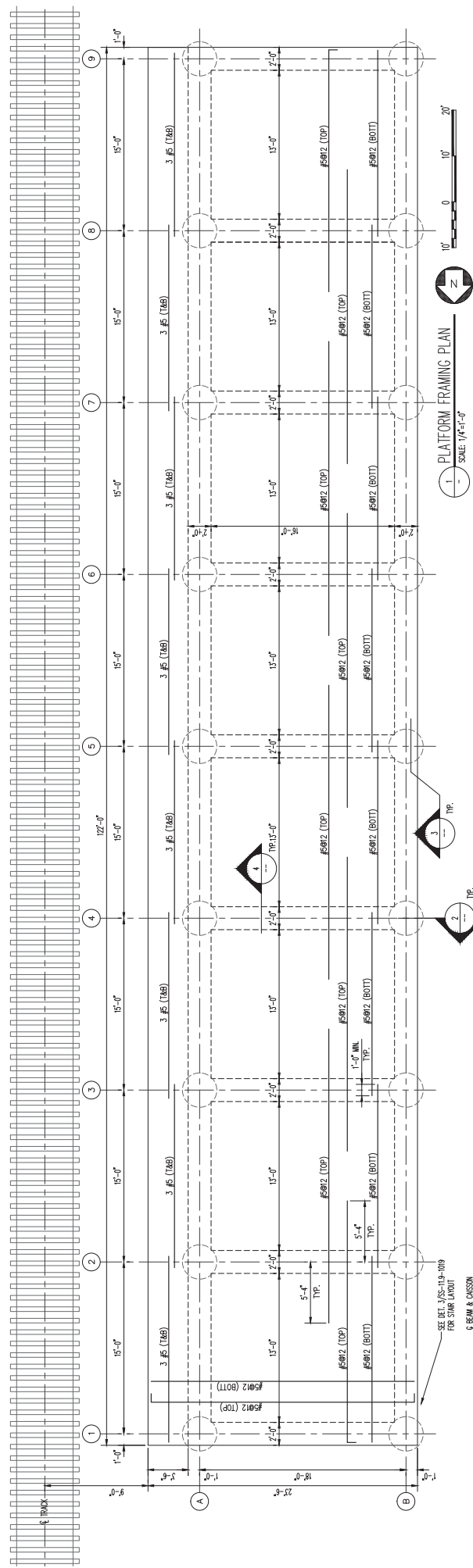
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1. NO WORK SHALL BE DONE ON CONCRETE SURFACES UNTIL THE CONCRETE HAS GAINED SUFFICIENT STRENGTH TO SUPPORT THE NEXT CONCRETE POUR.
1. PRIOR TO POURING CONCRETE, CONTRACTORS SHALL ALLOWANCE FOR AN INSPECTION OF REINFORCING STEEL (REBAR) BY THE STRUCTURAL ENGINEER. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A MINIMUM OF 48 HOUR NOTICES AS TO WHEN THE REBAR SHALL BE READY FOR INSPECTION. THIS REQUIREMENT DOES NOT APPLY FOR SLABS ON GRADE.
1. PROVIDE TO THE ARCHITECTOR OF ANY PILE, BENCH, OR OTHER SLAB FORMWORKS, OR MECHANICAL OR ELECTRICAL TRUNK SHALL PREPARE AND SUBMIT SHOP DRAWINGS OF PROPOSED SLEVE LAYOUT FOR STRUCTURAL ENGINEER'S REVIEW AND APPROVAL. NO CORING OF THE COMPLETED REINFORCED CONCRETE SHALL BE PERMITTED WITHOUT WRITTEN AUTHORIZATION OF THE ENGINEER.
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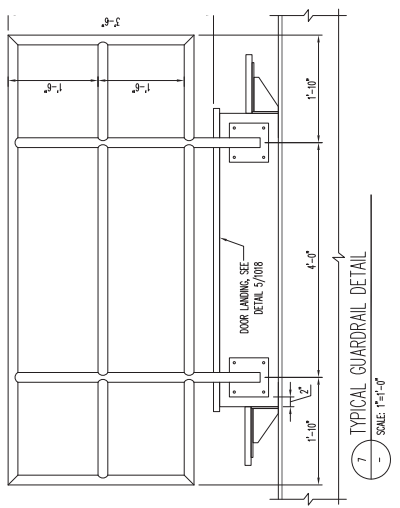
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1. NO WORK SHALL BE DONE ON CONCRETE SURFACES UNTIL THE CONCRETE HAS GAINED SUFFICIENT STRENGTH TO SUPPORT THE NEXT CONCRETE POUR.
1. PRIOR TO POURING CONCRETE, CONTRACTORS SHALL ALLOWANCE FOR AN INSPECTION OF REINFORCING STEEL (REBAR) BY THE STRUCTURAL ENGINEER. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A MINIMUM OF 48 HOUR NOTICES AS TO WHEN THE REBAR SHALL BE READY FOR INSPECTION. THIS REQUIREMENT DOES NOT APPLY FOR SLABS ON GRADE.
1. PROVIDE TO THE ARCHITECTOR OF ANY PILE, BENCH, OR OTHER SLAB FORMWORKS, OR MECHANICAL OR ELECTRICAL TRUNK SHALL PREPARE AND SUBMIT SHOP DRAWINGS OF PROPOSED SLEVE LAYOUT FOR STRUCTURAL ENGINEER'S REVIEW AND APPROVAL. NO CORING OF THE COMPLETED REINFORCED CONCRETE SHALL BE PERMITTED WITHOUT WRITTEN AUTHORIZATION OF THE ENGINEER.
1. ALL CONCRETE SURFACES EXPOSED TO WEATHERING SHALL BE SEALED AS SPECIFIED IN SPECIFICATIONS.
1. FRESHLY PLACED CONCRETE SHALL BE PROTECTED FROM PREMATURE DRYING AND EXCESSIVE HOT OR COOL TEMPERATURES, AND SHALL BE MAINTAINED WITHIN THE RANGE OF 32 TO 75 DEGREES FAHRENHEIT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER SETTING AND MAINTENANCE OF CONCRETE, OR FOR AT LEAST 7 DAYS.
1. REINFORCING BAR PRESSURE IS REQUIRED TO BE 3000 PSI, PER ACTUAL SPECIFIC GRAVE.
1. CONCRETE SLAB ON GRADE SHALL HAVE A MINIMUM OF 600 PSF LOADING CAPACITY.

CONCRETE NOTES CONTINUED:

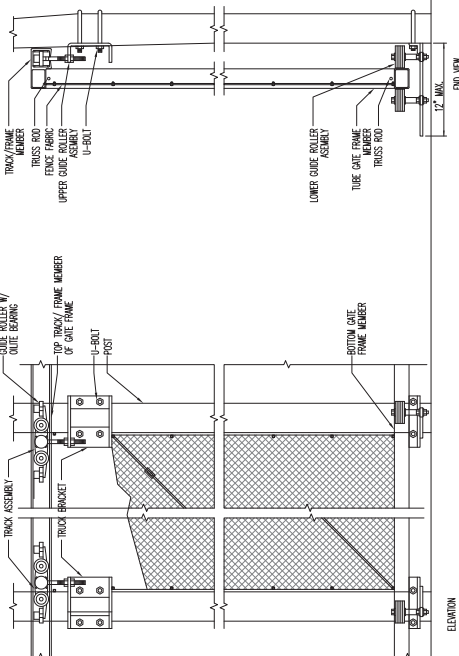
1. SIZE OF THE CONCRETE POUR SHALL NOT EXCEED 2000 S.F. FOR SLABS ON GRADE AND 90 FEET FOR WALLS UNLESS CONSTRUCTION JOBS ARE PROVIDED.
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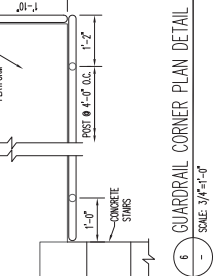
PROJECT: SS-119-101-G		DATE: 11/11/2010	
DESIGNED BY: S. HAYASHI	CHECKED BY: S. HAYASHI	DATE: 11/11/2010	DATE: 11/11/2010
Metra			
Metra Metropolitan Mass. Comm. Transp. Authority 1000 Massachusetts Ave., Suite 200, Cambridge, MA 02142 Tel: (617) 552-3000 Fax: (617) 552-3001			
PROJECT: SS-119-101-G		DATE: 11/11/2010	
DESIGNED BY: S. HAYASHI	CHECKED BY: S. HAYASHI	DATE: 11/11/2010	DATE: 11/11/2010
KMI			
Kulshrestha Mehta, Inc. ARCHITECTS & ENGINEERS 220 W. Jackson Blvd., Suite 1010 Chicago, IL 60606 Tel: (312) 267-8807 Fax: (312) 267-9282			
PROJECT: SS-119-101-G		DATE: 11/11/2010	
DESIGNED BY: S. HAYASHI	CHECKED BY: S. HAYASHI	DATE: 11/11/2010	DATE: 11/11/2010
SS-119-101-G			
FRAMING PLAN AND DETAILS			



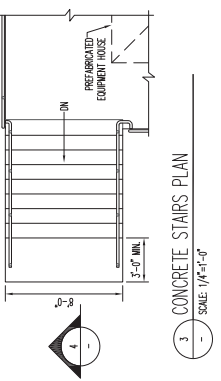
7 TYPICAL GUARDRAIL DETAIL
SCALE: 1/4"=1'-0"



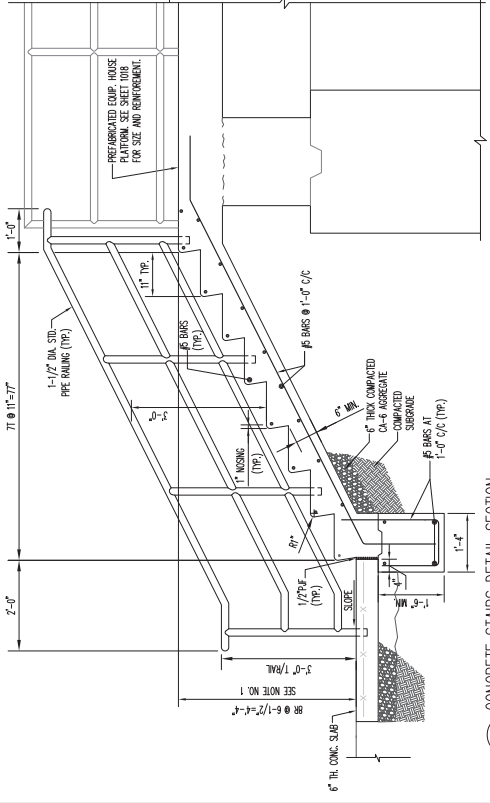
2 ROLLING GATE TRACK ASSEMBLY
SCALE: N.T.S.



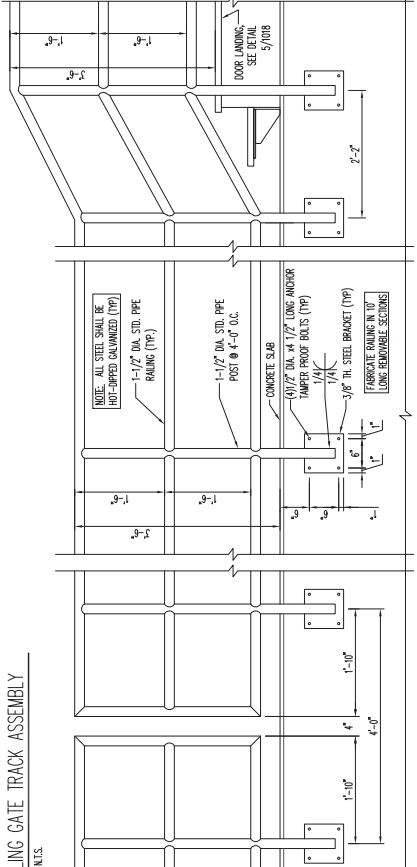
3 CONCRETE STAIRS PLAN
SCALE: 1/4"=1'-0"



6 GUARDRAIL CORNER PLAN DETAIL
SCALE: 3/4"=1'-0"



4 CONCRETE STAIRS DETAIL SECTION
SCALE: 3/4"=1'-0"



5 TYPICAL GUARDRAIL DETAIL
SCALE: 1/4"=1'-0"

- NOTES:**
- ADJUST NUMBER OF STEPS BASED ON FIELD CONDITIONS AS REQUIRED.
 - SUPE TREAS TO DRINK.
 - PROVIDE BROOM FLOOR-FINISH IN TREADS.

REV	DATE	BY	APP	DESCRIPTION
0	07-29-2017	OT	ES	ISSUED FOR BID

CONSULTANT SEAL & SIGNATURE: 

CONSULTANT: **KMI**
KMI Associates, Inc.
ARCHITECTS & ENGINEERS
229 W. Jackson Blvd., Suite 1910 Chicago, IL 60606
TEL: (312) 597-9800 FAX: (312) 597-9822

REVISIONS:

DATE	DESCRIPTION	BY	APP

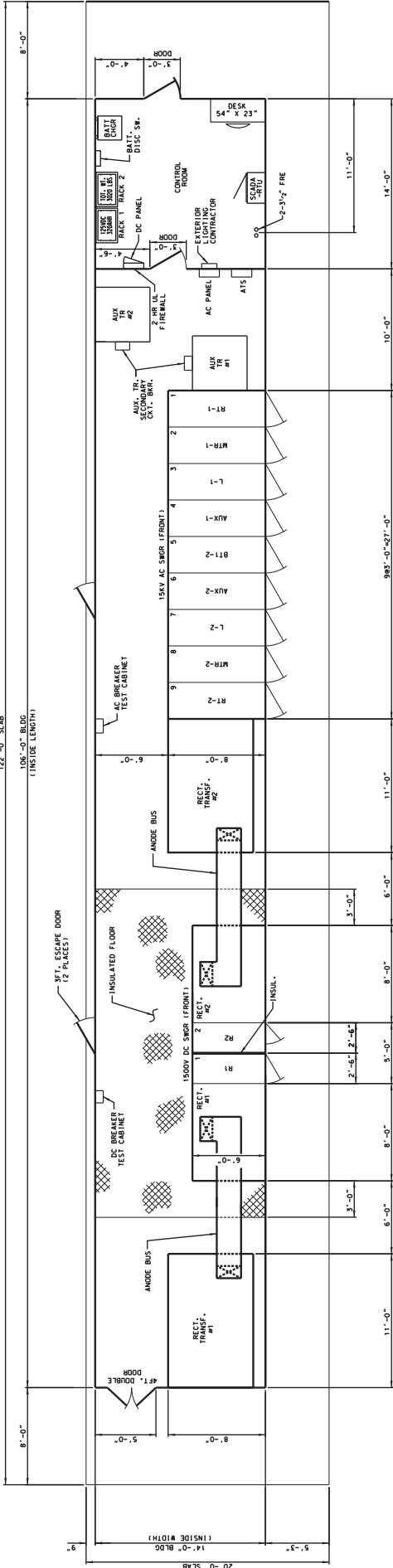
DESIGNED BY: DC
DRAWN BY: MK
CHECKED BY: MK
METRA PROJECT: GSWT
DATE: JUNE 12, 2017

LOCATION NAME: **99TH STREET SUBSTATION**

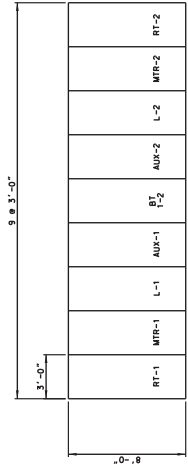
TITLE: **DETAILS**

SCALE: AS SHOWN
PROJECT NO.: GW252671/0232
SHEET NO.: 11.3
DISTRICT: SS-11.9-1019

CONTRACT NO.: 17-015
SHEET NO.: 11.3
SHEET TOTAL: 11.3



PLAN
SCALE: 1/4" = 1'-0"

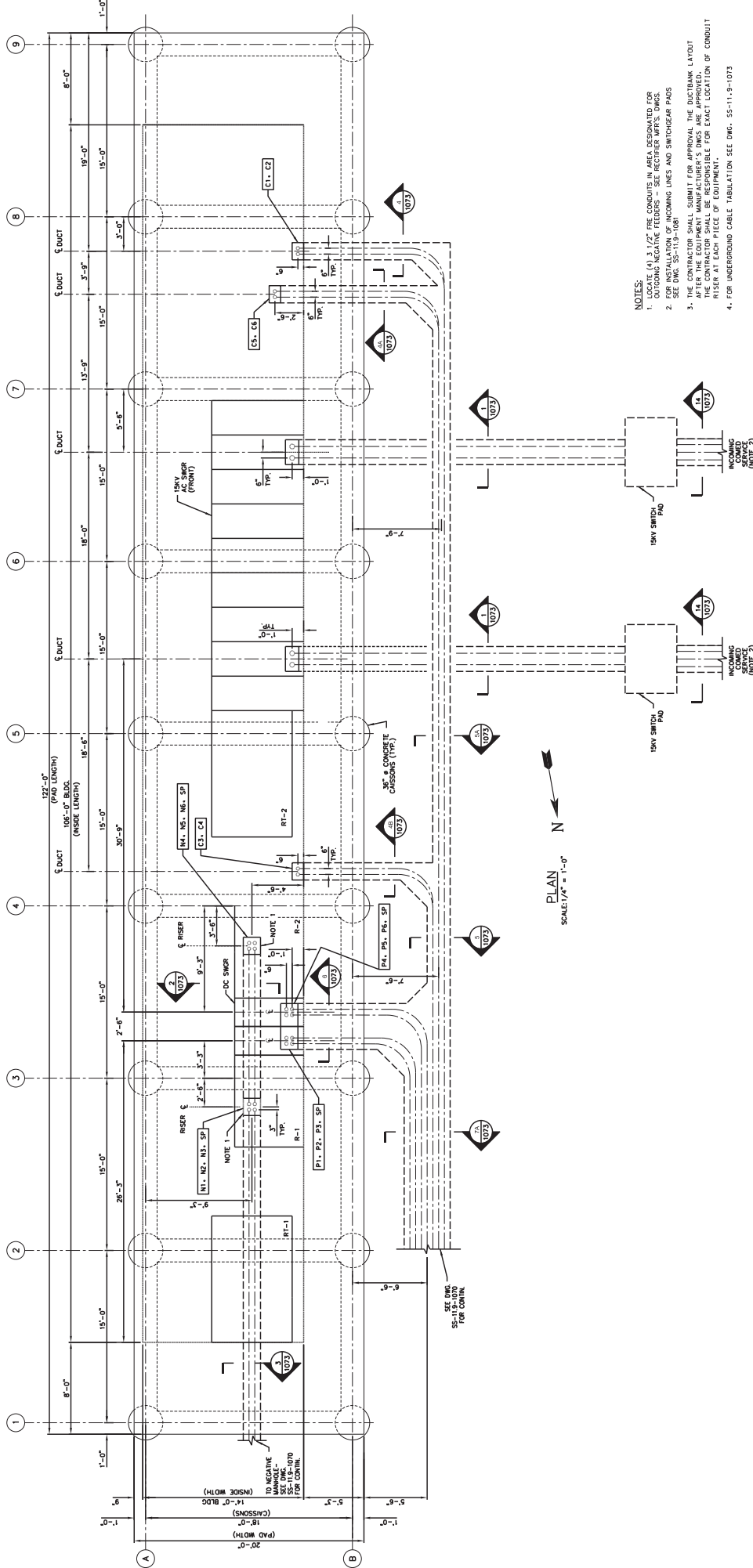


15KV AC SWITCHGEAR ELEVATION
SCALE: 1/2" = 1'-0"

- NOTES:
1. SUBSTATION BUILDING ENCLOSURE SHALL BE MAXIMUM 14 FEET HIGH.
 2. FOR UNDERGROUND DUCTBANKS SEE DWG. SS-11.9-1071.
 3. ALL PANELS SHALL BE PROVIDED WITH REMOVABLE PANELS.

LOCATION NAME: 95TH STREET SUBSTATION		CAD FILE NUMBER: SS-11.9-107000	
TITLE: SUBSTATION EQUIPMENT LAYOUT PLAN		SCALE: AS SHOWN	
DISTRICT: 27		PROJECT NO: GANZB-F107000	
SHEET NO.: SS-11.9-1050		FILE POST NO.: 119	
CONSULTANT SEAL & SIGNATURE		CONSULTANT: Gannett Fleming 201 N. Wacker Dr. Ste. 1500 Chicago IL 60606	
DESIGNED BY: JC		DRAWN BY: FM	
CHECKED BY: FM		CHECKED BY: FM	
DATE: 06/12/2017		DATE: 06/12/2017	

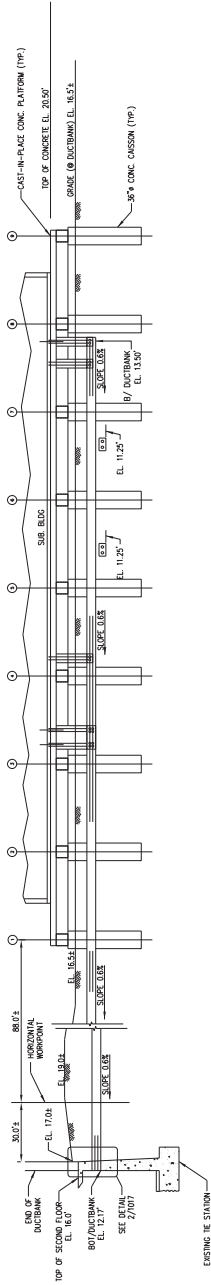
REV	DATE	BY	APP	DESCRIPTION
0	0/0/2017	HS	HS	ISSUED FOR BID



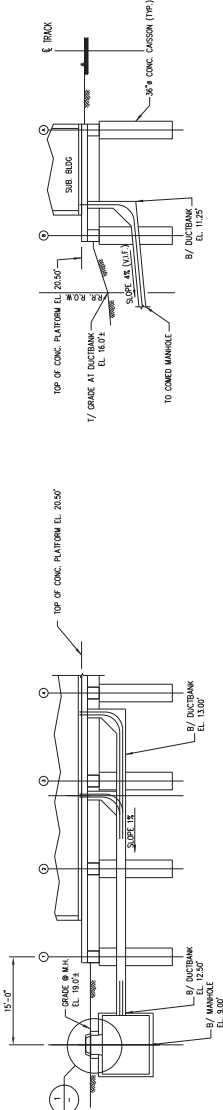
PLAN
SCALE: 1/4" = 1'-0"

REV	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION
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								DESCRIPTION

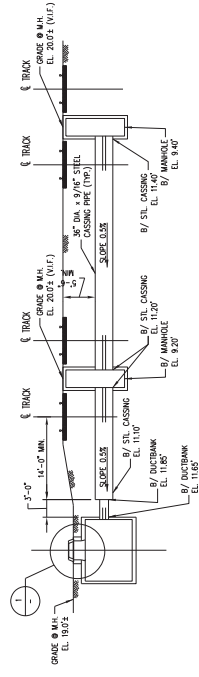
KMI Kalsomni Metals, Inc. 2034 Jackson Blvd. Ste. 400 Chicago IL 60608 TEL: (773) 969-0997 FAX: (773) 969-0992		CDP CONSULTANT C/O KMI 2034 Jackson Blvd. Ste. 400 Chicago IL 60608		Metra METRA SERVICES 571 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601		ENGINEER: JMC DRAWN: JMC CHECKED: FM METRA P&S, DESKTOP DATE: JUNE 12, 2017		LOCATION NAME: 95TH STREET SUBSTATION TITLE: DUCTBANK LAYOUT		CAD FILE NUMBER: SS-11.9-1073.DWG SCALE: 1/4" = 1'-0" PROJECT NO.: GW528-P10000 MILE POST NO.: 11.9	
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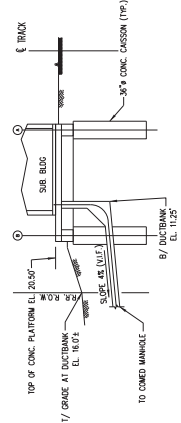
A DUCTBANK PROFILE
SCALE: 1"=10'-0"



B DUCTBANK PROFILE
SCALE: 1"=10'-0"



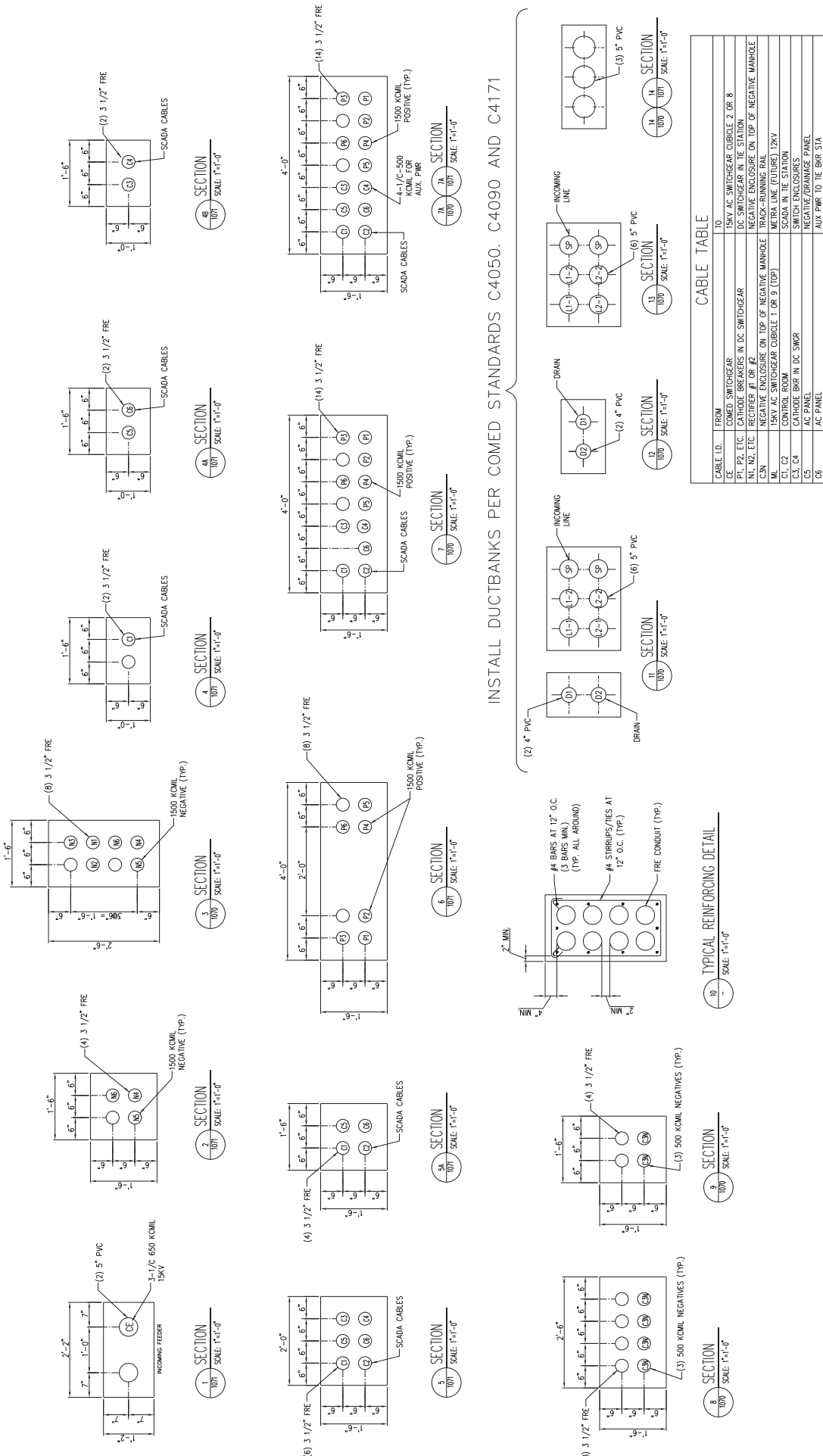
C DUCTBANK PROFILE
SCALE: 1"=10'-0"



D DETAIL
SCALE: 1"=1'-0"

- NOTES:
1. DUCTBANK LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE ADJUSTED AS REQUIRED TO FIT FIELD CONDITIONS.
 2. THE TOPS OF DUCTBANKS SHOWN ARE BASED ON EXISTING GROUND TO BOTTOM OF DUCTBANK.
 3. SEE SHEET SS-11.9-1011.

ISSUED FOR BID		DESCRIPTION	
REV	DATE	BY	APP
0	0/0/2017	HS	HS
PRINTED ON 50x115			
KMI Kalesam Mehta, Inc. 233 W. Jackson St., Suite 2000 Chicago, IL 60606 Tel: 312.567.0000 Fax: 312.567.0002		CONSULTANT SEAL & SIGNATURE	
IDP A Company of Gannett Fleming Consultants 20 N. Wacker Dr., Ste. 1500 Chicago IL 60606		CONSULTANT	
REVISIONS: HS DRAWN: JC CHECKED: FM DESIGNED: MRS DATE: JUNE 12, 2017		LOCATION NAME: 95TH STREET SUBSTATION TITLE: DUCTBANK PROFILES	
PROJECT NO. GM258-F10202		SHEET NO. SS-11.9-1072	
MILE POST NO. 11.9		DISTRICT: T-9	
CAD FILE NUMBER: SS-11.9-1072-000			

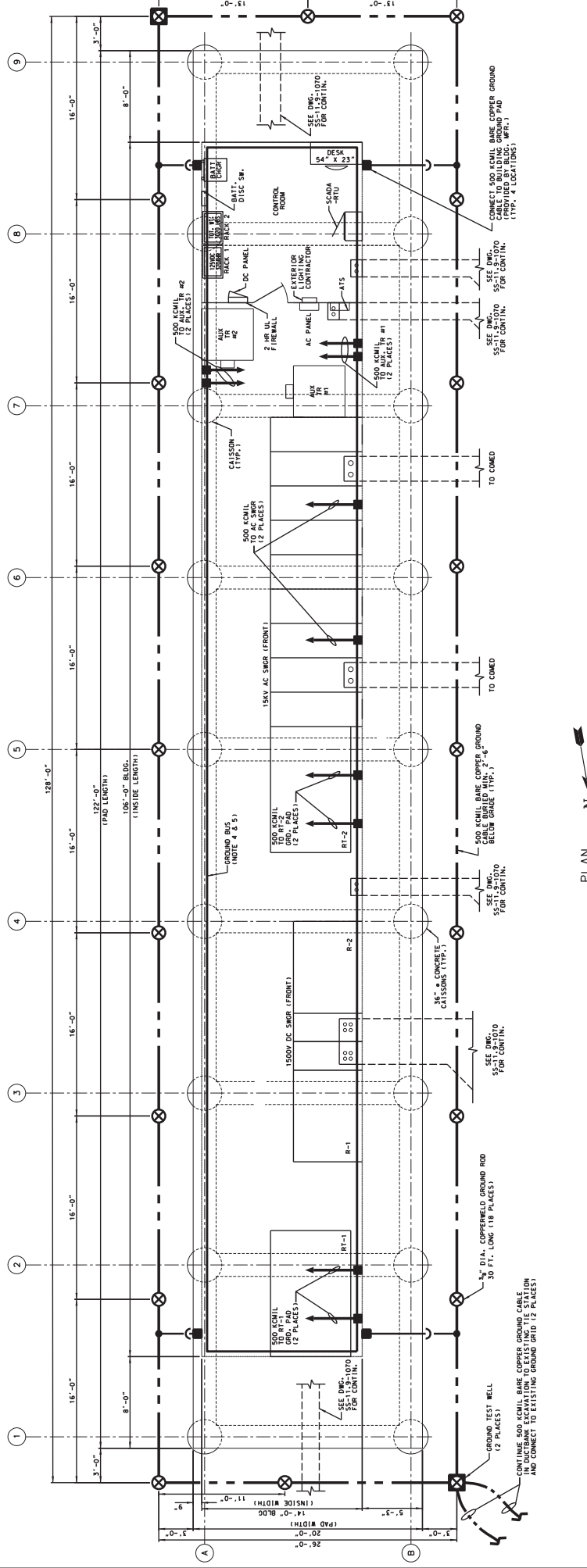


INSTALL DUCTBANKS PER COMED STANDARDS C4050, C4090 AND C4171

CABLE ID.	FROM	TO
CF	COMED SWITCHGEAR	15KV AC SWITCHGEAR CUBICLE 2 OR 8
PI, P2, E.C.	CATHODE BREAKERS IN DC SWITCHGEAR	DC SWITCHGEAR IN THE STATION
M1, M2, E.T.C.	RECTIFIER #1 OR #2	NEGATIVE ENCLOSURE ON TOP OF NEGATIVE MANHOLE TRACK-RUNNING RAIL
C.3N	NEGATIVE ENCLOSURE ON TOP OF NEGATIVE MANHOLE	METRA LINE (TUBURE) 12KV
M.L.	15KV AC SWITCHGEAR CUBICLE 1 OR 9 (TOP)	SCADA IN THE STATION
C1, C2	CONTROL ROOM	SWITCH ENCLOSURES
C3, C4	CATHODE BRK IN DC SWMR	NEGATIVE/DRAINAGE PANEL
C5	AC PANEL	AUX. PWR. TO THE BRK STA.
C6	AC PANEL	AUX. PWR. TO THE BRK STA.

