

VOLUME IV

ELECTRICAL

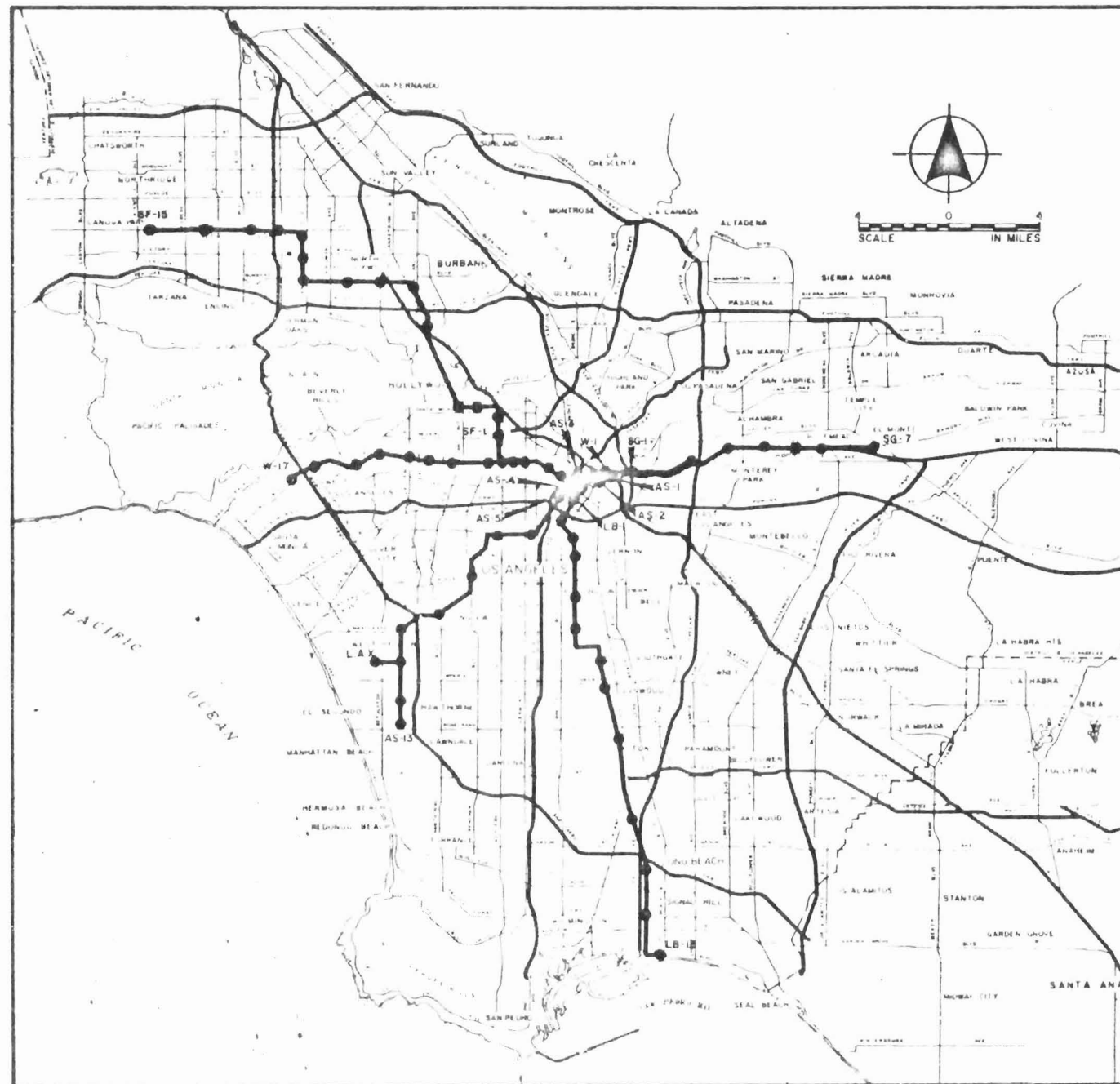
PRELIMINARY DRAWINGS
RECOMMENDED FIVE CORRIDOR SYSTEM

PREPARED FOR
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
MAY 1968

OVERSIZE

SCRTD
1968
.P73
v.4
c.1

KAISER ENGINEERS/DANIEL, MANN, JOHNSON, & MENDENHALL A JOINT VENTURE
■ ARCHITECTS AND ENGINEERS ■



LOCATION MAP

SAN FERNANDO VALLEY CORRIDOR

STATION	STATION
SF - 1	BEVERLY BLVD.
SF - 2	SANTA MONICA BLVD.
SF - 3	VINE
SF - 4	HOLLYWOOD-LA BREA
SF - 5	UNIVERSAL CITY
SF - 6	NORTH HOLLYWOOD
SF - 7	LAUREL CANYON
SF - 8	FULTON
SF - 9	BURBANK BLVD.
SF - 10	VAN NUYS
SF - 11	SHERMAN CIRCLE
SF - 12	SEPULVEDA
SF - 13	BALBOA
SF - 14	LINDLEY
SF - 15	TAMPA

AIRPORT SOUTHWEST CORRIDOR

STATION	STATION
AS - 1	METROPORT
AS - 2	CIVIC CENTER
AS - 3	BUNKER HILL
AS - 4	7th. & FLOWER
AS - 5	CONVENTION CENTER
AS - 6	EXPOSITION PARK
AS - 7	WESTERN AVE.
AS - 8	CRENSHAW - 54th.
AS - 9	INGLEWOOD
AS - 10	MANCHESTER
AS - 11	CENTURY
AS - 12	EL SEGUNDO
AS - 13	ROSECRANS
AS - 14	L.A.X.

WILSHIRE CORRIDOR

STATION	STATION
W - 1	UNION STATION
W - 2	CIVIC CENTER
W - 3	6th. & BROADWAY
W - 4	7th. & FLOWER
W - 5	LUCAS
W - 6	ALVARADO
W - 7	VERMONT
W - 8	NORMANDIE
W - 9	WILSHIRE - WESTERN
W - 10	WILSHIRE - CRENSHAW
W - 11	WILSHIRE - LA BREA
W - 12	FAIRFAX
W - 13	LA CIENEGA
W - 14	BEVERLY HILLS
W - 15	CENTURY CITY
W - 16	WESTWOOD
W - 17	BARRINGTON

LONG BEACH CORRIDOR

STATION	STATION
LB - 1	OLYMPIC
LB - 2	WASHINGTON
LB - 3	ADAMS
LB - 4	VERNON AVENUE
LB - 5	GAGE
LB - 6	FIRESTONE
LB - 7	WATTS
LB - 8	IMPERIAL
LB - 9	COMPTON
LB - 10	DEL AMO
LB - 11	WARDLOW
LB - 12	PACIFIC COAST
LB - 13	LONG BEACH

SAN GABRIEL VALLEY CORRIDOR

STATION	STATION
SG - 1	COUNTY HOSPITAL
SG - 2	STATE COLLEGE
SG - 3	FREMONT
SG - 4	GARFIELD
SG - 5	SAN GABRIEL
SG - 6	ROSEMEAD
SG - 7	EL MONTE

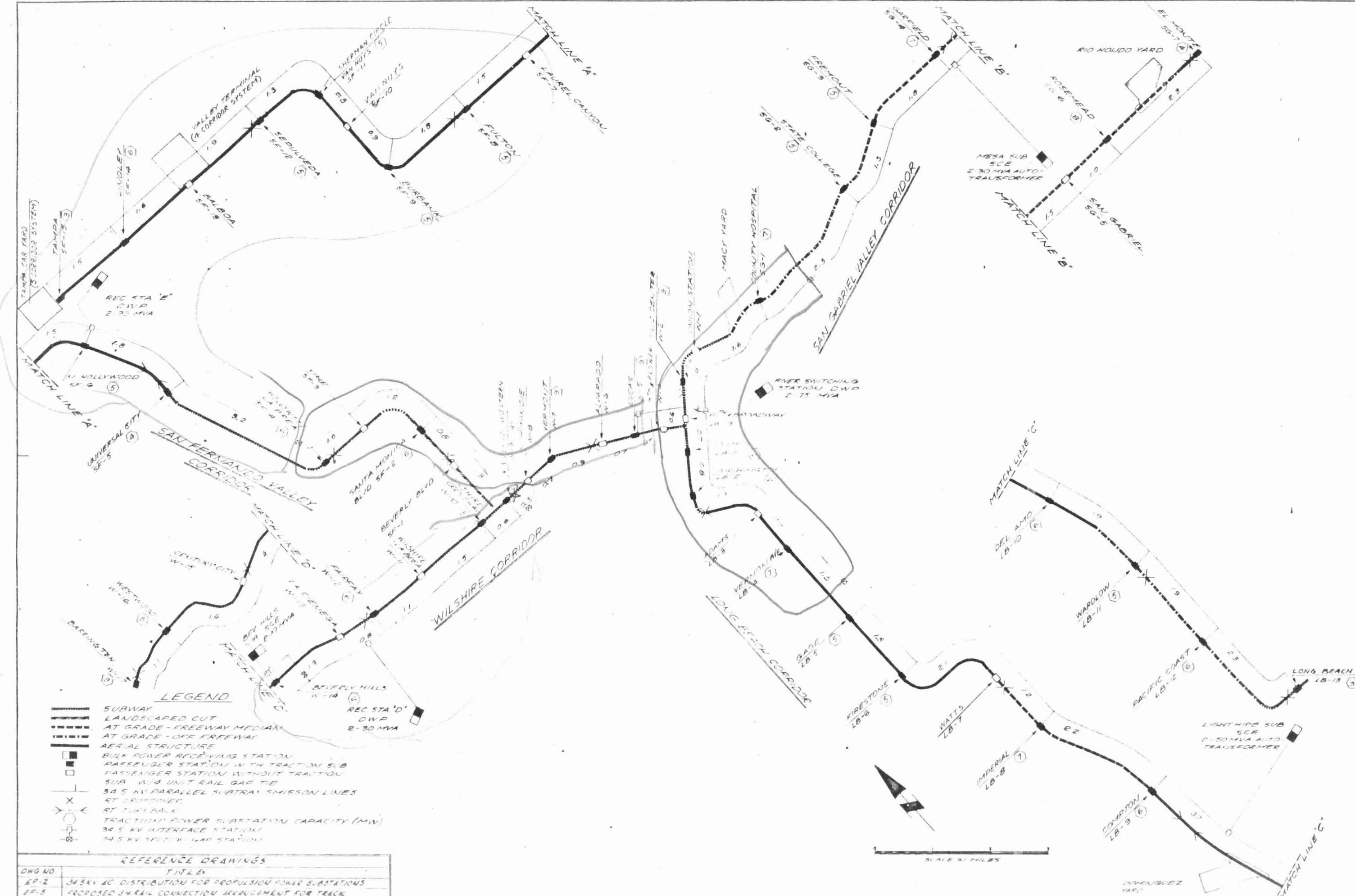
ELECTRICAL DRAWING INDEX

DRAWING NO.	TITLE
	WILSHIRE, SAN GABRIEL, SAN FERNANDO, LONG BEACH CORRIDORS
ELECTRICAL POWER	
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EP-2	34.5 KV AC DISTRIBUTION FOR PROPULSION POWER SUBSTATIONS
EP-3	34.5 KV INTERFACE AND SECTION TIE STATION CABLE ROUTING - SYSTEM DETAILS
EP-4	PROPULSION POWER SUBSTATION - LAYOUT & DETAILS
EP-5	PROPOSED 3RD RAIL CONNECTION ARRANGEMENT FOR TRACK SYSTEM - 1,000-VOLT DC DISTRIBUTION

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E-2	AERIAL STATION - TYPICAL LIGHTING PLAN
E-3	POWER AND LIGHTING DETAILS
E-4	SUBWAY AND AERIAL STATION - TYPICAL SINGLE LINE DIAGRAM
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T-2	QUANTITIES OF SPEED CONTROL ZONES AT SYSTEMS FACILITIES
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T-4	VOICE COMMUNICATION SYSTEM DIAGRAM
T-5	DATA COMMUNICATION SYSTEM DIAGRAM

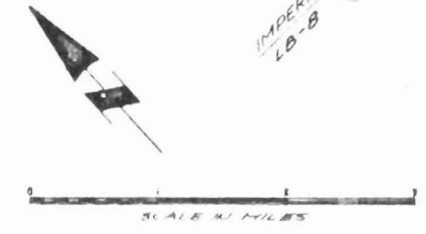
DRAWING NO.	TITLE
	AIRPORT-SOUTHWEST CORRIDOR
E-201	ONE LINE DIAGRAM - UNDERGROUND PASSENGER STATION
E-202	ONE LINE DIAGRAM - AERIAL PASSENGER STATION
E-203	LIGHTING PLAN - UNDERGROUND PASSENGER STATIONS
E-204	LIGHTING PLAN - UNDERGROUND PASSENGER STATIONS
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- LEGEND**
- SUBWAY
 - LANDSCAPED CUT
 - AT GRADE - FREEWAY MEDIAN
 - AT GRADE - OFF FREEWAY
 - AERIAL STRUCTURE
 - BULK POWER RECEIVING STATION
 - PASSENGER STATION WITH TRACTION SUB
 - PASSENGER STATION WITHOUT TRACTION
 - SUB W/3 UNIT RAIL GAP TIE
 - 34.5 KV PARALLEL SUBTRAN SMIRSON LINES
 - RT CROSSOVER
 - RT TURNBACK
 - TRACTION POWER SUBSTATION CAPACITY (MW)
 - 34.5 KV INTERFACE STATION
 - 34.5 KV SECTION GAP STATION

REFERENCE DRAWINGS

DWG NO.	TITLE
EP-2	34.5KV AC DISTRIBUTION FOR PROPULSION POWER SUBSTATIONS
EP-3	PROPOSED 34 RAIL CONNECTION ARRANGEMENT FOR TRACK
	SYSTEM 1000 VOLT DC DISTRIBUTION

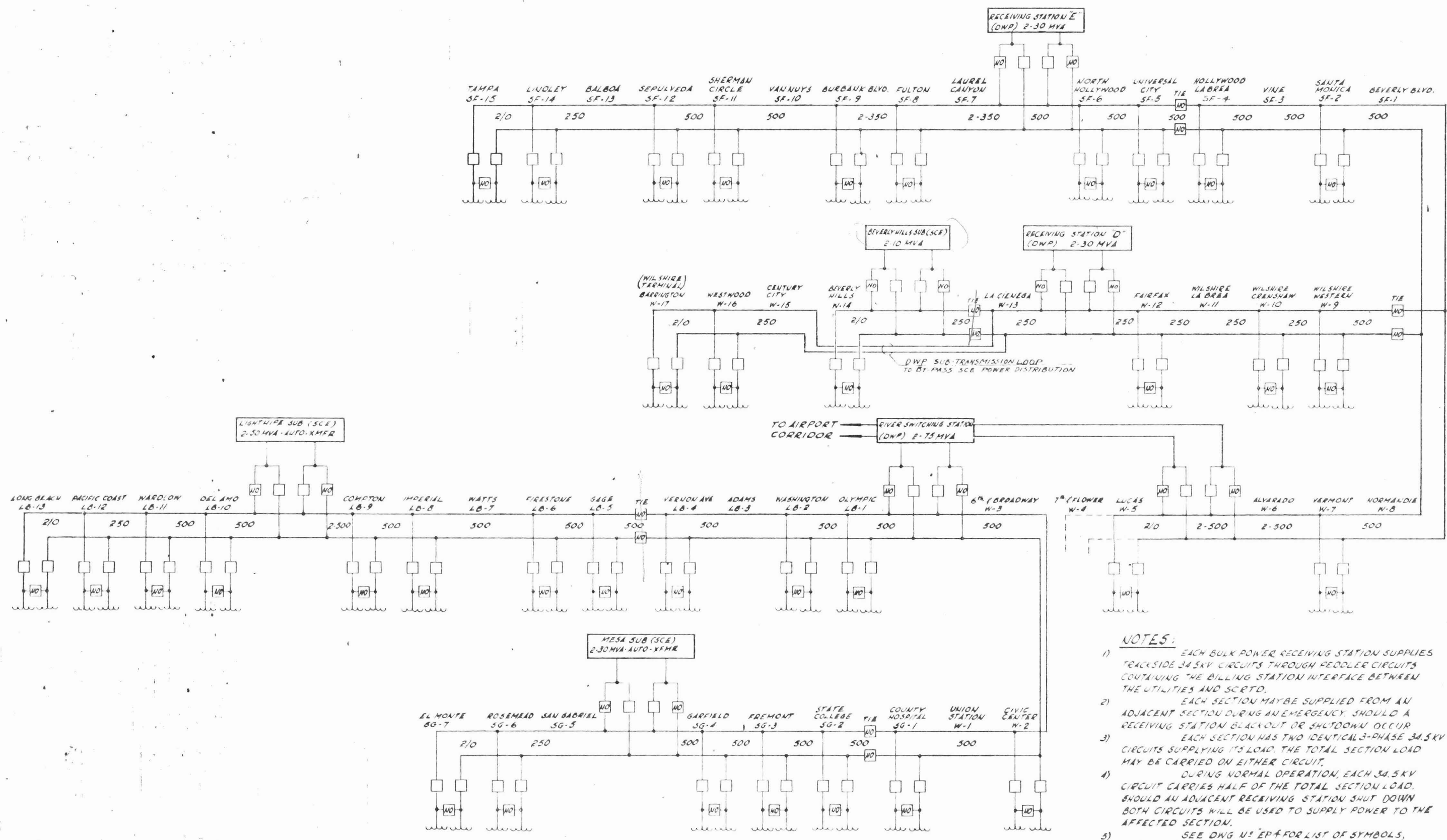


APPROVALS
 DATE: 12/15/85
 BY: [Signature]
 CHECKED BY: [Signature]
 DESIGNED BY: [Signature]