NOTES:
 1. ALL DUCT BANKS INCLUDING COMED INCOMING LINES AND DRAIN SHALL BE REINFORCED.

PRINTED ON 5/8" X 11"		ISSUED FOR BID		REV. DATE		BY APP		DATE		DESCRIPTION	
KMI Kallsoum Metall, Inc. 2014 West 48th St., Suite 200 Chicago, IL 60608 TEL: (773) 946-7777 FAX: (773) 946-7778		CONSULTANT Gannett Fleming 201 N. Western Dr., Ste. 1500 Chicago, IL 60608		DESIGNED BY JC		CHECKED BY FM		DATE JUNE 12, 2017		LOCATION NAME 95TH STREET SUBSTATION TITLE	
CAD FILE NUMBER: 85-11-1073-000		PROJECT NO. 85-11-1073-000		SHEET NO. 1/3		DISTRICT GMEB-4710000		MILE POST NO.		SS-11,9-1073	



- NOTES:**
1. BARE COPPER GROUND CABLE SHALL BE BURIED MINIMUM 2'-6" BELOW GRADE.
 2. ALL GROUNDING CONNECTIONS BELOW GRADE SHALL BE MADE USING COPPER CABLES. INSULATED TEST WELLS TO BE USED. CONNECTIONS SHALL BE USED.
 3. GROUND ROD LOCATIONS SHOWN ARE APPROXIMATE. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF RODS BY FIELD SURVEY. ENTIRE BUILDING ON THE INSIDE FACE OF BUILDING WALL, AND AT FOUR LOCATIONS TO GROUND PDS OF THE BUILDING.
 4. 1/2" X 2" COPPER GROUND BUS SHALL BE INSTALLED AROUND THE ENTIRE BUILDING ON THE INSIDE FACE OF BUILDING WALL, AND AT FOUR LOCATIONS TO GROUND PDS OF THE BUILDING.
 5. ALL SUBSTATION EQUIPMENT REQUIRING GROUNDING SHALL BE CONNECTED TO SUBSTATION GROUND BUS FOR NATIONAL ELECTRICAL CODE.
 6. ALL GROUNDING RISERS ABOVE GRADE FOR CONNECTION TO THE GROUNDING SYSTEM SHALL BE BURIED IN THE RIGID STEEL CONDUIT SUPPORTED ALONG THE CAISSONS.

LEGEND:

(Symbol: Dashed line)	GROUND CABLE BURIED IN EARTH OR EMBEDDED IN CONCRETE
(Symbol: T-bar)	GROUND CABLE CONNECTION
(Symbol: Square with dot)	GROUND BOLTED CONNECTION
(Symbol: Arrow)	GROUND CABLE CHANGE OF ELEVATION
(Symbol: Circle with X)	GROUND ROD WITH COPPERWELD GROUND RODS. MIN. 30 FT. LONG TOTAL LENGTH (16 SECTIONS)
(Symbol: Square with X)	GROUND TEST WELL COPPERWELD GROUND RODS. MIN. 30 FT. LONG TOTAL LENGTH (16 SECTIONS)









































PLAN
SCALE 1/4" = 1'-0"

CONNECTOR SEAL & SIGNATURE
 CONSULTANT
 ISSUED FOR BID
 DATE
 DESCRIPTION
 REV
 BY
 APP
 DATE
 DESCRIPTION

REV	DATE	BY	APP	DESCRIPTION
0	0/20/2017	HS		

LOCATION NAME: 95TH STREET SUBSTATION		PROJECT NO.: GM26R-F10202		DISTRICT: SS-11,9-1075
TITLE: SUBSTATION GROUNDING LAYOUT		SHEET NO.: SS-11,9-1075		
DESIGNER: HS DRAWN: JC CHECKED: FM DATE: JUNE 12, 2017			WILE POST NO.: 118	
CONSULTANT: 		CONTRACTOR: 		

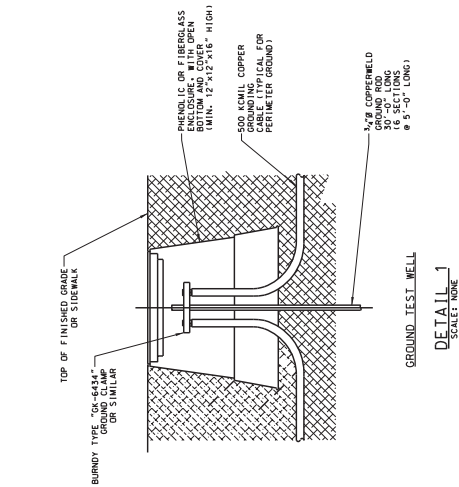
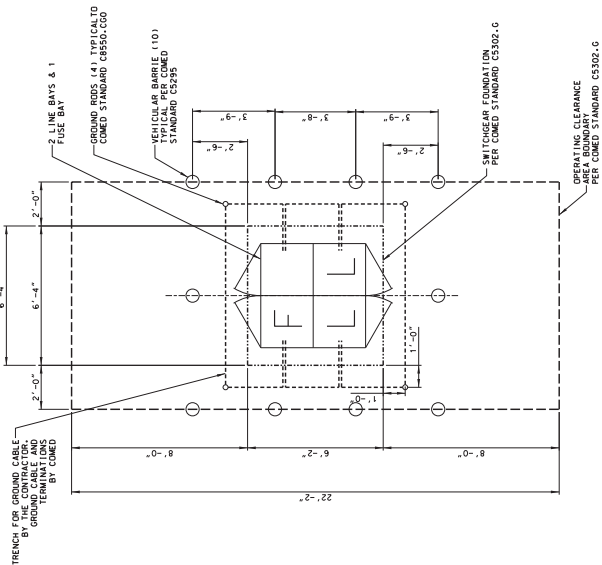
PRINTED ON SOFTIES

SYMBOLS		GROUNDING NOTES		GENERAL NOTES	
<p>GENERAL</p>  POWER TRANSFORMER  POTENTIAL TRANSFORMER  CURRENT TRANSFORMER  AIR CIRCUIT BREAKER  DRAWOUT TYPE  FUSE  RESISTOR  SHUNT  STATION CLASS ARRESTOR  DISTRIBUTION CLASS ARRESTOR  CAPACITOR FIXED  BATTERY  RECTIFIER  DISCONNECT SWITCH  AUTOMATIC TRANSFER SWITCH	<p>GENERAL CONT'D</p>  MAGNETIC OVERLOAD DEVICE  THERMAL OVERLOAD DEVICE  ELECTRICAL EQUIPMENT, SUCH AS CONTROL PANELS, PULLBOXES, ETC.  JUNCTION BOX, ALSO IDENTIFIED AS J-BOX OR JCT. BOX  POWER OUTLET  CONDUIT BURIED IN CONCRETE OR BURIED IN EARTH.  CONDUIT EXPOSED  CONDUIT TURNING UP OR TOWARD OBSERVER  CONDUIT TURNING DOWN OR AWAY FROM OBSERVER  FLEXIBLE ELECTRICAL CONDUIT <p>METERING/INDICATING DEVICES</p>  AMMETER  VOLTMETER  AMMETER SWITCH  VOLTMETER SWITCH  INDICATING LIGHT <p>ALL-AMBER RIL-BLUE ALL-GREEN RIL-RED ALL-WHITE</p>	<p>GROUNDING</p>  GROUND CABLE BURIED IN EARTH OR EMBEDDED IN CONCRETE  GROUND CABLE CONNECTION  GROUND BOLTED CONNECTION  GROUND CABLE CHANGE OF ELEVATION  GROUND ROD  GROUND ROD CONNECTIONS FOR GRADE SHALL BE COVERED PIPE & SHALL BE MADE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. ALL CABLE CONNECTIONS SHALL BE INSPECTED BEFORE BACKFILLING. IF PUFFY WELDS ARE FOUND, THEY SHALL BE CUT OUT AND THE CONNECTIONS REMADE.  ALL GROUNDING CABLE CONNECTIONS TO EQUIPMENT ABOVE GRADE SHALL BE MADE WITH 1/2" SILICON BRONZE BOLTS, NUTS AND WASHERS. ALL CONNECTIONS SHALL BE MADE ELECTRICALLY CLEAN. SILVER-PLATE ALL BAR AND LUG CONNECTIONS.  BAR TO BAR AND LUG TO BAR BOLTED CONNECTIONS SHALL BE MADE WITH 1/2" SILICON BRONZE BOLTS, NUTS AND WASHERS. ALL CONNECTIONS SHALL BE MADE ELECTRICALLY CLEAN. SILVER-PLATE ALL BAR AND LUG CONNECTIONS.  ALL METAL CONDUITS, EQUIPMENT AND JUNCTION BOXES SHALL BE GROUNDED WITH FLEXIBLE ELECTRICAL CONDUIT.  AFTER THE ENTIRE GROUNDING SYSTEM HAS BEEN INSTALLED, INSULATING RODS, THE SYSTEM SHALL BE TESTED TO MEET SPECIFICATION REQUIREMENTS.	<p>GROUNDING NOTES</p> <p>1. GROUND CABLE RUNS ARE SHOWN DIAGONALLY. EXACT RUNS SHALL BE DETERMINED IN FIELD TO SUIT CONDITIONS.</p> <p>2. ALL UNDERGROUND CABLE SHALL BE 300CMIL BARE COPPER, UNLESS NOTED OTHERWISE.</p> <p>3. ALL UNDERGROUND CABLE SHALL BE RUN MINIMUM 2'-6" BELOW GRADE AND SHALL BE INSTALLED WITH SUFFICIENT SLACK TO PREVENT DAMAGE DUE TO GROUND FAULTS AND/OR EARTH SETTLEMENT.</p> <p>4. AT POINTS OF CROSSING, UNDERGROUND CABLE SHALL BE RUN ABOVE FOUNDATION FOOTINGS, EXISTING DUCTBANKS, SEWER LINES AND OTHER BURIED UTILITIES.</p> <p>5. GROUND BELLS AND RIGS SHALL BE INSTALLED AT APPROXIMATE POINTS OF CROSSING AND SHALL BE INSTALLED USING DRIVING STUD FITTINGS TO AVOID IMPACT.</p> <p>6. ALL SURFACES TO BE COVERED SHALL BE THOROUGHLY CLEANED TO BARE METAL BEFORE MAKING CONNECTIONS.</p> <p>7. ALL GROUNDING CONNECTIONS FOR GRADE SHALL BE COVERED PIPE & SHALL BE MADE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. ALL CABLE CONNECTIONS SHALL BE INSPECTED BEFORE BACKFILLING. IF PUFFY WELDS ARE FOUND, THEY SHALL BE CUT OUT AND THE CONNECTIONS REMADE.</p> <p>8. ALL GROUNDING CABLE CONNECTIONS TO EQUIPMENT ABOVE GRADE SHALL BE MADE WITH 1/2" SILICON BRONZE BOLTS, NUTS AND WASHERS. ALL CONNECTIONS SHALL BE MADE ELECTRICALLY CLEAN. SILVER-PLATE ALL BAR AND LUG CONNECTIONS.</p> <p>9. BAR TO BAR AND LUG TO BAR BOLTED CONNECTIONS SHALL BE MADE WITH 1/2" SILICON BRONZE BOLTS, NUTS AND WASHERS. ALL CONNECTIONS SHALL BE MADE ELECTRICALLY CLEAN. SILVER-PLATE ALL BAR AND LUG CONNECTIONS.</p> <p>10. ALL METAL CONDUITS, EQUIPMENT AND JUNCTION BOXES SHALL BE GROUNDED WITH FLEXIBLE ELECTRICAL CONDUIT.</p> <p>11. AFTER THE ENTIRE GROUNDING SYSTEM HAS BEEN INSTALLED, INSULATING RODS, THE SYSTEM SHALL BE TESTED TO MEET SPECIFICATION REQUIREMENTS.</p>	<p>GENERAL NOTES</p> <p>1. ALL DIMENSIONS OF EXISTING STRUCTURES SHOWN ON THE DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY DIMENSIONS BEFORE PROCEEDING WITH THE INSTALLATIONS.</p> <p>2. CONDUIT USED SHALL BE AS FOLLOWS: A. EXPOSED CONDUIT INSIDE SUBSTATION BUILDING SHALL BE 1/2" INTERMEDIATE METAL RIGID CONDUIT. B. OUTDOOR CONDUIT FOR GENERAL USE SHALL BE HOT-DIP GALVANIZED RIGID STEEL. C. CONDUIT FOR TRACTION POWER POSITIVE AND NEGATIVE FEEDERS, WHETHER EXPOSED OR CONCRETE ENCASED, SHALL BE FIBERGLASS REINFORCED EPoxy AS SHOWN ON PLANS. D. CONCRETE ENCASED CONDUIT FOR HANGING 12KV COMED FEEDERS SHALL BE FIBERGLASS REINFORCED EPoxy. E. WHEN CONDUITS OF VARIOUS SERVICES ARE ENCASED IN COMMON CONCRETE DUCTBANK, THE CONDUIT TYPE IS SPECIFIED ON PLANS. F. DIRECT BURIED UNDERGROUND CONDUIT SHALL BE HEAVY WALL PVC, TYPE 50-100, MANUFACTURED PER IAH-9 AND 9-1. G. CONDUIT SHALL BE 12" INTERVALS. H. MAXIMUM INTERVAL (NOT TO EXCEED TO -17'). I. RADIUS OF BOWTHROUSE TO THE INSIDE EDGE OF FIELD BARS SHALL BE A MINIMUM OF EIGHT TIMES THE TRADE SIZE OF CONDUIT, UNLESS NOTED OTHERWISE.</p> <p>3. EXPOSED CONDUIT SHALL, IN GENERAL, BE RUN PARALLEL TO OR AT RIGHT ANGLES TO WALLS AND STRUCTURAL MEMBERS.</p> <p>4. CONDUITS INSTALLED PARALLEL TO HOT SURFACES SHALL BE RUN A MINIMUM OF 12 INCHES AWAY FROM SUCH SURFACES.</p> <p>5. AT EQUIPMENT ENCLOSURES, CONDUIT SHALL BE TERMINATED WITH 2-LUG NUTS AND BUSHINGS OR INSULATED GROUNDING BUSHING INDOORS AND CASSETED INSULATED BUSHINGS OUTDOORS, EXCEPT WHERE ENCLOSURES ARE FURNISHED WITH INTEGRAL THREADED NUTS.</p> <p>6. CONDUIT TERMINATIONS AT METERS, ELECTRICAL INSTRUMENTS AND WHERE SPECIFIED SHALL BE LIQUIDTITE (SEALITTE TYPE "DA" OR TQAL) AND SHALL BE INSTALLED WITH LIQUIDTITE CONNECTORS, WITH A MAXIMUM LENGTH OF TWO FEET. METAL FEEDERS, UNLESS OTHERWISE NOTED, AND SHALL BE LOCATED CLEAR OF INTERFERENCES FOR RIPOUT ACCESS.</p> <p>7. CONDUIT TERMINATIONS SHALL BE 2 FEET BY THE CONTRACTOR WHEN TOTAL LENGTH OF CONDUIT BARS EXCEED 210'. CONTRACTOR SHALL ADD AND LOCATE PULL BOX AS NEEDED.</p> <p>8. WHEREVER THE TERMS "DRAWING" OR "SHEET" ARE USED FOR REFERENCE ON A DRAWING, THE TWO TERMS SHOULD BE CONSIDERED SYNONYMOUS.</p>	

PRINTED ON 80#115

REV	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION
0	0/26/2017	HS	HS	ISSUED FOR BID				
				DESCRIPTION				

ISSUERS: I&S	DRAWN: JC	CHECKED: FM	DATE: JUNE 12, 2017
Metra Metra Electric Corporation 547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60661	CONSULTANT: IDP A Company of Gannett Fleming Consultants 20 N. Wacker Dr. Ste. 1500 Chicago IL 60606	LOCATION NAME: 95TH STREET SUBSTATION TITLE: ELECTRICAL NOTES & SYMBOLS	CD FILE NUMBER: 05-15-1816000 DEST. NO.: G0528-FR10300 SHEET NO.: SS-11.9-1080 FILE POST NO.: T/S

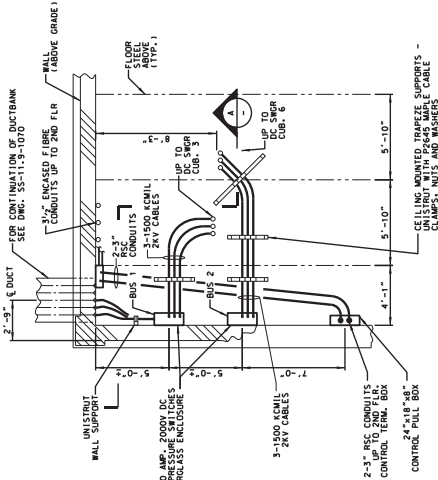


PADMOUNT SWITCHGEAR FOUNDATION
SCALE: NONE

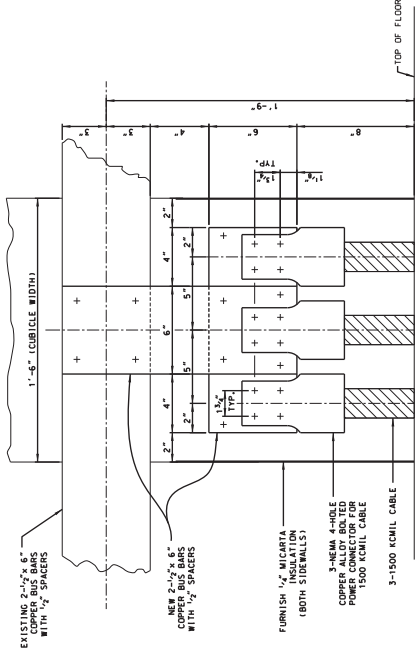
NOTES FOR INSTALLATION OF INCOMING LINE AND DRAIN

1. VERIFY EXACT LOCATION OF COMED INCOMING LINES AND DRAIN DUCTS.
2. INTERCEPT COMED DRAIN DUCT AT LOCATION MARK (A). INSTALL 12\"/>
- 3. MAKE TERMINATIONS COMED PROVIDED 1/2\"/>
- 4. INTERCEPT COMED INCOMING LINE-1 DUCT AT LOCATION MARK (B). INSTALL 1.31\"/>
- 5. INTERCEPT COMED INCOMING LINE-2 DUCT AT LOCATION MARK (C). INSTALL 1.31\"/>
- 6. INSTALL 2\"/>
- 7. INCOMING LINE CABLES FROM COMED MANHOLES TO COMED SWITCHGEAR 1 AND 2 WILL BE INSTALLED BY COMED.
- 8. ALL TERMINATIONS AT COMED EQUIPMENT WILL BE BY COMED.

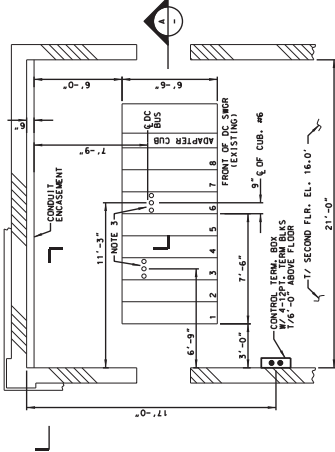
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">REV</td> <td style="width: 10%;">DATE</td> <td style="width: 10%;">BY</td> <td style="width: 10%;">APP</td> <td style="width: 10%;">REV</td> <td style="width: 10%;">DATE</td> <td style="width: 10%;">BY</td> <td style="width: 10%;">APP</td> <td style="width: 10%;">DESCRIPTION</td> </tr> <tr> <td>0</td> <td>12-16-2017</td> <td>HS</td> <td>HS</td> <td></td> <td></td> <td></td> <td></td> <td>ISSUED FOR BID</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>DESCRIPTION</td> </tr> </table>	REV	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION	0	12-16-2017	HS	HS					ISSUED FOR BID									DESCRIPTION	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;"> Metra METRA ELECTRIC SERVICE 571 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60691 </td> <td style="width: 50%; text-align: center;"> CONSULTANT EDP CONSULTANTS 201 N. Wacker Dr. Ste. 1600 Chicago IL 60606 </td> </tr> <tr> <td style="width: 50%; text-align: center;"> DESIGNER: JIC DRAWN: JIC CHECKED: FM METRA PAUL GORANT DATE: JUNE 12, 2017 </td> <td style="width: 50%; text-align: center;"> CONSULTANT SEAL & SIGNATURE </td> </tr> </table>	Metra METRA ELECTRIC SERVICE 571 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60691	CONSULTANT EDP CONSULTANTS 201 N. Wacker Dr. Ste. 1600 Chicago IL 60606	DESIGNER: JIC DRAWN: JIC CHECKED: FM METRA PAUL GORANT DATE: JUNE 12, 2017	CONSULTANT SEAL & SIGNATURE 	LOCATION NAME: 95TH STREET SUBSTATION	CAD FILE NUMBER: SS-11,9-1081.DGN
REV	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION																										
0	12-16-2017	HS	HS					ISSUED FOR BID																										
								DESCRIPTION																										
Metra METRA ELECTRIC SERVICE 571 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60691	CONSULTANT EDP CONSULTANTS 201 N. Wacker Dr. Ste. 1600 Chicago IL 60606																																	
DESIGNER: JIC DRAWN: JIC CHECKED: FM METRA PAUL GORANT DATE: JUNE 12, 2017	CONSULTANT SEAL & SIGNATURE 																																	
TITLE: ELECTRICAL DETAILS		DISTRICT: SHEET NO.: SS-11,9-1081	SCALE: PROJECT NO.: GW262471002 FILE POST NO.: T/P																															



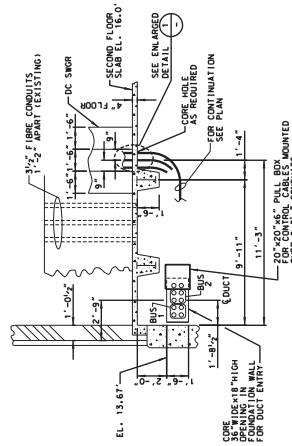
FIRST FLOOR PLAN
SCALE 1/4" = 1'-0"



DC SWITCHGEAR HIGH VOLTAGE
OVER-COMPARTMENT
ELEVATION (CUB. 3 & 6).



SECOND FLOOR PLAN
SCALE 1/4" = 1'-0"



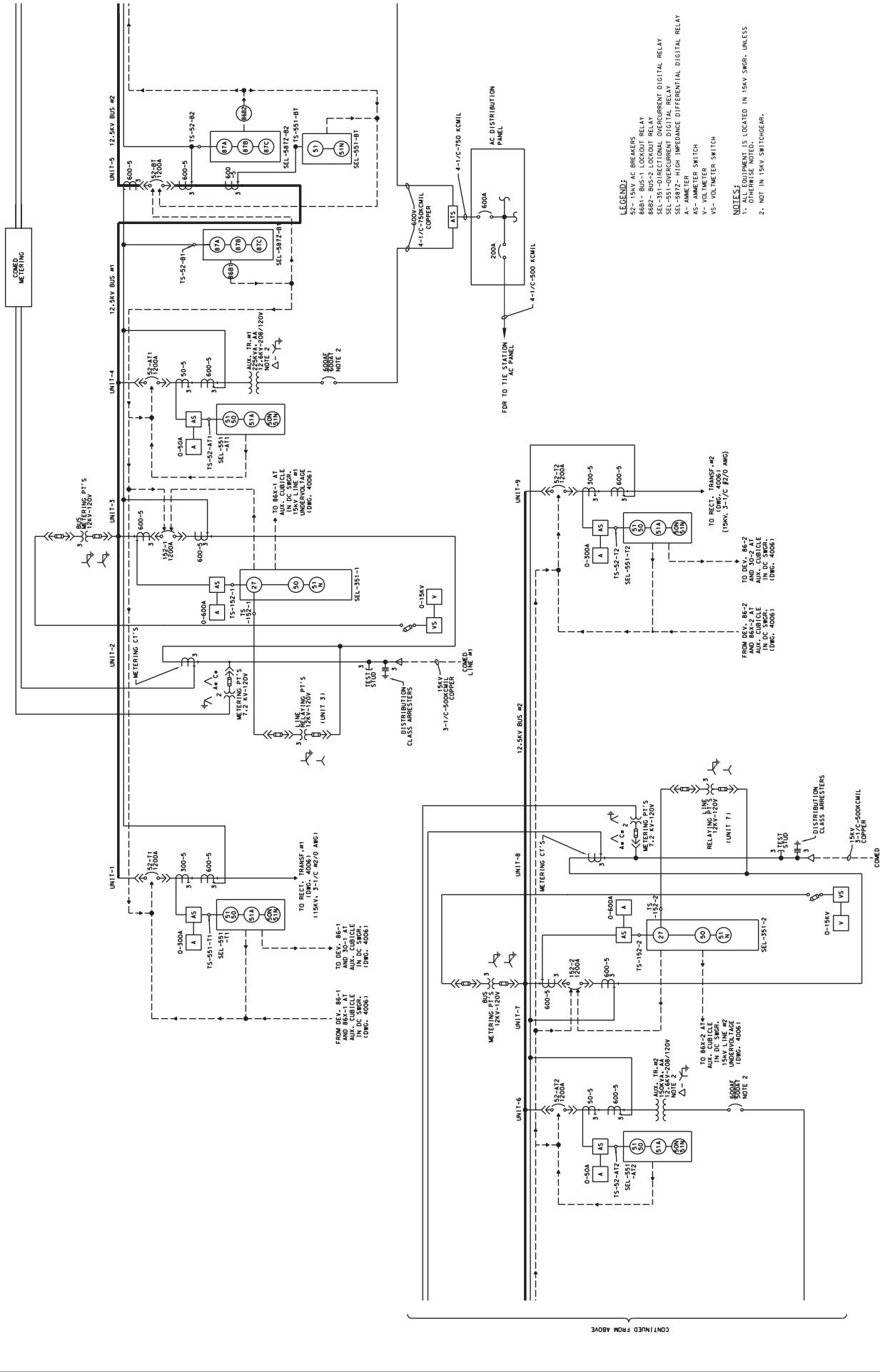
SECTION
SCALE 1/4" = 1'-0"

- NOTES:**
1. TERMINATOR SHALL BE BUS VERIFY ALL RELIABLE INSTALLATIONS AND MAKE NECESSARY ADJUSTMENTS.
 2. ALL EQUIPMENT SHOWN IS NEW, UNLESS IDENTIFIED AS EXISTING.
 3. REFER TO 3-D ELEVATION OF BUS PER DETAIL 1 ON THIS DRAWING. TERMINATE 3-1/2\"/>
 - 4. REFERENCES TO BUS 1 AND BUS 2 (AT SWITCHES AND WITHIN DUCTBANK) ARE FOR FUTURE CONFIGURATION.

REV.	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION
0	0/09/2017	HS						ISSUED FOR BID

	Gannett Fleming A Corporation of IDP 201 N. Wacker Dr. Ste. 1500 Chicago IL 60606 CONTRACT NO. 16-0177 CONSULTANT SEAL & SIGNATURE	Metra Metra Engineering 547 N. JACKSON BOULEVARD CHICAGO, ILLINOIS 60651 DRAWN: JC CHECKED: FM METRA P&IS DEPT. DATE: JUNE 12, 2017	LOCATION NAME: 95TH STREET SUBSTATION TITLE: TIE STATION INCOMING FEEDER & CONTROL CABLES PLAN & SECTIONS	CAD FILE NUMBER: 95-11-SUBSECTION DISTRICT: PROJECT NO.: GW368-RPT0302 SHEET NO.: SS-11.9-1085 WILE POST NO.: /
--	--	---	--	--

PRINTED ON SOLITE



LEGEND:
 8881- AC BREAKER
 8882- BUS-2 LOCKOUT RELAY
 SEL-551-DIRECTIONAL OVERCURRENT DIGITAL RELAY
 SEL-551-OVERCURRENT DIGITAL RELAY
 SEL-551-IMPEDANCE DIFFERENTIAL DIGITAL RELAY
 A- AMMETER
 AS- AMMETER SWITCH
 V- VOLTMETER
 VS- VOLTMETER SWITCH

NOTES:
 1. ALL EQUIPMENT IS LOCATED IN 15KV SWGR, UNLESS OTHERWISE NOTED.
 2. NOT IN 15KV SWITCHGEAR.

CONNECTION NAME: 95TH STREET SUBSTATION
 TITLE: 12.5KV AC SINGLE LINE DIAGRAM

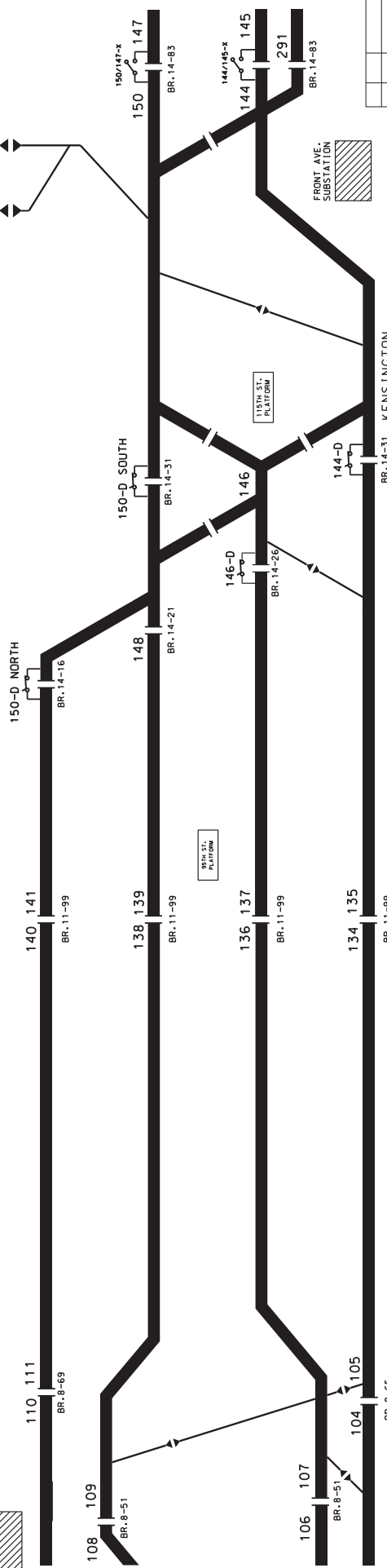
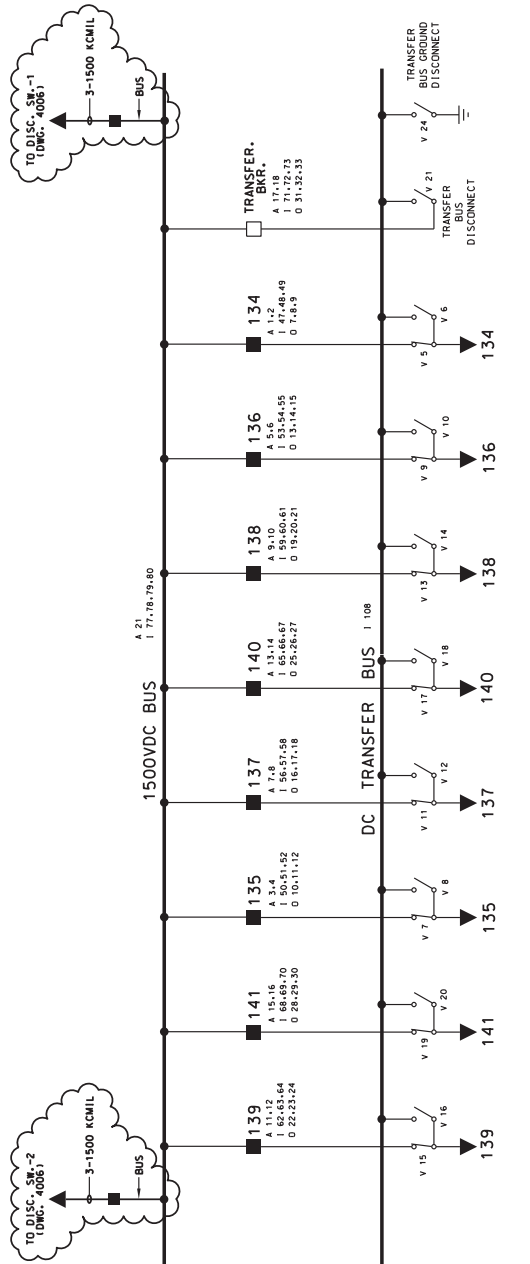
REVISIONS:
 DRAWN: JC
 CHECKED: FM
 METR P.J.S. DESANT
 DATE: JUNE 12, 2017

CONSULTANT SEAL & SIGNATURE:
 I.D.P. CONSULTANTS
 A COMPANY OF
 Gannett Fleming
 201 N. Wacker Dr. Ste. 1500 Chicago IL 60606

REV	DATE	BY	APP	DESCRIPTION
0	0/26/2017	HS	HS	ISSUED FOR BID

95th STREET TIE STATION FEEDER STRUCTURE 11-99

CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT



BY LDP

REV	DATE	DESCRIPTION	ISSUED FOR	BY
1	07/20/11	ISSUED FOR BID	HS	
1	1/00	ISSUED FOR SCADA AS-BUILT	WPS	

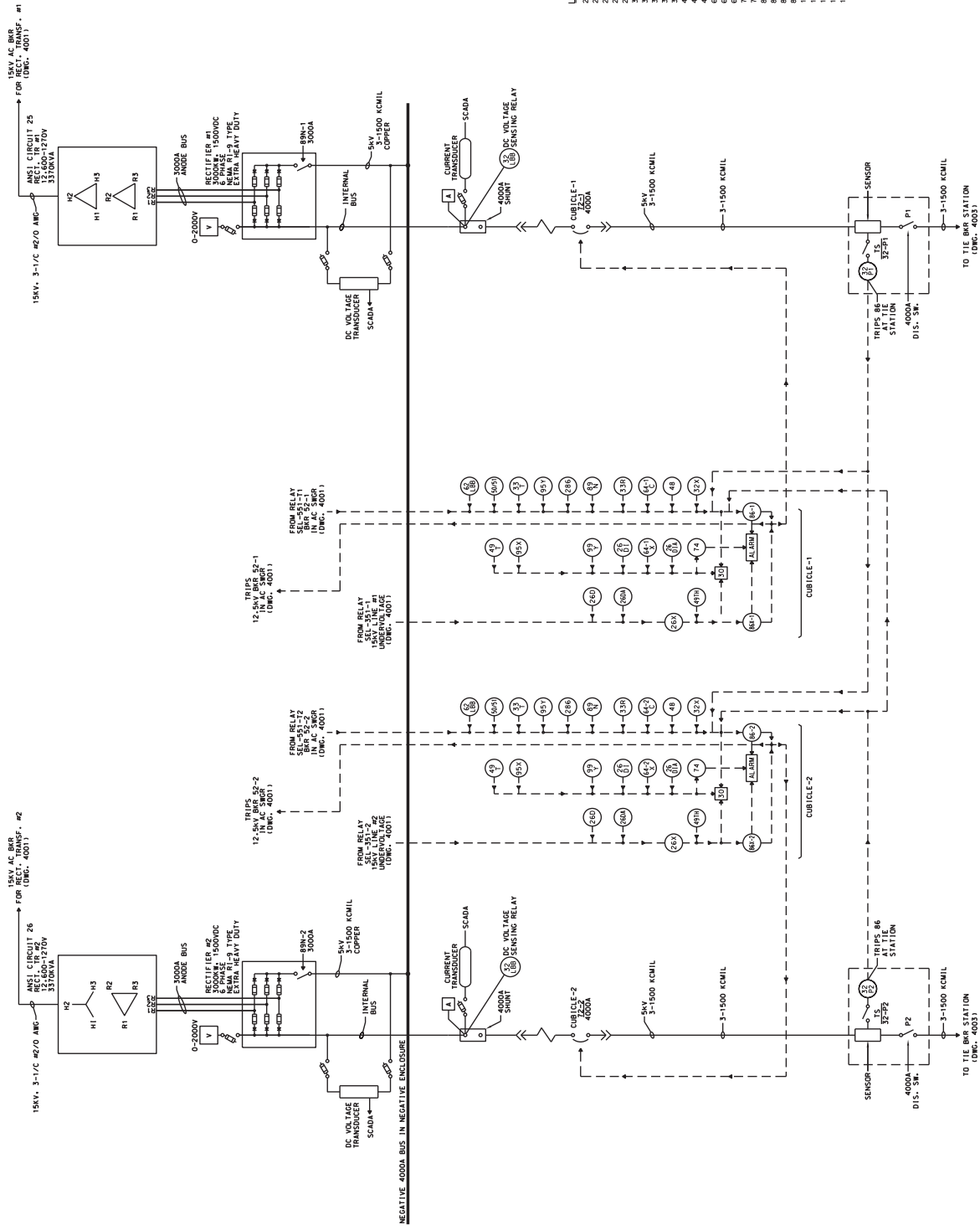
METRA ENGINEERING DEPARTMENT
CONSTRUCTION DIVISION

TRACTION POWER ONE LINE DIAGRAM

95th STREET TIE STATION

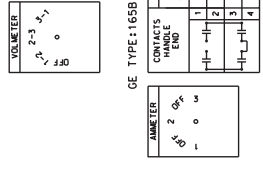
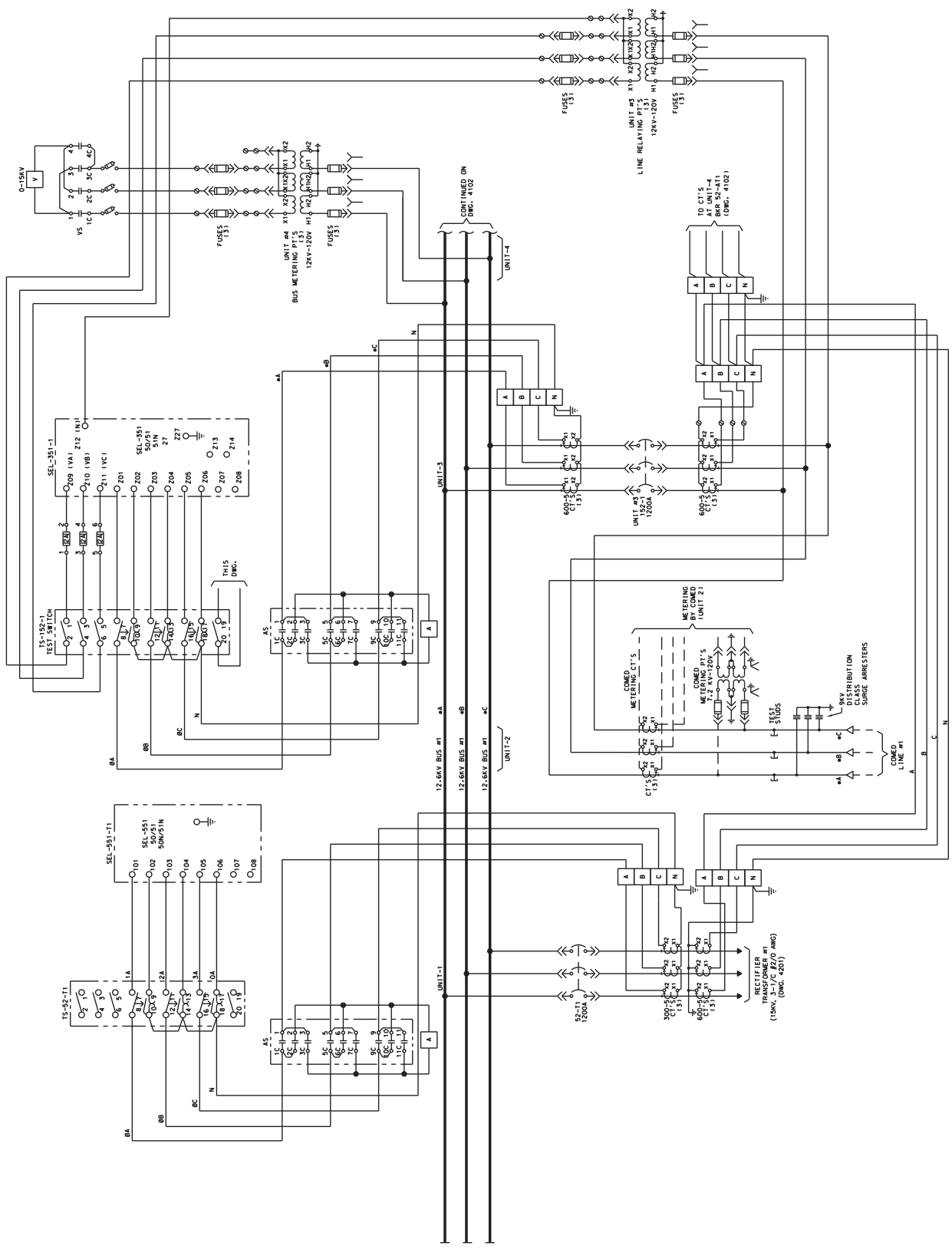
DATE PLOTTED: 10/2/95
FILE: E:\CAL\95TH\4003-1.dwg

WDS WDS RAS WPS
METRA ELECT. SS-11.9-4003



LEGEND:
 260- RECT. POS. OVERTEMP-SECOND STEP
 260A- RECT. NEG. OVERTEMP - SECOND STEP
 261- RECT. POS. OVERTEMP-FIRST STEP
 261A- RECT. NEG. OVERTEMP-FIRST STEP
 262- AUXILIARY TO 260 AND 260A
 30- RECTIFIER ANNUNCIATOR
 31- RECTIFIER ANNUNCIATOR
 32- DC VOLTAGE SENSING RELAY FOR DEV-32 CKT
 33- RECT. COMPT. DOOR POSITION SWITCH
 33T- RECT. TR. DOOR POSITION SWITCH
 491- TRANS. WINDING OVERTEMP-FIRST STEP
 491T- TRANS. WINDING OVERTEMP-SECOND STEP
 62LBB- BREAKER BACK-UP TIMING RELAY
 62- RECT. POS. OVERTEMP-STRUCTURE
 64- RECT. NEG. OVERTEMP-STRUCTURE
 64X- RECT. REL-HOT STRUCTURE
 72- CATHODE BREAKER
 74- DOUBLE ALARM RELAY FOR STRUCTURE HOT
 86- HAND RESET LOCKOUT RELAY
 86A- CONDITIONAL LOCKOUT RELAY
 89N- RECT. POS. NEG. DISC. 3P
 89- RECT. POS. NEG. DISC. 3P
 150RR- RATE OF RISE DIGITAL RELAY
 164M- DC SWGR GRD RELAY-GROUNDED STRUCTURE
 164X- DC SWGR GRD RELAY-HOT STRUCTURE
 164N- DC SWGR RELAY TO DEVICES 164

PROJECT NO.: GANZ-15-01002 SHEET NO.: SS-11,9-4006 FILE POST NO.: T/S		COD FILE NUMBER: 95-11-14-0000	
DESTRICT: TRANSFERS, RECTIFIERS & DC SWGR SINGLE LINE DIAGRAM		LOCATION NAME: 95TH STREET SUBSTATION TITLE:	
Meta 54 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601		DRAWN: JC CHECKED: FM METE P. J. S. DESANT 20 N. WILSON DR. SRA. 1500 CHICAGO IL 60608 DATE: JUNE 12, 2017	
Gannett Fleming A Company of IGP		CONSULTANT SEAL & SIGNATURE 	
ISSUED FOR BID DATE BY APP		DESCRIPTION	



GE TYPE: 166B1CF15

CONTACTS AND POSITIONS

CONTACTS	POSITIONS
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27
28	28
29	29
30	30

LEGEND:
 S2 OR 152V OVERCURRENT DIGITAL RELAY
 SEL-351-1 OVERCURRENT DIGITAL RELAY
 AS-351-1 AMMETER SWITCH
 VS-VOLTMETER SWITCH
 V-VOLTMETER

NOTES:
 1. ALL EQUIPMENT IS LOCATED IN 15KV SWGR. UNLESS OTHERWISE NOTED.
 2. TERMINAL BLOCKS ARE TO BE SURTING TERMINAL BLOCK PRIOR TO CONNECTING TO A DEVICE.

CONSULTANT SEAL & SIGNATURE

CONSULTANT: Gannett Fleming
 20 N. Wacker Dr., Ste. 1500 Chicago IL 60606

ISSUED FOR BID

PROJECT NO.: GAN2015-01002
SHEET NO.: SS-11,9-4101

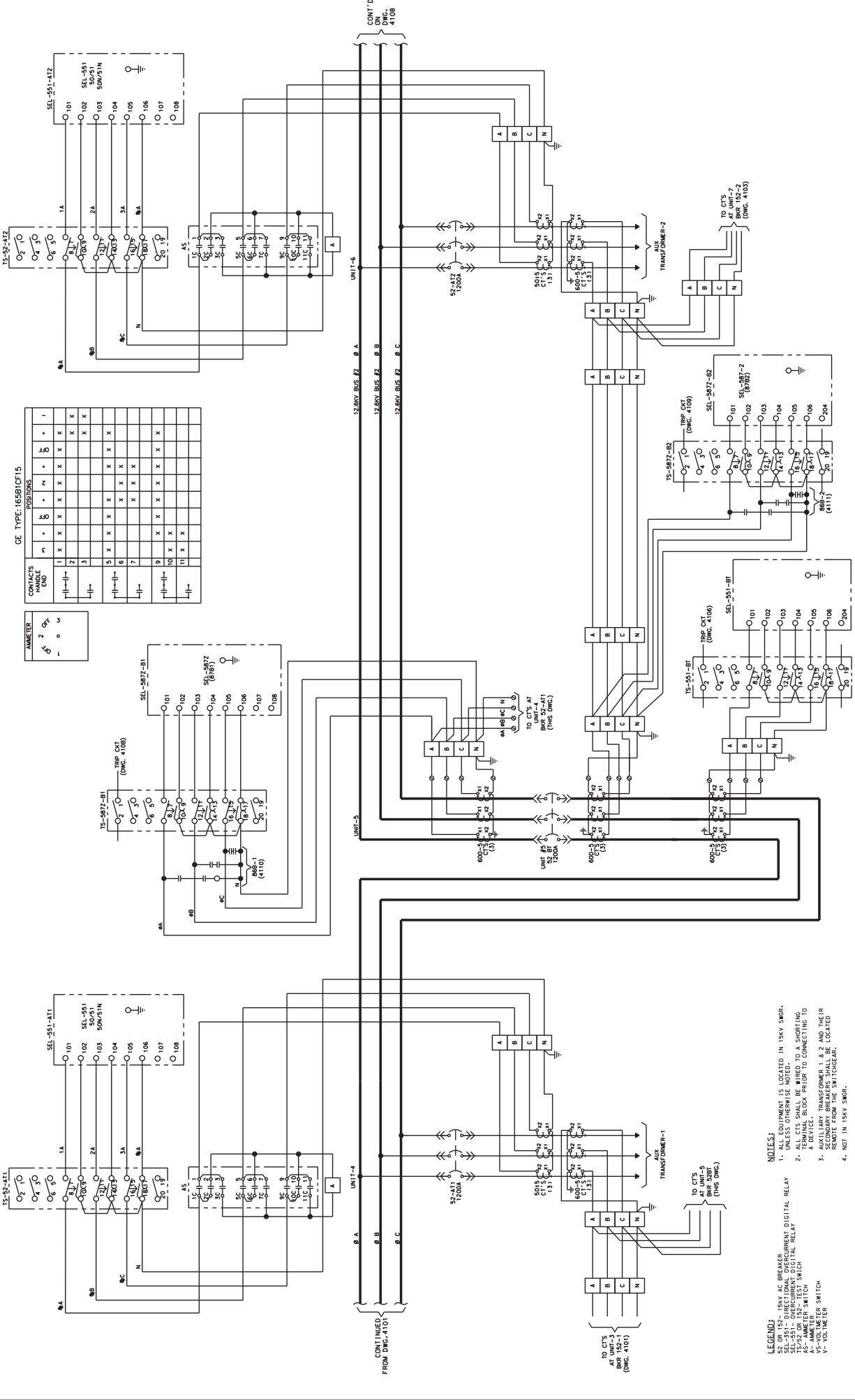
LOCATION NAME: 95TH STREET SUBSTATION
TITLE: 12.6KV AC FUSE LINE DIAGRAM SHEET 1 OF 3

DATE: 01/29/2017
BY: [Signature]
APP: [Signature]
DATE: [Blank]
APP: [Blank]
DATE: [Blank]
APP: [Blank]

REVISIONS:

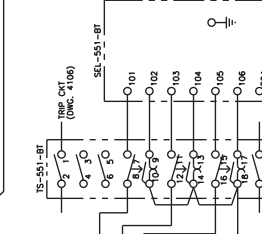
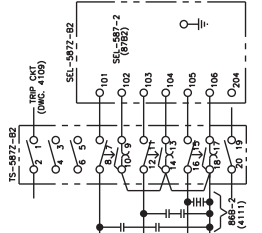
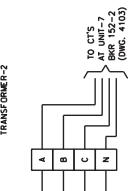
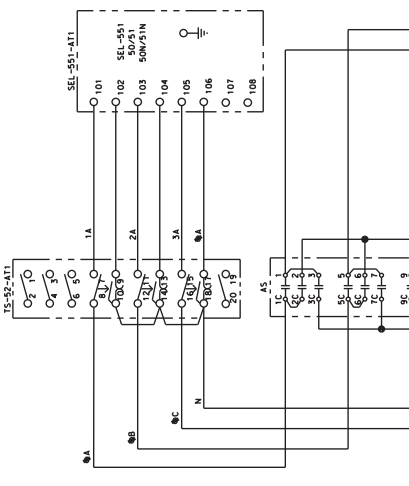
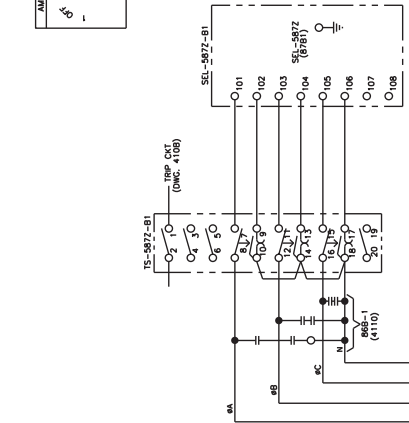
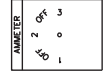
NO.	DATE	DESCRIPTION

PRINTED ON 80#17S



CE TYPE: 165B1C15

CONTACTS UNITS END	POSITIONS										
	1	2	3	4	5	6	7	8	9	10	11
1	X	X	X	X	X	X	X	X	X	X	X
2	X	X	X	X	X	X	X	X	X	X	X
3	X	X	X	X	X	X	X	X	X	X	X
4	X	X	X	X	X	X	X	X	X	X	X
5	X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X	X	X	X	X	X	X	X
7	X	X	X	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	X	X	X	X
9	X	X	X	X	X	X	X	X	X	X	X
10	X	X	X	X	X	X	X	X	X	X	X
11	X	X	X	X	X	X	X	X	X	X	X



- NOTES:**
1. ALL EQUIPMENT IS LOCATED IN 15KV SWGR.
 2. UNLESS OTHERWISE NOTED, TO A SURTING
 3. TERMINAL BLOCK PRIOR TO CONNECTING TO A DEVICE.
 4. TRANSFORMER 1, 2, 3, AND THEIR REMOTE BREAKERS SHALL BE LOCATED REMOTE FROM THE SWITCHGEAR.
 5. NOT IN 15KV SWGR.

CONSULTANT SEAL & SIGNATURE

ISSUED FOR BID

REV	DATE	BY	APP	DESCRIPTION
0	0/0/2017	HS	HS	

PRINTED ON 50/175

CONSULTANT: **BDP** (A Company of **Gannett Fleming**)
 201 N. Wacker Dr. Ste. 1500 Chicago IL 60606

REVISIONS:

NO.	DATE	DESCRIPTION
1	06/12/2017	ISSUED FOR BID

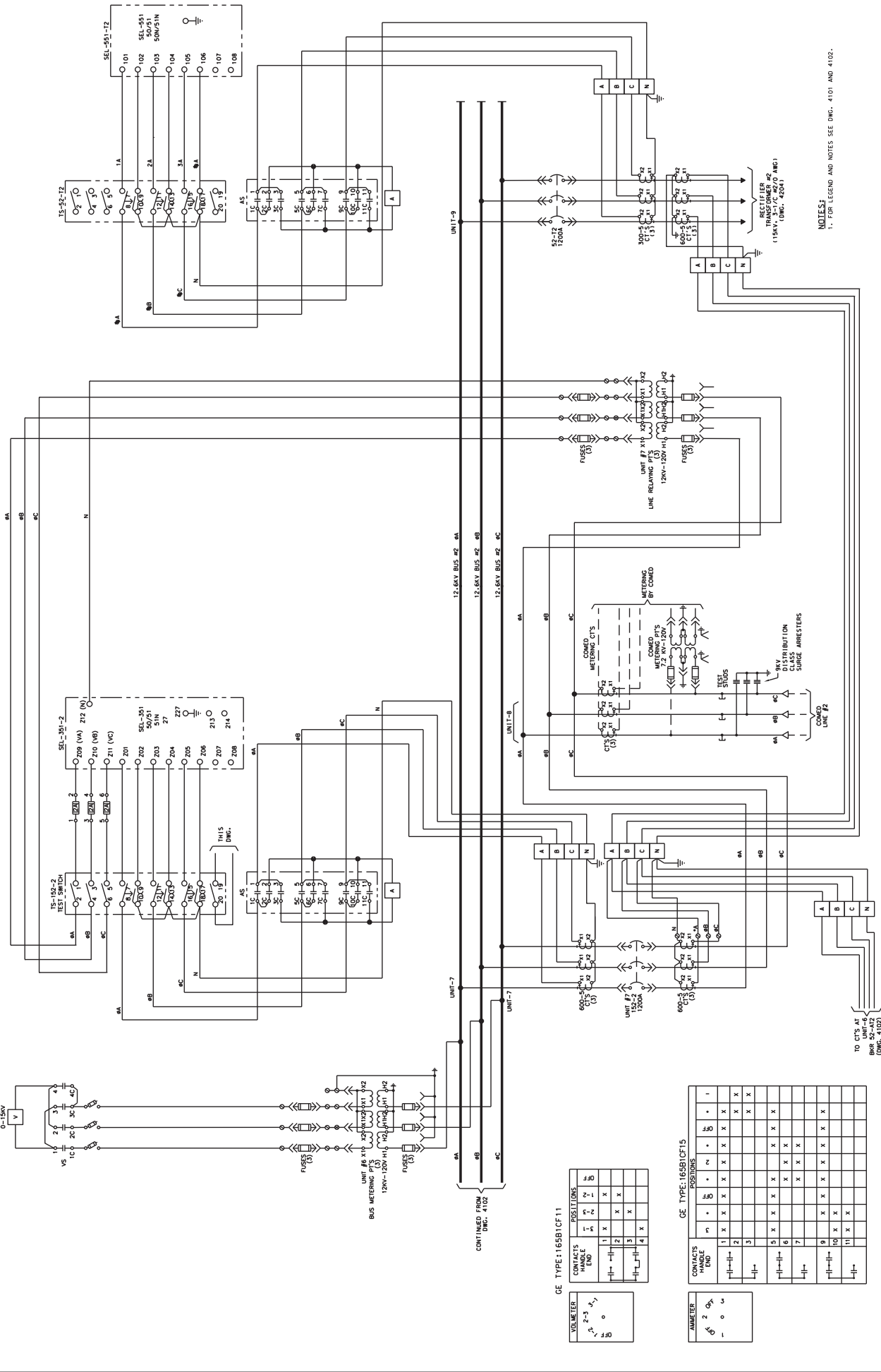
DESIGNED BY: JC
 DRAWN BY: FM
 CHECKED BY: MRP
 METRI PULS, ESSENT
 DATE: JUNE 12, 2017

LOCATION NAME: 95TH STREET SUBSTATION
 TITLE: 12.8KV AC THURSE LINE DIAGRAM SHEET 2 OF 3

PROJECT NO.: GAN587P10002
 SHEET NO.: SS-11,9-4102
 MILE POST NO.: 1/3

CAD FILE NUMBER: SS-11,9-4102.DWG

DISTRICT:



NOTES:
1. FOR LEGEND AND NOTES SEE DWG. 4101 AND 4102.