A JOINT VENTURE
 KAISER ENGINEERS
 DANIEL, MANN, JOHNSON & MENDENHALL
 ARCHITECTS ENGINEERS

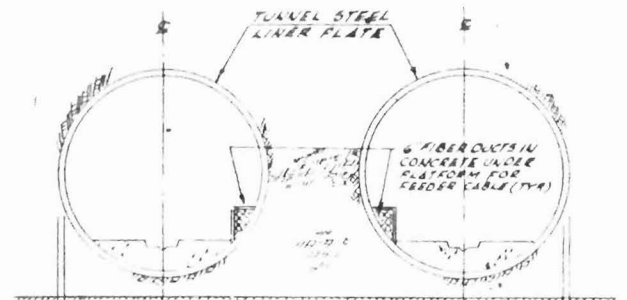
HID
 SOUTHERN CALIFORNIA
 RAPID TRANSIT DISTRICT
 LOS ANGELES, CALIFORNIA 90015

TITLE: ELECTRICAL PLOT PLAN FOR 1000VOLT DC TRUSIT SYSTEM
 DRAWING NO: EP-1

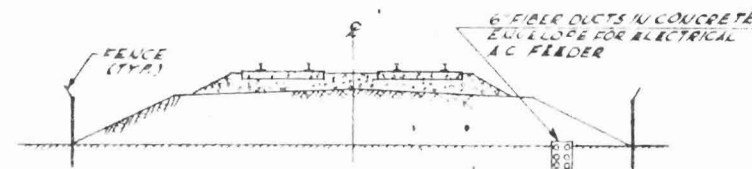


- NOTES:**
- 1) EACH BULK POWER RECEIVING STATION SUPPLIES TRACKSIDE 34.5KV CIRCUITS THROUGH FEEDER CIRCUITS CONTAINING THE BILLING STATION INTERFACE BETWEEN THE UTILITIES AND SCRTD.
 - 2) EACH SECTION MAY BE SUPPLIED FROM AN ADJACENT SECTION DURING AN EMERGENCY. SHOULD A RECEIVING STATION BACKOUT OR SHUTDOWN OCCUR EACH SECTION HAS TWO IDENTICAL 3-PHASE 34.5KV CIRCUITS SUPPLYING ITS LOAD. THE TOTAL SECTION LOAD MAY BE CARRIED ON EITHER CIRCUIT.
 - 3) DURING NORMAL OPERATION, EACH 34.5KV CIRCUIT CARRIES HALF OF THE TOTAL SECTION LOAD. SHOULD AN ADJACENT RECEIVING STATION SHUT DOWN BOTH CIRCUITS WILL BE USED TO SUPPLY POWER TO THE AFFECTED SECTION.
 - 4) SEE DWG NO. EP-4 FOR LIST OF SYMBOLS, ABBREVIATIONS AND CIRCUIT DETAILS.
 - 5) 34.5KV AC DISTRIBUTION FOR PROPULSION POWER SUBSTATIONS.
 - 6) 34.5KV CABLE SIZE PER PHASE PER CNT IN AWG OR MCM

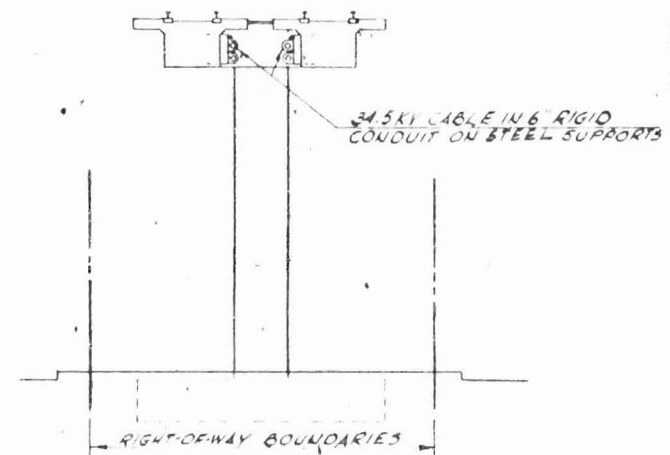
REFERENCE DRAWINGS	
DWG No	TITLE
EP-1	ELECTRICAL PLOT PLAN FOR 1000V D.C. TRANSIT SYSTEM
EP-3	34.5KV INTERFACE AND SECTION TIE STATION
EP-4	CABLE ROUTING SYSTEM DETAILS
EP-4	PROPULSION POWER SUBSTATION LAYOUT & DETAILS



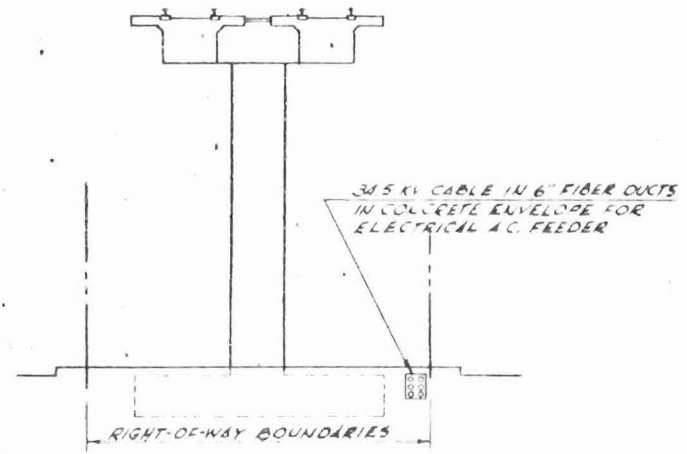
TYPICAL FIBER-DUCT RUNNING UNDER TUNNEL PLATFORM



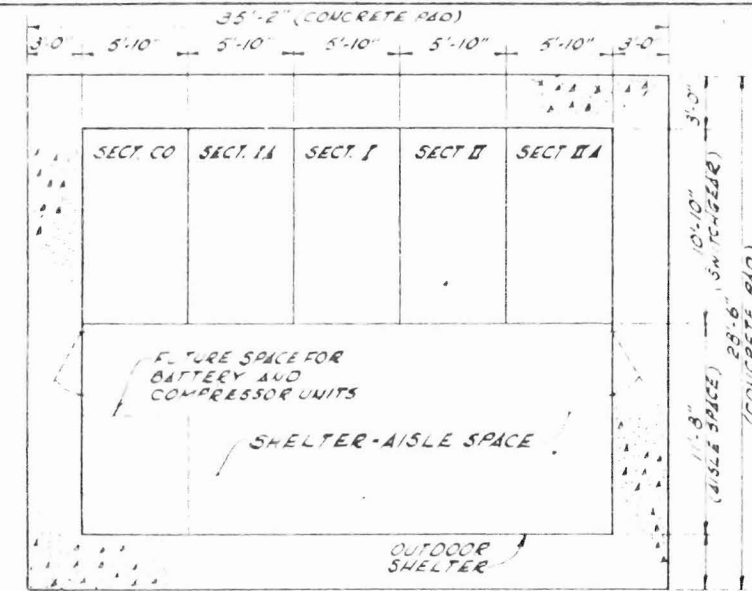
SLOPED EMBANKMENT SHOWING FIBER-DUCT LOCATION



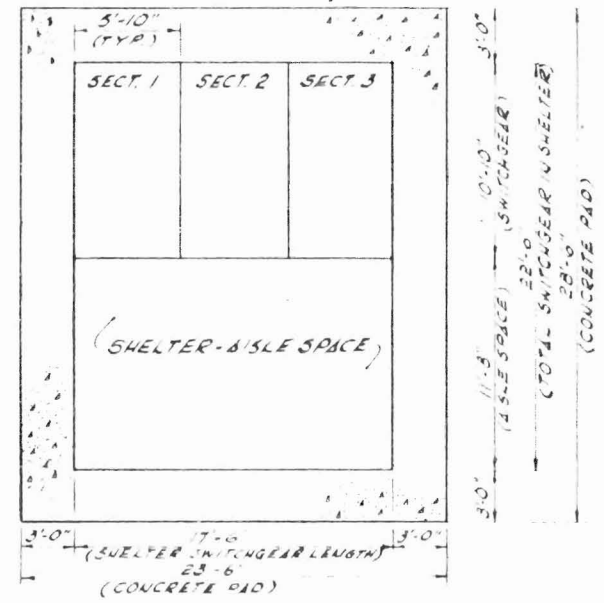
SECTION OF AERIAL STRUCTURE IN PUBLIC RIGHT OF WAY SHOWING LOCATION OF 34.5KV DISTRIBUTION CABLE IN RIGID CONDUIT



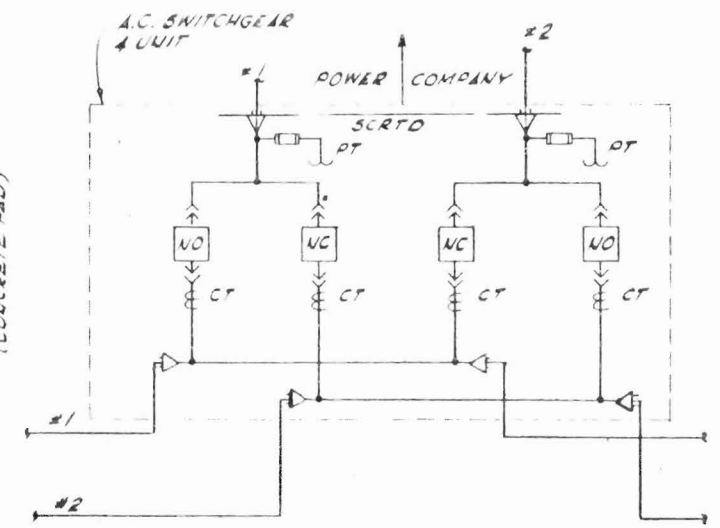
SECTION OF AERIAL STRUCTURE SHOWING ELECTRICAL CONCRETE DUCT IN PRIVATE RIGHT OF WAY (TYPICAL FOR ALL AREAS)



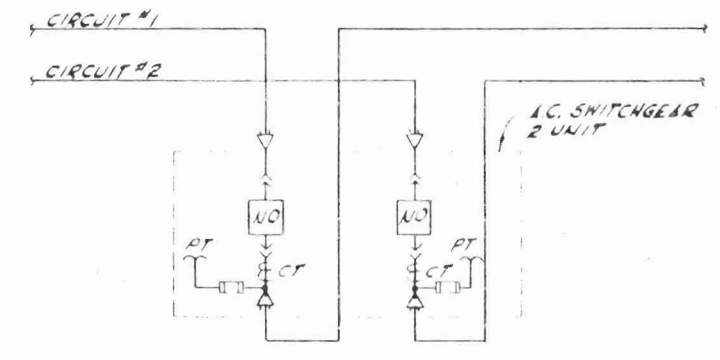
PLAN VIEW OF 34.5KV INTERFACE SHELTERFORM SWITCHGEAR



PLAN VIEW OF 34.5KV SECTION TIE-BREAKER SHELTER OUTDOOR METAL CLAD SWITCHGEAR



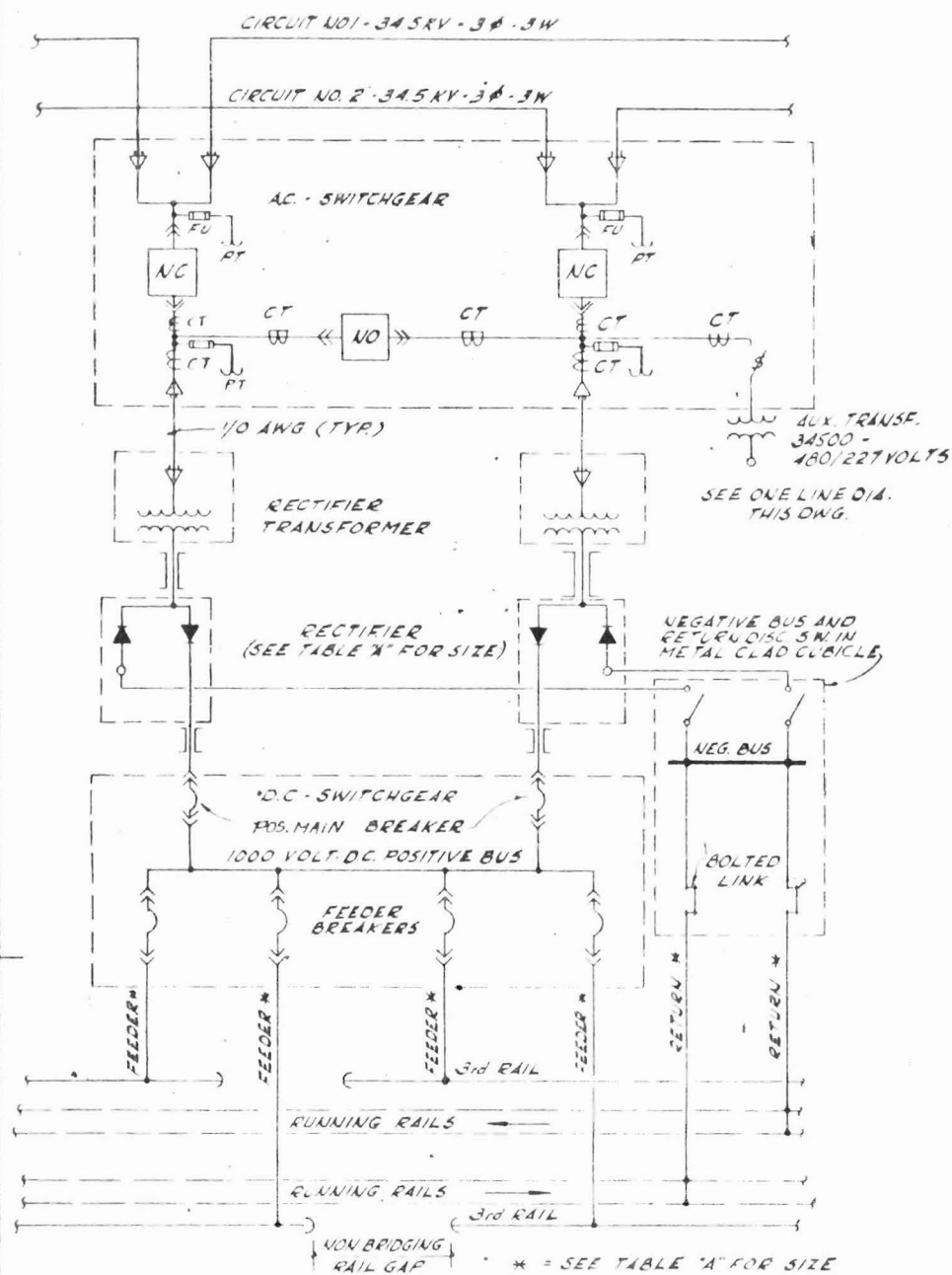
34.5 KV-DISTRIBUTION SYSTEM POWER COMPANY INTERFACE



34.5-DISTRIBUTION SYSTEM SECTION TIE-BREAKERS

- NOTES:**
- RIGID STEEL CONDUIT RUNS ON AERIAL STRUCTURES (PUBLIC RIGHT OF WAY) SHALL BE MADE WITHOUT OFFSET AND SHALL BE SUPPORTED ON THE GIRDERS BY STEEL BRACKETS SPACED NOT OVER 10 FT. APART.
 - PULL BOXES ON AERIAL STRUCTURES SHALL BE SPACED APPROX. 1000 FT. APART.
 - DISTRIBUTION CABLE 34.5KV, SINGLE CONDUCTOR SHALL RUN IN 6-INCH FIBER DUCT, CONCRETE ENCLOSED, WITH AT LEAST 2-INCH CONCRETE COVERING ON DUCTS WITH PROVISION FOR TWO 6-INCH FIBER DUCT SPARES, BURIED AT LEAST 30 INCHES BELOW GRADE UNDER AERIAL STRUCTURES (PRIVATE R.O.W.), AT GRADE, LANDSCAPED, SLOPED OR CUT.
 - HATCHHOLES AT AERIAL STRUCTURE (PRIVATE RIGHT OF WAY) AT GRADE AND LANDSCAPED SHALL BE SPACED ABOUT 500-2000 FT. APART.
 - FOR TUNNEL DISTRIBUTION 34.5KV DUCT LINE, THE 6-INCH FIBER DUCT WITH SPARES, IS LOCATED UNDER THE TUNNEL PLATFORM OR WALKWAY.
 - IN THE INTERFACE SHELTERFORM SWITCHGEAR, THE METERING AND CONTROL UNIT IS LOCATED ON THE END OF THE SWITCHGEAR LINEUP LEAVING CLEAR SPACE OPPOSITE FOR AUXILIARY EQUIPMENT, SUCH AS BATTERY OR AIR COMPRESSOR.
 - THE INTERFACE IS THE NORMAL POWER SUPPLY AND METERING POINT FOR ALL PROPULSION POWER FED TO A GROUP OF RECTIFIER SUBSTATIONS.
 - IN THE SECTION TIE-BREAKER SWITCHGEAR, METERING AND CONTROL UNIT IS IN THE MIDDLE OF THE SWITCHGEAR LINEUP LEAVING CLEAR SPACE OPPOSITE FOR AUXILIARY EQUIPMENT, SUCH AS BATTERY OR AIR COMPRESSOR.
 - SECTION TIE-BREAKER SWITCHGEAR FUNCTIONS ONLY IN THE CASE OF EMERGENCY WHEN AN INTERFACE STATION NO LONGER SUPPLIES POWER AND POWER MAY BE SUPPLIED TO OR RECEIVED FROM AN ADJACENT SECTION TO RETAIN RAPID TRANSIT SERVICE.
 - SEE DNG. WREP-9 FOR LIST OF SYMBOLS, ABBREVIATIONS AND CIRCUIT DETAILS.