TO CT'S AT BUS BARS (DWG. 4102)

GE TYPE 165B1CF11

CONTACTS	POSITIONS	1	2	3	4
1	1	X	X	X	X
2	2	X	X	X	X
3	3	X	X	X	X
4	4	X	X	X	X

GE TYPE 165B1CF15

CONTACTS	POSITIONS	1	2	3	4	5	6	7	8	9	10	11
1	1	X	X	X	X	X	X	X	X	X	X	X
2	2	X	X	X	X	X	X	X	X	X	X	X
3	3	X	X	X	X	X	X	X	X	X	X	X
4	4	X	X	X	X	X	X	X	X	X	X	X
5	5	X	X	X	X	X	X	X	X	X	X	X
6	6	X	X	X	X	X	X	X	X	X	X	X
7	7	X	X	X	X	X	X	X	X	X	X	X
8	8	X	X	X	X	X	X	X	X	X	X	X
9	9	X	X	X	X	X	X	X	X	X	X	X
10	10	X	X	X	X	X	X	X	X	X	X	X
11	11	X	X	X	X	X	X	X	X	X	X	X

LEGEND:
VOLUME: 2-3
DATE: 09/28/2017

REVISIONS:

REV	DATE	BY	APP	DESCRIPTION
0	09/28/2017	HS	HS	ISSUED FOR BID

CONSULTANT SEAL & SIGNATURE:

CONSULTANT: IEP, A Company of Gannett Fleming

REVISIONS: DRAWN: JC, CHECKED: FM, DESIGNED: MRP, DATE: 06/12/2017

LOCATION NAME: 95TH STREET SUBSTATION
TITLE: 12.6KV AC THREE LINE DIAGRAM SHEET 3 OF 3

PROJECT NO.: GMSR-PT0202
SHEET NO.: SS-11.9-4103

DATE: 06/12/2017

CONTROL SWITCH DEVICES-5S

CONTACTS	POSITION	
	TRIP	CLOSE
1-2	X	
3-4	C	X

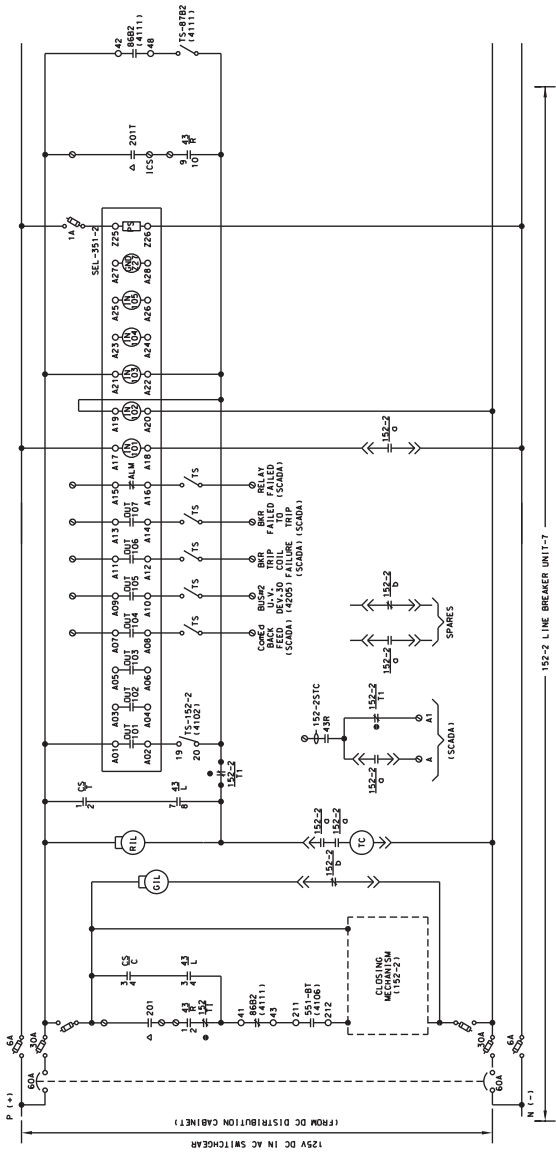
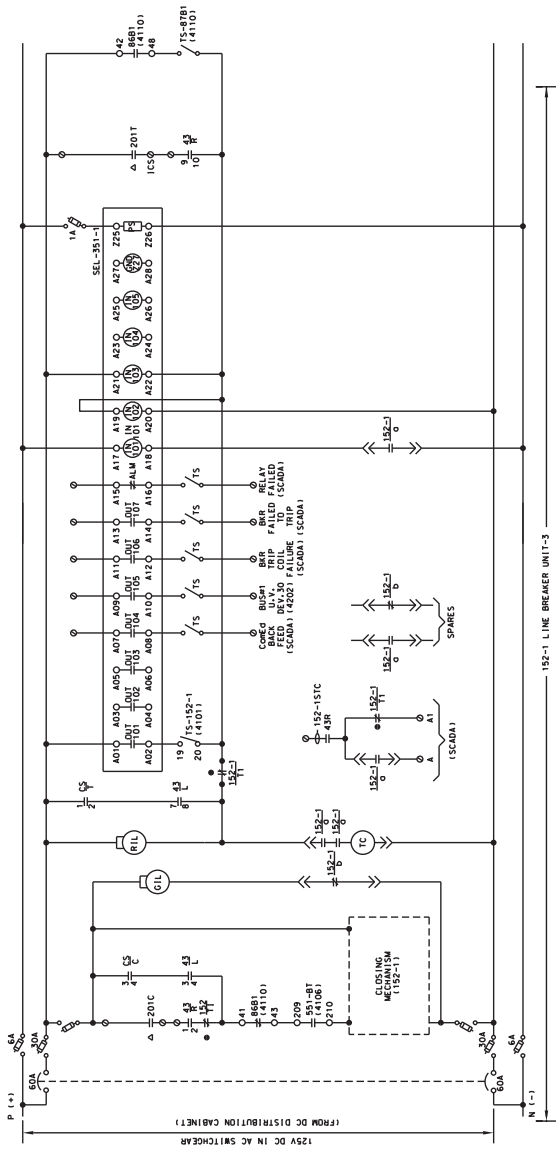
SPRING RETURN TO "OFF"

SELECTOR SWITCH DEVICES-4S

CONTACTS	POSITION	
	REMOTE	LOCAL
1-2	R	X
3-4	L	X
5-6	R	X
7-8	L	X
9-10	R	X
11-12	L	X

NON-SPRING RETURN.
REMOTE POSITION AT 12 O' CLOCK.
LOCAL POSITION CLOCKWISE WHEN FACING FRONT OF SWITCH

- LEGEND:
- IN SCADA RTU CABINET
 - CLOSED ONLY WITH BREAKER IN CONNECTED POSITION
 - TERMINAL WITH BREAKER IN CONNECTED POSITION
 - TERMINAL BLOCK



- NOTES:
1. UNLESS OTHERWISE NOTED, ALL EQUIPMENT IS LOCATED IN 15KV SWGR.
 2. NUMBER IN PARENTHESIS REFERS TO A DRAWING NUMBER.

ISSUED FOR BID

REV	DATE	BY	APP	REV	DATE	BY	APP	DESCRIPTION
0	0/0/2017	HS						

CONSULTANT SEAL & SIGNATURE

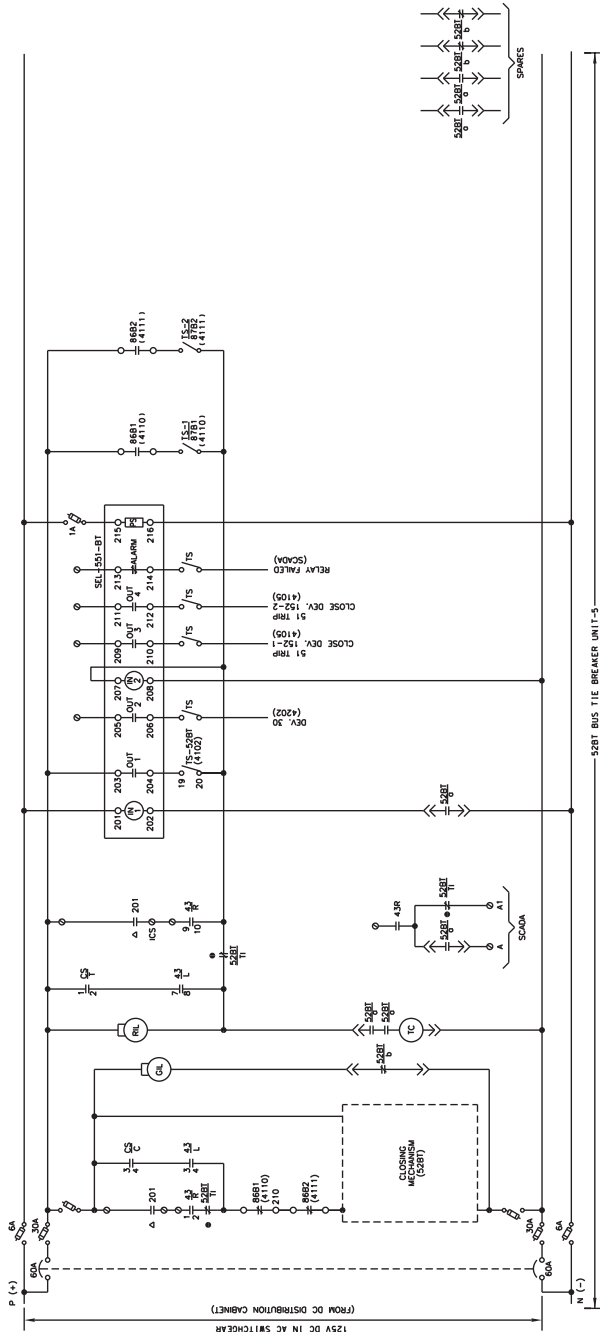
CONSULTANT: **BDP** **Gannett Fleming**
 201 N. Wacker Dr., Ste. 1500 Chicago IL 60606

DESIGNED BY: JC
 DRAWN BY: FM
 CHECKED BY: METRA P&S, ESSENT
 DATE: JUNE 12, 2017

LOCATION NAME: **95TH STREET SUBSTATION**
 TITLE: **15.5KV AC GOVERNATIC DIAGRAM
 INC. LINE BKRS: 152-1 & 152-2**

CAD FILE NUMBER: 95-11-14-10000
 DISTRICT: **SS-11, 9-4105**
 PROJECT NO.: **GANNETT-F170002**
 SHEET NO.: **1/5**
 WILE POST NO.: **1/5**

PRINTED ON 5017S



SELECTOR SWITCH
DEVICE-43

CONTACTS	POSITION	
	REMOTE	LOCAL
1-2	R	X
3-4	L	X
5-6	R	X
7-8	L	X
9-10	R	X
11-12	L	X

CONVERTER SWITCH
DEVICE-43

CONTACTS	POSITION		CLOSE
	TRIP	OFF AFTER TRIP	
1-2	T	X	X
3-4	C		

SPRING RETURN TO "OFF"

NON-SPRING RETURN, 12 0° CLOCK.
LOCAL POSITION, CLOCKWISE WHEN FACING FRONT OF SWITCH

LEGEND:
 A - LOCATED IN SCADA RTU CABINET
 B - LOCATED IN SCADA RTU CABINET
 C - OPERATED ONLY WITH BREAKER IN CONNECTED POSITION
 D - TERMINAL BLOCK

NOTES:

1. ALL EQUIPMENT IS LOCATED IN 15KV SWGR. UNLESS OTHERWISE NOTED.
2. NUMBER IN PARENTHESES REFERS TO A DRAWING NUMBER.

LOCATION NAME: 95TH STREET SUBSTATION		CAD FILE NUMBER: 85-11-14-10-000	
TITLE: 12.5KV AC SYMMETRIC DIAGRAM BUS TIE BKR. 528T		DISTRICT: PROJECT NO.: SHEET NO.: SS-11,9-4106	
CONSULTANT SEAL & SIGNATURE 		CONSULTANT: Gannett Fleming A Company of IDP CONSULTING ENGINEERS 201 N. Wacker Dr., Ste. 1500 Chicago IL 60606	
DESIGNED BY: DRAWN BY: CHECKED BY: DATE: JUNE 12, 2017		META PLUS, INC. 547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60681	
REV. DATE 0 0/0/2017	BY HS	APP. HS	DESCRIPTION ISSUED FOR BID

CONTROL SWITCH
DEVICE-43

CONTACTS	POSITION	TRIP	DEF	AFTER	CLOSE
1-2	T	X			
3-4	C				X

SPRING RETURN TO "OFF"

SELECTION SWITCH
DEVICE-44

CONTACTS	POSITION	REMOTE	LOCAL
1-2	R	X	
3-4	L		X
5-6	R	X	
7-8	L		X
9-10	R	X	
11-12	L		X

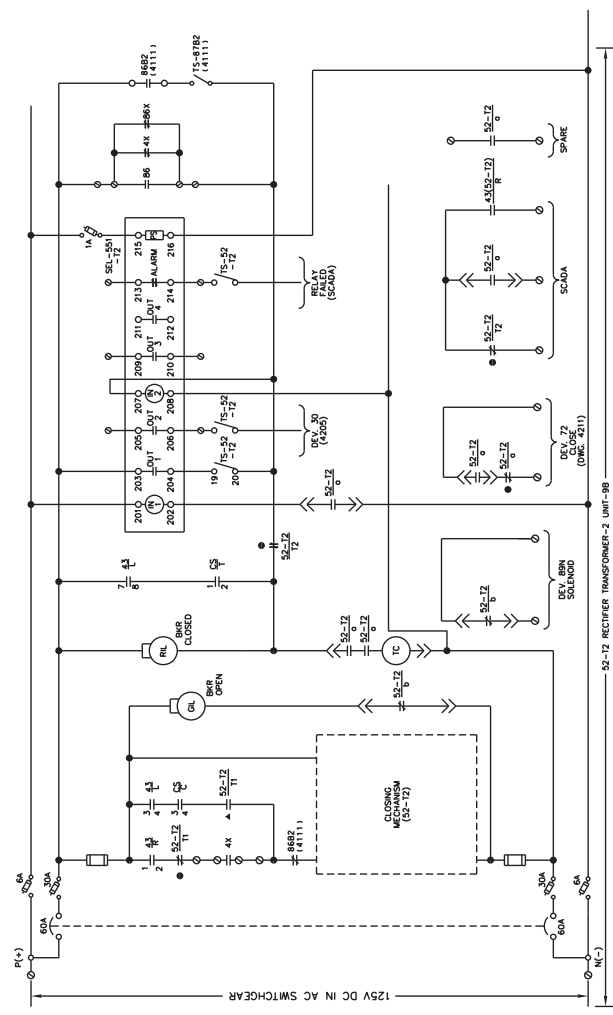
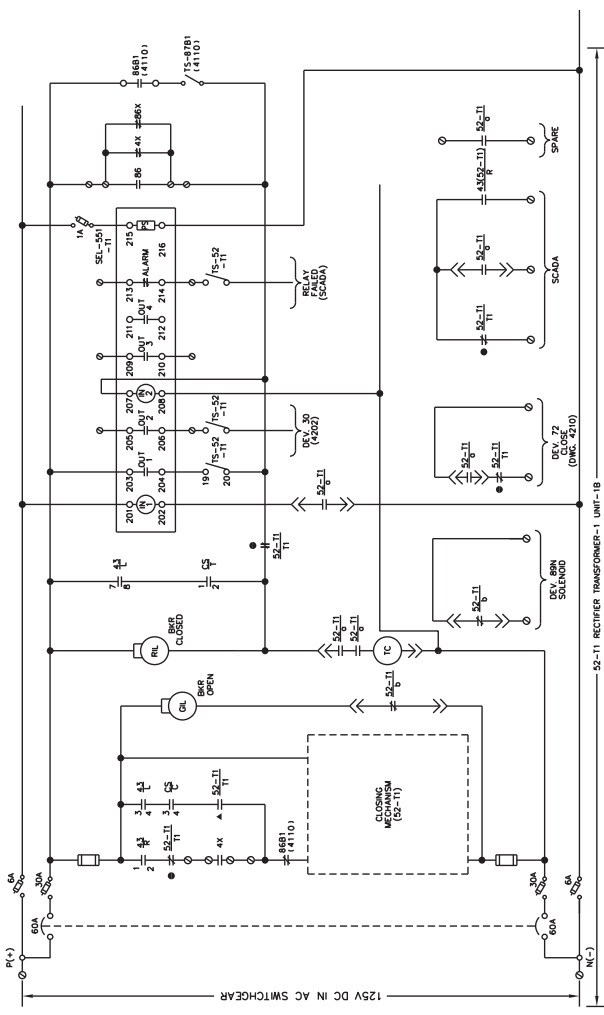
WARNING: THE REMOTE POSITION IS 12 O' CLOCK. LOCAL POSITION COUNTERCLOCKWISE WHEN FACING FRONT OF SWITCH

LEGEND:

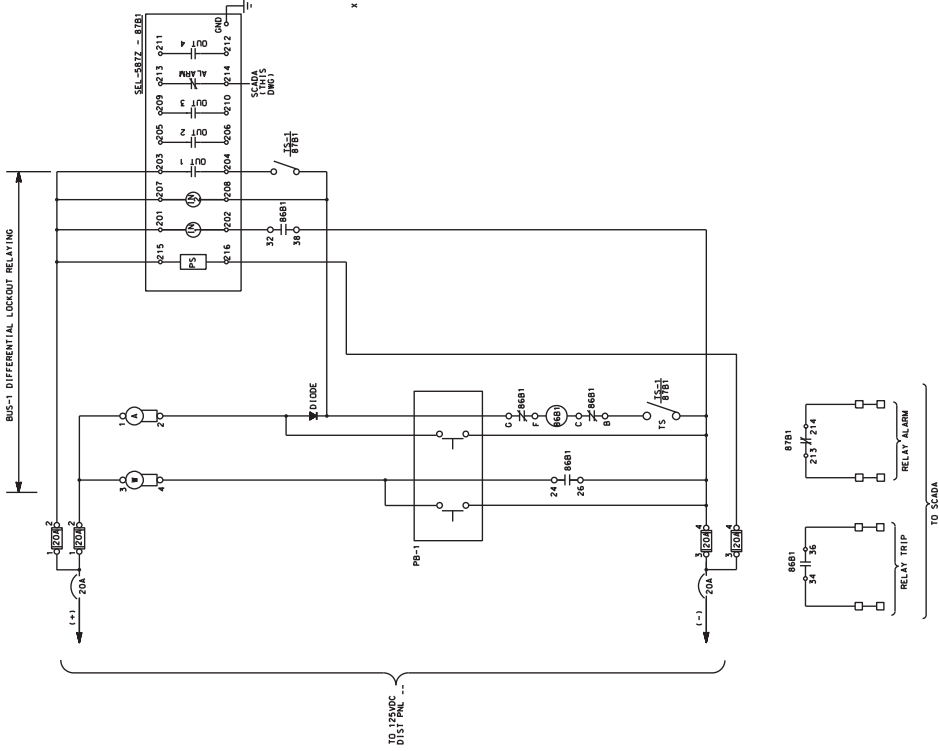
- - CLOSED IN 15KV RTR CABINET
- - CLOSED ONLY WITH BREAKER IN CONNECTED POSITION
- ▲ - OPEN ONLY WITH BREAKER IN CONNECTED POSITION
- - TERMINAL BLOCK

NOTES:

- ALL EQUIPMENT IS LOCATED IN 15KV SWGR.
- NUMBER IN PARENTHESES REFERS TO A DRAWING NUMBER.



ISSUED FOR BID		DATE		BY		APP	
0	0/20/2017	HS					
REV	DATE	BY	APP	REV	DATE	BY	APP
DESCRIPTION							
CONSULTANT SEAL & SIGNATURE							
				CONSULTANT Gannett Fleming A Company of IDP 201 N. Wacker Dr. Ste. 1600 Chicago IL 60606			
DESIGNER: JRS DRAWN: JC CHECKED: FM METRA P&LS, DESANT DATE: JUNE 12, 2017				LOCATION NAME: 95TH STREET SUBSTATION TITLE: 15 KV AC GOVERNATIC CIRCUIT RECT. TRANS. BRK. 52-T1 & 52-T2			
DISTRICT: PROJECT NO. SHEET NO. WILE POST NO.				CAD FILE NUMBER: 95-11-14-107-200N PROJECT NO.: SHEET NO.: WILE POST NO.:			
META 547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601				SS-11,9-4107			



8B81

RECH	CONTACTS	POSITION
1	15-111-1-213	X
2	15-111-1-214	X
3	15-111-1-217	X
4	15-111-1-216	X
5	210-111-1-225	X
6	22-111-1-228	X
7	25-111-1-227	X
8	24-111-1-226	X
9	310-111-1-331	X
10	32-111-1-338	X
11	35-111-1-337	X
12	43-111-1-423	X
13	43-111-1-424	X
14	44-111-1-447	X
15	44-111-1-446	X
16	51-111-1-551	X
17	52-111-1-548	X
18	55-111-1-557	X
19	54-111-1-556	X
20	61-111-1-643	X
21	62-111-1-648	X
22	65-111-1-647	X
23	64-111-1-646	X
24	73-111-1-723	X
25	73-111-1-724	X
26	74-111-1-727	X
27	74-111-1-726	X

4 - REMOTES CLOSED TO POSITION

LEGEND:
 8B81 BUS-1 DIFFERENTIAL RELAY
 8B81 BUS-1 LOCKOUT RELAY
 TS-1 TEST SWITCH FOR BUS DIFFERENTIAL AND LOCKOUT RELAY FOR BUS-1
 PB MOMENTARY TEST PUSHBUTTON

NOTES:
 1. NUMBER IN PARENTHESIS REFERS TO A DRAWING NUMBER

LOCATION NAME: 95TH STREET SUBSTATION
 TITLE: 15.8KV AC GOVERNMENT DIAGRAM BUS-1 DIFFERENTIAL LOCKOUT

ISSUED FOR BID
 0 0/20/2017 HS BY APP
 REV DATE BY APP DESCRIPTION

DATE: JUNE 12, 2017

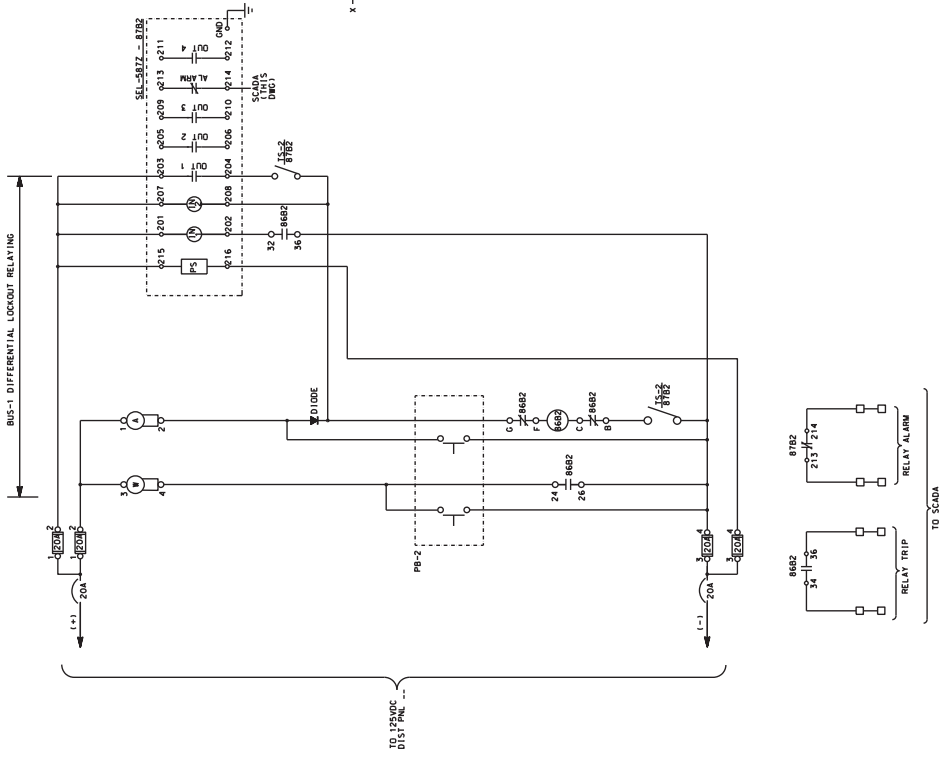
CONSULTANT: Gannett Fleming
 20 N. Wacker Dr., Ste. 4000 Chicago IL 60606

DESIGNED BY: JC
 DRAWN: FM
 CHECKED: FM
 METRIK PLUS, ESSENT
 CHICAGO, ILLINOIS 60681

PROJECT NO.: GAN28-F70002
 SHEET NO.: SS-11,9-4110

WILE POST NO.: T/S

PRINTED ON 80/115

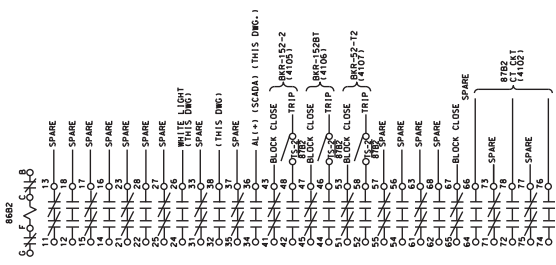


LOCKOUT RELAY 8682
X - DENOTES CLOSED IN POSITION

COIL	CONTACTS	POSITION
1	110-H-013 X	1
2	120-H-018 X	1
3	140-H-017 X	1
4	150-H-016 X	1
5	170-H-023 X	1
6	210-H-028 X	1
7	220-H-027 X	1
8	230-H-026 X	1
9	330-H-038 X	1
10	350-H-037 X	1
11	360-H-036 X	1
12	410-H-043 X	1
13	420-H-048 X	1
14	450-H-047 X	1
15	510-H-053 X	1
16	520-H-052 X	1
17	530-H-051 X	1
18	610-H-058 X	1
19	620-H-057 X	1
20	630-H-056 X	1
21	640-H-055 X	1
22	840-H-066 X	1
23	850-H-065 X	1
24	720-H-078 X	1
25	730-H-077 X	1
26	740-H-076 X	1

- LEGEND:
8782 BUS-2 DIFFERENTIAL RELAY
8682 BUS-2 LOCKOUT RELAY
15-2 LOCKOUT RELAY FOR DIFFERENTIAL AND
PB MOMENTARY TEST PUSHBUTTON

NOTES:
1. NUMBER IN PARENTHESES REFERS TO A DRAWING NUMBER



LOCATION NAME: 95TH STREET SUBSTATION
TITLE: 15,000 AMP GOVERNATIC MANSAM BUS& DIFFERENTIAL LOCKOUT

REV	DATE	BY	APP	DESCRIPTION
0	0/0/2017	HS	HS	ISSUED FOR BID

ISSUED FOR BID

DATE DATE BY APP DESCRIPTION

PRINTED ON 50/115

CONSULTANT SEAL & SIGNATURE: [Signature]

CONSULTANT: IDP A Company of Gannett Fleming
20 N. Wacker Dr. Ste. 1600 Chicago IL 60606

REVISIONS:
DRAWN: JC
CHECKED: FM
METRI-PALUS, ESSENT
DATE: JUNE 12, 2017

Meta
150 N. WACKER BOULEVARD
CHICAGO, ILLINOIS 60601

NO.	DATE	REVISION
1	01/12/2017	ISSUED FOR BID

SCALE: 1"=20'

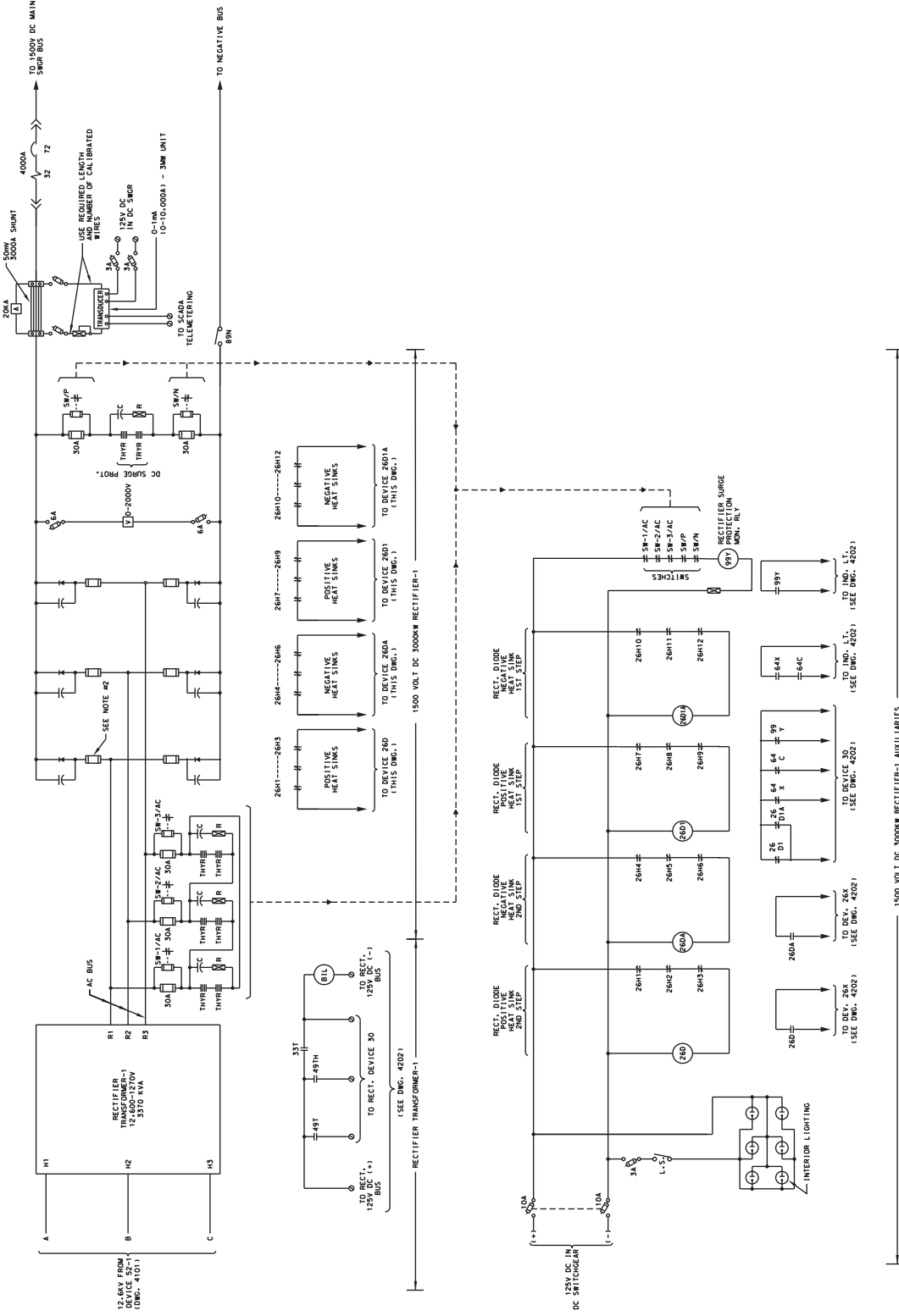
PROJECT NO: GM282-PT0020

SHEET NO: SS-11.9-4-111

FILE NUMBER: 95-11-14-11-200N

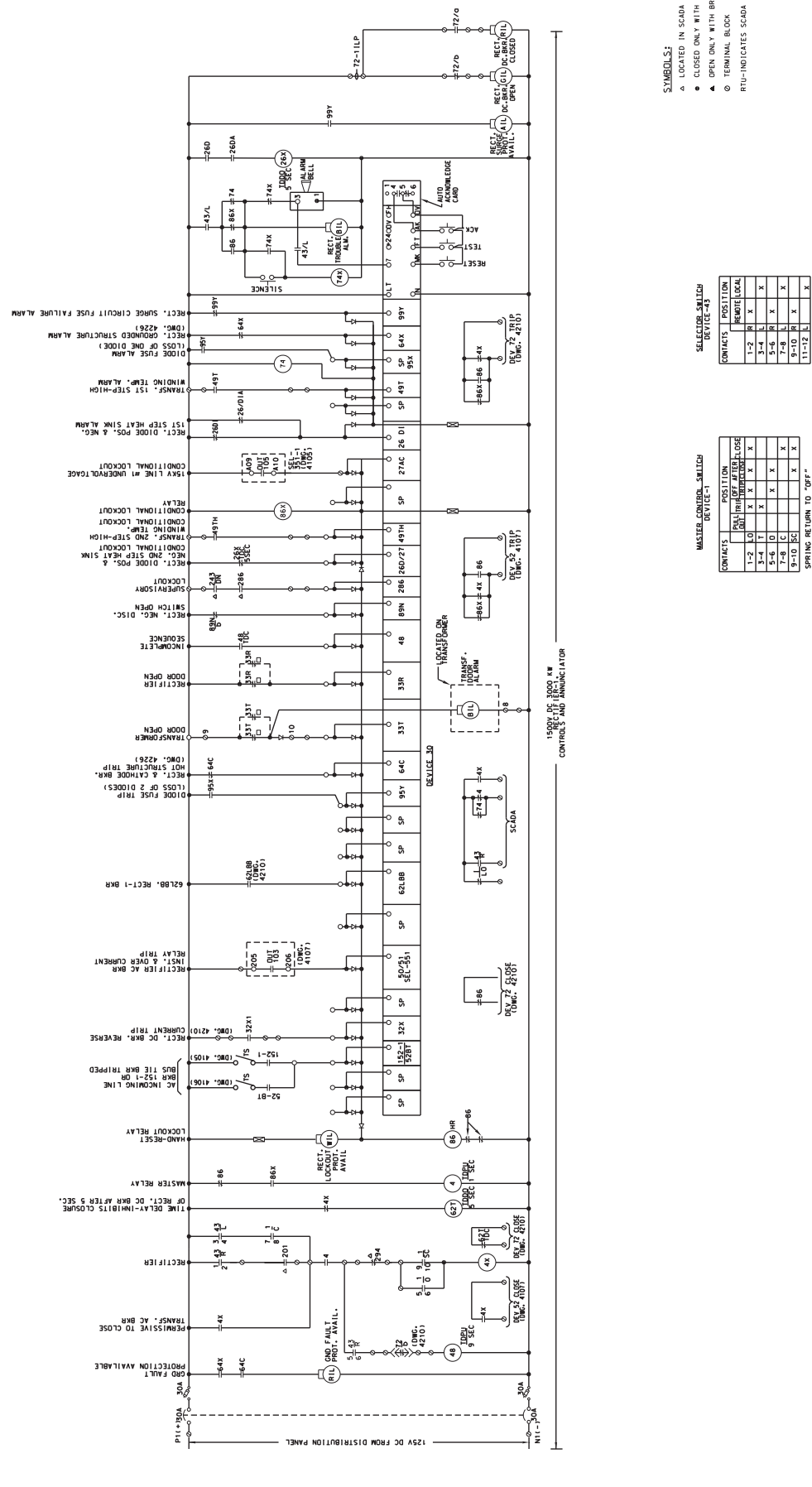
DISTRICT:

WILE POST NO: 11.9



- NOTES:**
1. DIODE THERMAL DEVICES CONNECTED TOGETHER MUST BE ON HEAT SINKS OF THE SAME POLARITY UNDER ALL OPERATING CONDITIONS.
 2. PROVIDE FUSES, THERMIST TYPE DIODE FUSES.
 3. CONTACT WILL CLOSE IN NORMAL CONDITION & WILL OPEN IN FAULT CONDITION.
- SYMBOLS:**
- Ø TERMINAL BLOCK

<p>ISSUED FOR BID</p>			
REV	DATE	BY	DESCRIPTION
0	0/02/2017	HS	ISSUED FOR BID
<p>DESCRIPTION</p>			
<p>CONSULTANT SEAL & SIGNATURE</p>			
<p>CONSULTANT</p>			
<p>ISSUED FOR BID</p>			
<p>DATE: JUNE 12, 2017</p>			
<p>DESIGNED BY: JC</p>			
<p>CHECKED BY: FM</p>			
<p>DRAWN BY: JES</p>			
<p>DATE: JUNE 12, 2017</p>			
<p>PROJECT NO. GAN26-RF10002</p>			
<p>PROJECT NAME: 1500V DC CONVERTER DIAGRAM</p>			
<p>SHEET NO. SS-11, 9-4201</p>			
<p>LOCATION NAME: 95TH STREET SUBSTATION</p>			
<p>TITLE: RECTIFIER-1 POWER & AUXILIARIES</p>			
<p>SCALE: 1/8" = 1'-0"</p>			
<p>CAD FILE NUMBER: 95-11-9-4201.DWG</p>			
<p>WILE POST NO. I/S</p>			
<p>Meta</p>			
<p>547 W. JACKSON BOULEVARD</p>			
<p>CHICAGO, ILLINOIS 60681</p>			



SYMBOLS:
 ▲ LOCATED IN SCADA RTU CABINET
 ● CLOSED ONLY WITH BREAKER IN CONNECTED POS.
 ▲ OPEN ONLY WITH BREAKER IN CONNECTED POS.
 ○ TERMINAL BLOCK
 RTU-INDICATES SCADA REMOTE TERMINAL UNIT.