REFERENCE DRAWINGS	
DWG NO	TITLE
EP-1	ELECTRICAL PLAN FOR 1000V DC TRANSIT SYSTEM
EP-2	34.5KV AC DISTRIBUTION FOR PROPULSION POWER SUBSTATIONS



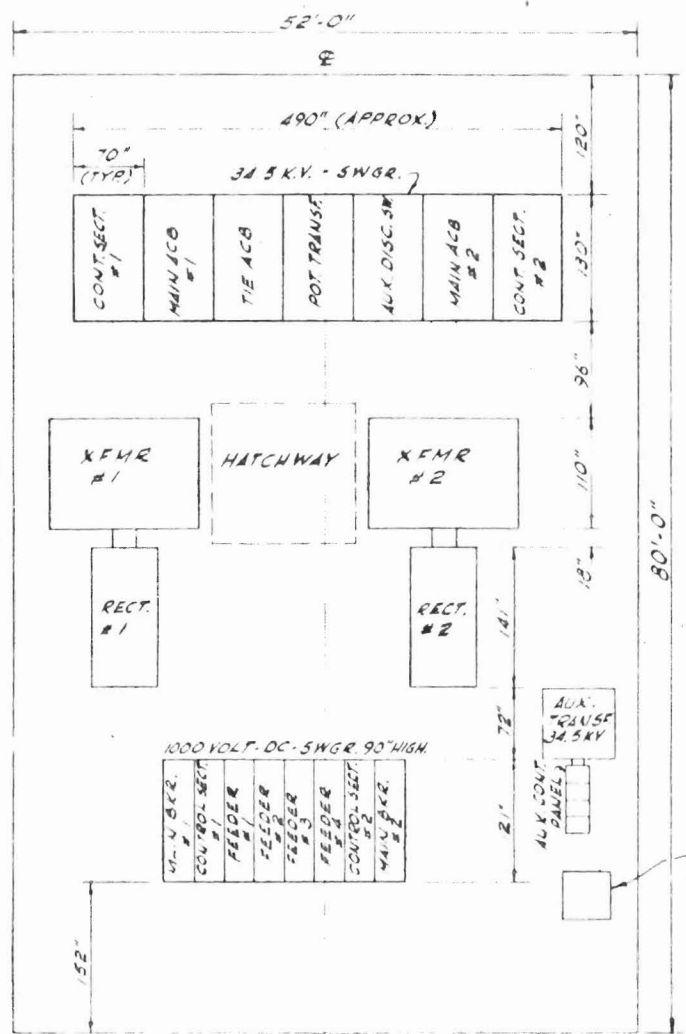
PROPULSION POWER SUBSTATION
TYPICAL SINGLE LINE DIAGRAM

TABLE "A" 1000 VOLT - DC

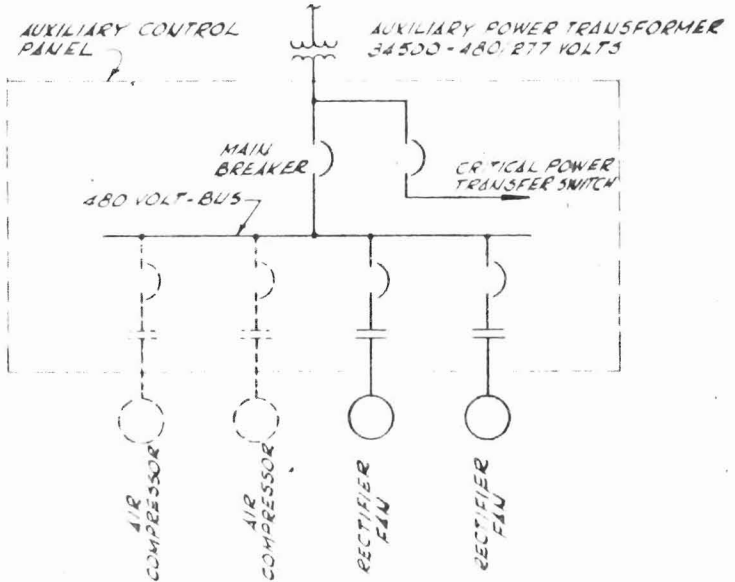
SUBSTATION SIZE MW	SUBSTATION RECTIFIER UNIT 1000 MW		CURRENT RATINGS - AMPERES			
	CAPACITY MW	CONTRIBUTING AMP	DC MAIN BREAKER	DC FEEDER BREAKER	DC FEEDER CABLES	DC RETURN CABLES
30	15	1500	2250	3000	2500	2500
40	20	2000	3000	4000	3300	3300
50	25	2500	3750	4000	4000	4000
60	30	3000	4500	6000	4950	4950
70	35	3500	5250	6000	5800	5800
80	40	4000	6000	8000	6670	6670
90	45	4500	6750	8000	7500	7500

REFERENCE DRAWINGS

DWG. NO.	TITLE
EP-1	ELECTRICAL PLOT PLAN FOR 1000V DC TRANSIT SYSTEM
EP-2	34.5KV AC DISTRIBUTION FOR PROPULSION POWER SUBSTATION
EP-3	PROPOSED 3-RAIL CONNECTION ARRANGEMENT FOR TRACK SYSTEM 1000 VOLT DC DISTRIBUTION



PLAN VIEW
PROPULSION POWER SUBSTATION
TYPICAL ARRANGEMENT - INDOOR



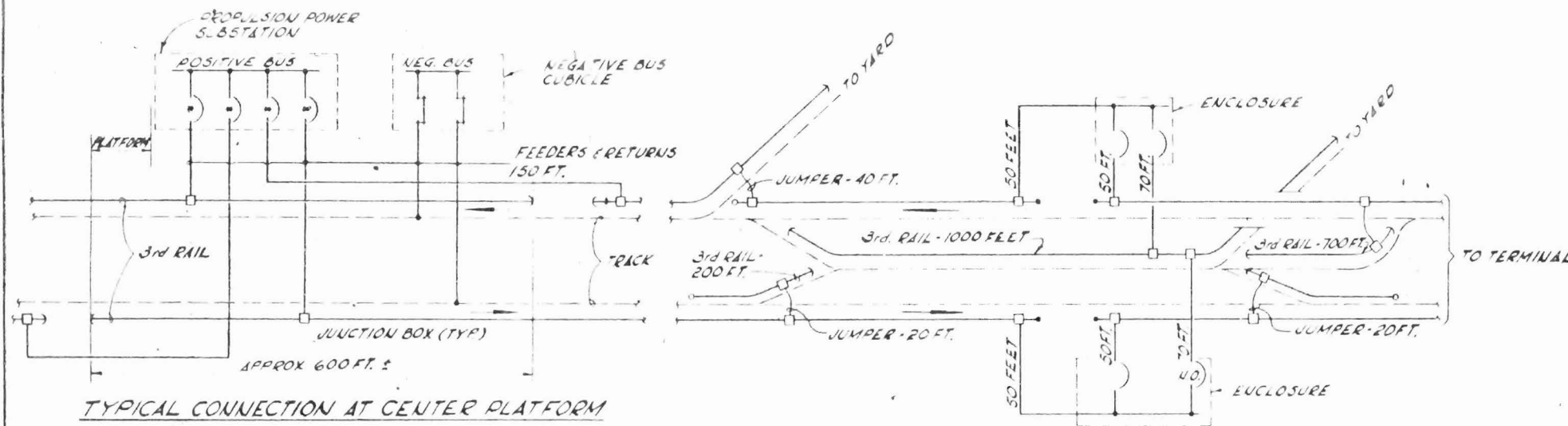
ONE LINE DIA. OF AUXILIARY POWER CONTROL PANEL

SYMBOL	DESCRIPTION
	PROPULSION RECTIFIER SUBSTATION
	34.5KV CIRCUIT BREAKER
	FUSED POTENTIAL TRANSFORMER
	CURRENT TRANSFORMER
	DC - CIRCUIT BREAKER (DRAWOUT TYPE)
	CIRCUIT BREAKER NO = NORMALLY OPEN
	CIRCUIT BREAKER NC = NORMALLY CLOSED
	34.5KV-FUSED DISCONNECT SWITCH
	DISCONNECT SWITCH
	AC - HV. POHEAD
	BULK POWER RECEIVING STATION
	PASSENGER STATION WITH PROPULSION SUBSTATION
	PASSENGER STA. W/O PROPULSION SUBSTATION
	PROPULSION POWER SUBSTATION
	CAPACITY MW
	NON BRIDGING RAIL GAP (60 FT. OR OVER)
	BRIDGING RAIL GAP (~15 FT)
	RAIL GAP TIE UNIT
	SUBWAY OR TUNNEL ADIT.
	RT TURNBACK
	RT CROSSOVER
	END OF RAIL
	RT LINE SURFACE OR AERIAL
	RT LINE SUBWAY OR TUNNEL

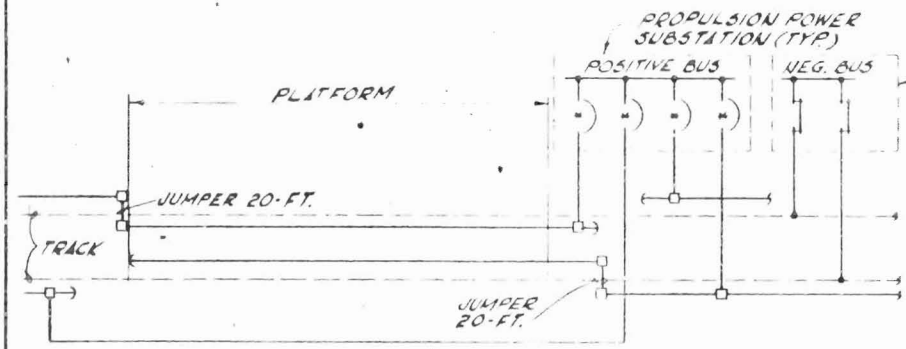
LIST OF ABBREVIATIONS

ABBREVIATION	DESCRIPTION
DWP	DEPARTMENT OF WATER & POWER (IN LOS ANGELES)
SCE	SOUTHERN CALIF. EDISON COMPANY
RT	RAPID TRANSIT
HV	HIGH VOLTAGE
XFMR	RECTIFIER TRANSFORMER
500 MCM	500,000 CIRCULAR MILS
2/0	SIZE #2 AMERICAN WIRE GAGE

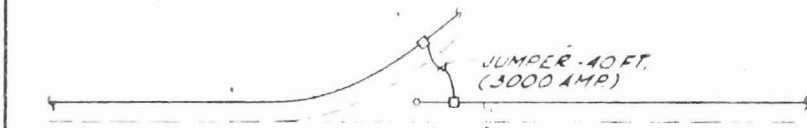
DRAWING NO. EP-4
 APPROVALS: [Signatures]
 KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON & MENDENHALL ARCHITECTS ENGINEERS
 SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
 PROPULSION POWER SUBSTATION LAYOUT - DETAILS
 EP-4



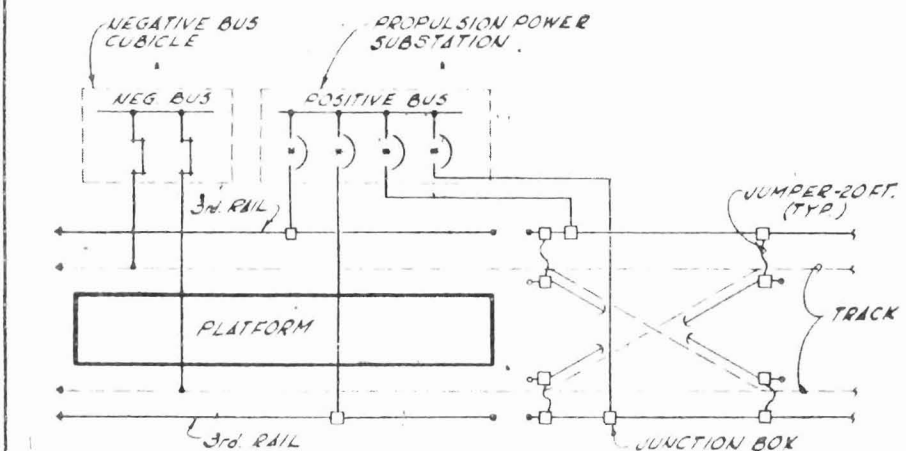
TYPICAL CONNECTION AT CENTER PLATFORM



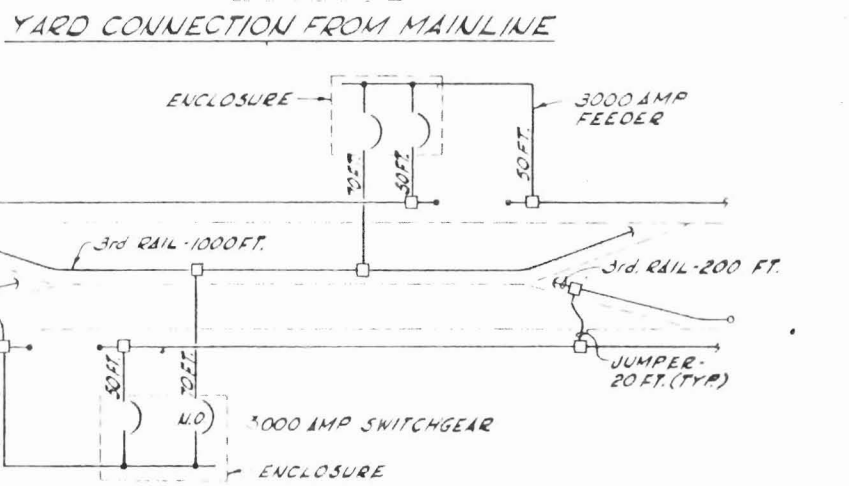
TYPICAL CONNECTION AT SIDE PLATFORM STATIONS



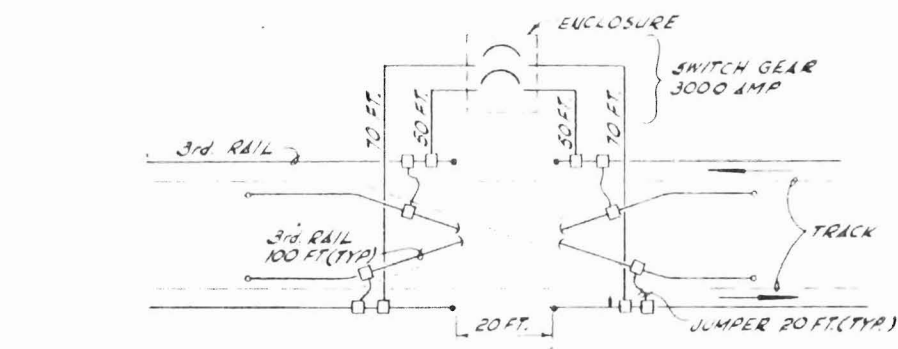
TURNOUT



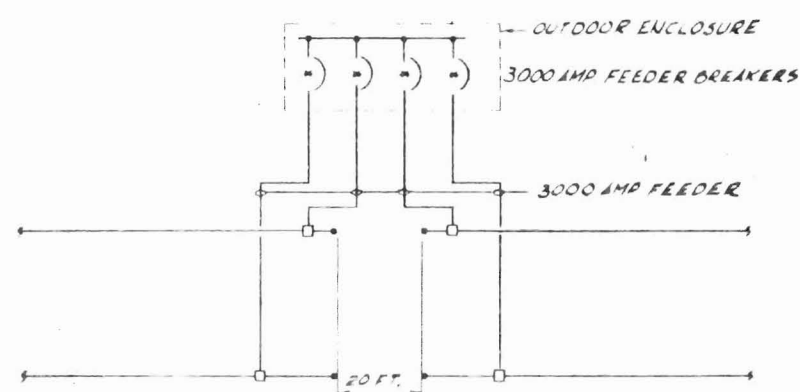
TERMINAL CONNECTIONS
AT CENTER PLATFORM WITHOUT TAIL TRACK



YARD CONNECTION FROM MAINLINE

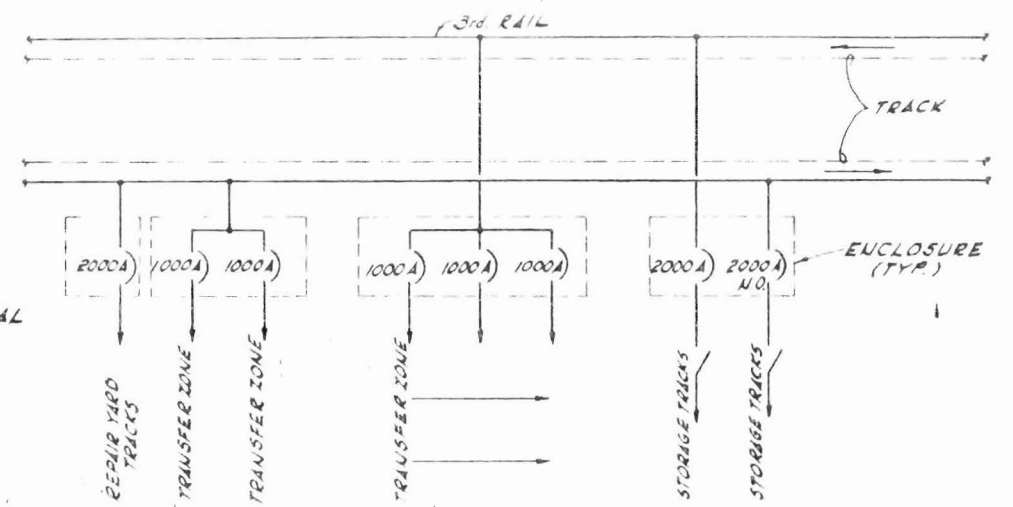


DOUBLE CROSSOVER

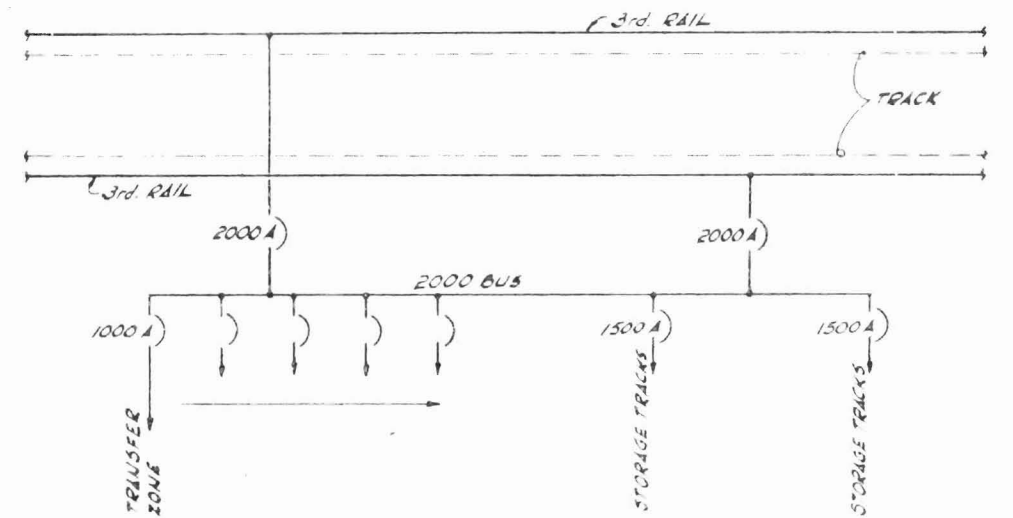


RAIL GAP TIE

3rd RAIL CONNECTIONS - SEE NOTE NO. 2 & 3



DOMINGUEZ YARD - PROPULSION POWER SINGLE LINE



STORAGE YARDS PROPULSION POWER SINGLE LINE

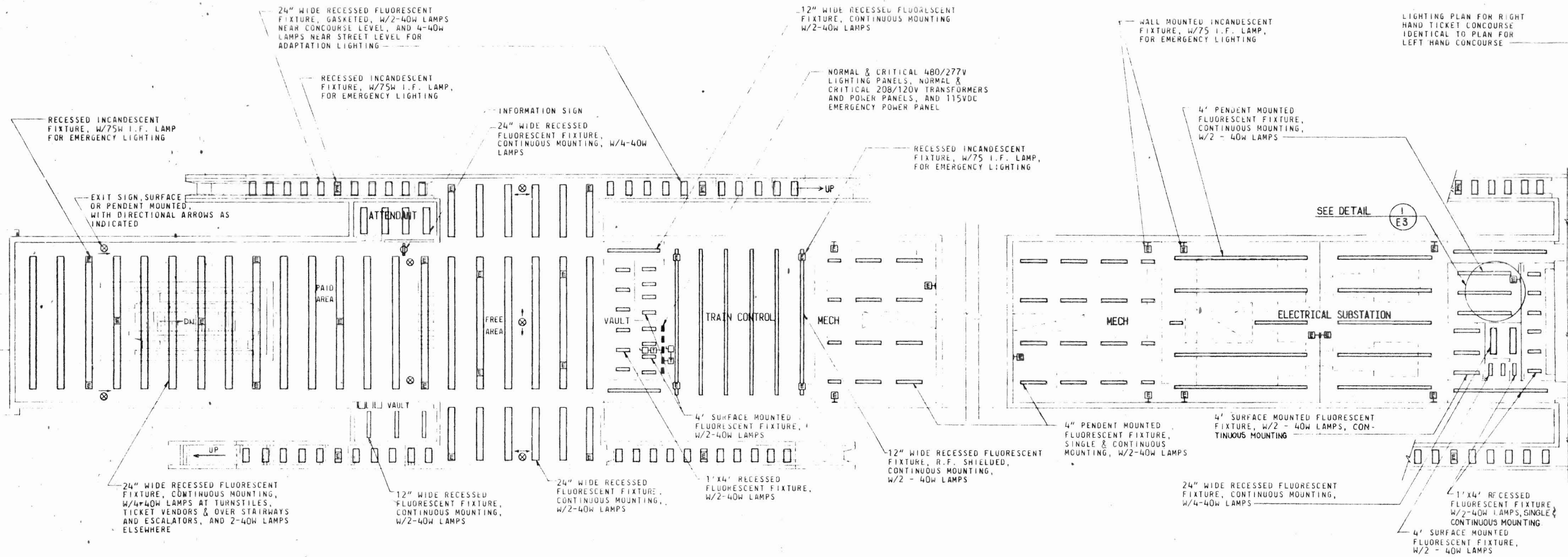
SYMBOL	DESCRIPTION
	BOLTED LINK
	CIRCUIT BREAKER, REMOTE CONTROL
	CIRCUIT BREAKER OVERLOAD PROTECTION, REMOTE CONTROL
	INTERCONNECTED JUNCTION BOXES ON 3rd RAIL CIRCUIT