SELECTOR-RELAY DEVICE-43

CONTACTS	POSITION
1-2	SP
3-4	SP
5-6	SP
7-8	SP
9-10	SP
11-12	SP

MASTER CONTROL-RELAY DEVICE-43

CONTACTS	POSITION
1-2	SP
3-4	SP
5-6	SP
7-8	SP
9-10	SP
11-12	SP

REC-1, 125V DC FROM DISTRIBUTION PANEL
 REC-2, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-3, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-4, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-5, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-6, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-7, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-8, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-9, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-10, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-11, 150V DC 3000 MW CONTROL AND ANNUNCIATOR
 REC-12, 150V DC 3000 MW CONTROL AND ANNUNCIATOR

PROJECT NO. GAN285-PT0002
 SHEET NO. 1/5
 MILE POST NO. SS-11.9-4202

LOCATION NAME: 95TH STREET SUBSTATION
 TITLE: 150V DC SCHEMATIC DIAGRAM REC-TIE-1 CONTROLS & ANNUNCIATOR

ISSUED FOR BID
 DATE: 0/0/2017
 BY: HS
 APP: HS

REV. DATE BY APP DESCRIPTION

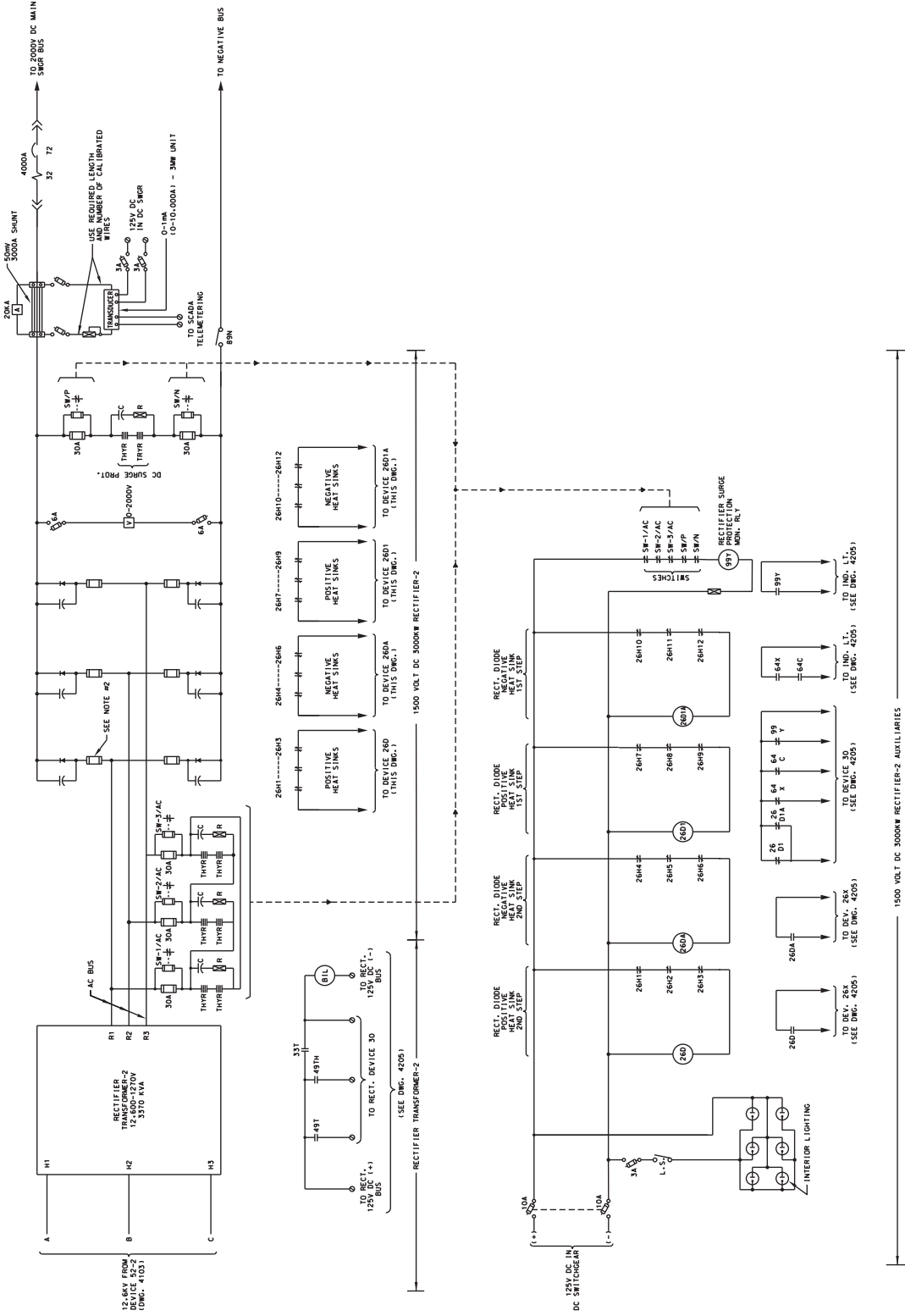
ISSUED FOR BID
 DATE: 0/0/2017
 BY: HS
 APP: HS

CONSULTANT SEAL & SIGNATURE
 CONSULTANT: Gannett Fleming
 20 N. Wacker Dr. Ste. 1500 Chicago IL 60606

REVISIONS
 DRAWN: JC
 CHECKED: FM
 METRA P.O. BOX 5000
 CHICAGO, ILLINOIS 60681
 DATE: JUNE 12, 2017

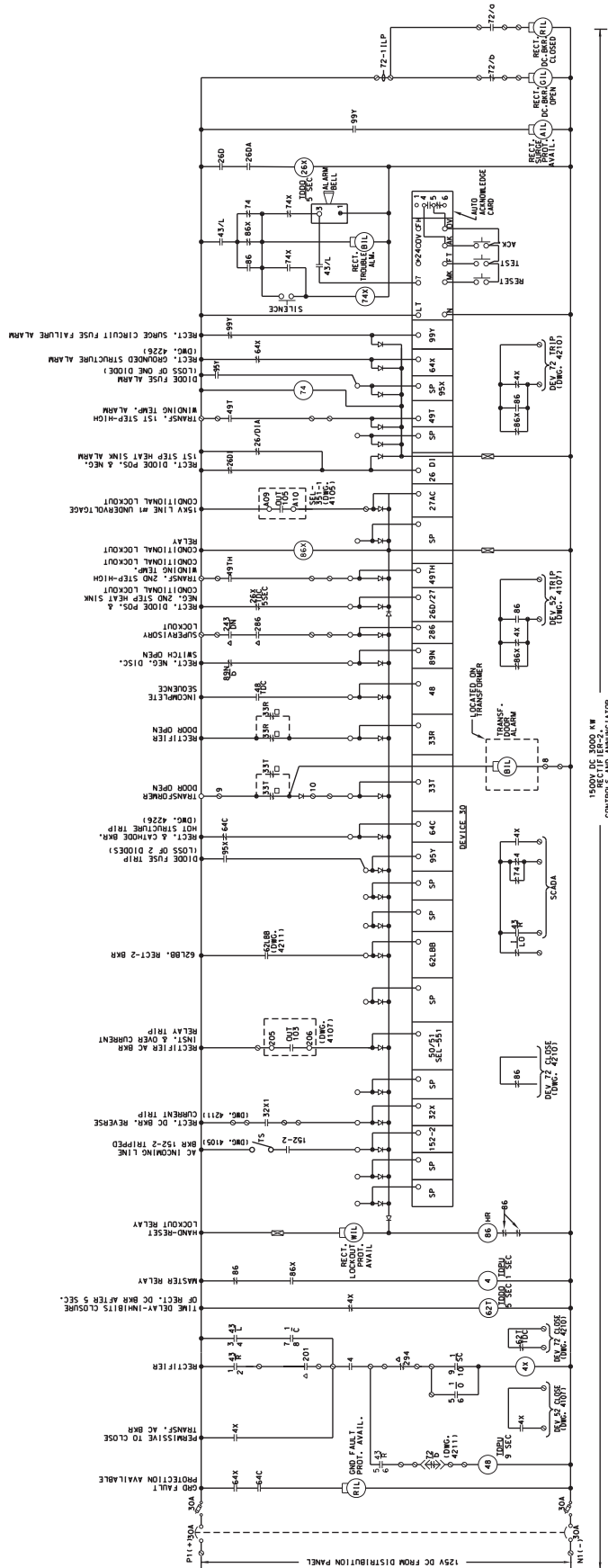
REVISIONS
 DATE: 0/0/2017
 BY: HS
 APP: HS
 DESCRIPTION

PRINTED ON 5017S



- NOTES:**
1. DIODE THERMAL DEVICES CONNECTED TOGETHER MUST BE ON HEAT SINKS OF THE SAME POLARITY UNDER ALL CONDITIONS.
 2. PROVIDE PROUDER FINGER TYPE DIODE FUSES.
 3. IN FAULT CONDITION, IN NORMAL CONDITION & WILL OPEN.
- SYMBOLS:**
- ⊙ TERMINAL BLOCK

Meta 1600V DC SCHEMATIC DIAGRAM RECTIFIER-2 POWER & AUXILIARIES		LOCATION NAME: 95TH STREET SUBSTATION	CAD FILE NUMBER: 95-11-4204-000
DRAWN: JC CHECKED: FM METRA P&LS, DESIGNT DATE: JUNE 12, 2017	PROJECT NO.: GAN285-R70002	DESTINCT: SHEET NO.: SS-11-9-4204	WILE POST NO.: T/S
IDP A Company of Gannett Fleming CONSULTANT 201 N. Wacker Dr., Ste. 1600 Chicago IL 60606		PRINTED ON 501T5	



- SYMBOLS:**
- ▲ LOCATED IN SCADA RTU CABINET
 - CLOSED ONLY WITH BREAKER IN CONNECTED POS.
 - ▲ OPEN ONLY WITH BREAKER IN CONNECTED POS.
 - TERMINAL BLOCK
 - RTU-INDICATES SCADA REMOTE TERMINAL UNIT.

SELECTOR SWITCH DEVICES-4S

CONTACTS	POSITION
1-2	R
3-4	X
5-6	X
7-8	X
9-10	R
11-12	X

MASTER CONTROL SWITCH DEVICES-1

CONTACTS	POSITION
1-2	LO
3-4	LO
5-6	LO
7-8	C
9-10	SC

SPRING RETURN TO "OFF"

NON-SPRING RETURN LOCAL POSITION LOCKED IN OPEN POSITION

15KV DC 3000 KW RECTIFIER-2 CONTROLS AND ANNUNCIATOR

NON-SPRING RETURN LOCAL POSITION LOCKED IN OPEN POSITION

NON-SPRING RETURN LOCAL POSITION LOCKED IN OPEN POSITION

NON-SPRING RETURN LOCAL POSITION LOCKED IN OPEN POSITION

PRINTED ON 80/115

REV.	DATE	BY	APP.	DESCRIPTION
0	0/0/2007	HS	HS	ISSUED FOR BID

ISSUED FOR BID

CONTRACTOR: **Meta**
 547 W. JACKSON BOULEVARD
 CHICAGO, ILLINOIS 60681

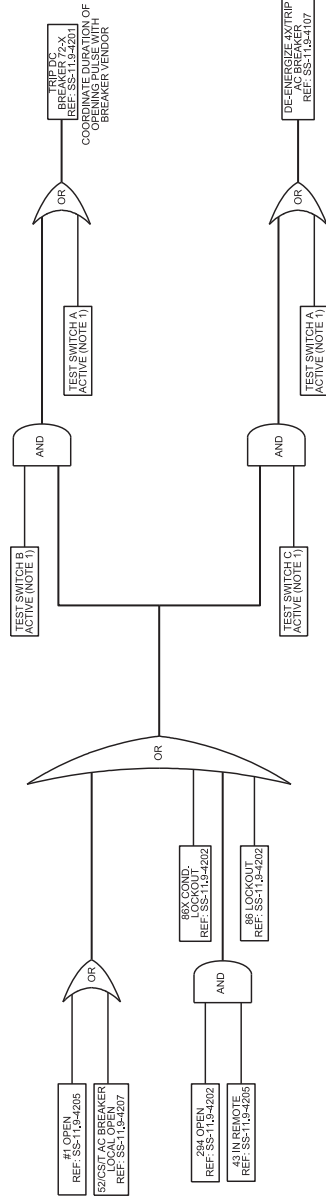
CONSULTANT SEAL & SIGNATURE: **BDP** CONSULTANT
 A Company of **Gannett Fleming**
 CONSULTANT
 20 N. Wacker Dr., Ste. 1600 Chicago IL 60606

DESIGNED BY: JC
 DRAWN BY: FM
 CHECKED BY: FM
 METR PLUS DESKTOP
 DATE: JUNE 12, 2017

LOCATION NAME: 95TH STREET SUBSTATION
 TITLE: 15KV DC 3000 KW RECTIFIER-2 CONTROLS & ANNUNCIATOR

CAD FILE NUMBER: SS-11-9-4205
 DISTRICT: SS-11-9-4205
 PROJECT NO: GMM28-PT0002
 SHEET NO.: T-5
 FILE POST NO.: T-5

AC BREAKER/CATHODE TRIP

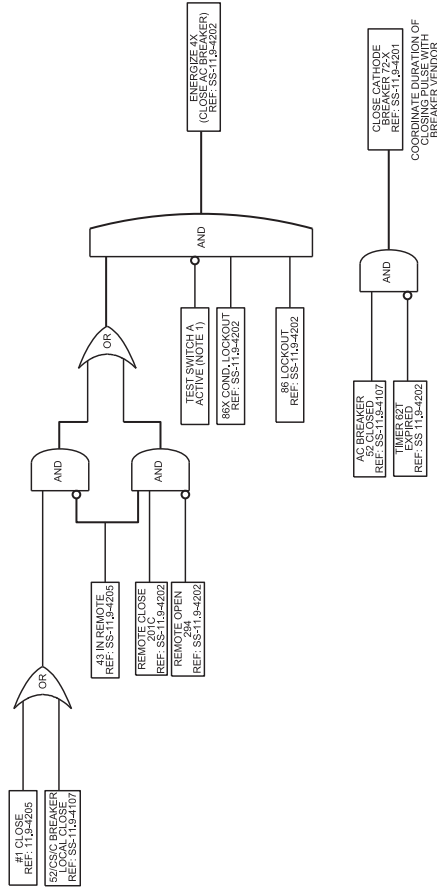


NOTES:

1. TEST SWITCHES SHOWN IN THE LOGIC DIAGRAM ARE USED FOR THE ANNUNCIATOR, THE FOLLOWING KEYS SHALL BE AVAILABLE:
 - A TRIP AND LOCK 92Z AND 17Z
 - B TRIP AND TRIP TO 52Z
 - C ENABLE TRIP 10 52Z
 - D ENABLE 88 INCOMPLETE SEQUENCE
 - E ENABLE 88 INCOMPLETE SEQUENCE
 - F ENABLE 88 LOCKOUT
2. ALL LOGIC DIAGRAMS ARE FOR INFORMATION PURPOSES ONLY. THE LOGIC DIAGRAMS MUST MATCH THE PLC CODE. ALL CONTRACTUAL REQUIREMENTS BASED ON THE EQUIPMENT PROVIDED.

REV	DATE	BY	APP	DESCRIPTION
0	1/26/2017	AA	ER	ISSUED FOR BID
SUB CONSULTANT				
LTK Engineering Services				
SEAL SIGNATURE				
PRIMARY CONSULTANT				
DESIGNED BY: R. SCHMIDT DRAWN BY: E. MZ CHECKED BY: R. WINE REVISED BY: R. CORANT DATE: JUNE 12, 2017				
Metta Metrotech Services, Inc. 547 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601			LOCATION NAME: 95TH STREET SUBSTATION	
PROJECT NO. GW2625710002 MILE POST NO. 1.3			RECTIFIER PLC LOGIC DIAGRAM AC BREAKER/CATHODE TRIP SHEET 7 OF 4	
DISTRICT: SHEET NO. SS-11.9-4206			CAD FILE NUMBER: SPLRS:	

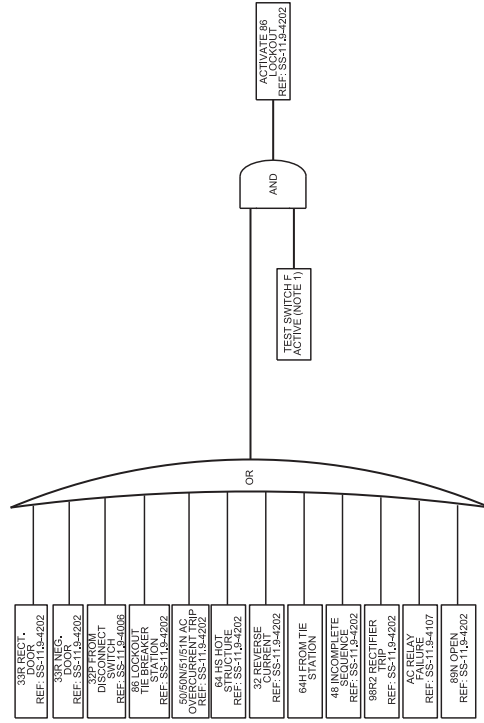
AC BREAKER/CATHODE CLOSE



- NOTES:
- TEST SWITCHES SHOWN IN THE LOGIC DIAGRAM SHALL BE TEST SWITCHES PROGRAMMED ON THE PLANT. THE LOGIC DIAGRAM FOR THE FOLLOWING SWITCHES SHALL BE AVAILABLE:
 - A TRIP AND BLOCK 52R AND 12ZR
 - B ENABLE TRIP TO 52R
 - C RESET #4 INCOMPLETE SEQUENCE
 - D ENABLE TRIP TO 52R
 - E ENABLE 88 LOCKOUT
 - F ENABLE 88 LOCKOUT
 - ALL LOGIC DIAGRAMS ARE FOR INFORMATION ONLY. THE SUPPLIER SHALL ENSURE THAT THE PLC CODE ON THE EQUIPMENT PROVIDED, MEETS THE REQUIREMENTS BASED ON THE EQUIPMENT PROVIDED.

SUB CONSULTANT		PRIMARY CONSULTANT		DESIGNER/PROGRAMMER		LOCATION NAME		CAD FILE NUMBER	
SEAL/SIGNATURE		LTK Engineering Services		DRAWN: N. EMZ CHECKED: E. RINE METE: M. R. CERANT DATE: JUNE 12, 2017		95TH STREET SUBSTATION		SP/RES:	
ISSUED FOR BID		LTK Engineering Services		METRO ILLINOIS POWER		RECTIFIER PLC LOGIC DIAGRAMS		PROJECT NO. GW425-2710002	
DESCRIPTION		LTK Engineering Services		571 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601		AC BREAKER/CATHODE CLOSE		SHEET NO. SS-11.9-4207	
REV	DATE	BY	APP	DATE: JUNE 12, 2017		SHEET Z OF 4		MILE POST NO. 1.9	

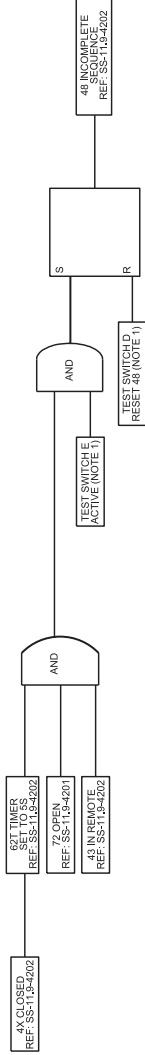
LOCKOUT LOGIC



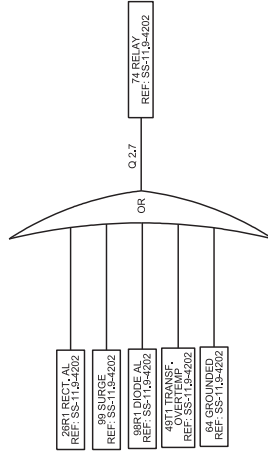
- NOTES:
- TEST SWITCHES SHOWN IN THE LOGIC DIAGRAM SHALL BE SOFTWARE PROGRAMMED ON THE HMI TO BE AVAILABLE. THE FOLLOWING KEYS SHALL BE AVAILABLE:
 - A TRIP AND BLOCK 52R AND 172R
 - B ENABLE TRIP TO 172R
 - C RESET 48 INCOMPLETE SEQUENCE
 - D ENABLE 86 LOCKOUT
 - E 86 LOCKOUT
 - F ENABLE 86 LOCKOUT
 - ALL LOGIC DIAGRAMS ARE FOR INFORMATION ONLY. THE SUPPLIER SHALL ENSURE THAT LOGIC CODE ON THE EQUIPMENT PROVIDED.

REV	DATE	APP	DESCRIPTION	ISSUED FOR BID	BY	DATE	APP	DESCRIPTION	
0	1/29/2017	AA	ER	ISSUED FOR BID					
SUB CONSULTANT				SUB CONSULTANT		SUB CONSULTANT		SUB CONSULTANT	
PRIMARY CONSULTANT				PRIMARY CONSULTANT		PRIMARY CONSULTANT		PRIMARY CONSULTANT	
DESIGNED BY: DREW N. EMZ				DESIGNED BY: DREW N. EMZ		DESIGNED BY: DREW N. EMZ		DESIGNED BY: DREW N. EMZ	
CHECKED BY: MERIT P. S. SZENT				CHECKED BY: MERIT P. S. SZENT		CHECKED BY: MERIT P. S. SZENT		CHECKED BY: MERIT P. S. SZENT	
DATE: JUNE 12, 2017				DATE: JUNE 12, 2017		DATE: JUNE 12, 2017		DATE: JUNE 12, 2017	
									
LTK Engineering Services				Metia		Metia		Metia	
347 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601				347 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601		347 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601		347 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601	
PROJECT NO. GW426-0710002				PROJECT NO. GW426-0710002		PROJECT NO. GW426-0710002		PROJECT NO. GW426-0710002	
SHEET NO. 1/3				SHEET NO. 1/3		SHEET NO. 1/3		SHEET NO. 1/3	
MILE POST NO.				MILE POST NO.		MILE POST NO.		MILE POST NO.	
DISTRICT: SS-11.9-4208				DISTRICT: SS-11.9-4208		DISTRICT: SS-11.9-4208		DISTRICT: SS-11.9-4208	
LOCATION NAME: 95TH STREET SUBSTATION				LOCATION NAME: 95TH STREET SUBSTATION		LOCATION NAME: 95TH STREET SUBSTATION		LOCATION NAME: 95TH STREET SUBSTATION	
TITLE: RECTIFIER PLC LOGIC DIAGRAM 86 LOCKOUT LOGIC SHEET 3 OF 4				TITLE: RECTIFIER PLC LOGIC DIAGRAM 86 LOCKOUT LOGIC SHEET 3 OF 4		TITLE: RECTIFIER PLC LOGIC DIAGRAM 86 LOCKOUT LOGIC SHEET 3 OF 4		TITLE: RECTIFIER PLC LOGIC DIAGRAM 86 LOCKOUT LOGIC SHEET 3 OF 4	
CAD FILE NUMBER:				CAD FILE NUMBER:		CAD FILE NUMBER:		CAD FILE NUMBER:	

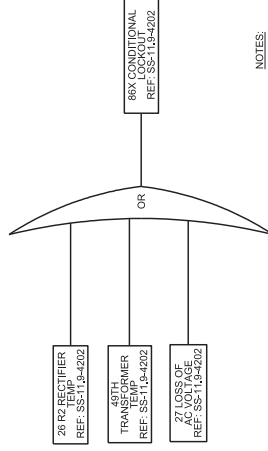
INCOMPLETE SEQUENCE



74 RELAY TROUBLE



CONDITIONAL LOCKOUT



NOTES:

- TEST SWITCHES SHOWN IN THE LOGIC DIAGRAM SHALL BE USED FOR THE ANNUNCIATOR, THE FOLLOWING KEYS SHALL BE AVAILABLE:
 A TRIP AND BLOCK 5ZR AND 17ZR
 B ENABLE TRIP TO 5ZR
 C RESET #8 INCOMPLETE SEQUENCE
 D ENABLE TRIP TO 5ZR
 E RESET #8 INCOMPLETE SEQUENCE
 F ENABLE #8 LOCKOUT
- ALL LOGIC DIAGRAMS ARE FOR INFORMATION ONLY. THE SUPPLIER SHALL ENSURE THAT PLC CODE MATCHES ALL SUPPLIER'S ORIGINAL REQUIREMENTS BASED ON THE EQUIPMENT PROVIDED.