NOTES:

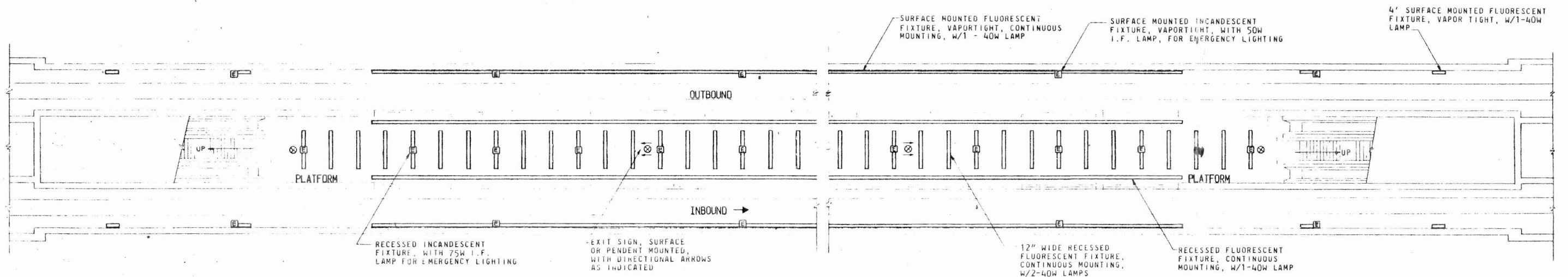
- 1) RAIL GAP TIES ARE LOCATED AT PASSENGER STATIONS NOT HAVING A SUBSTATION AND MIDWAY BETWEEN STATIONS OF EXTRA LONG R.U.S.
- 2) RAIL GAP TIES AT PASSENGER STATIONS, WHERE NO SUBSTATIONS ARE LOCATED, ARE SIMILAR TO STATION CONNECTIONS WITH A SUBSTATION, EXCEPT THE NEGATIVE RETURN IS OMITTED.
- 3) ALL 3rd RAIL GAPS AND RAIL GAP TIES IN PASSENGER STATIONS ARE 60-FT. IN LENGTH, ALL OTHERS ARE 20-FEET. THE 60-FT. GAPS ARE LOCATED IN THE INCOMING TRACK OF PASSENGER STATIONS OUTSIDE THE PLATFORM AREA.
- 4) SEE DWG NO. EPA FOR LIST OF SYMBOLS, ABBREVIATIONS AND CIRCUIT DETAILS.

DWG NO	REFERENCE DRAWINGS	TITLE
EPA	PROPULSION POWER SUBSTATION LAYOUT & DETAILS	

TITLE: BARRIERS FOR RAIL COLLECTION AREA UNDER TRACK SYSTEM
 DRAWING NO: 100012-01-01-01-01-01
 DATE: 11/11/01
 PROJECT MANAGER: DANIEL MANN JOHNSON & MENDENHALL
 ARCHITECTS ENGINEERS
 KAISER ENGINEERS A JOINT VENTURE
 APPROVALS: [Signature] DATE: 11/11/01
 PROJECT ENGINEER: [Signature] DATE: 11/11/01
 SCALE: 1"=100'-0"



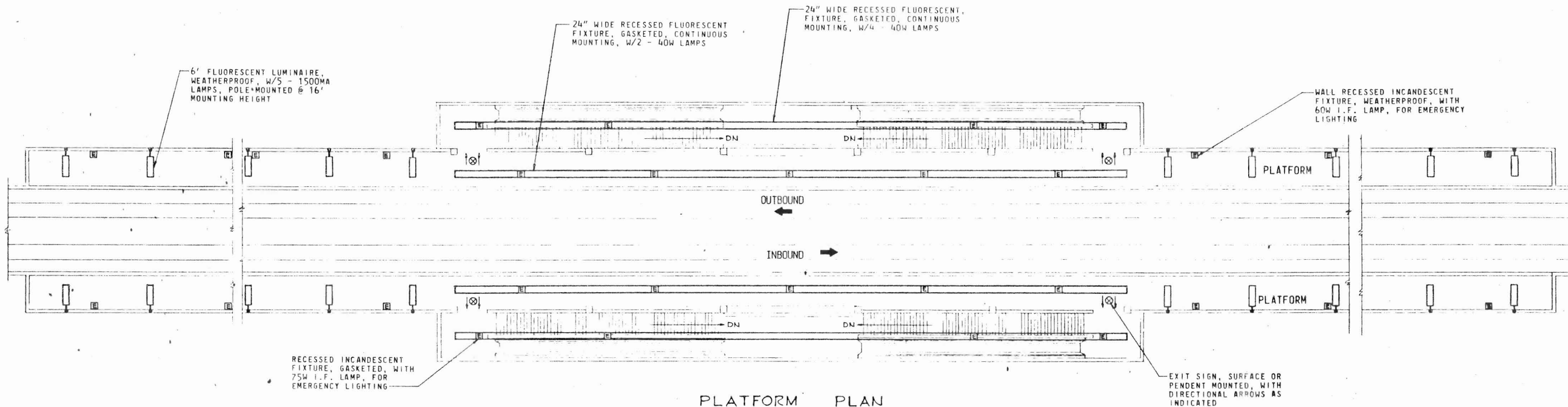
MEZZANINE PLAN



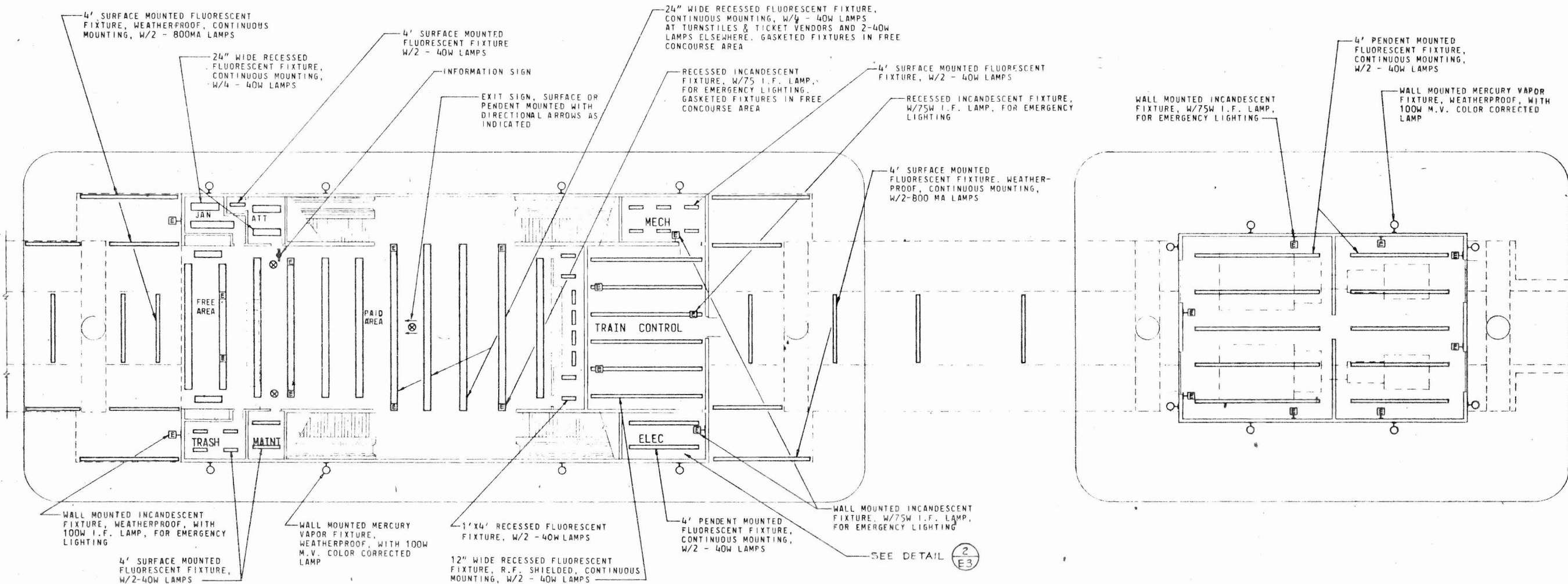
PLATFORM PLAN

1/16" = 1'-0" 10' 0' 10' 20' 30'

DRAWING NO. E1
 DATE
 PROJECT MANAGER
 ARCHITECTS - ENGINEERS
 KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDELL
 ARCHITECTS - ENGINEERS
 SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015
 SUBWAY STATION TYPICAL LIGHTING PLAN
 TITLE
 DRAWING NO. E1



PLATFORM PLAN

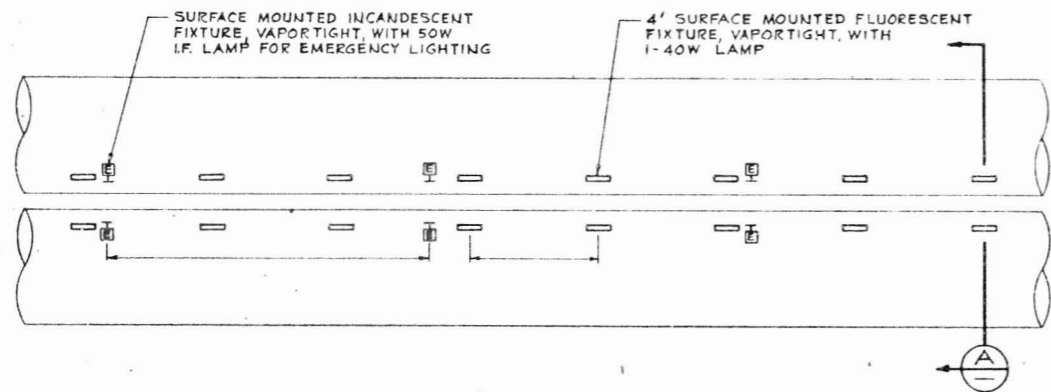


TICKET CONCOURSE PLAN

ELECTRICAL SUBSTATION PLAN

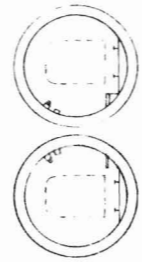
1/16" = 1'-0" 10' 0' 20' 30'

E2
 APPROVALS
 PROJECT MANAGER
 ARCHITECT
 23 JUN 58
 A JOINT VENTURE
 KAISER ENGINEERS
 DANIEL, MANN, JOHNSON, & MENDELHALL
 ARCHITECTS-ENGINEERS
 SOUTHERN CALIFORNIA
 RAPID TRANSIT DISTRICT
 LOS ANGELES, CALIFORNIA 90015
 AERIAL STATION
 TYPICAL LIGHTING PLAN
 E2

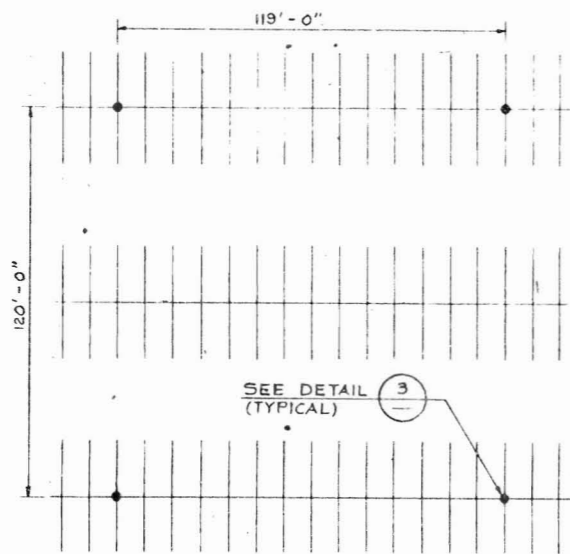


TYPICAL TUNNEL LIGHTING PLAN
NOT TO SCALE

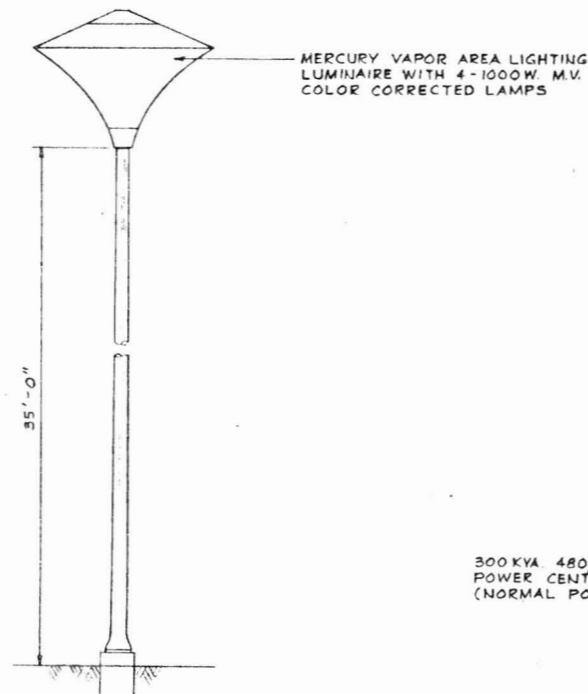
SECTION A-A



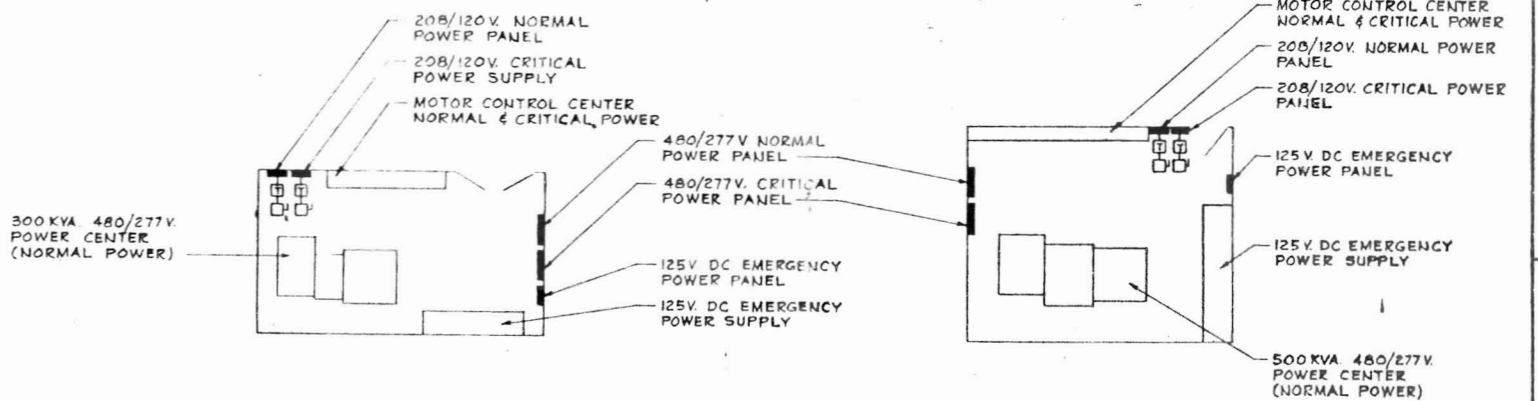
- PLAN SYMBOLS**
- FLUORESCENT LIGHTING FIXTURE
 - INCANDESCENT LIGHTING FIXTURE - EMERGENCY POWER
 - EXIT SIGN, WITH FLUORESCENT CRITICAL LIGHTING SECTION AND INCANDESCENT EMERGENCY LIGHTING SECTION
 - INFORMATION SIGN
 - WALL MOUNTED FIXTURE - INCANDESCENT OR MERCURY VAPOR AS INDICATED
 - LIGHTING STANDARD
 - LIGHTING OR POWER PANEL AS INDICATED
 - LIGHTING AND POWER TRANSFORMER, DRY TYPE
 - UNDERGROUND CONDUIT, RIGID STEEL CONDUIT (C) OR NONMETALLIC DUCT (K), AS INDICATED
 - LOW VOLTAGE DISCONNECT SWITCH
- DIAGRAM SYMBOLS**
- CABLE TERMINATOR
 - POTENTIAL TRANSFORMER WITH FUSED PRIMARY
 - CURRENT TRANSFORMER
 - FUSED DISCONNECT/ INTERRUPTER SWITCH
 - UNFUSED DISCONNECT/ INTERRUPTER SWITCH
 - TRANSFORMER, RATING AS INDICATED
 - POWER AIR CIRCUIT BREAKER, DRAWOUT TYPE, FRAME AND TRIP SIZE AS INDICATED
 - MOLDED CASE CIRCUIT BREAKER, FRAME AND TRIP SIZE AS INDICATED
 - COMBINATION MOTOR STARTER, CIRCUIT BREAKER TYPE SIZE AS INDICATED
 - MOTOR, HORSEPOWER AS INDICATED



TYPICAL PARKING LOT LIGHTING PLAN
SCALE: 1" = 30'-0"