REV	DATE	BY	APP	DESCRIPTION

DESIGNED BY: DREW N. EMZ
 CHECKED BY: MERIN P. S. GOSWAMI
 DATE: JUNE 12, 2017

PRIMARY CONSULTANT
 SEAL/SIGNATURE

SUB CONSULTANT

PRIMARY CONSULTANT
LTK Engineering Services
 LTK ENGINEERING SERVICES
 571 W. JACKSON BOULEVARD
 CHICAGO, ILLINOIS 60601

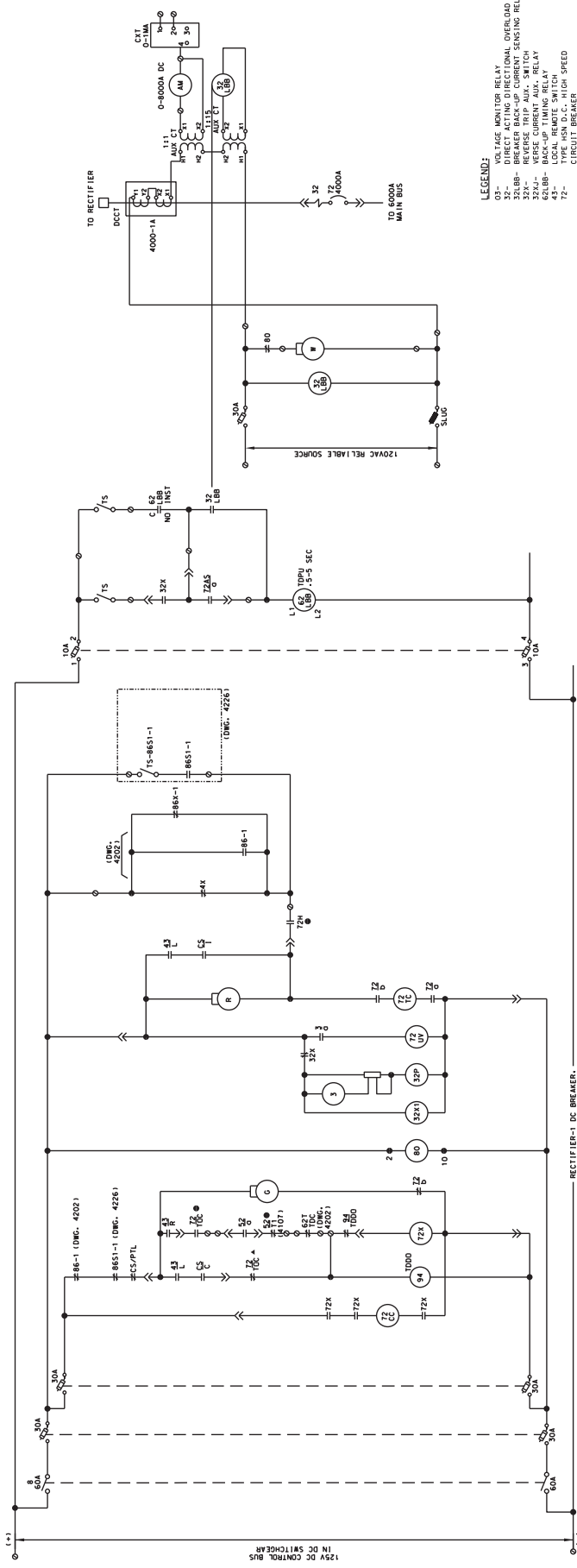
DESIGNED BY: DREW N. EMZ
 CHECKED BY: MERIN P. S. GOSWAMI
 DATE: JUNE 12, 2017

PRIMARY CONSULTANT
LTK Engineering Services
 LTK ENGINEERING SERVICES
 571 W. JACKSON BOULEVARD
 CHICAGO, ILLINOIS 60601

LOCATION NAME: 95TH STREET SUBSTATION
 TITLE: RECTIFIER PLC LOGIC DIAGRAM LOCKOUT AND ALARM LOGIC SHEET 4 OF 4

PROJECT NO.: GW2024-010002
 SHEET NO.: SS-11,9-4209

DATE: JUNE 12, 2017



- LEGEND:**
- D3- VOLTAGE MONITOR RELAY
 - D4- DIRECT ACTING DIRECTIONAL OVERLOAD
 - D5- REVERSE PREP. CURR. OVERLOAD
 - D6- REVERSE PREP. CURR. OVERLOAD
 - D7- REVERSE PREP. CURR. OVERLOAD
 - D8- REVERSE PREP. CURR. OVERLOAD
 - D9- REVERSE PREP. CURR. OVERLOAD
 - D10- REVERSE PREP. CURR. OVERLOAD
 - D11- REVERSE PREP. CURR. OVERLOAD
 - D12- REVERSE PREP. CURR. OVERLOAD
 - D13- REVERSE PREP. CURR. OVERLOAD
 - D14- REVERSE PREP. CURR. OVERLOAD
 - D15- REVERSE PREP. CURR. OVERLOAD
 - D16- REVERSE PREP. CURR. OVERLOAD
 - D17- REVERSE PREP. CURR. OVERLOAD
 - D18- REVERSE PREP. CURR. OVERLOAD
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 - D94- REVERSE PREP. CURR. OVERLOAD
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 - D97- REVERSE PREP. CURR. OVERLOAD
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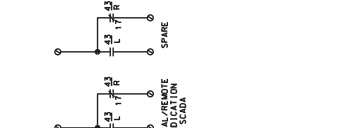
CONTROL SWITCH
DEVICE-43

CONTACTS	POSITION	CLOSE
1-2	TRIP	X
3-4	TRIP	X
5-6	TRIP	X
7-8	TRIP	X
9-10	TRIP	X
11-12	TRIP	X

SELECTOR SWITCH
DEVICE-43

CONTACTS	POSITION	CLOSE
1-2	REMOTE	X
3-4	LOCAL	X
5-6	REMOTE	X
7-8	LOCAL	X
9-10	REMOTE	X
11-12	LOCAL	X

NOTES:
1. ALL EQUIPMENT IS LOCATED IN DC SWGR.
UNLESS OTHERWISE NOTED.



**1500V DC SCHEMATIC DIAGRAM
RECTIFIER BREAKER 724**

LOCATION NAME: 95TH STREET SUBSTATION
TITLE: 1500V DC SCHEMATIC DIAGRAM RECTIFIER BREAKER 724

DESIGNED BY: JC
DRAWN BY: FM
CHECKED BY: FM
DATE: 06/12/2017

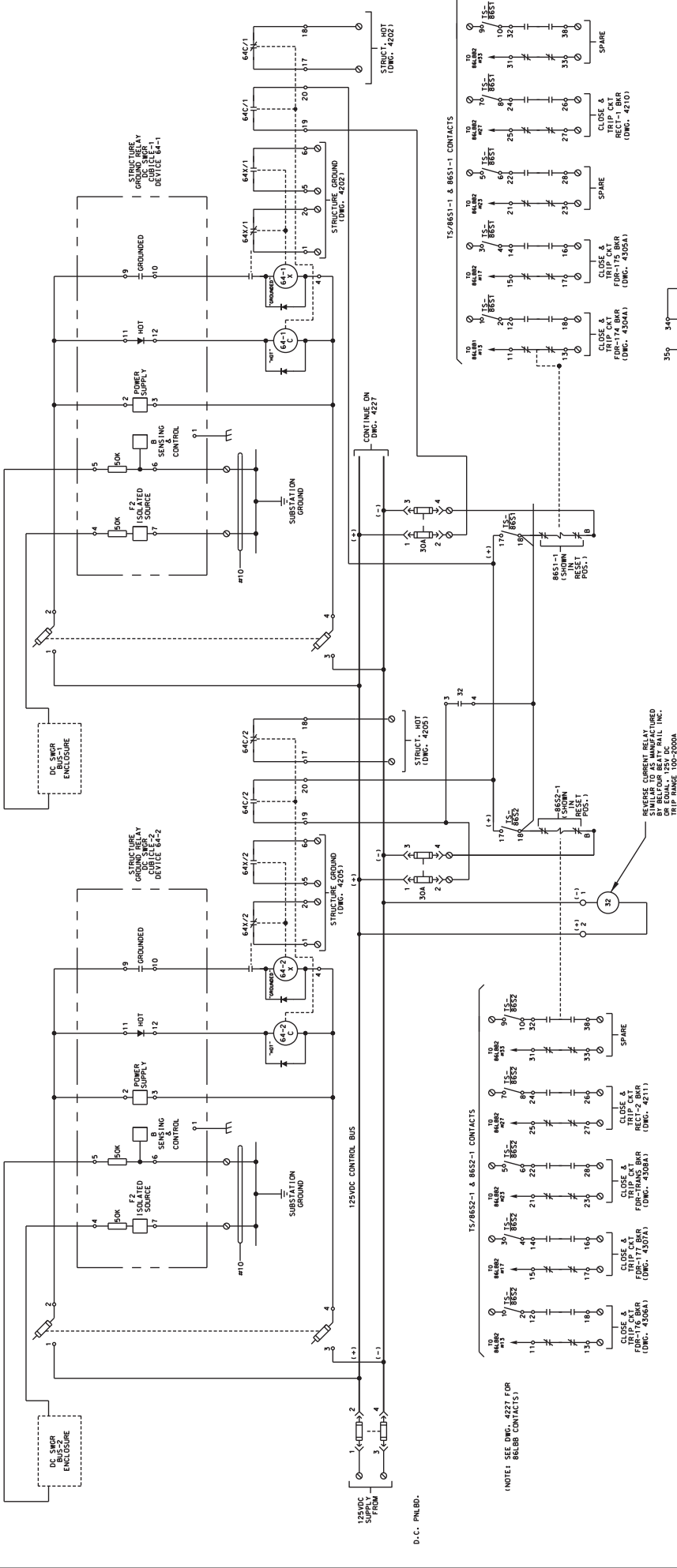
ISSUED FOR BID: 06/12/2017
DATE: 06/12/2017
BY: APP
REV: 1

PROJECT NO.: GMD28-P10002
SHEET NO.: SS-11,9-4210
FILE POST NO.: T/S

CONSULTANT SEAL & SIGNATURE: Gannett Fleming
CONSULTANT: Gannett Fleming
20 N. Wacker Dr., Ste. 4000 Chicago IL 60606

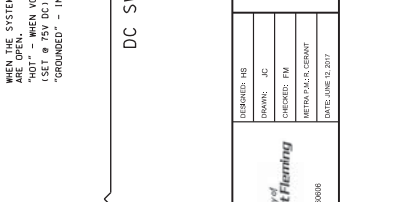
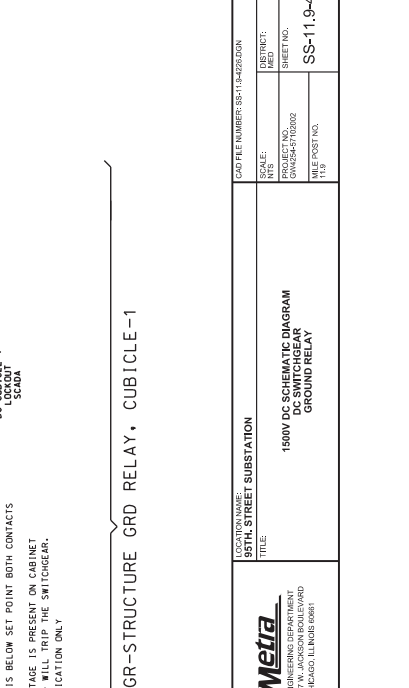
PROJECT NO.: GMD28-P10002
SHEET NO.: SS-11,9-4210
FILE POST NO.: T/S

PRINTED ON 80#115



*** NOTICE:**

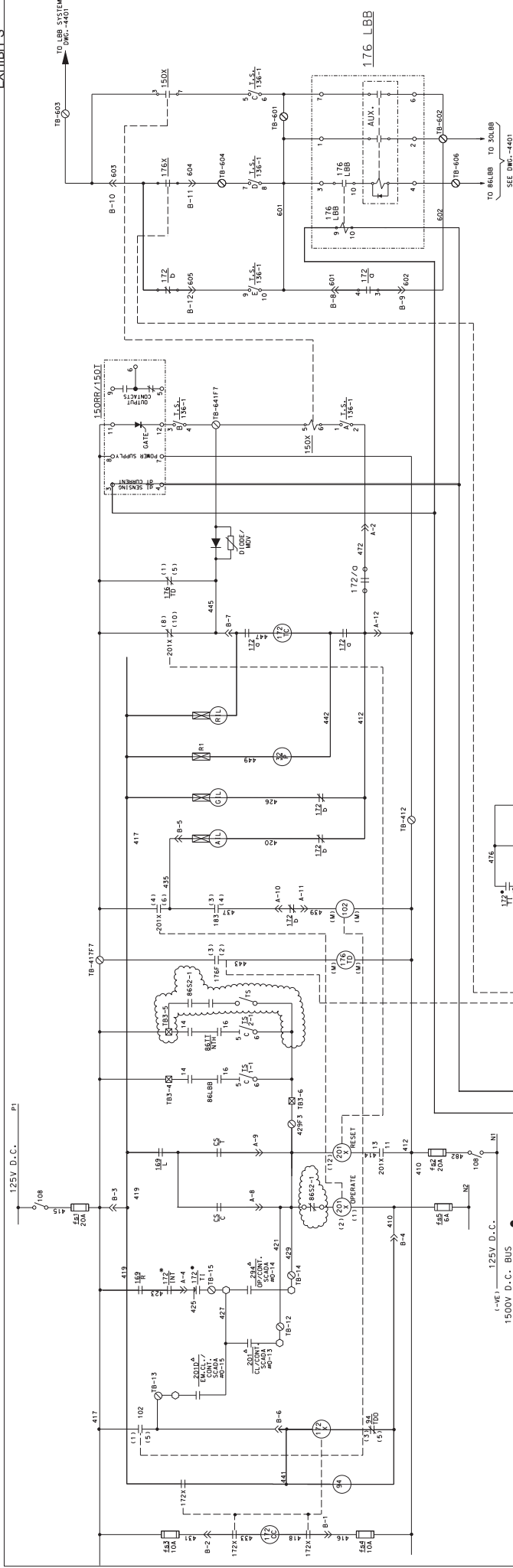
WHEN THE SYSTEM IS BELOW SET POINT BOTH CONTACTS
 "CLOSE" WHEN VOLTAGE IS PRESENT ON CABINET
 ("HOT" WHEN VOLTAGE IS PRESENT ON CABINET
 (SET @ 75V DC) - WILL TRIP THE SWITCHGEAR.
 "GROUNDED" - INDICATION ONLY



DC SWGR-STRUCTURE GRD RELAY, CUBICLE-1

DC SWGR-STRUCTURE GRD RELAY, CUBICLE-2

ISSUED FOR BID		DESCRIPTION	
REV	DATE	BY	APP
0	0/0/2007	HS	
PROJECT NO. GMS28-F10020 SHEET NO. SS-11,9-4226 TITLE DC SCHEMATIC DIAGRAM DC SWITCHGEAR GROUND RELAY			
LOCATION NAME: 95TH STREET SUBSTATION		CD FILE NUMBER: 95-11-14-22600N	
DRAWN: JC CHECKED: FM DATE: 06/15/07		CONSULTANT: Metra 875 W. JACKSON BOULEVARD CHICAGO, ILLINOIS 60606	



NOTES:
 • CONTACT CLOSED IN CONNECTED POSITION OF BREAKER
 • CONTACT OPEN IN CONNECTED POSITION OF BREAKER
 • CONTACT OPEN IN OPEN POSITION OF BREAKER
 • CONTACT CLOSED IN OPEN POSITION OF BREAKER
 • CONTACT OPEN IN OPEN POSITION OF BREAKER
 • CONTACT CLOSED IN OPEN POSITION OF BREAKER

FOR 125V D.C. AND 120V A.C. WIRING USE STANDARD 7/32" DIA. GREY #18

DEVICE LEGEND

DEVICE	DESCRIPTION
300BB	120V D.C. SHUNT
320	120V D.C. SHUNT
328	120V D.C. SHUNT
332	120V D.C. SHUNT
336	120V D.C. SHUNT
340	120V D.C. SHUNT
344	120V D.C. SHUNT
348	120V D.C. SHUNT
352	120V D.C. SHUNT
356	120V D.C. SHUNT
360	120V D.C. SHUNT
364	120V D.C. SHUNT
368	120V D.C. SHUNT
372	120V D.C. SHUNT
376	120V D.C. SHUNT
380	120V D.C. SHUNT
384	120V D.C. SHUNT
388	120V D.C. SHUNT
392	120V D.C. SHUNT
396	120V D.C. SHUNT
400	120V D.C. SHUNT
404	120V D.C. SHUNT
408	120V D.C. SHUNT
412	120V D.C. SHUNT
416	120V D.C. SHUNT
420	120V D.C. SHUNT
424	120V D.C. SHUNT
428	120V D.C. SHUNT
432	120V D.C. SHUNT
436	120V D.C. SHUNT
440	120V D.C. SHUNT
444	120V D.C. SHUNT
448	120V D.C. SHUNT
452	120V D.C. SHUNT
456	120V D.C. SHUNT
460	120V D.C. SHUNT
464	120V D.C. SHUNT
468	120V D.C. SHUNT
472	120V D.C. SHUNT
476	120V D.C. SHUNT
480	120V D.C. SHUNT
484	120V D.C. SHUNT
488	120V D.C. SHUNT
492	120V D.C. SHUNT
496	120V D.C. SHUNT
500	120V D.C. SHUNT
504	120V D.C. SHUNT
508	120V D.C. SHUNT
512	120V D.C. SHUNT
516	120V D.C. SHUNT
520	120V D.C. SHUNT
524	120V D.C. SHUNT
528	120V D.C. SHUNT
532	120V D.C. SHUNT
536	120V D.C. SHUNT
540	120V D.C. SHUNT
544	120V D.C. SHUNT
548	120V D.C. SHUNT
552	120V D.C. SHUNT
556	120V D.C. SHUNT
560	120V D.C. SHUNT
564	120V D.C. SHUNT
568	120V D.C. SHUNT
572	120V D.C. SHUNT
576	120V D.C. SHUNT
580	120V D.C. SHUNT
584	120V D.C. SHUNT
588	120V D.C. SHUNT
592	120V D.C. SHUNT
596	120V D.C. SHUNT
600	120V D.C. SHUNT
604	120V D.C. SHUNT
608	120V D.C. SHUNT
612	120V D.C. SHUNT
616	120V D.C. SHUNT
620	120V D.C. SHUNT
624	120V D.C. SHUNT
628	120V D.C. SHUNT
632	120V D.C. SHUNT
636	120V D.C. SHUNT
640	120V D.C. SHUNT
644	120V D.C. SHUNT
648	120V D.C. SHUNT
652	120V D.C. SHUNT
656	120V D.C. SHUNT
660	120V D.C. SHUNT
664	120V D.C. SHUNT
668	120V D.C. SHUNT
672	120V D.C. SHUNT
676	120V D.C. SHUNT
680	120V D.C. SHUNT
684	120V D.C. SHUNT
688	120V D.C. SHUNT
692	120V D.C. SHUNT
696	120V D.C. SHUNT
700	120V D.C. SHUNT
704	120V D.C. SHUNT
708	120V D.C. SHUNT
712	120V D.C. SHUNT
716	120V D.C. SHUNT
720	120V D.C. SHUNT
724	120V D.C. SHUNT
728	120V D.C. SHUNT
732	120V D.C. SHUNT
736	120V D.C. SHUNT
740	120V D.C. SHUNT
744	120V D.C. SHUNT
748	120V D.C. SHUNT
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840	120V D.C. SHUNT
844	120V D.C. SHUNT
848	120V D.C. SHUNT
852	120V D.C. SHUNT
856	120V D.C. SHUNT
860	120V D.C. SHUNT
864	120V D.C. SHUNT
868	120V D.C. SHUNT
872	120V D.C. SHUNT
876	120V D.C. SHUNT
880	120V D.C. SHUNT
884	120V D.C. SHUNT
888	120V D.C. SHUNT
892	120V D.C. SHUNT
896	120V D.C. SHUNT
900	120V D.C. SHUNT
904	120V D.C. SHUNT
908	120V D.C. SHUNT
912	120V D.C. SHUNT
916	120V D.C. SHUNT
920	120V D.C. SHUNT
924	120V D.C. SHUNT
928	120V D.C. SHUNT
932	120V D.C. SHUNT
936	120V D.C. SHUNT
940	120V D.C. SHUNT
944	120V D.C. SHUNT
948	120V D.C. SHUNT
952	120V D.C. SHUNT
956	120V D.C. SHUNT
960	120V D.C. SHUNT
964	120V D.C. SHUNT
968	120V D.C. SHUNT
972	120V D.C. SHUNT
976	120V D.C. SHUNT
980	120V D.C. SHUNT
984	120V D.C. SHUNT
988	120V D.C. SHUNT
992	120V D.C. SHUNT
996	120V D.C. SHUNT
1000	120V D.C. SHUNT

CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT

LEGEND

- TERMINAL POINT AT 1500 V D.C. SWITCHGEAR
- ⊗ TERMINAL POINT AT 12.4 KV A.C. SWITCHGEAR
- ⊠ TERMINAL POINT AT 4 KV A.C. SWITCHGEAR
- ⊡ TERMINAL POINT AT RECTIFIER CONTROL PANEL
- ⊞ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
- ⊞ TERMINAL POINT AT TRANSFER TRIP & LBB SWITCHBOARD
- TERMINAL POINT AT SUPERVISORY CONTROL CABINET
- ⊠ TERMINAL POINT AT BUS FAULT RELAY PANEL OR CONTROL SWITCHBOARD OR OTHER MISC. PANELS.

1500V D.C. SWITCHGEAR CHICAGO, ILLINOIS

D.C. FOR SCHEMATIC DIAGRAM

95th STREET TIE STATION

DATE: 11/15/55

REVISION: 1

BY: M.E.D.

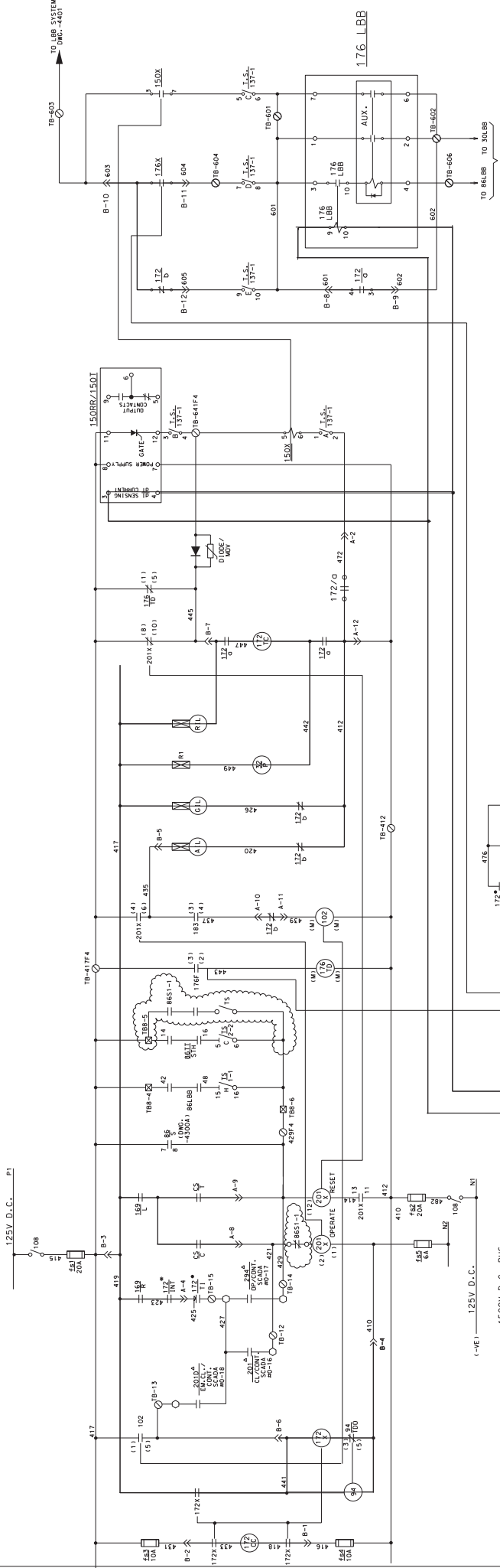
SS-11-9-4302A

DEVICE LEGEND

REFERENCE	DESCRIPTION
A	WATER-O-RODA 10-24-F507 RECT.
AIL	AMBER INDICATION LAMP - AUTO CLOSE
ASC	120V, 60HZ. SIGNAL CONDITIONER
ASG	120V, 60HZ. SIGNAL CONDITIONER
AXD	SPLIT CORE D.C. CURRENT TRANSFORMER
C	CLOSING COIL
CC	CLOSING COIL
DCCT	D.C. CURRENT TRANSFORMER, 1000V/1A
DCC	D.C. CURRENT TRANSFORMER, 1000V/1A
DCV	D.C. VOLTS CALIBRATOR
DCVT	D.C. VOLTS CALIBRATOR
DIDU/ADV	DIRECT READING 600W MOVING COIL LONG SCALE
GIL	GREEN INDICATION LAMP - C.B. OPEN, 125V
I.C.T.	LOCAL CONTROL TRANSFORMER
LBB	LOCAL BREAKER BACKUP
OP	OPERATE
RE	RESET
RIL	RED INDICATION LAMP - C.B. CLOSED, 125V
SHUNT	SWITCHBOARD D.C. SHUNT
TL	TEST SWITCH
T	TRANSFER TRIP
V	DIRECT READING 600W MOVING COIL LONG SCALE
WV1	ATTENUATOR, 20W, D.C. OHM VARIABLE
WV2	FEEDER VOLTAGE TRANSFORMER

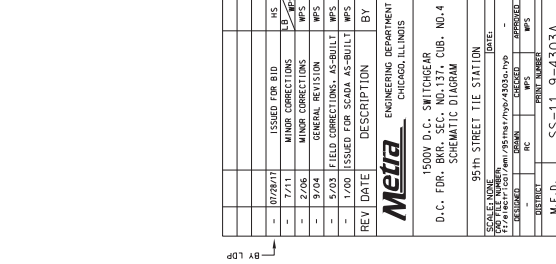
DEVICE LEGEND

DEVICE	DESCRIPTION
300BB	LBB ANNUNCIATOR (BATTERY RELAY)
320	FLAG INDICATION RELAY FOR LOSS OF 230V VOLTAGE
328	GROUND FAULT SENSING RELAY (BUS 2)
336	GROUND FAULT SENSING RELAY (BUS 2)
344	AUX. RELAY FOR GROUND FAULT TRANSFER TRIP
352	TRANSFER TRIP LOCKOUT RELAY (MANUAL RESET)
360	TRANSFER TRIP LOCKOUT RELAY (ELECT. RESET)
368	TRANSFER TRIP LOCKOUT RELAY (PUMP RELAY)
376	CLOSING COIL FOR HNTI-PUMP RELAY
384	RETRIGGERING TIMER
392	RETRIGGERING TIMER
400	1500V D.C. VOLTAGE MEASURING ISOLATOR
408	A.C. SUPPLY CHANGE OVER RELAY "SMARTZ"
416	RATE OF RISE OVERCURRENT RELAY "SMARTZ"
424	AUTOMATIC RELAY FOR LBB ON 1500V/150T
432	LOCAL - REMOTE SWITCH
440	D.C. FEEDER BREAKER
448	BREAKER OPEN-CLOSE STATUS SWITCH
456	BREAKER OPEN-CLOSE STATUS SWITCH
464	BREAKER OPEN-CLOSE STATUS SWITCH
472	BREAKER OPEN-CLOSE STATUS SWITCH
480	SHUNT TRIP COIL, 125V D.C., 20 OHMS
488	SHUNT TRIP COIL, 125V D.C., 20 OHMS
496	SHUNT TRIP COIL, 125V D.C., 20 OHMS
504	SHUNT TRIP COIL, 125V D.C., 20 OHMS
512	SHUNT TRIP COIL, 125V D.C., 20 OHMS
520	SHUNT TRIP COIL, 125V D.C., 20 OHMS
528	SHUNT TRIP COIL, 125V D.C., 20 OHMS
536	SHUNT TRIP COIL, 125V D.C., 20 OHMS
544	SHUNT TRIP COIL, 125V D.C., 20 OHMS
552	SHUNT TRIP COIL, 125V D.C., 20 OHMS
560	SHUNT TRIP COIL, 125V D.C., 20 OHMS
568	SHUNT TRIP COIL, 125V D.C., 20 OHMS
576	SHUNT TRIP COIL, 125V D.C., 20 OHMS
584	SHUNT TRIP COIL, 125V D.C., 20 OHMS
592	SHUNT TRIP COIL, 125V D.C., 20 OHMS
600	SHUNT TRIP COIL, 125V D.C., 20 OHMS
608	SHUNT TRIP COIL, 125V D.C., 20 OHMS
616	SHUNT TRIP COIL, 125V D.C., 20 OHMS
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696	SHUNT TRIP COIL, 125V D.C., 20 OHMS
704	SHUNT TRIP COIL, 125V D.C., 20 OHMS
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768	SHUNT TRIP COIL, 125V D.C., 20 OHMS
776	SHUNT TRIP COIL, 125V D.C., 20 OHMS
784	SHUNT TRIP COIL, 125V D.C., 20 OHMS
792	SHUNT TRIP COIL, 125V D.C., 20 OHMS
800	SHUNT TRIP COIL, 125V D.C., 20 OHMS
808	SHUNT TRIP COIL, 125V D.C., 20 OHMS
816	SHUNT TRIP COIL, 125V D.C., 20 OHMS
824	SHUNT TRIP COIL, 125V D.C., 20 OHMS
832	SHUNT TRIP COIL, 125V D.C., 20 OHMS
840	SHUNT TRIP COIL, 125V D.C., 20 OHMS
848	SHUNT TRIP COIL, 125V D.C., 20 OHMS
856	SHUNT TRIP COIL, 125V D.C., 20 OHMS
864	SHUNT TRIP COIL, 125V D.C., 20 OHMS
872	SHUNT TRIP COIL, 125V D.C., 20 OHMS
880	SHUNT TRIP COIL, 125V D.C., 20 OHMS
888	SHUNT TRIP COIL, 125V D.C., 20 OHMS
896	SHUNT TRIP COIL, 125V D.C., 20 OHMS
904	SHUNT TRIP COIL, 125V D.C., 20 OHMS
912	SHUNT TRIP COIL, 125V D.C., 20 OHMS
920	SHUNT TRIP COIL, 125V D.C., 20 OHMS
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952	SHUNT TRIP COIL, 125V D.C., 20 OHMS
960	SHUNT TRIP COIL, 125V D.C., 20 OHMS
968	SHUNT TRIP COIL, 125V D.C., 20 OHMS
976	SHUNT TRIP COIL, 125V D.C., 20 OHMS
984	SHUNT TRIP COIL, 125V D.C., 20 OHMS
992	SHUNT TRIP COIL, 125V D.C., 20 OHMS
996	SHUNT TRIP COIL, 125V D.C., 20 OHMS
1000	SHUNT TRIP COIL, 125V D.C., 20 OHMS



NOTES:
 • CONTACT CLOSED IN CONNECTED POSITION OF BREAKER
 • CONTACT OPEN IN DISCONNECTED POSITION OF BREAKER
 • CONTACT CLOSED WHEN INTERLOCK LEVER IN DOWN POSITION
 • EQUIPMENT IN SUPERVISORY CABINET
 • CONTACT CLOSED IN DISCONNECTED POSITION OF BREAKER
 • CONTACT OPEN IN DISCONNECTED POSITION OF BREAKER
 • CONTACT CLOSED WHEN INTERLOCK LEVER IN DOWN POSITION
 • EQUIPMENT IN SUPERVISORY CABINET
 • CONTACT CLOSED IN DISCONNECTED POSITION OF BREAKER
 • CONTACT OPEN IN DISCONNECTED POSITION OF BREAKER
 • CONTACT CLOSED WHEN INTERLOCK LEVER IN DOWN POSITION
 • EQUIPMENT IN SUPERVISORY CABINET

FOR 125V D.C. AND 120V A.C. WIRING USE STANDARDS 7/0-57mm GREY WIRE



DEVICE LEGEND

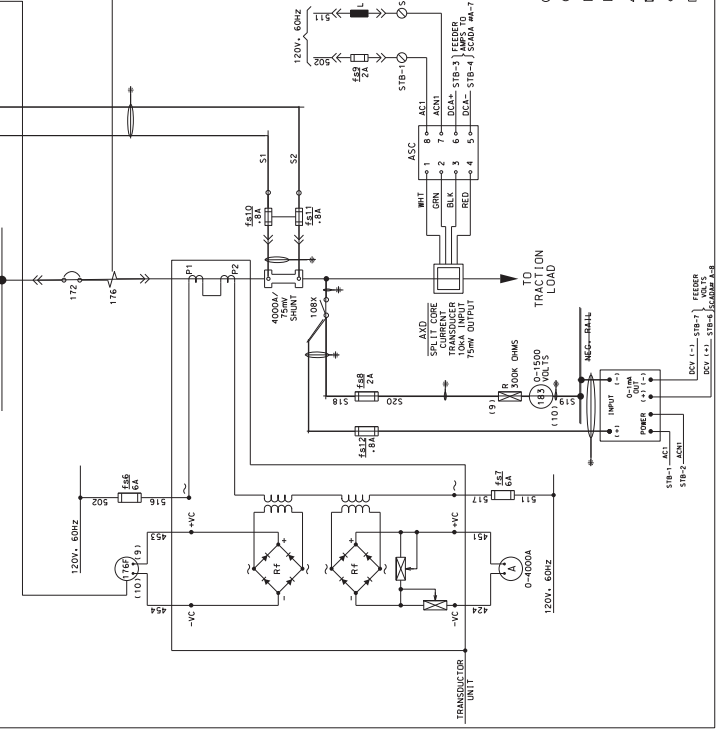
DEVICE	DESCRIPTION
30LBB	LBB ANNUNCIATOR TARGET RELAY
32P	125V D.C. COIL FOR 176 TRIPPING 125V D.C.
32X	FLAG INDICATION RELAY FOR LOSS OF 2SP VOLTAGE
36B	GROUND FAULT SENSING RELAY (GFS. 2)
6402	GROUND FAULT SENSING RELAY (GFS. 2)
6404	AUX. RELAY FOR GROUND FAULT TRANSFER TRIP
6670B	TRANSFER TRIP LOCKOUT RELAY (MANUAL RESET)
6672B	TRANSFER TRIP LOCKOUT RELAY (ELECT. RESET)
8611	TRANSFER TRIP LOCKOUT RELAY (ELECT. RESET)
94	CLOSING COIL FOR INTI-PUMP RELAY
94TT	TRANSFER TRIP OUTPUT RELAY
102	RECLUSING TIMER
108	125V D.C. COIL FOR 176
127	A.C. SUPPLY CHANGE OVER RELAY
150R	RATE OF RISE OVERCURRENT RELAY - S.M.B.R.I.Z.
150T	AUX. OVERCURRENT RELAY ON 150R/150T
169	LOCAL - REMOTE SWITCH
172	D.C. FEEDER BREAKER
172P-D	BREAKER OPEN-CLOSE STATUS SWITCH
172P-S	BREAKER OPEN-CLOSE STATUS SWITCH
17211	BREAKER CARTRIDGE POSITION SWITCH
17212	SHUNT TRIP COIL - 125V D.C. - 20 OHMS
1721C	AUX. SHUNT TRIP COIL - 125V D.C. - 20 OHMS
176	MAGNETIC SERIES TRIP D/C DEVICE
176P	D/C RELAY (20-6000A - SCALE 120V, 600A)
176LBB	LBB D.C. CURRENT SENSING RELAY
176X	IN-CASE-OF-FIRE (ICOFF) MESSAGING RELAY
183	VOLTAGE MESSAGING TRANSFER RELAY
201	SUPERVISORY CLOSE RELAY (REMOTE CONTACT)
201X	EMERGENCY CLOSE RELAY (REMOTE CONTACT)
201K	BREAKER MASTER CONTROL RELAY (LATCHING TYPE)
301TT	CONTROL SWITCH (FB TRANSFER TRIP P1-2/35)

DEVICE LEGEND

REFERENCE	DESCRIPTION
A	NAMEPLATE 0-4000A (0-25/50) RECT.
AIL	AMBER INDICATION LAMP - AUTO CLOSE
ASC	IN OPERATION - 125V CONDITIONER
ASC	SPLIT CORE D.C. CURRENT TRANSFORMER
C	CLOSE
CC	CLOSING COIL - TRIP-NEUTRAL-CLOSE
DCCT	D.C. CURRENT TRANSDUCER - 3000V/1A
DCSC	120V, 600A SIGNAL CONDITIONER
DCVC	D.C. VOLTS CALIBRATOR
DIODE/AND	D.C. VOLTS TRANSDUCER
GIL	GREEN INDICATION LAMP - C.B. OPEN - 125V
I.C.T.	LOCAL CENTER CURRENT TRANSFORMER
LBB	LOCAL BREAKER BACKUP
OP	OPERATE
RE	RESET
RIL	RED INDICATION LAMP - C.B. CLOSED - 125V
SHUNT	SWITCHING D.C. SHUNT
T	TEST SWITCH
T.S.	TEST LINK
TRIP	TRANSFER TRIP
V	DIODE READING 600V MOVING COIL LONG SCALE
VFI	ATTENUATOR - 20W, D.C. OHM VARIABLE
VFD	FEEDER VOLTAGE TRANSDUCER

CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT

- LEGEND
- TERMINAL POINT AT 1500V D.C. SWITCHGEAR
 - ⊗ TERMINAL POINT AT 12.4 KV A.C. SWITCHGEAR
 - ⊠ TERMINAL POINT AT 4 KV A.C. SWITCHGEAR
 - ⊡ TERMINAL POINT AT RECTIFIER CONTROL PANEL
 - ⊓ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
 - ⊔ TERMINAL POINT AT TRANSFER TRIP & LBB SWITCHBOARD
 - TERMINAL POINT AT SUPERVISORY CONTROL CABINET
 - ⊞ TERMINAL POINT AT BUS FAULT RELAY PANEL OR CONTROL SWITCHBOARD OR OTHER MISC. PANELS.



95TH STREET TIE STATION

DATE	DESCRIPTION	BY
07/29/11	ISSUED FOR BID	HS
7/11	MINOR CORRECTIONS	WPS
2/06	GENERAL REVISION	WPS
9/04	FIELD CORRECTIONS, AS-BUILT	WPS
5/03	FIELD CORRECTIONS, AS-BUILT	WPS
1/00	ISSUED FOR SCADA AS-BUILT	WPS

1500V D.C. SWITCHGEAR
 D.C. FOR SCHEMATIC DIAGRAM

95TH STREET TIE STATION

DATE: 07/29/11
 DRAWN BY: HS
 CHECKED BY: WPS
 APPROVED BY: WPS

DESIGN NUMBER: 1500V D.C. SWITCHGEAR
 PROJECT NUMBER: 1500V D.C. SWITCHGEAR

ISSUED FOR BID

MINOR CORRECTIONS

GENERAL REVISION

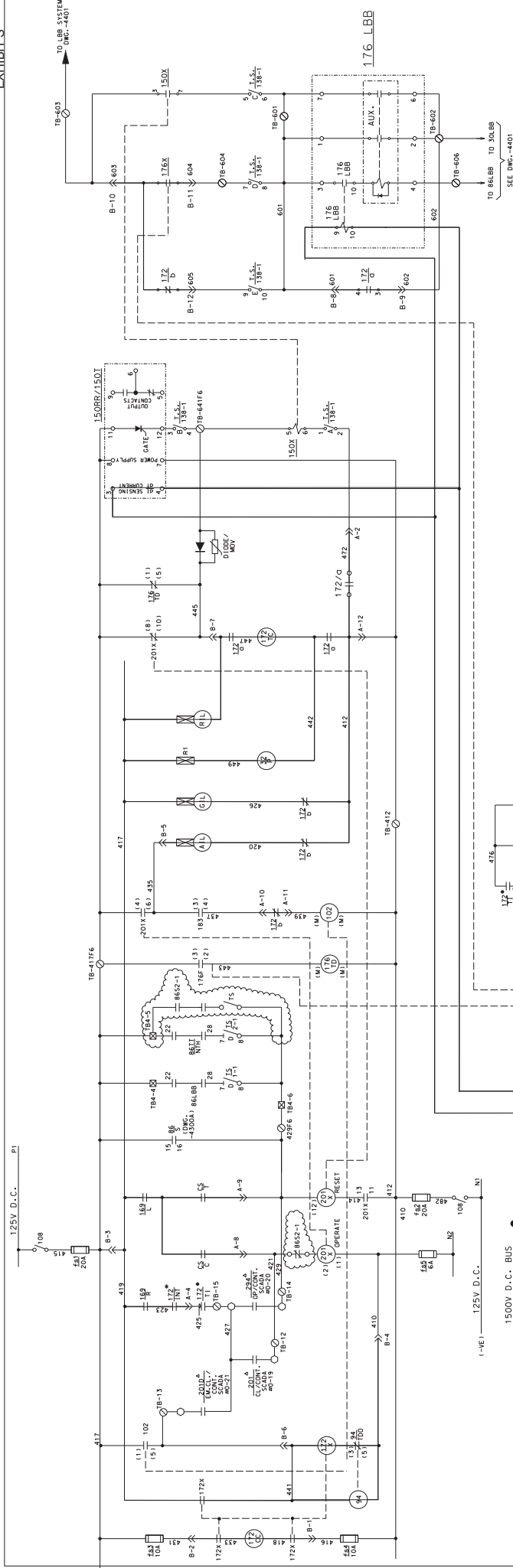
FIELD CORRECTIONS, AS-BUILT

FIELD CORRECTIONS, AS-BUILT

ISSUED FOR SCADA AS-BUILT

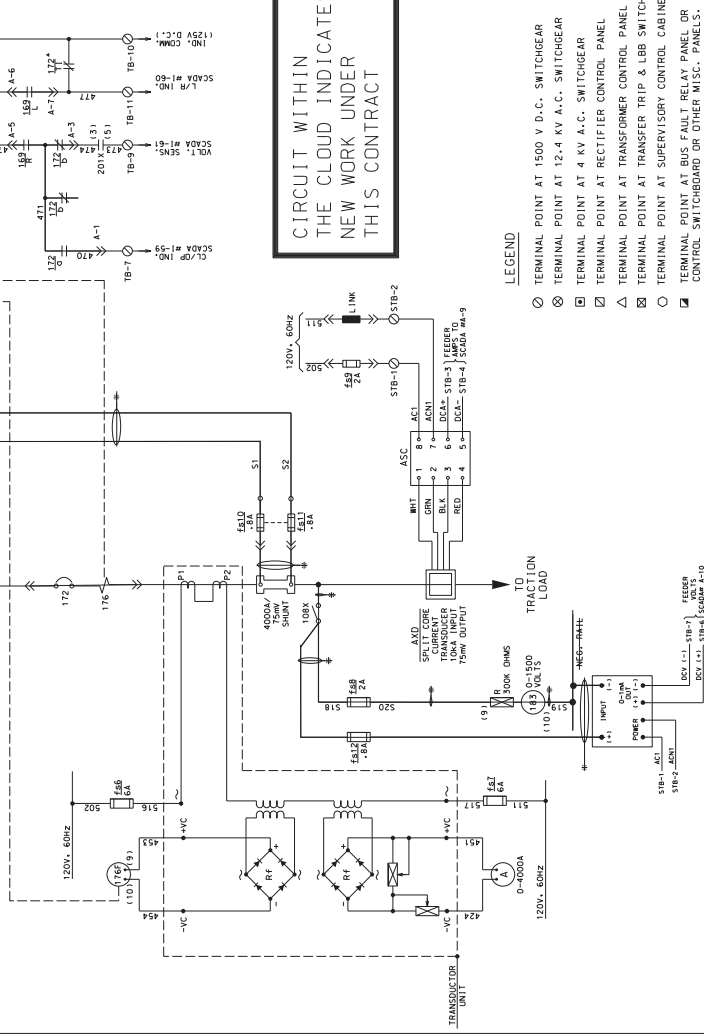
MEGA ENGINEERING DEPARTMENT
 CHICAGO, ILLINOIS

SS-11.9-4303A



NOTES:
 • CONTACT CLOSED IN CONNECTED POSITION OF BREAKER
 • CONTACT CLOSED WHEN INTERLOCK LEVER IN DOWN POSITION
 • EQUIPMENT IN SUPERVISORY CABINET
 • SCADA IN 1500V D.C. BUS

FOR 125V D.C. AND 120V A.C. WIRING USE STANDARD 7/16 67mm GREY WIRE



CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT

DEVICE	DESCRIPTION
30LBB	LBB ANNUNCIATOR TARGET RELAY
32P	32P INDICATION RELAY FOR LOSS OF 2SP VOLTAGE
32X	32X INDICATION RELAY FOR LOSS OF 2SP VOLTAGE
32Y	32Y INDICATION RELAY FOR LOSS OF 2SP VOLTAGE
6402	GROUND FAULT SENSING RELAY (BUS 2)
644X	AUX. RELAY FOR GROUND FAULT TRANSFER TRIP
667A	TRANSFER TRIP LOCKOUT RELAY (MANUAL RESET)
667B	TRANSFER TRIP LOCKOUT RELAY (ELECT. RESET)
861T	CLOSING COIL OUT OF (ANTI-PUMP) RELAY
941T	TRANSFER TRIP OUTPUT RELAY
102	RELEASING TIMER
108	120V D.C. CONTACT MEASURING ISOLATOR
127	A.C. SUPPLY CHANGE OVER RELAY
150RR	RATE OF RISE OVERCURRENT RELAY - SBRATZ
150T	LINE OVERCURRENT RELAY ON 1500V/150T
169	LOCAL - REMOTE SWITCH
172	D.C. FEEDER BREAKER
172P-5	BREAKER OPEN-CLOSE STATUS SWITCH
172P-6	BREAKER OPEN-CLOSE STATUS SWITCH
172T1	BREAKER CARRIER POSITION SWITCH
172T2	SHUNT TRIP COIL, 125V D.C., 20 OHMS
172T3	AUXILIARY CLOSING COIL, 125V D.C.
176	MAGNETIC SERIES TRIP OVC DEVICE
176P	OVC RELAY TO SCADA - SCALE 120V, 60W+
176LBB	LBB D.C. CURRENT SENSING RELAY AT 20 SEC.
176X	IN CASE OF HIGH LIFE-TO-FAILURE - TEST TRIP
176Y	VOLTAGE MEASURING TRANSFER RELAY
20T	SUPERVISORY CLOSE RELAY (REMOTE CONTACT)
201X	BREAKER MASTER CONTROL RELAY (LATCHING TYPE)
201Y	BREAKER MASTER CONTROL RELAY (LATCHING TYPE)
201Z	CONTROL SWITCH (BP TRANSFER TRIP BY-2/255)

REFERENCE	DESCRIPTION
A	NAMEPLATE, 0-4000A (0-24250) RECT.
AIL	AMBER INDICATION LAMP - AUTO CLOSE
ASC	IN OPERATION, 125V, CONDITIOENER
AXD	SPLIT CORE D.C. CURRENT TRANSFORMER
C	CLOSING COIL
CC	CLOSING COIL, TRIP-NEUTRAL-CLOSE
DCSC	D.C. CURRENT SIGNAL CONDITIONER
DOVC	D.C. VOLTS CALIBRATOR
DYD	D.C. VOLTS TRANSDUCER
GIL	GREEN INDICATION LAMP - C.B. OPEN, 125V
I.C.T.	LOCAL CONTROL CURRENT TRANSFORMER
LBB	LOCAL BREAKER BACKUP
OP	OPERATE
RE	RESET
RIL	RED INDICATION LAMP - C.B. CLOSED, 125V
SHUNT	SWITCHBOARD D.C. SHUNT
T	TEST SWITCH
T-1	TRANSFORMER
V	VOLTS READING
VPI	ATTENUATOR, 20W, D.C. DM VARIABLE
VTD	FEEDER VOLTAGE TRANSDUCER

- LEGEND
- ⊙ TERMINAL POINT AT 1500V D.C. SWITCHGEAR
 - ⊗ TERMINAL POINT AT 12.4 KV A.C. SWITCHGEAR
 - ⊠ TERMINAL POINT AT 4KV A.C. SWITCHGEAR
 - ⊡ TERMINAL POINT AT RECTIFIER CONTROL PANEL
 - ⊞ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
 - ⊕ TERMINAL POINT AT SUPERVISORY CONTROL CABINET
 - ⊖ TERMINAL POINT AT BUS FAULT RELAY PANEL OR CONTROL SWITCHBOARD OR OTHER MISC. PANELS.

DEVICE LEGEND

DEVICE LEGEND

REV	DATE	DESCRIPTION	BY
01/29/11		ISSUED FOR BID	HS
-	7/11	MINOR CORRECTIONS	WPS
-	2/06	GENERAL REVISION	WPS
-	9/04	FIELD CORRECTIONS, AS-BUILT	WPS
-	5/03	FIELD CORRECTIONS, AS-BUILT	WPS
-	1/00	ISSUED FOR SCADA AS-BUILT	WPS

1500V D.C. SWITCHGEAR
 D.C. FOR SCHEMATIC DIAGRAM

95TH STREET TIE STATION
 CHICAGO, ILLINOIS

METRA ENGINEERING DEPARTMENT

1500V D.C. SWITCHGEAR
 D.C. FOR SCHEMATIC DIAGRAM

95TH STREET TIE STATION
 CHICAGO, ILLINOIS

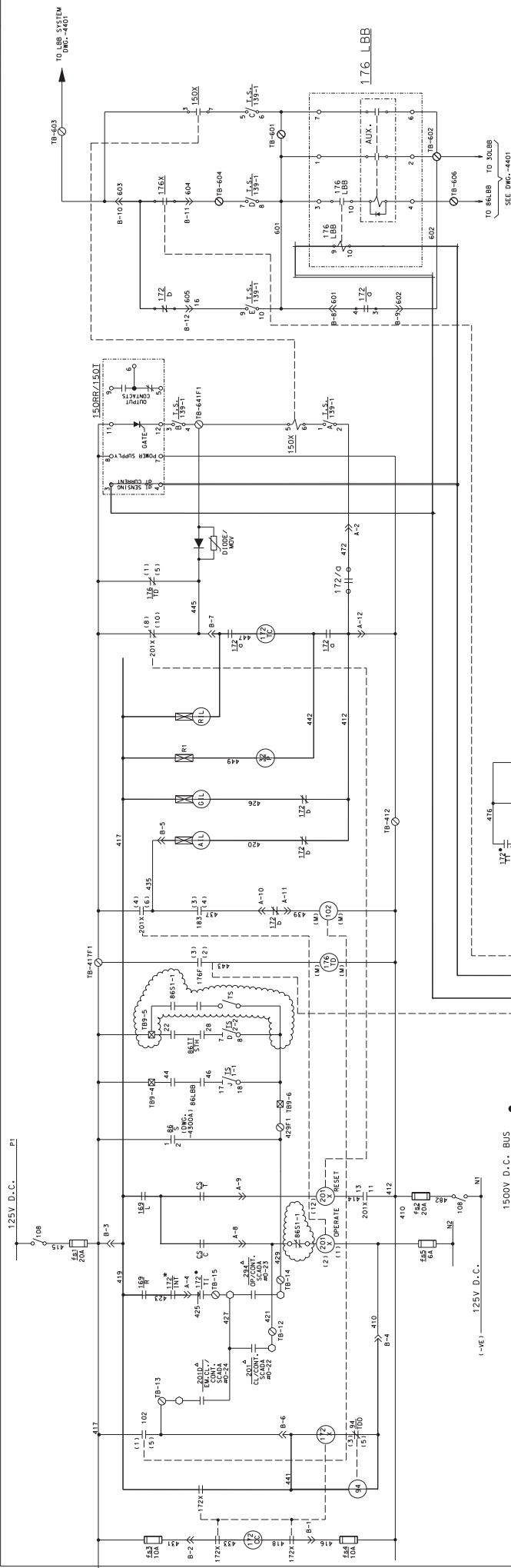
DATE: 01/29/11
 DRAWING NO: 176-11-9-4304A
 PROJECT NO: 176-11-9-4304A
 SHEET NO: 176-11-9-4304A-10

DESIGNED BY: WPS
 CHECKED BY: WPS
 IN CHARGE: WPS
 APPROVED BY: WPS

JOB NO: 176-11-9-4304A
 SHEET NO: 176-11-9-4304A-10

DATE: 01/29/11

176-11-9-4304A

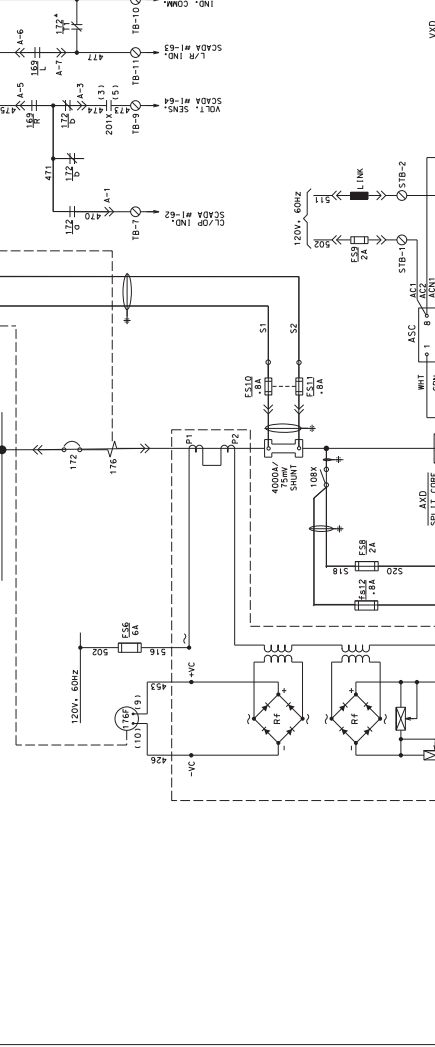


DEVICE LEGEND

REFERENCE	DESCRIPTION
A	AMMETER 0-600A 120V D.C. RECT.
AL	ALARM INDICATION LAMP - AUTO CLOSE
ASC	D.C. CURRENT SIGNAL TRANSFORMER
ASD	SPLIT CORE D.C. CURRENT TRANSFORMER
CC	CLOSING COIL
CCCT	D.C. CURRENT TRANSFORMER, 5000V/1A
CCS	D.C. CURRENT SIGNAL CONTROLLER
DCS	D.C. VOLTS CALIBRATOR
DCS	D.C. VOLTS CALIBRATOR
DIR	DIRECTIONAL BLOCKING DEVICE
DIO	DIRECTIONAL BLOCKING DEVICE
GIL	GENERAL INDICATION LAMP - C.B. OPEN, 125V
L.C.L.	LOCAL - REMOTE SWITCH
LSB	LOCAL BREAKER BACKUP
OP	OPERATE CONTROL WIRE
RE	RESET CONTROL WIRE
RE	RESET CONTROL WIRE
SHUNT	SHUNT CURRENT SIGNAL CONTROLLER
TRIP	TRIP
T.S.	TEST SWITCH
TT	TRANSFER TRIP
V	VOLTS INDICATOR
V	VOLTS INDICATOR
VVD	FEEDER VOLTAGE TRANSFORMER

LEGEND

- ⊗ TERMINAL POINT AT 1500 V D.C. SWITCHGEAR
- ⊙ TERMINAL POINT AT 12.4 KV A.C. SWITCHGEAR
- ⊚ TERMINAL POINT AT 4 KV A.C. SWITCHGEAR
- △ TERMINAL POINT AT RECTIFIER CONTROL PANEL
- ⊞ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
- ⊟ TERMINAL POINT AT SUPERVISORY CONTROL CABINET
- ⊠ TERMINAL POINT AT BUS FAULT RELAY PANEL OR CONTROL SWITCHBOARD OR OTHER MISC. PANELS.



REVISIONS

NO.	DATE	DESCRIPTION	BY
1	07/29/71	ISSUED FOR BID	HS
2	7/11	MINOR CORRECTIONS	HS
3	9/04	GENERAL REVISIONS	WPS
4	5/03	FIELD CORRECTIONS, AS-BUILT	WPS
5	1/00	ISSUED FOR SADA AS-BUILT	WPS

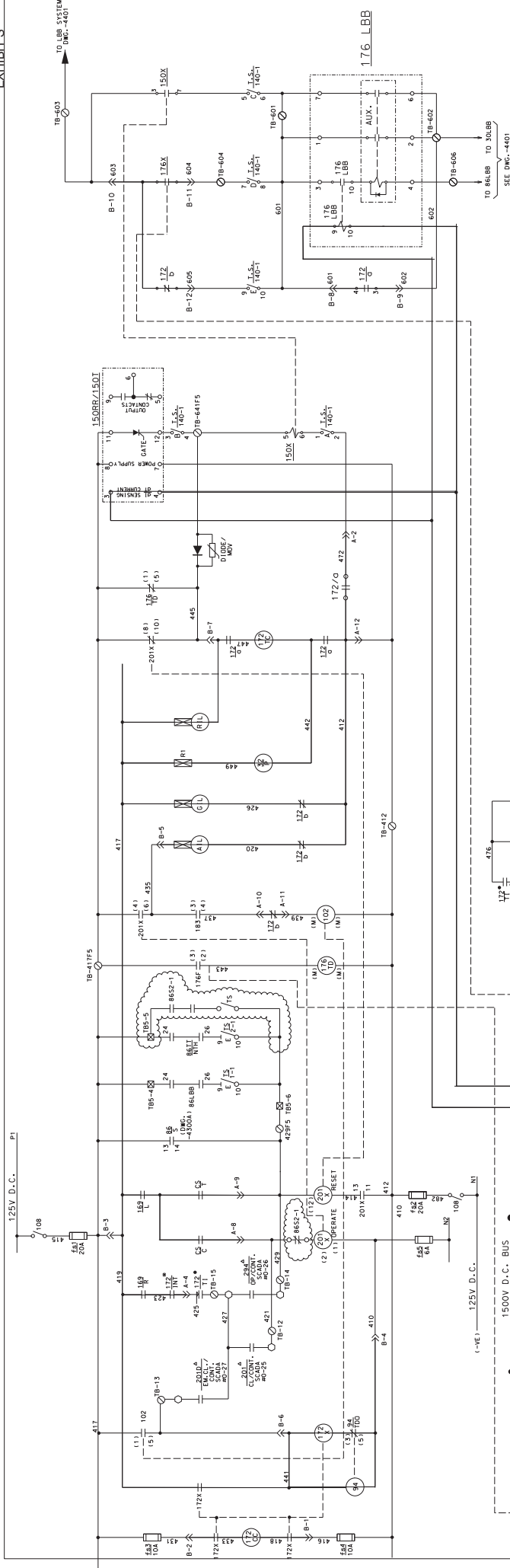
MECLA ENGINEERING DEPARTMENT
CHICAGO, ILLINOIS

1500V D.C. SWITCHGEAR
D.C. FOR SCHEMATIC DIAGRAM

95TH STREET TIE STATION

DATE: 11/17/71
DRAWN BY: HS
CHECKED BY: WPS
APPROVED BY: WPS

PROJECT NUMBER: SS-11-9-4305A
M.E.D.



NOTES:

- CONTACT CLOSED IN CONNECTED POSITION OF BREAKER
- CONTACT OPEN IN CONNECTED POSITION OF BREAKER
- CONTACT CLOSED WHEN INTERLOCK LEVER IN DOWN POSITION
- CONTACT OPEN WHEN INTERLOCK LEVER IN UP POSITION
- THESE WIRING CONNECTIONS ARE TO BE SEPARATED AND RE-SEPARATED AS NECESSARY TO ACCOMMODATE THE REPAIR OF THE EQUIPMENT.