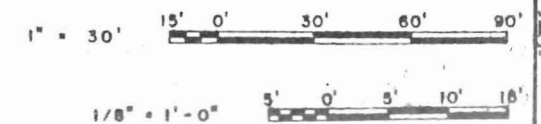


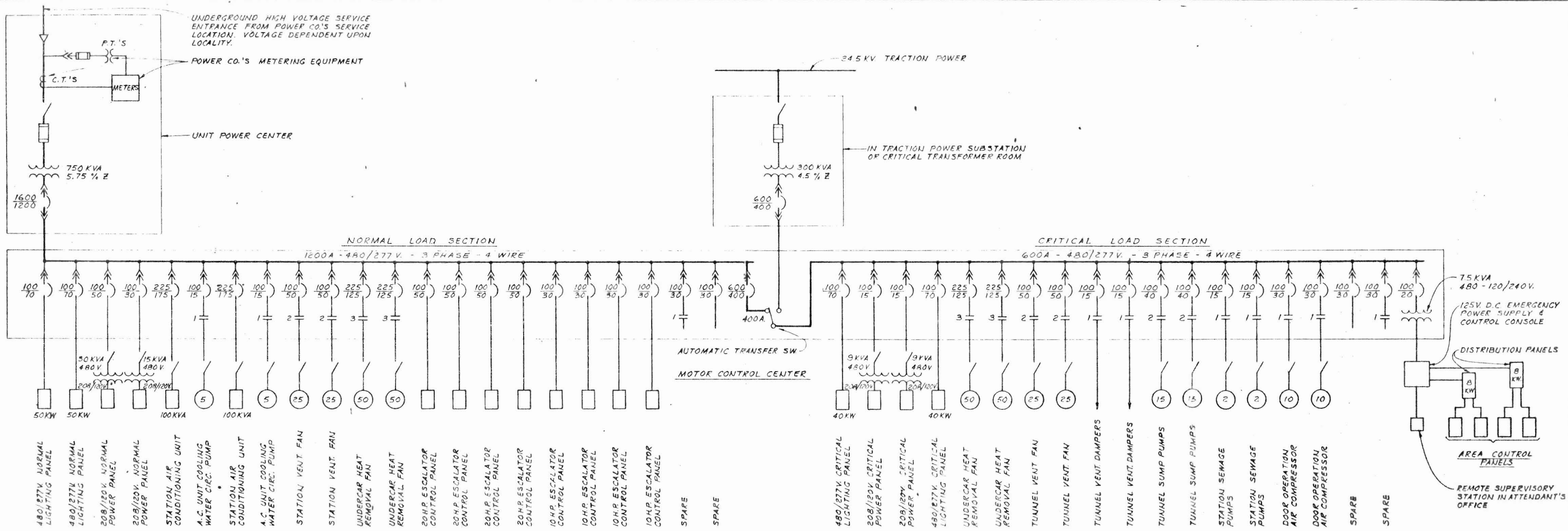
DETAIL 3
NOT TO SCALE



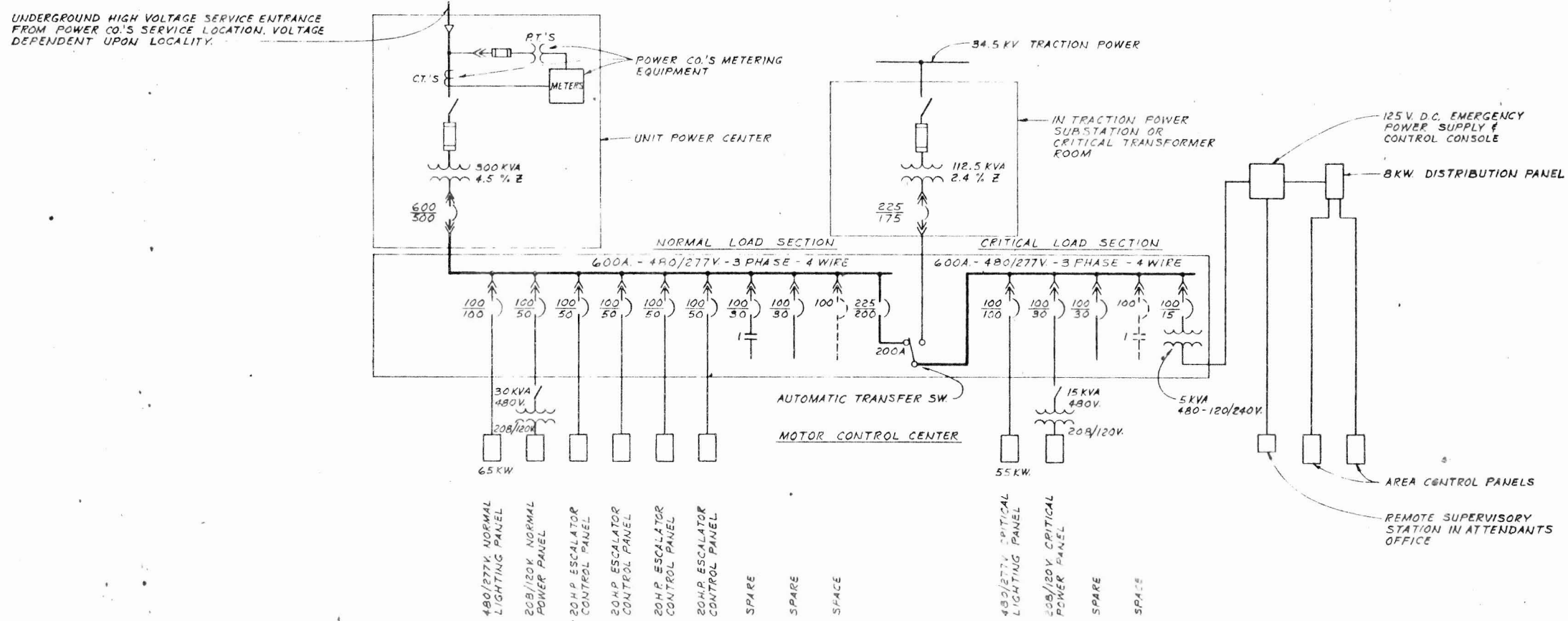
AERIAL STATION ELECTRICAL ROOM
DETAIL 2
SCALE: 1/8" = 1'-0" E2

SUBWAY STATION ELECTRICAL ROOM
DETAIL 1
SCALE: 1/8" = 1'-0" E1

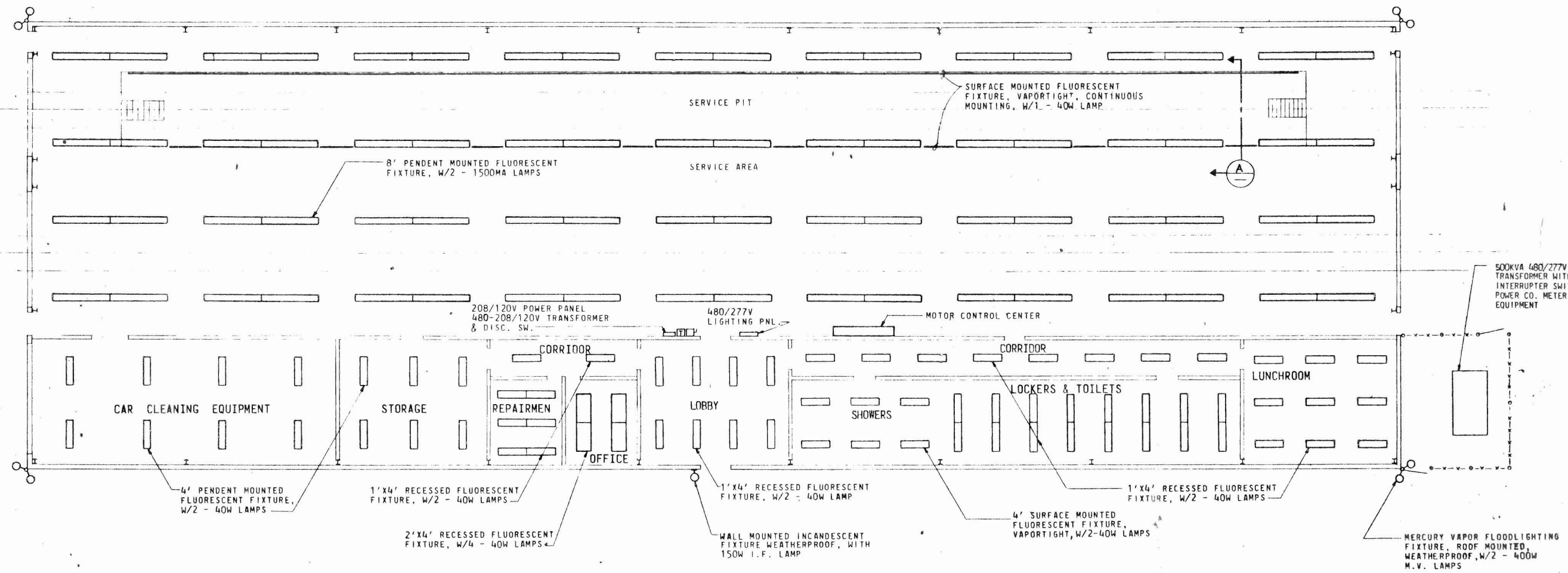




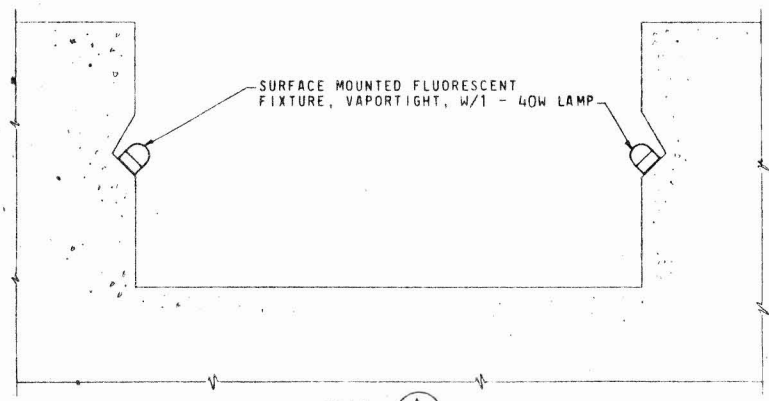
SINGLE LINE DIAGRAM FOR TYPICAL SUBWAY PASSENGER STATION



SINGLE LINE DIAGRAM FOR TYPICAL AERIAL PASSENGER STATION



LIGHTING PLAN
SCALE: 1/8" = 1'-0"

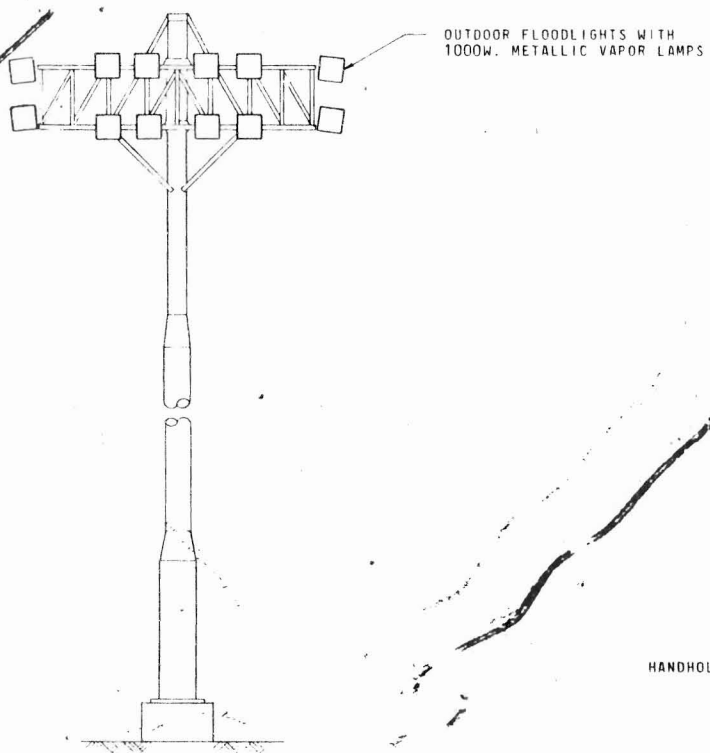


SECTION **A**
SERVICE PIT LIGHTING
NOT TO SCALE

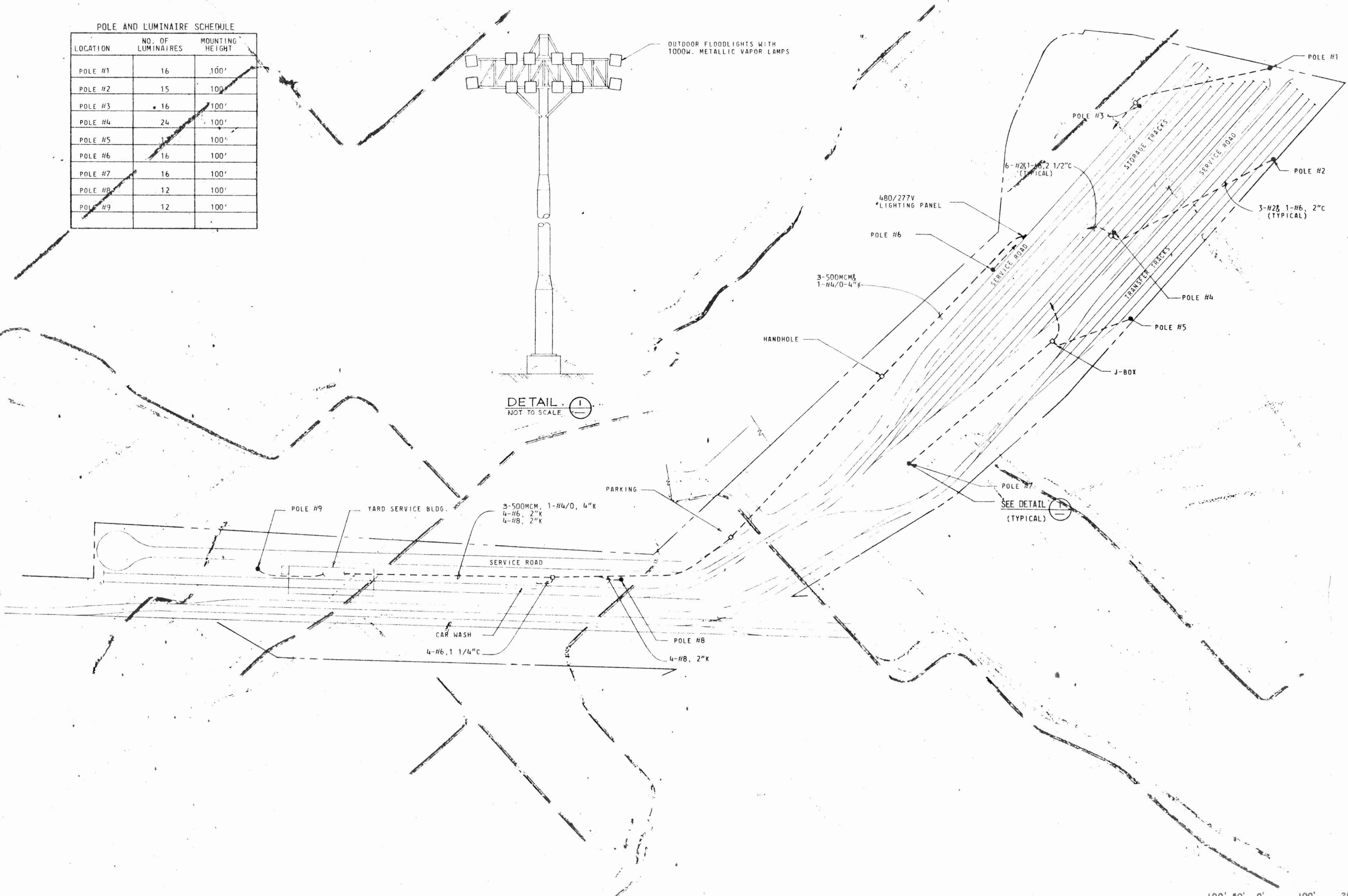
DRAWING NO.	E5
	DATE
APPROVALS	PROJECT MANAGER
	SCHEMATIC DESIGNER
DATE	12 DEC 87
	PROJECT NO.
TITLE	YARD SERVICE BUILDING TYPICAL POWER & LIGHTING PLAN
	PROJECT NO.
DRAWING NO.	E5
	DATE
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT	ARCHITECTS & ENGINEERS
	DATE
Kaiser Engineers A Joint Venture	Daniel Mann, Johnson, & Mendenhall
	ARCHITECTS & ENGINEERS

POLE AND LUMINAIRE SCHEDULE

LOCATION	NO. OF LUMINAIRES	MOUNTING HEIGHT
POLE #1	16	100'
POLE #2	15	100'
POLE #3	16	100'
POLE #4	24	100'
POLE #5	17	100'
POLE #6	16	100'
POLE #7	16	100'
POLE #8	12	100'
POLE #9	12	100'

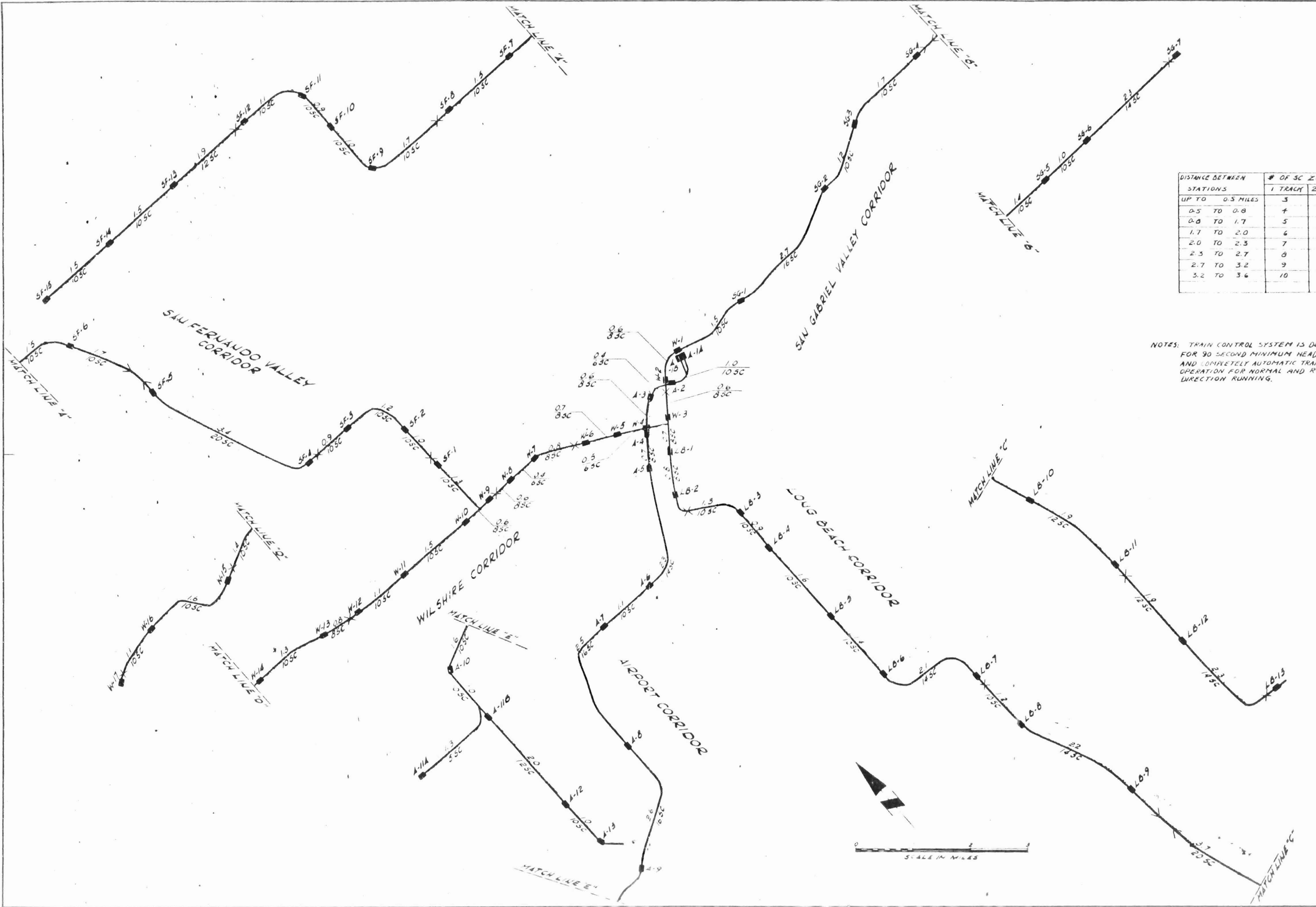


DETAIL 1
NOT TO SCALE



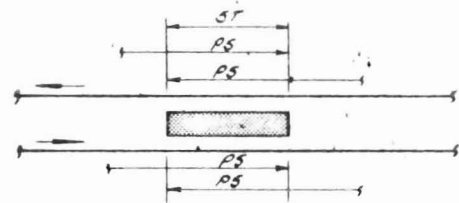
SEE DETAIL 2
(TYPICAL)



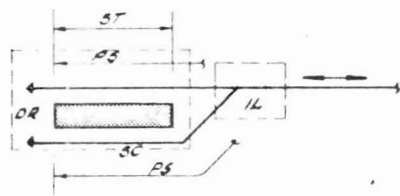


DISTANCE BETWEEN STATIONS	# OF SC ZONES	
	1 TRACK	2 TRACK
UP TO 0.5 MILES	3	6
0.5 TO 0.8	4	8
0.8 TO 1.7	5	10
1.7 TO 2.0	6	12
2.0 TO 2.3	7	14
2.3 TO 2.7	8	16
2.7 TO 3.2	9	18
3.2 TO 3.6	10	20

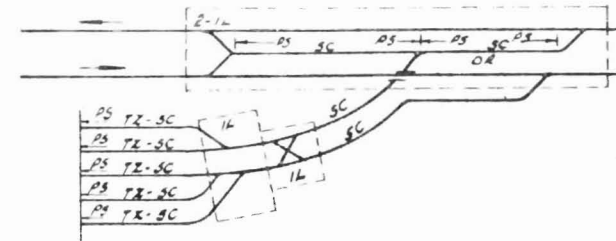
NOTES: TRAIN CONTROL SYSTEM IS DESIGNED FOR 90 SECOND MINIMUM HEADWAY AND COMPLETELY AUTOMATIC TRAIN OPERATION FOR NORMAL AND REVERSE DIRECTION RUNNING.



1 TYPICAL STATION



6 AIRPORT TERMINAL



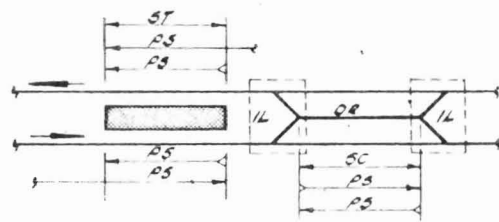
9 BASIC YARD TURNOUT

LEGEND

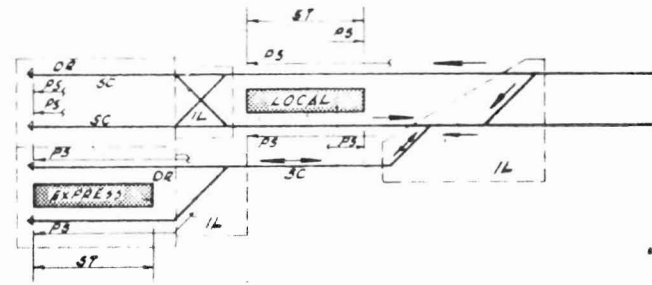
- SC = SPEED CONTROL ZONE
- IL = INTERLOCK ZONE
- DR = DIRECTION REVERSING ZONE
- ST = STATION ZONE
- PS = PROGRAMMED STOP
- TZ = TRANSFER ZONE

NOTES: TRAIN CONTROL SYSTEM IS DESIGNED FOR 90 SECOND MINIMUM HEADWAY AND COMPLETELY AUTOMATIC TRAIN OPERATION FOR NORMAL AND REVERSE DIRECTION RUNNING

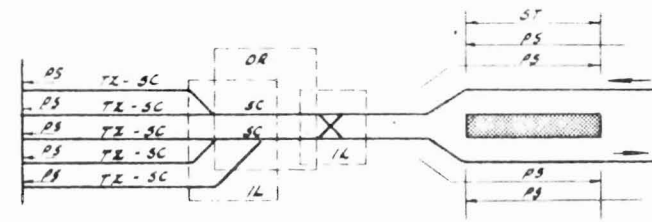
TRAIN CONTROL TABLE						
	SC	IL	DR	ST	PS	TZ
1				1	4	
2	1	2	1	1	6	
3		1	1	1	6	
4	2	2		1	4	
5		1	1	1	3	
6	1	1	1	1	2	
7	3	3	2	2	8	
8		2				
9	9	4	1		9	5
10	7	2	1		5	5
11		3				



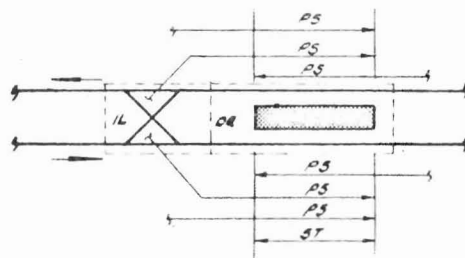
2 TURNBACK STATION



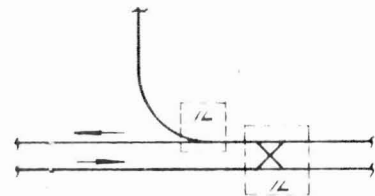
7 METRO PORT TERMINAL



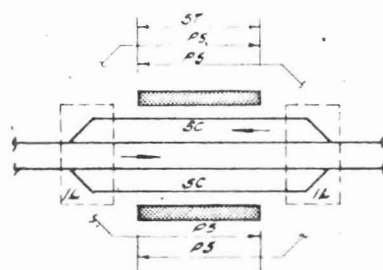
10 END OF LINE YARD



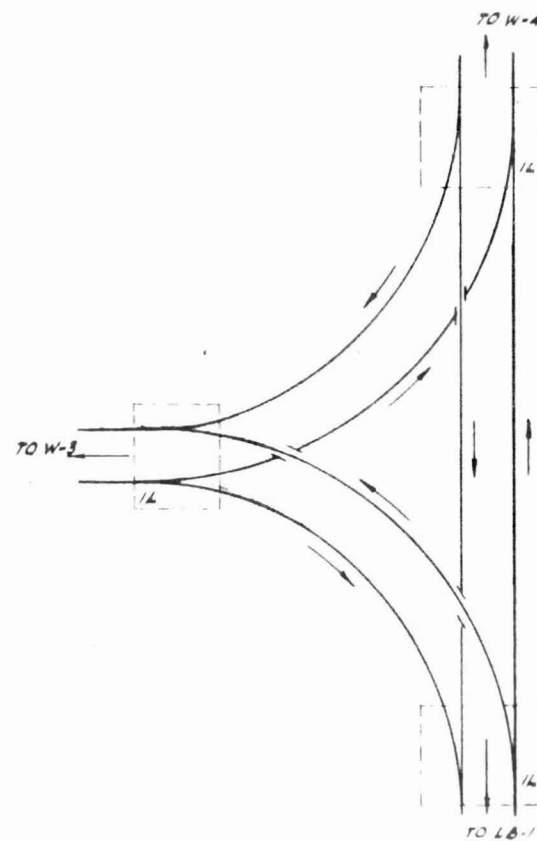
3 CROSSOVER STATION



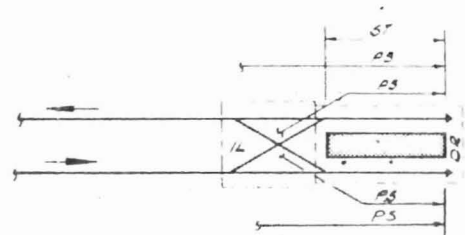
8 AIRPORT TURNOUT



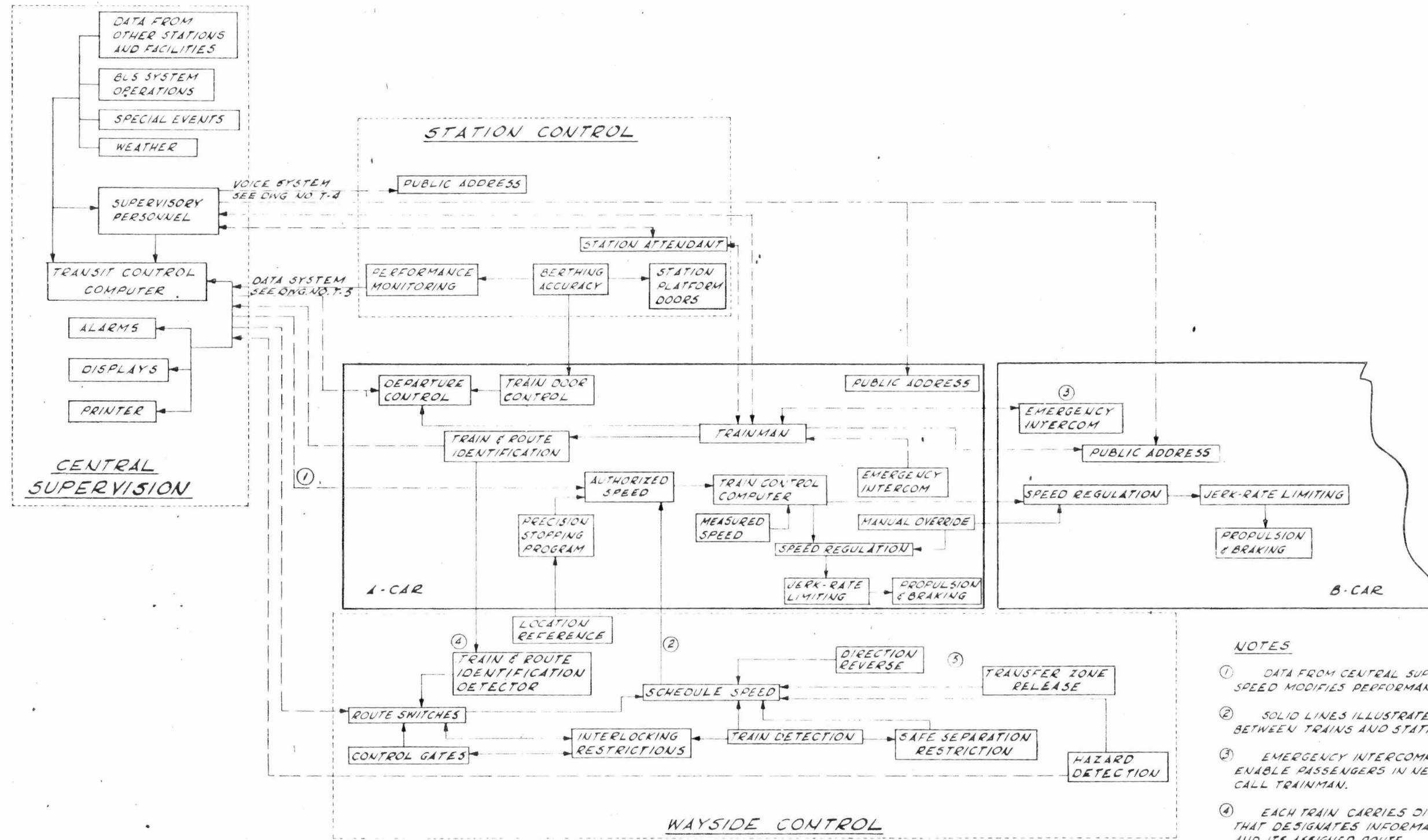
4 WESTERN STATION



11 BROADWAY INTERCHANGE



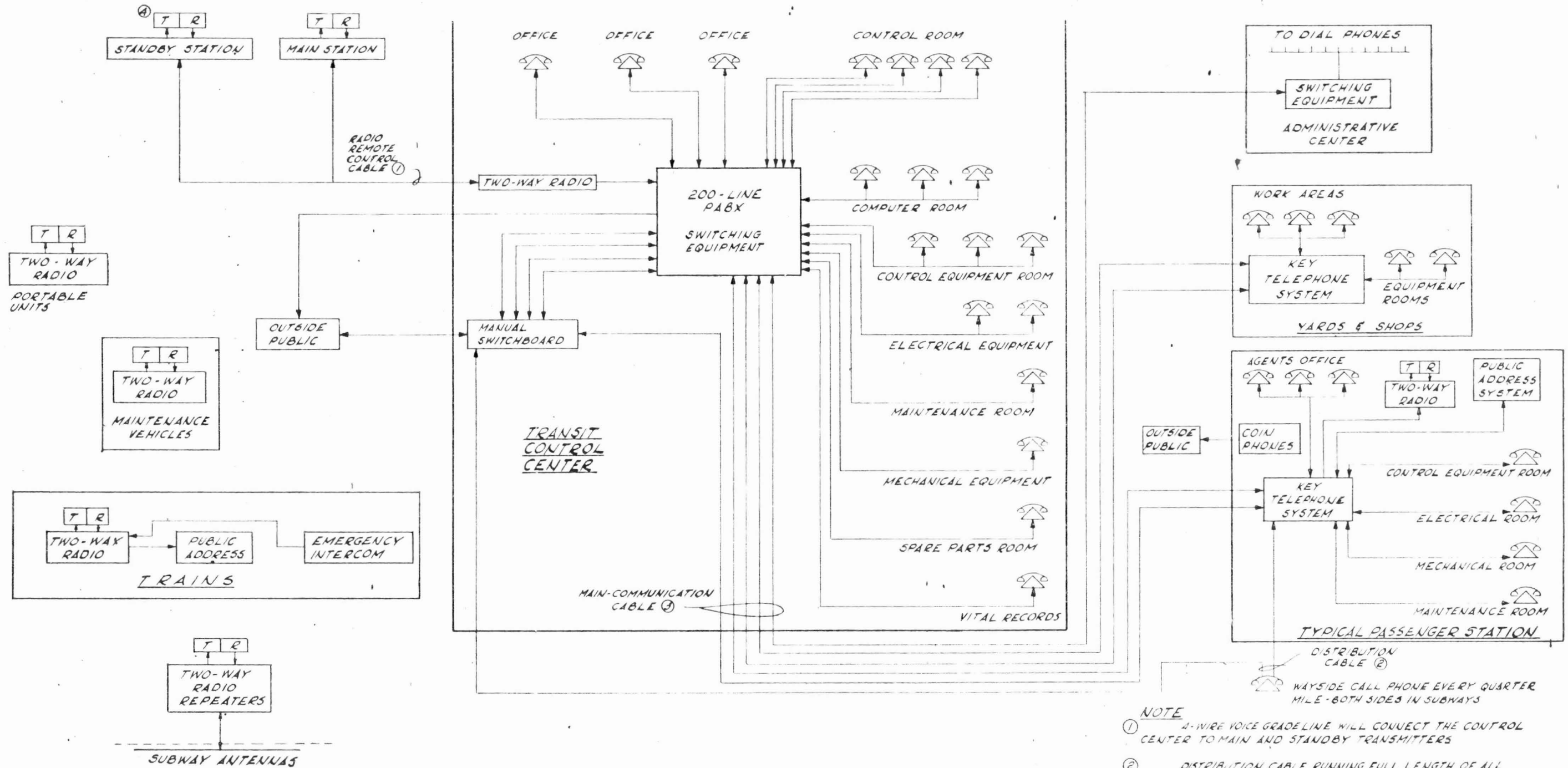
5 TERMINAL STATION



NOTES

- ① DATA FROM CENTRAL SUPERVISION TO AUTHORIZED SPEED MODIFIES PERFORMANCE LEVEL.
- ② SOLID LINES ILLUSTRATE TRANSFER OF INTELLIGENCE BETWEEN TRAINS AND STATION OR WAYSIDE DEVICES.
- ③ EMERGENCY INTERCOMMUNICATION SYSTEM WILL ENABLE PASSENGERS IN NEED OF ASSISTANCE TO CALL TRAINMAN.
- ④ EACH TRAIN CARRIES DIGITAL IDENTIFICATION THAT DESIGNATES INFORMATION ABOUT THE TRAIN AND ITS ASSIGNED ROUTE.
- ⑤ TRANSFER ZONES & DIRECTION REVERSING ZONES LIMIT SCHEDULED SPEED TO ZERO UNLESS CONDITIONS FOR RELEASE ARE SATISFIED.