FOR 125V D.C. AND 120V A.C. WIRING USE STANDARD 170-67mm GREY WIRE

CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT

DEVICE LEGEND

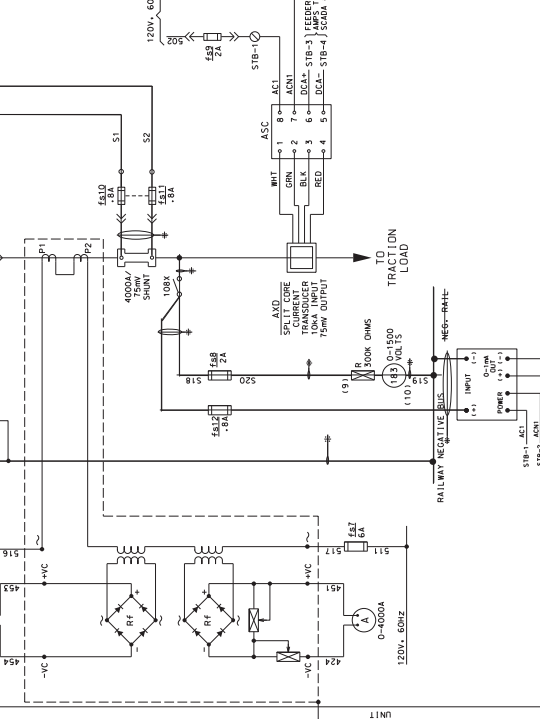
DEVICE	DESCRIPTION
30LBB	LBB ANNUNCIATOR TARGET RELAY
32P	125V D.C. SUPPLY RELAY FOR 176 TRIPPING 125V D.C.
32X	FLG INDICATION RELAY FOR LOSS OF 2SP VOLTAGE
32Y	2 X 20 OHM COILS
6402	GROUND FAULT SENSING RELAY (BUS 2)
6404	AUX. RELAY FOR GROUND FAULT TRANSFER TRIP
667A	TRANSFER TRIP LOCKOUT RELAY (MANUAL RESET)
667B	TRANSFER TRIP LOCKOUT RELAY (ELECT. RESET)
8611	TRANSFER TRIP LOCKOUT RELAY (ELECT. RESET)
94	CLOSING COIL OF ANTI-PUMP RELAY
94T	TRANSFER TRIP OUTPUT RELAY
102	RE-CLUSING TIMER
108	2 X 20 OHM COILS
127	A.C. SUPPLY CHANGE OVER RELAY
130R	RATE OF RISE OVERCURRENT RELAY - SABBATZ
150T	AUX. OVERCURRENT RELAY ON 1500V/150T
169	LOCAL - REMOTE SWITCH
172	D.C. FEEDER BREAKER
172P-5	BREAKER OPEN-CLOSE STATUS SWITCH
172P-6	BREAKER OPEN-CLOSE STATUS SWITCH
172P-7	BREAKER OPEN-CLOSE STATUS SWITCH
172P-8	BREAKER OPEN-CLOSE STATUS SWITCH
172P-9	BREAKER OPEN-CLOSE STATUS SWITCH
172P-10	BREAKER OPEN-CLOSE STATUS SWITCH
172P-11	BREAKER OPEN-CLOSE STATUS SWITCH
172P-12	BREAKER OPEN-CLOSE STATUS SWITCH
172P-13	BREAKER OPEN-CLOSE STATUS SWITCH
172P-14	BREAKER OPEN-CLOSE STATUS SWITCH
172P-15	BREAKER OPEN-CLOSE STATUS SWITCH
172P-16	BREAKER OPEN-CLOSE STATUS SWITCH
172P-17	BREAKER OPEN-CLOSE STATUS SWITCH
172P-18	BREAKER OPEN-CLOSE STATUS SWITCH
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172P-93	BREAKER OPEN-CLOSE STATUS SWITCH
172P-94	BREAKER OPEN-CLOSE STATUS SWITCH
172P-95	BREAKER OPEN-CLOSE STATUS SWITCH
172P-96	BREAKER OPEN-CLOSE STATUS SWITCH
172P-97	BREAKER OPEN-CLOSE STATUS SWITCH
172P-98	BREAKER OPEN-CLOSE STATUS SWITCH
172P-99	BREAKER OPEN-CLOSE STATUS SWITCH
172P-100	BREAKER OPEN-CLOSE STATUS SWITCH

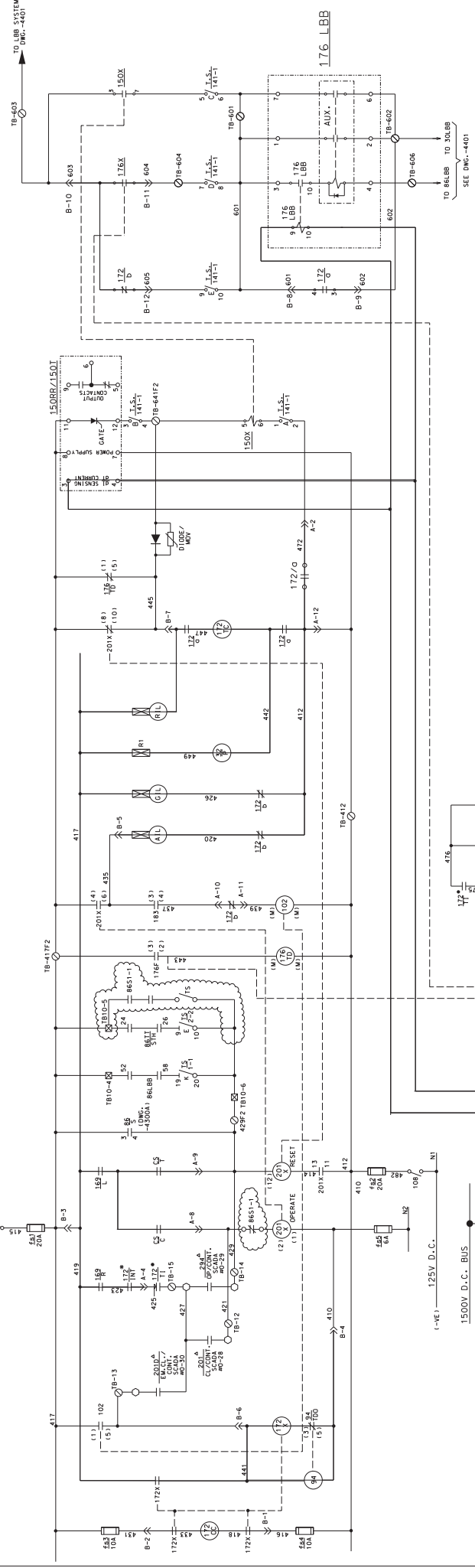
DEVICE LEGEND

REFERENCE	DESCRIPTION
A	AMMETER, 0-4000A (0-25000 FT. RECT.)
A1L	AMBER INDICATION LAMP - AUTO CLOSE
A1C	AMBER INDICATION LAMP - AUTO CLOSE
A1E	AMBER INDICATION LAMP - AUTO CLOSE
A1F	AMBER INDICATION LAMP - AUTO CLOSE
A1G	AMBER INDICATION LAMP - AUTO CLOSE
A1H	AMBER INDICATION LAMP - AUTO CLOSE
A1I	AMBER INDICATION LAMP - AUTO CLOSE
A1J	AMBER INDICATION LAMP - AUTO CLOSE
A1K	AMBER INDICATION LAMP - AUTO CLOSE
A1L	AMBER INDICATION LAMP - AUTO CLOSE
A1M	AMBER INDICATION LAMP - AUTO CLOSE
A1N	AMBER INDICATION LAMP - AUTO CLOSE
A1O	AMBER INDICATION LAMP - AUTO CLOSE
A1P	AMBER INDICATION LAMP - AUTO CLOSE
A1Q	AMBER INDICATION LAMP - AUTO CLOSE
A1R	AMBER INDICATION LAMP - AUTO CLOSE
A1S	AMBER INDICATION LAMP - AUTO CLOSE
A1T	AMBER INDICATION LAMP - AUTO CLOSE
A1U	AMBER INDICATION LAMP - AUTO CLOSE
A1V	AMBER INDICATION LAMP - AUTO CLOSE
A1W	AMBER INDICATION LAMP - AUTO CLOSE
A1X	AMBER INDICATION LAMP - AUTO CLOSE
A1Y	AMBER INDICATION LAMP - AUTO CLOSE
A1Z	AMBER INDICATION LAMP - AUTO CLOSE
A2	AMBER INDICATION LAMP - AUTO CLOSE
A3	AMBER INDICATION LAMP - AUTO CLOSE
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A79	AMBER INDICATION LAMP - AUTO CLOSE
A80	AMBER INDICATION LAMP - AUTO CLOSE
A81	AMBER INDICATION LAMP - AUTO CLOSE
A82	AMBER INDICATION LAMP - AUTO CLOSE
A83	AMBER INDICATION LAMP - AUTO CLOSE
A84	AMBER INDICATION LAMP - AUTO CLOSE
A85	AMBER INDICATION LAMP - AUTO CLOSE
A86	AMBER INDICATION LAMP - AUTO CLOSE
A87	AMBER INDICATION LAMP - AUTO CLOSE
A88	AMBER INDICATION LAMP - AUTO CLOSE
A89	AMBER INDICATION LAMP - AUTO CLOSE
A90	AMBER INDICATION LAMP - AUTO CLOSE
A91	AMBER INDICATION LAMP - AUTO CLOSE
A92	AMBER INDICATION LAMP - AUTO CLOSE
A93	AMBER INDICATION LAMP - AUTO CLOSE
A94	AMBER INDICATION LAMP - AUTO CLOSE
A95	AMBER INDICATION LAMP - AUTO CLOSE
A96	AMBER INDICATION LAMP - AUTO CLOSE
A97	AMBER INDICATION LAMP - AUTO CLOSE
A98	AMBER INDICATION LAMP - AUTO CLOSE
A99	AMBER INDICATION LAMP - AUTO CLOSE
A100	AMBER INDICATION LAMP - AUTO CLOSE

LEGEND

- TERMINAL POINT AT 1500V D.C. SWITCHGEAR
- ⊗ TERMINAL POINT AT 12.4 KV A.C. SWITCHGEAR
- ⊠ TERMINAL POINT AT 4KV A.C. SWITCHGEAR
- ⊡ TERMINAL POINT AT RECTIFIER CONTROL PANEL
- ⊞ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
- ⊟ TERMINAL POINT AT TRANSFORMER TRIP & LBB SWITCHBOARD
- TERMINAL POINT AT SUPERVISORY CONTROL CABINET
- ⊠ TERMINAL POINT AT BUS FAULT RELAY PANEL OR CONTROL SWITCHBOARD OR OTHER MISC. PANELS.





NOTES:
 * CONTACT CLOSED IN CONNECTED POSITION OF BREAKER
 * CONTACT OPEN IN CONNECTED POSITION OF BREAKER
 * CONTACT CLOSED WHEN INTERLOCK LEVER IN DOWN POSITION
 * EQUIPMENT IN SUPERVISORY CABINET
 * EQUIPMENT IN SUPERVISORY CABINET

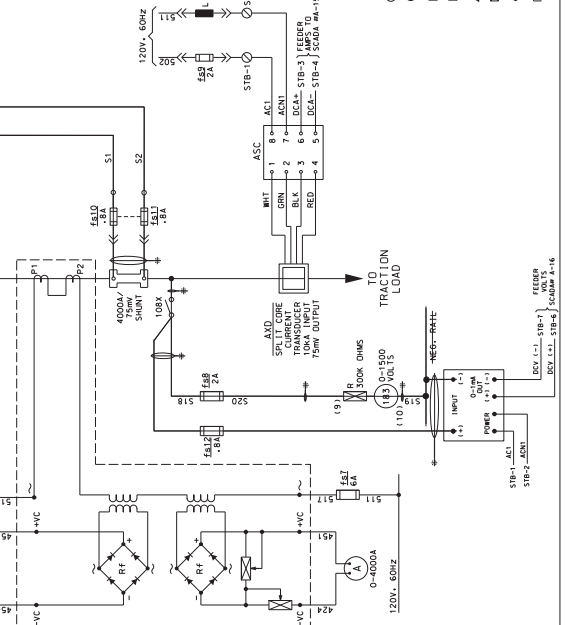
FOR 125V D.C. AND 120V A.C. WIRING USE STANDARD 7/0-6mm GREY WIRE

CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT

DEVICE	DESCRIPTION
30LBB	LBB ANNUNCIATOR TARGET RELAY
32F	2% 50 OHM COILS
32X	FLAG INDICATION RELAY FOR LOSS OF 25P VOLTAGE
33B	GROUND FAULT SENSING RELAY (GRS. 2)
6402	GROUND FAULT SENSING RELAY (GRS. 2)
6404	AUX. RELAY FOR GROUND FAULT TRANSFER TRIP
667A	DEFECTOR RELAY LOCKOUT RELAY (MANUAL RESET)
667B	DEFECTOR RELAY LOCKOUT RELAY (ELECT. RESET)
861F	TRANSFER TRIP LOCKOUT RELAY (ELECT. RESET)
94	CLOSING COIL ON OFF (ANTI-PUMP) RELAY.
94TT	TRANSFER TRIP OUTPUT RELAY
102	RE-CLOSING TIMER
108	125V D.C. CONTROL RELAY
116	125V D.C. CONTROL RELAY
127	A.C. SUPPLY CHANGE OVER RELAY
150RR	RATE OF RISE OVERCURRENT RELAY - 3MBRZ*
150T	TIME OVERCURRENT RELAY ON 1500V/150V
169	LOCAL - REMOTE SWITCH
172	D.C. FEEDER BREAKER
172P-5	BREAKER OPEN-CLOSE STATUS SWITCH
172P-6	BREAKER OPEN-CLOSE STATUS SWITCH
172T1	BREAKER CARTRIDGE POSITION SWITCH
172T2	SHUNT TRIP COIL, 125V D.C., 20 OHMS
172K	AUXILIARY CLOSING CONTACTOR, 125V D.C.,
176	MAGNETIC SERIES TRIP DVC DEVICE
176F	CAL. 3.75 TO 6000A SCALE 120V, 60HZ.
176LBB	LBB D.C. CURRENT SENSING RELAY
176P	LBB D.C. CURRENT SENSING RELAY AT 20 SEC.
176T	IN CASE OF TRIP, LBB D.C. CURRENT SENSING RELAY
183	VOLTAGE MEASURING TRANSFORMER RELAY
201	EMERGENCY CLOSE RELAY (REMOTE CONTACT)
201X	BREAKER MASTER CONTROL RELAY (LATCHING TYPE)
201T	BREAKER MASTER CONTROL RELAY (NON-LATCHING TYPE)
201TT	CONTROL SWITCH (BP TRANSFER TRIP BP-2/35)

REFERENCE	DESCRIPTION
A	AMMETER, 0-4000A (0-2AF50) RECT.
AIL	AMBER INDICATION LAMP - AUTO CLOSE
ASC	IN OPERATION, 125V CONDITIONER
AXD	SPLIT CORE D.C. CURRENT TRANSFORMER
C	CLOSING COIL
CC	CLOSING COIL, TRIP-NEUTRAL-CLOSE
DCSC	D.C. CURRENT TRANSFORMER, 3000V/1A,
DCVC	D.C. VOLTS CALIBRATOR
DIVIDE/AMB	D.C. VOLTS TRANSFORMER
GIL	GREEN INDICATION LAMP - C.B. OPEN, 125V
I.C.T.	LOCAL INTERLOCK CONTACTOR
LBB	LOCAL BREAKER BACKUP
OP	OPERATE
RE	RESET
RIL	RED INDICATION LAMP - C.B. CLOSED, 125V
SHUNT	SWITCHBOARD D.C. SHUNT
T	TEST SWITCH
T-S	TEST LINK
TRIP	TRANSFER TRIP
V	DIRECTIONAL MOVING COIL LONG SCALE
VRT	ATTENUATOR, 20W, 0.2 OHM VARIABLE
VVD	FEEDER VOLTAGE TRANSFORMER

- LEGEND
- ⊙ TERMINAL POINT AT 1500V D.C. SWITCHGEAR
 - ⊗ TERMINAL POINT AT 12.4 KV A.C. SWITCHGEAR
 - ⊠ TERMINAL POINT AT 4 KV A.C. SWITCHGEAR
 - ⊡ TERMINAL POINT AT RECTIFIER CONTROL PANEL
 - ⊞ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
 - TERMINAL POINT AT TRANSFER TRIP & LBB SWITCHBOARD
 - ⊕ TERMINAL POINT AT SUPERVISORY CONTROL CABINET
 - ⊖ TERMINAL POINT AT BUS FAULT OTHER MISC. PANELS.
 - ⊟ CONTROL SWITCHBOARD OR OTHER MISC. PANELS.



REV.	DATE	DESCRIPTION	BY
0	07/27/71	ISSUED FOR BID	H5
1	7/11	MINOR CORRECTIONS	WPS
2	9/04	GENERAL REVISION	WPS
3	5/03	FIELD CORRECTIONS, AS-BUILT	WPS
4	1/00	ISSUED FOR SCADA AS-BUILT	WPS

1500V D.C. SWITCHGEAR
 CHICAGO, ILLINOIS
 D.C. FOR SCHEMATIC DIAGRAM

95TH STREET TIE STATION
 CHICAGO, ILLINOIS

DATE: 07/27/71
 DRAWN BY: H5
 CHECKED BY: WPS
 DESIGNED BY: WPS

PROJECT NUMBER: SS-11-9-4307A
 SHEET NUMBER: M.E.D.

DEVICE LEGEND

DEVICE	DESCRIPTION
3043	125 VOLT 1000 WATT RESISTOR
312	1000 WATT 125 VOLT RESISTOR
313	1000 WATT 125 VOLT RESISTOR
314	1000 WATT 125 VOLT RESISTOR
315	1000 WATT 125 VOLT RESISTOR
316	1000 WATT 125 VOLT RESISTOR
317	1000 WATT 125 VOLT RESISTOR
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367	1000 WATT 125 VOLT RESISTOR
368	1000 WATT 125 VOLT RESISTOR
369	1000 WATT 125 VOLT RESISTOR
370	1000 WATT 125 VOLT RESISTOR

DEVICE LEGEND

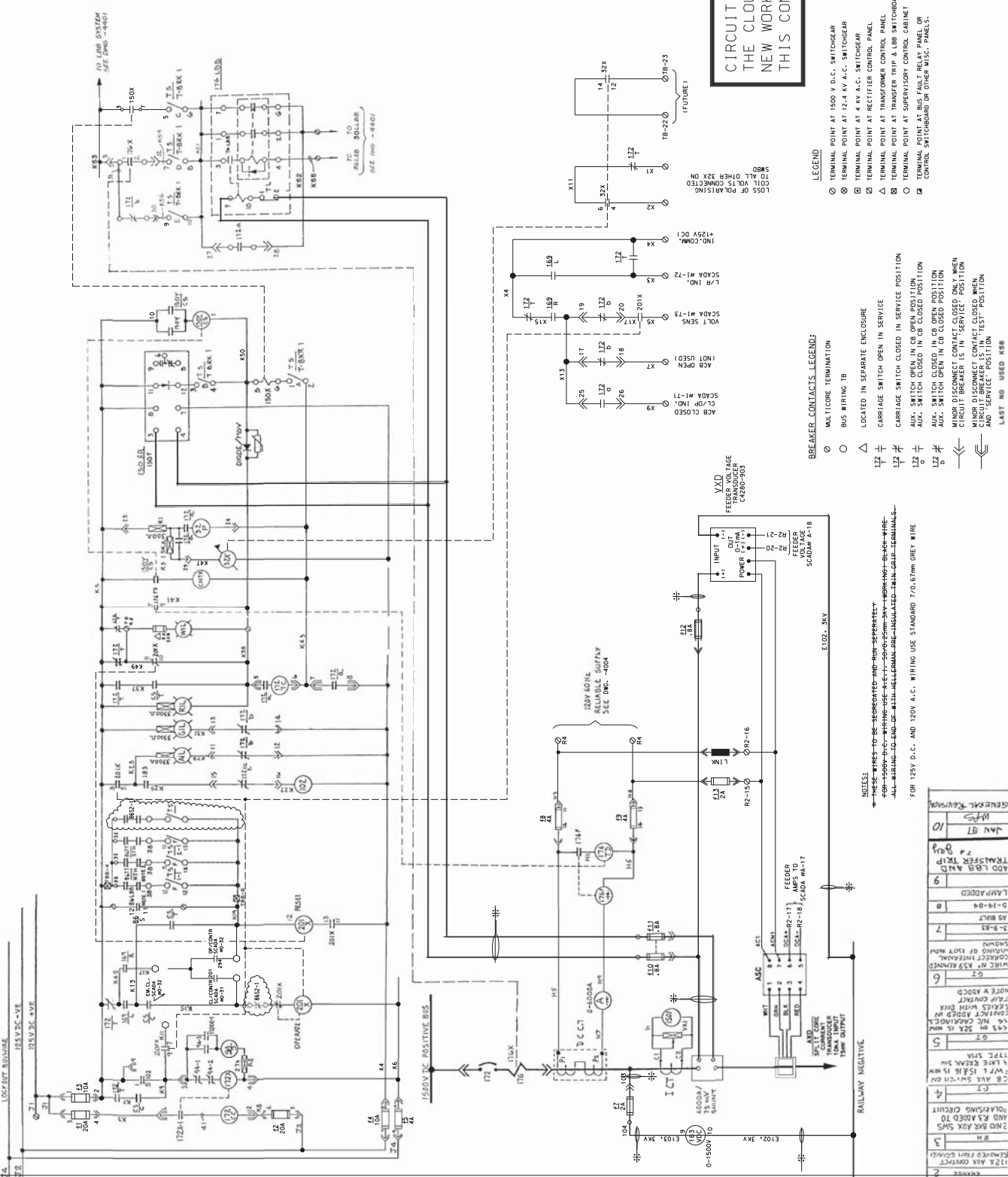
REF	DESCRIPTION
A1	1000 WATT 125 VOLT RESISTOR
A2	1000 WATT 125 VOLT RESISTOR
A3	1000 WATT 125 VOLT RESISTOR
A4	1000 WATT 125 VOLT RESISTOR
A5	1000 WATT 125 VOLT RESISTOR
A6	1000 WATT 125 VOLT RESISTOR
A7	1000 WATT 125 VOLT RESISTOR
A8	1000 WATT 125 VOLT RESISTOR
A9	1000 WATT 125 VOLT RESISTOR
A10	1000 WATT 125 VOLT RESISTOR
A11	1000 WATT 125 VOLT RESISTOR
A12	1000 WATT 125 VOLT RESISTOR
A13	1000 WATT 125 VOLT RESISTOR
A14	1000 WATT 125 VOLT RESISTOR
A15	1000 WATT 125 VOLT RESISTOR
A16	1000 WATT 125 VOLT RESISTOR
A17	1000 WATT 125 VOLT RESISTOR
A18	1000 WATT 125 VOLT RESISTOR
A19	1000 WATT 125 VOLT RESISTOR
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A21	1000 WATT 125 VOLT RESISTOR
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A54	1000 WATT 125 VOLT RESISTOR
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A56	1000 WATT 125 VOLT RESISTOR
A57	1000 WATT 125 VOLT RESISTOR
A58	1000 WATT 125 VOLT RESISTOR
A59	1000 WATT 125 VOLT RESISTOR
A60	1000 WATT 125 VOLT RESISTOR

REV	DATE	DESCRIPTION	BY
1	10/20/71	ISSUED FOR BID	HS
2	2/26	MINOR CORRECTIONS	WFS
3	9/24	GENERAL REVISIONS	WFS
4	1/20	ISSUED FOR SCADA AS-BUILT	WFS

MELIA
ENGINEERING DEPARTMENT
CHICAGO, ILLINOIS
1500V D.C. SWITCHGEAR
D.-C. FDR. BKR. SEC.
-BKR. CLUB. #10
SCHEMATIC DIAGRAM

95th ST. TIE STATION
DATE: 10/20/71
DRAWN BY: WFS
CHECKED BY: WFS
PROJECT NUMBER: 416766
M.C.D.: SS-11.9-4308A

MFG. BY WHIPP & BOURNE LTD.
W & B INC. NO. 416766



CIRCUIT WITHIN THE CLOUD INDICATES NEW WORK UNDER THIS CONTRACT

LEGEND
 ○ TERMINAL POINT AT 1500 V D.C. SWITCHGEAR
 ⊗ TERMINAL POINT AT 12.4 KV A.C. SWITCHGEAR
 ⊠ TERMINAL POINT AT RECTIFIER CONTROL PANEL
 ⊡ TERMINAL POINT AT TRANSFORMER CONTROL PANEL
 ⊞ TERMINAL POINT AT TRANSFER TRIP & LBS SWITCHBOARD
 ⊣ TERMINAL POINT AT SUPERVISORY CONTROL CABINET
 ⊤ TERMINAL POINT AT BUS FAIL RELAY PANEL OR CONTROL SWITCHBOARD OR OTHER MISC. PANELS.

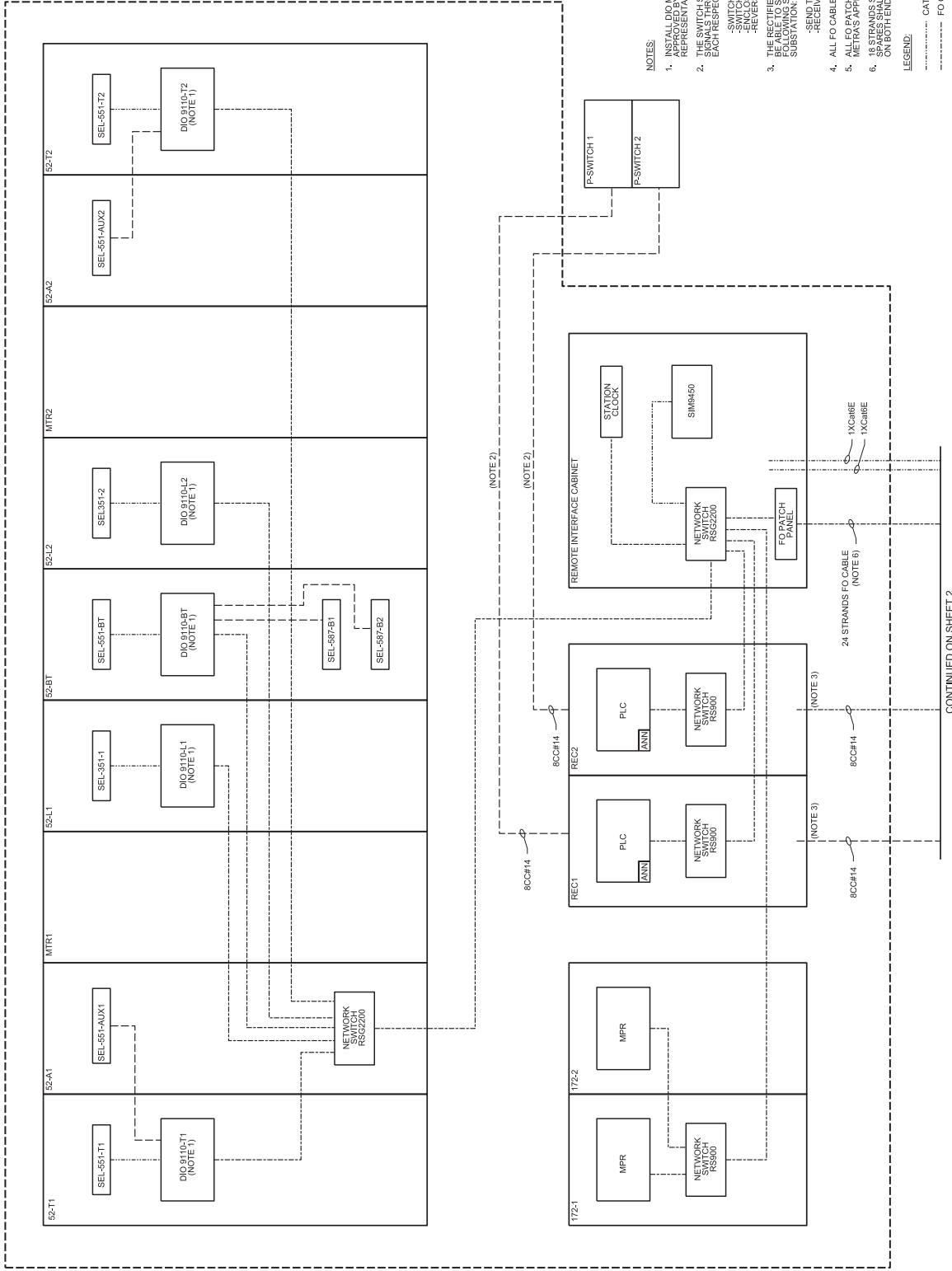
BEARER CONTACTS LEGEND:
 ○ MULTICORE TERMINATION
 ⊙ BUS WIRING TB
 ⊕ LOCATED IN SEPARATE ENCLOSURE
 ⊞ CARRIAGE SWITCH OPEN IN SERVICE
 ⊡ CARRIAGE SWITCH CLOSED IN SERVICE POSITION
 ⊠ SWITCH OPEN IN CB OPEN POSITION
 ⊞ SWITCH CLOSED IN CB CLOSED POSITION
 ⊡ SWITCH OPEN IN CB OPEN POSITION
 ⊠ SWITCH CLOSED IN CB CLOSED POSITION
 ⊞ MINOR DISCONNECT CONTACT CLOSED ONLY WHEN CIRCUIT BREAKER IS IN SERVICE POSITION
 ⊠ CIRCUIT BREAKER IS IN TEST POSITION AND 'SERVICE' POSITION
 ⊞ LAST NO USED KEB

NOTES:
 * THESE WIRES TO BE SEPARATED AND NON-IDENTIFY
 * FOR 1500V D.C. FDR USE AS SET BY 500V D.C. WIRING TO BE IDENTIFIED BY WIRE
 * ALL WIRING TO END OF BUS IN ALL CIRCUMSTANCES IS UNQUALIFIED UNLESS OTHERWISE SPECIFIED

FOR 150V D.C. AND 120V A.C. WIRING USE STANDARD 7/10.67mm GRES WIRE

NO.	REVISION	DESCRIPTION
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

NEW PREFABRICATED SUBSTATION



- NOTES**
- INSTALL DIO MODULES AS NEEDED AND AS REPRESENTED BY THE DRAWINGS.
 - THE SWITCH SHALL SEND THE FOLLOWING SIGNALS THROUGH DRY CONTACTS TO EACH RESPECTIVE CONTROL CABINET:
 - SWITCH OPENED
 - ENCLOSURE DOOR OPEN
 - REVERSE CURRENT
 - THE RECTIFIER CONTROL CABINET SHALL FOLLOWING SIGNALS TO THE EXISTING SUBSTATION:
 - SEND TRIP SIGNAL
 - SEND TRIP LOCKOUT SIGNALS
 - ALL FO CABLES USED SHALL BE MULTIMODE.
 - ALL FO PATCH PANELS SHALL BE SUBJECT TO 48 STRANDS SHALL BE KEPT AS SPARES. ALL SPARES SHALL BE PROPERLY TERMINATED ON BOTH ENDS FOR FUTURE USE.

LEGEND:

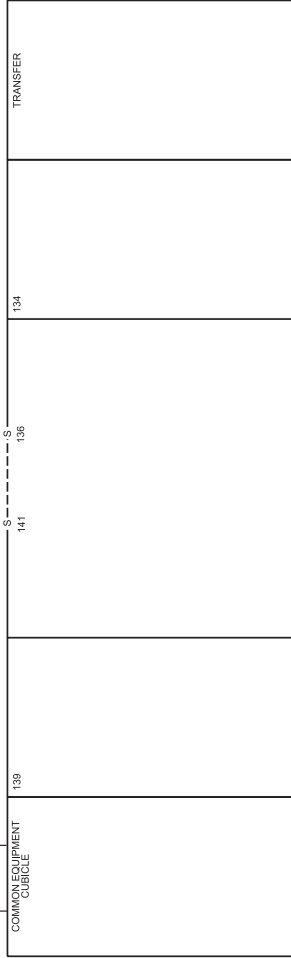
- CAT 6E
- FO CABLE
- HARDWIRED

Meta 100 N. LAUREL STREET 5TH FLOOR 374 N. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601		DESIGNED BY: A. SCHMIDT DRAWN BY: N. DINE CHECKED BY: R. HINE METSA P.A. S. 05/20/17 DATE: JUNE 12, 2017	LOCATION NAME: 95TH STREET SUBSTATION TITLE: STATION CONTROL ARCHITECTURE NEW BUILDING AND INTERFACES SHEET 1 OF 2	CAD FILE NUMBER: SPRESS SCALE: PROJECT NO.: GW2025-0710000 FILE POST NO.: 1/3 DISTRICT: SHEET NO.: SS-11,9-5000
LTK Engineering Services 100 N. LAUREL STREET 5TH FLOOR 374 N. JACKSON BOULEVARD CHICAGO, ILLINOIS 60601		PRIMARY CONSULTANT: SEAL SIGNATURE PRIMARY CONSULTANT: SEAL SIGNATURE SUB CONSULTANT: SEAL SIGNATURE	REV. DATE BY APP 0 1/29/2017 AA ER ISSUED FOR BID DESCRIPTION	PRINTED ON: 5/18/17

CONTINUED ON SHEET 1

EXISTING TIE BREAKER STATION

8CC#14 8CC#14 8CC#14
24 STRANDS FO CABLE (NOTE 4)
1XC#18E 1XC#18E



SEE TYPICAL
DISPATCH LINES
FO CONNECTION
TO RTU

- NOTES:
1. CONNECTIONS BETWEEN EXISTING EQUIPMENT IS NOT SHOWN
 2. ALL FO CABLES USED SHALL BE MULTIMODE.
 3. ALL FO PATCH PANELS SHALL BE SUBJECT TO METRAS APPROVAL.
 4. 18 STRANDS SHALL BE KEPT AS SPARES, ALL SPARES SHALL BE PERMANENTLY DISCONNECTED ON BOTH ENDS FOR FUTURE USE.

LEGEND:

- CAT 6E
- FO CABLE
- HARDWIRED



REV	DATE	BY	APP	DESCRIPTION
0	1/29/2017	AA	ER	ISSUED FOR BID

DESIGNED BY: J. J. JAMES	DRAWN BY: G.M.Z.	CHECKED BY: R.W.E.	DATE: JUNE 12, 2017
STATION CONTROL ARCHITECTURE EXISTING BUILDING AND INTERFACES SHEET 2 OF 2			
LOCATION NAME: 95TH STREET SUBSTATION		CAD FILE NUMBER: SP1855	
PROJECT NO.: GWA264-P10302		DISTRICT: SS-11,9-5001	
MILE POST NO.: 1.9		SHEET NO.:	