AUTOMATIC TRAIN CONTROL FUNCTIONAL SCHEMATIC DIAGRAM

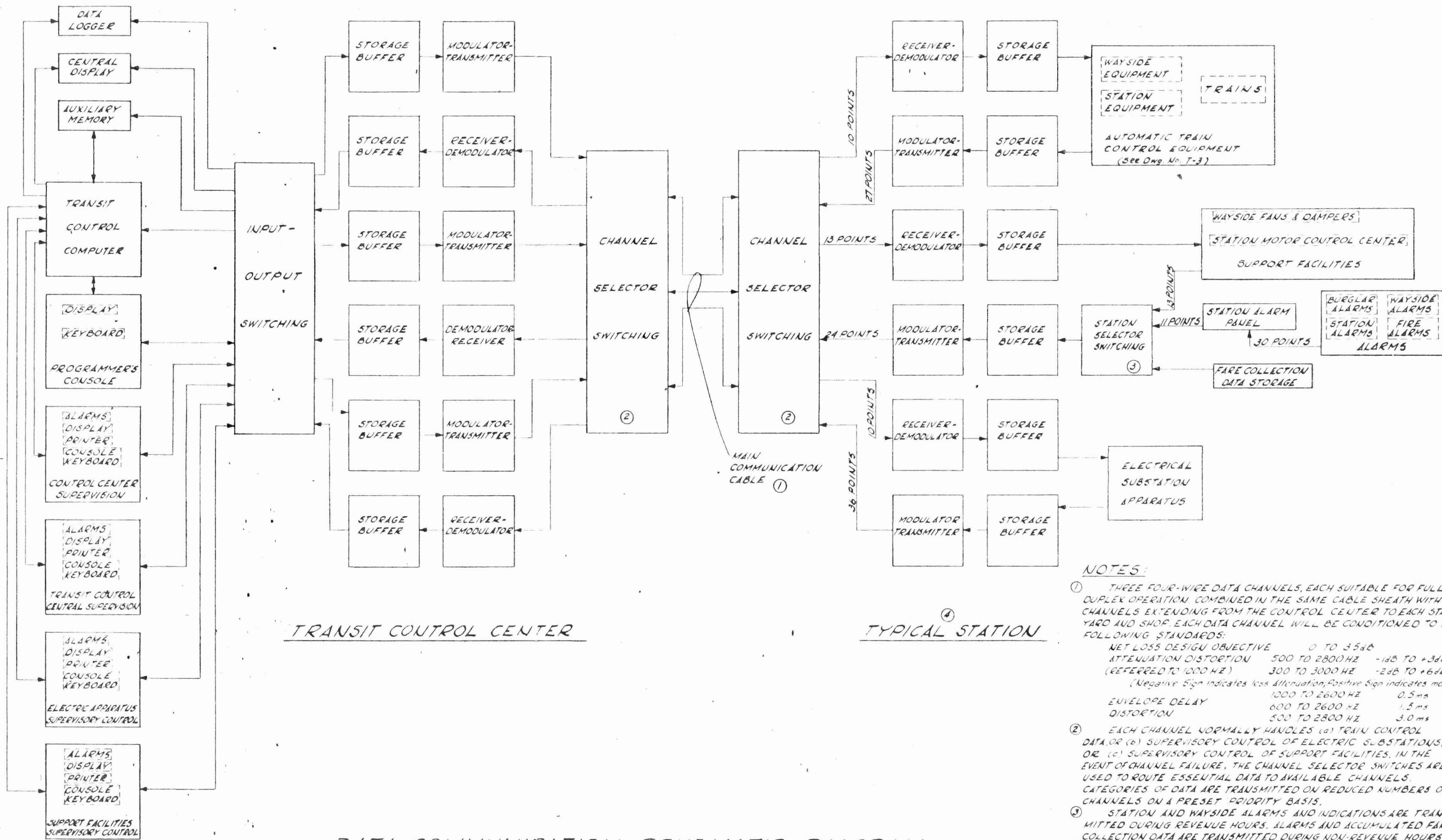


SCRTD VOICE COMMUNICATION SYSTEM

- NOTE**
- ① 4-WIRE VOICE GRADELINE WILL CONNECT THE CONTROL CENTER TO MAIN AND STANDBY TRANSMITTERS
 - ② DISTRIBUTION CABLE RUNNING FULL LENGTH OF ALL CORRIDORS WILL CONNECT ALL WAYSIDE CALL PHONES TO NEAREST STATION.
 - ③ MAIN COMMUNICATION CABLE IN EACH CORRIDOR WILL CONNECT THE CONTROL CENTER TO EACH PASSENGER STATION AND STORAGE YARD VIA TWO LINES, AND TO THE ADMINISTRATIVE CENTER AND MAINTENANCE SHOP VIA THREE LINES. THE CABLE WILL ALSO CONTAIN DATA LINES AND SPARES. VOICE LINES WILL BE FOUR-WIRE AND CONFORM TO THE FOLLOWING TRANSMISSION STANDARDS:
 - NET LOSS DESIGN OBJECTIVE 0 TO 3.5dB
 - ATTENUATION DISTORTION* 300-3000 HZ -3dB TO +12dB (REFERRED TO 1000HZ) 500-2500 HZ -2dB TO +8dB
 - MAXIMUM FREQUENCY ± 10HZ
 - DISPLACEMENT
 - MESSAGE CIRCUIT NOISE NOT TO EXCEED 31 dB rnc 0
- ④ **T/R** TWO-WAY RADIO TRANSMITTER (RECEIVER)

* NEGATIVE SIGN INDICATES LESS ATTENUATION; POSITIVE SIGN INDICATES MORE.

APPROVALS: PROJECT MANAGER, DESIGNER, CHECKED BY, DATE, SCALE, TITLE
 KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS ENGINEERS
 SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015
 VOICE COMMUNICATION SYSTEM DIAGRAM
 DRAWING NO. T-4



TRANSIT CONTROL CENTER

TYPICAL STATION

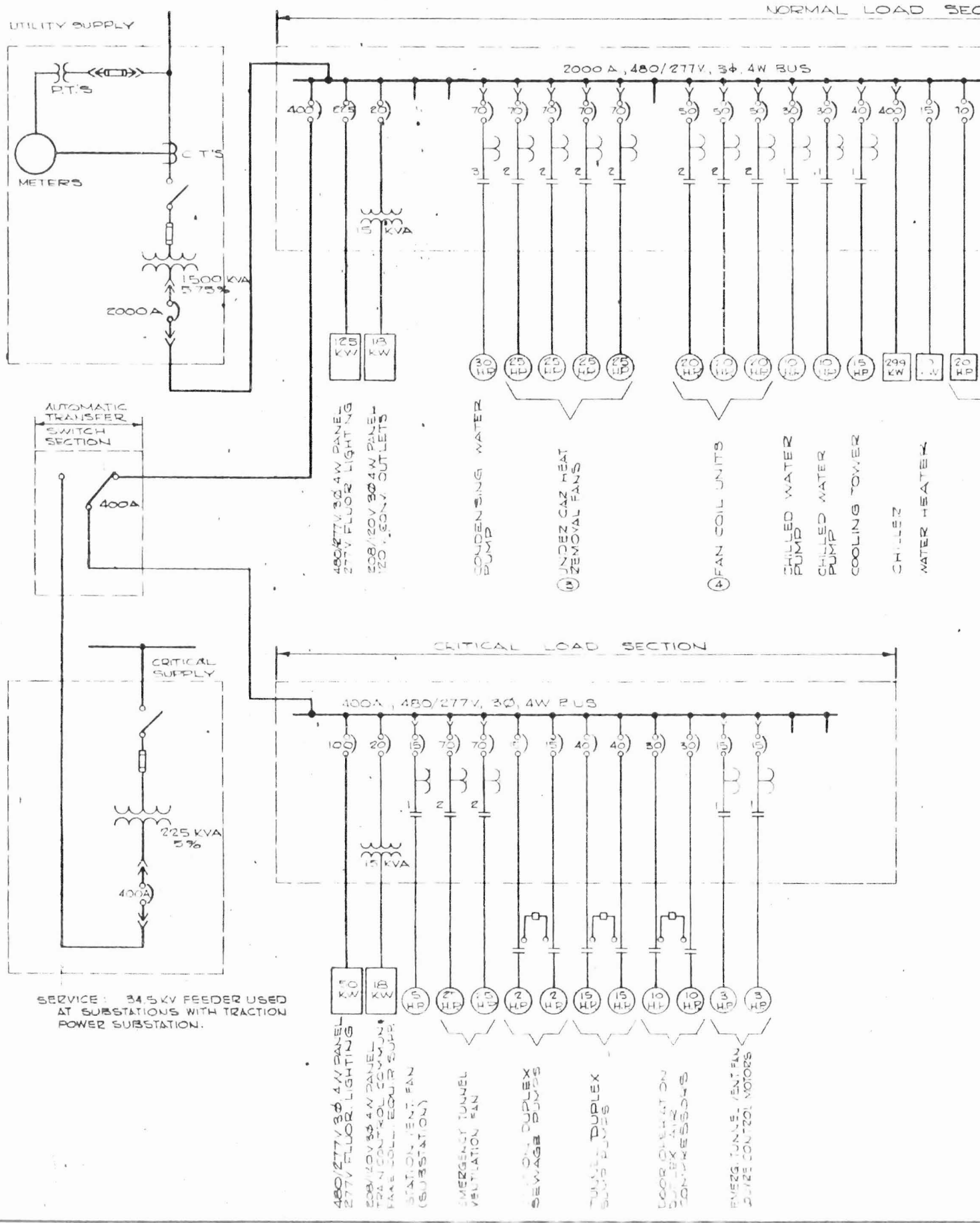
DATA COMMUNICATION SCHEMATIC DIAGRAM

NOTES:

- ① THREE FOUR-WIRE DATA CHANNELS, EACH SUITABLE FOR FULL DUPLEX OPERATION, COMBINED IN THE SAME CABLE SHEATH WITH VOICE CHANNELS EXTENDING FROM THE CONTROL CENTER TO EACH STATION YARD AND SHOP. EACH DATA CHANNEL WILL BE CONDITIONED TO THE FOLLOWING STANDARDS:

NET LOSS DESIGN OBJECTIVE	0 TO 35dB
ATTENUATION DISTORTION	500 TO 2800 HZ -1dB TO +3dB
(REFERRED TO 1000 HZ)	300 TO 3000 HZ -2dB TO +6dB
	(Negative Sign Indicates less Attenuation, Positive Sign indicates more)
ENVELOPE DELAY	1000 TO 2600 HZ 0.5 ms
DISTORTION	600 TO 2600 HZ 1.5 ms
	500 TO 2800 HZ 3.0 ms
- ② EACH CHANNEL NORMALLY HANDLES (a) TRAIN CONTROL DATA, OR (b) SUPERVISORY CONTROL OF ELECTRIC SUBSTATIONS, OR (c) SUPERVISORY CONTROL OF SUPPORT FACILITIES. IN THE EVENT OF CHANNEL FAILURE, THE CHANNEL SELECTOR SWITCHES ARE USED TO ROUTE ESSENTIAL DATA TO AVAILABLE CHANNELS. CATEGORIES OF DATA ARE TRANSMITTED ON REDUCED NUMBERS OF CHANNELS ON A PRESET PRIORITY BASIS.
- ③ STATION AND WAYSIDE ALARMS AND INDICATIONS ARE TRANSMITTED DURING REVENUE HOURS. ALARMS AND ACCUMULATED FARE COLLECTION DATA ARE TRANSMITTED DURING NON-REVENUE HOURS
- ④ DATA COMMUNICATION FACILITIES SERVING YARDS AND SHOPS PROVIDE CHANNEL AND DATA CAPACITIES IDENTICAL TO THOSE SERVING STATION.

SUBSTATION POWER TABULATION							
SUBSTATION	UNIT SUB-STATION	NORMAL POWER BUS	HEAVY LOAD BUS	TRANSFER SWITCH (AMP'S)	CRITICAL POWER SUBSTATION	CRITICAL POWER BUS	CRITICAL BUS LOAD
(2) BLUNKER HILL	1500KVA	1600 A	1331.9A	400	225KVA	400 A	233.2A
(2) BROADWAY	1500KVA	1600 A	1221.9A	400	225KVA	400 A	233.2A
(2) CONV CENTER	1000KVA	1200A		400	225KVA	400A	233.2A
(1) 2 WILSHIRE	1500KVA	2000 A	1763.1A	400	225KVA	400 A	233.2A



- DESIGN NOTES (THIS SHEET ONLY)
- (1) WILSHIRE PASSENGER STATION SHOWN & TABULATED. FOR REMAINING UNDERGROUND STATION FACILITIES, SEE TABULATION, THIS SHEET.
 - (2) INCREASING # OR DECREASING NUMBER OF ESCALATORS & AIR CONDITIONING REQUIREMENTS IN VARIOUS UNDERGROUND STATIONS ARE BASIC FACTORS IN DETERMINING LOAD DIFFERENCES.
 - (3) MOTORS SHOWN FOR WILSHIRE STATION ONLY, ALL OTHER UNDERGROUND STATIONS REQUIRE 2 AT 50HP.
 - (4) MOTORS SHOWN FOR WILSHIRE STATION ONLY, ALL OTHER UNDERGROUND STATIONS REQUIRE 2 AT 25HP.

- SYMBOLS FOR ONE LINE DIAGRAM (UNDERGROUND & AERIAL PASS. STNG.)
- CIRCUIT BREAKER, AMP TRIP AS NOTED 480V, 3Ø
 - COMBINATION LINE STARTER, PLUG IN TYPE, 480V, 3Ø, BREAKER AMPS AS NOTED, NEMA SIZE AS REQUIRED.
 - CONTROL TRANSFORMER 480/120V SIZE AS REQUIRED
 - TRANSFORMER - SIZE AS NOTED.
 - LIGHTING PANEL AS SHOWN
 - MOTOR - H.P. AS NOTED
 - PRESSURE OR LIQUID SENSITIVE OPERATING DEVICE.

PRELIMINARY ENGINEERING ONLY
FOR COST ESTIMATING PURPOSES
SUBJECT TO CHANGE IN FINAL DESIGN

E201

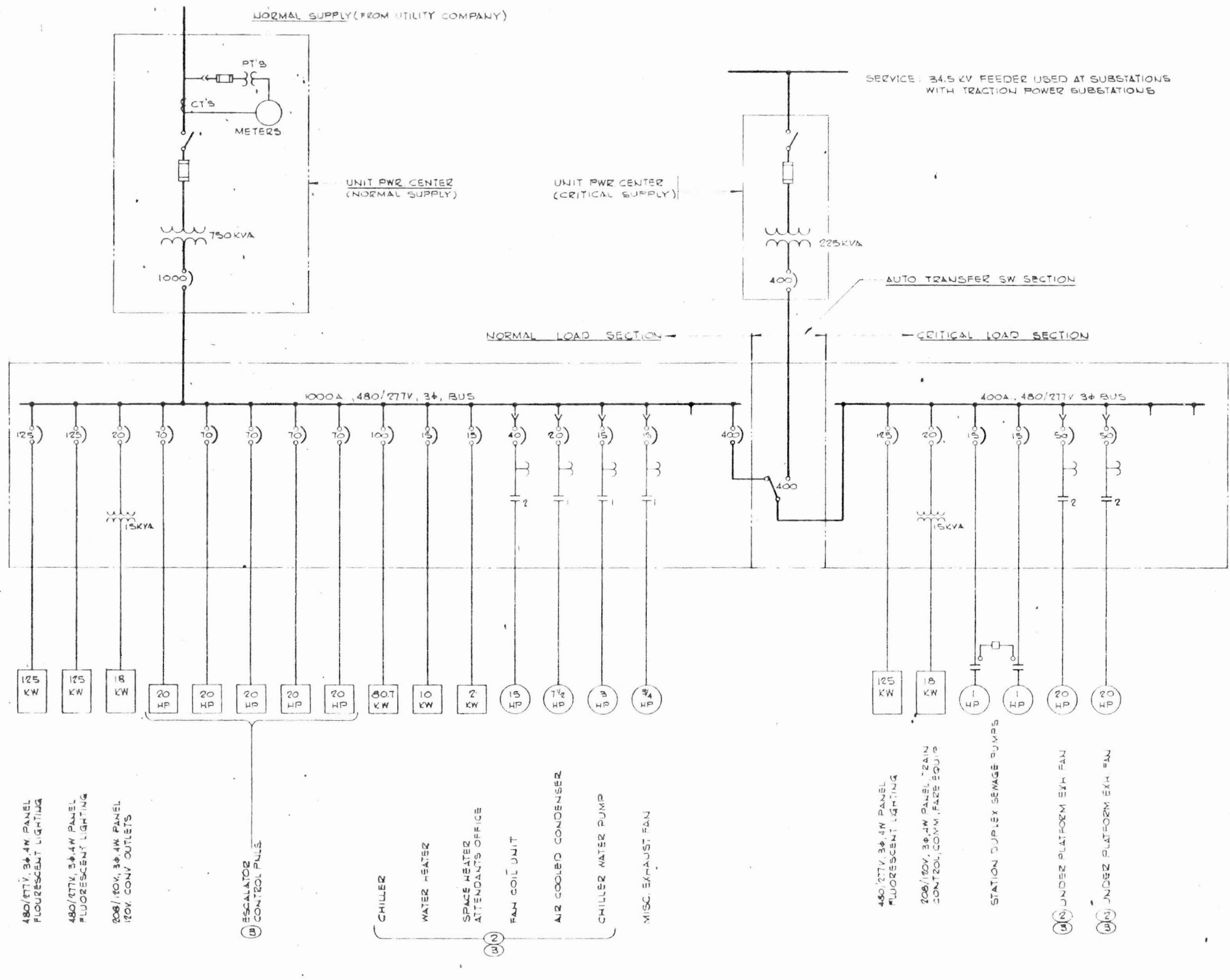
APPROVALS

M. A. NISHKIAN & CO. ENGINEERS CONSULTING LONG BEACH, CALIFORNIA

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015

ONE LINE DIAGRAM UNDERGROUND PASSENGER STATION AIRPORT-SOUTHWEST CORRIDOR

E201



SERVICE: 34.5 KV FEEDER USED AT SUBSTATIONS WITH TRACTION POWER SUBSTATIONS

ONE LINE DIAGRAM
AIRPORT PASSENGER STATION ①

SUBSTATION POWER TABULATION

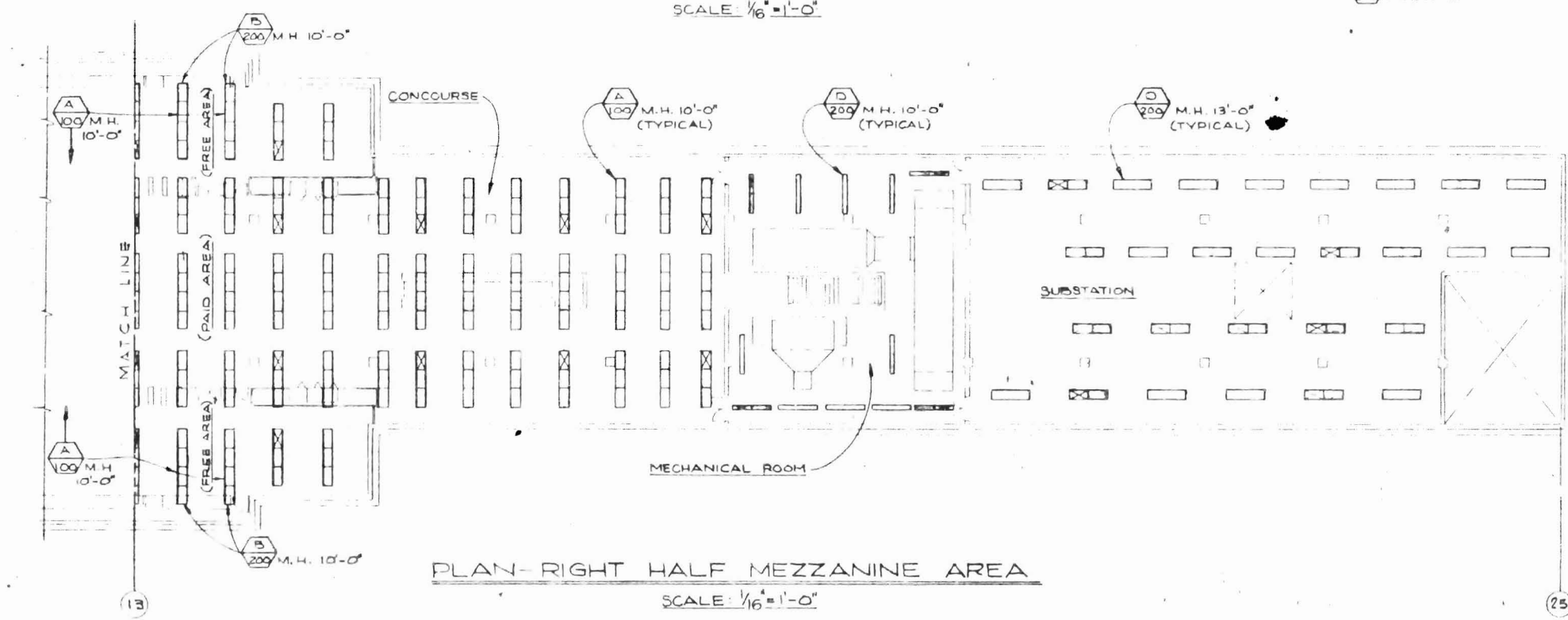
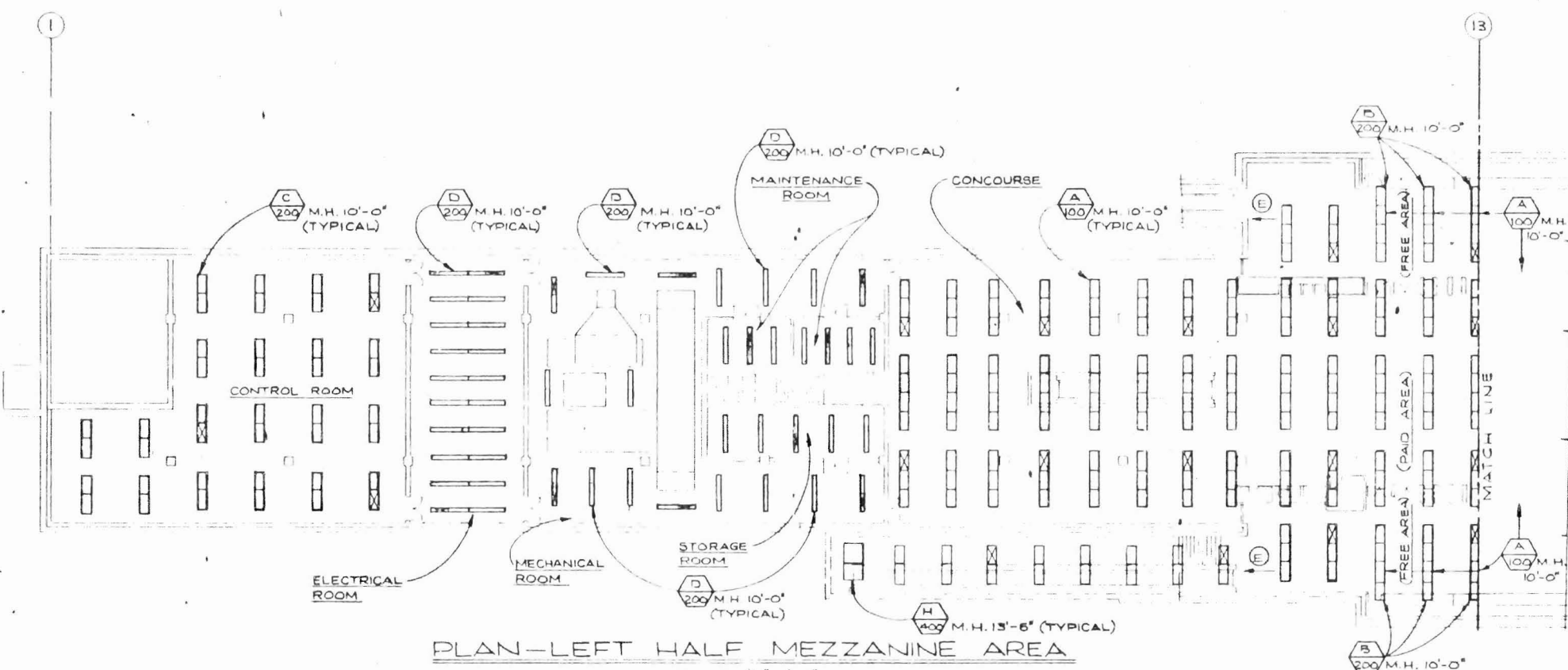
PASSENGER STATION	UNIT SUBDIV.	NORMAL PWR. BUS	CRIT. BUS	TRANSFORMER IN. AMP.	CRITICAL PWR. SUBSTATION	CRITICAL PWR. BUS	CRIT. BUS CONN. LOAD
ROSECRANS	300KVA	400A	277 2A	100A	75KVA	100A	81.7A
EXPOSITION	750KVA	800A	615.2A	100A	75KVA	100A	81.7A
CENTURY	500KVA	600A	407.2A	100A	75KVA	100A	81.7A
MANCHESTER	500KVA	600A	407.2A	100A	75KVA	100A	81.7A
EL SEGUNDO	500KVA	600A	407.2A	100A	75KVA	100A	81.7A
CRENSHAW	500KVA	600A	561.4	100A	75KVA	100A	81.7A
WESTERN	500KVA	600A	407.2A	100A	75KVA	100A	81.7A
LA BREA	500KVA	600A	407.2A	100A	75KVA	100A	81.7A
METROPORT	500KVA	600A	485.2A	100A	75KVA	100A	81.7A
AIRPORT	750KVA	1000A	819.9A	400A	225KVA	400A	225.7A

- DESIGN NOTES (THIS SHEET ONLY)
- AIRPORT STATION SHOWN & TABULATED FOR REMAINING AT GRADE STATION FACILITIES, SEE TABULATION, THIS SHEET.
 - AIR CONDITIONING EQUIPMENT REQUIRED ON AIRPORT STATION ONLY.
 - INCREASING &/OR DECREASING NUMBER OF ESCALATORS & THE ABSENCE OF AIR CONDITIONING EQUIPMENT ARE BASIC FACTORS DETERMINING LOAD DIFFERENCES ON THE REMAINING AERIAL PASSENGER STATIONS.
 - FOR SYMBOL LIST, SEE SHEET E 201.

PRELIMINARY ENGINEERING ONLY
FOR COST ESTIMATING PURPOSES
SUBJECT TO CHANGE IN FINAL DESIGN

LIGHTING FIXTURE SCHEDULE

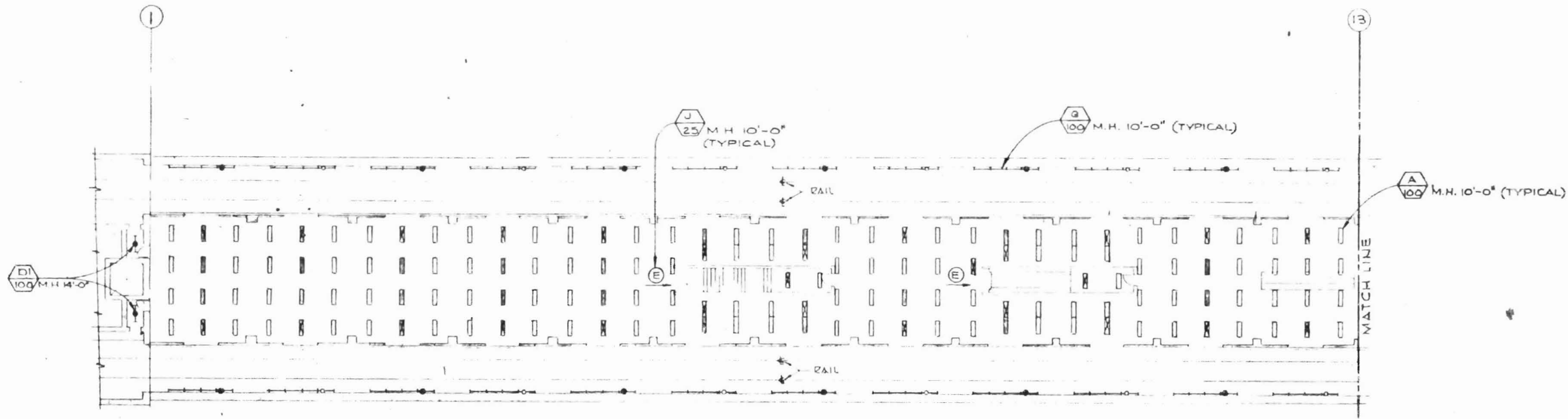
TYPE	DESCRIPTION	LOCATION	MTG HT
A □	FLUORESCENT RECESSED W/2-40W, T12/RS/CW LAMPS & ACRYLIC PRISM LENS. 48" FIXTURE	CONCOURSE FREE & PAID AREAS	AS NOTED ON PLANS
B □	FLUORESCENT, RECESSED W/4-40W, T12/RS/CW LAMPS & ACRYLIC PRISM LENS. 48" FIXTURE	CONCOURSE FREE & PAID AREAS	DO
C □	FLUORESCENT, RECESSED W/4-40W, T12/RS/CW LAMPS & ACRYLIC PRISM LENS (SPECIAL R.F. FREQUENCY SHIELD COATING). 48" FIXTURE	CONTROL ROOMS	DO
D □	INDUSTRIAL FLUORESCENT PENDENT MOUNTED W/4-40W, T12/RS/CW LAMPS. 8' FIXTURE W/48" TANDEM LAMPS.	SUBSTA. & EQUIP ROOMS	DO
DI □	SAME AS ABOVE EXCEPT 2-40W, T12/RS/CW LAMPS.	TUNNEL ENTRY	DO
E □	FLUORESCENT POLE MOUNTED VAPORTIGHT W/4-40W, T12/RS/CW LAMPS (4' FIXTURE W/ WRAP-AROUND LENS.)	PLATF. AREAS BELOW PLATF.	DO
F ○	MERCURY VAPOR 250W RECESSED SOFFIT LIGHT W/277V BALLAST	STREET AREAS BELOW PLATF.	DO
G □	FLUORESCENT SURFACE MOUNTED, W/2-40W, T12/RS/CW VAPORTIGHT "VAPORLUME."	TRAIN TRACKS ADJ. TO PLATF.	DO
H □	FLUORESCENT, RECESSED W/8-40W, T12/RS/CW LAMPS.	STREET ENTRANCE (UNDERGROUND STA. ONLY)	DO
J ⊕	FLUORESCENT, SURFACE MOUNTED, EXIT SIGN FIXTURE W/8W-T5 LAMPS, TO INCLUDE LAMP LIFE MUTIPLIER.	ALL PASS. AREAS	DO



- LEGEND**
- ⊕ INDICATES EMERGENCY LIGHTING FIXTURE W/BATTERY POWER PACK, TYPE AS INDICATED ON FIXTURE SCHEDULE. (ALSO OPERATES ON CRITICAL POWER)
 - TUNNEL EMERGENCY LIGHTING FIXTURE, TYPE AS INDICATED ON FIXTURE SCHEDULE (ALSO OPERATES ON NORMAL & CRITICAL POWER.)
 - ⊕ INDICATES POLE MOUNTED EMERGENCY LIGHTING FIXTURE ON PLATFORM AREA, TYPE AS INDICATED ON FIXTURE SCHEDULE (ALSO OPERATES ON NORM & CRIT PWR)
 - UNMARKED FIXTURE INDICATES GENERAL LIGHTING, TYPE AS INDICATED ON FIXTURE SCHEDULE (NORMAL POWER ONLY)
 - ⊕ M.H. INDICATES FIXTURE TYPE, 100 INDICATES WATTS AND M.H. INDICATES MOUNTING HEIGHT.
 - ⊕ CRITICAL LIGHTING FIXTURE TYPE AS INDICATED ON FIXTURE SCHEDULE. (SUPPLIED FROM CRITICAL POWER.)
 - TUNNEL LIGHTING FIXTURE, TYPE AS INDICATED ON FIXTURE SCHEDULE. (NORMAL POWER ONLY)
 - ⊕ INDICATES EXIT LIGHTING FIXTURE W/BATTERY POWER PACK, TYPE AS INDICATED ON FIXTURE SCHEDULE (ALSO OPERATES ON CRITICAL POWER)

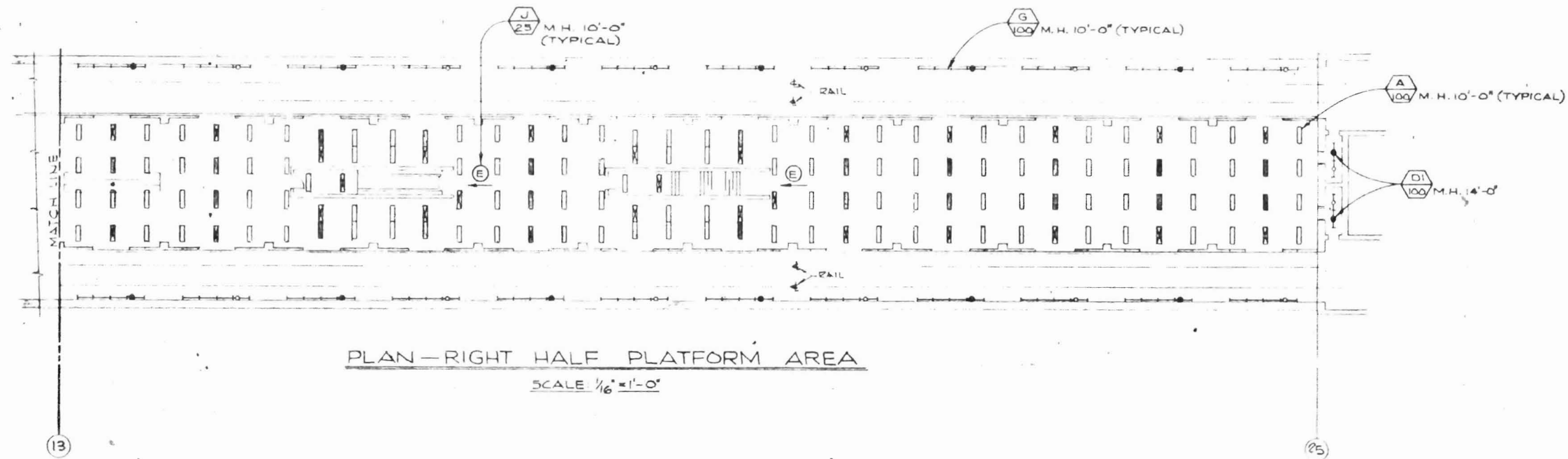
PRELIMINARY ENGINEERING ONLY FOR COST ESTIMATING PURPOSES. SUBJECT TO CHANGE IN FINAL DESIGN.

E203
 APPROVALS
 M. A. NISHKIAN & CO. CONSULTING ENGINEERS, LOS ANGELES, CALIFORNIA 90015
 SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
 LIGHTING PLAN UNDERGROUND PASSENGER STATIONS AIRPORT-SOUTHWEST CORRIDOR
 DRAWING NO. 1112
 DATE 11/27/77
 BY J. M. M.



PLAN—LEFT HALF PLATFORM AREA

SCALE: 1/16" = 1'-0"

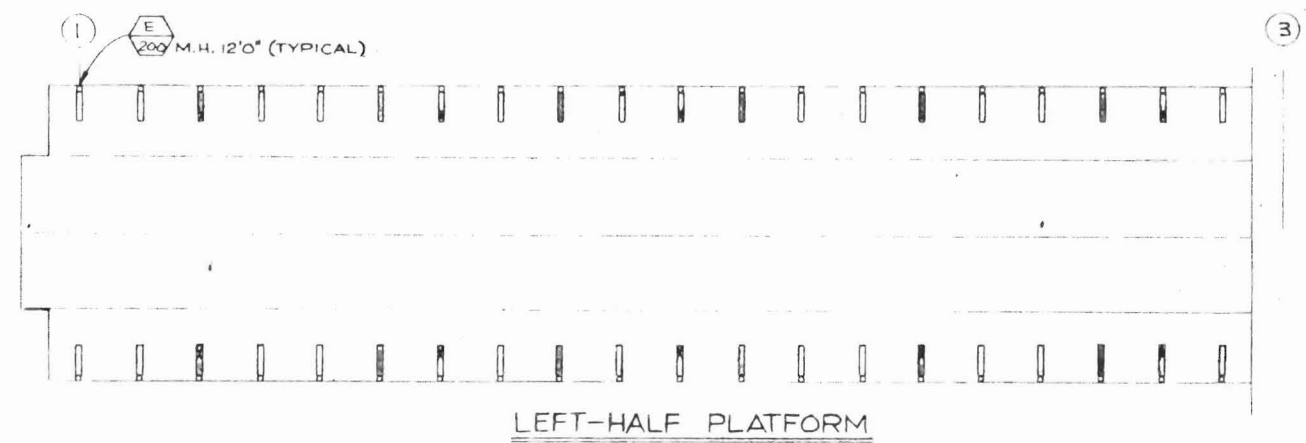
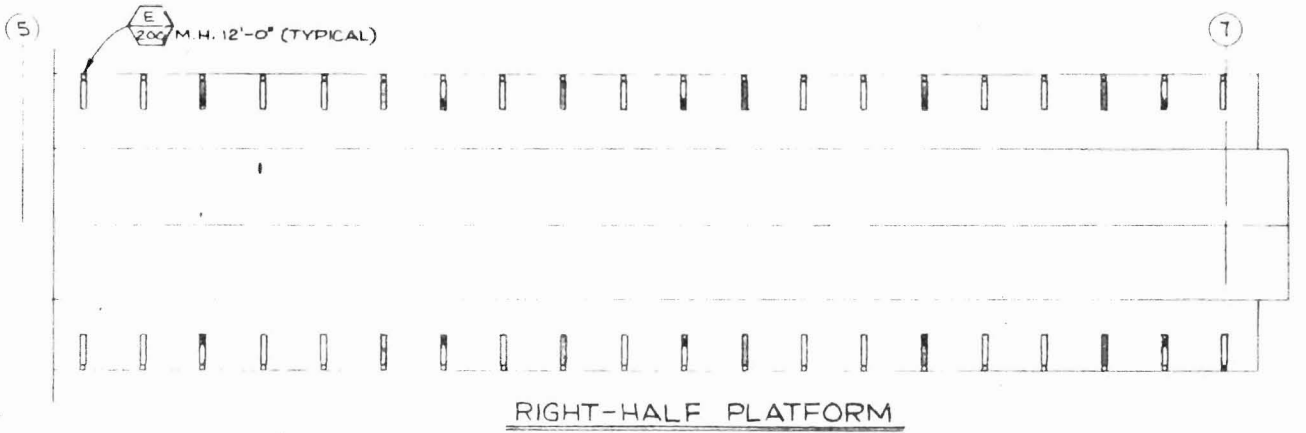
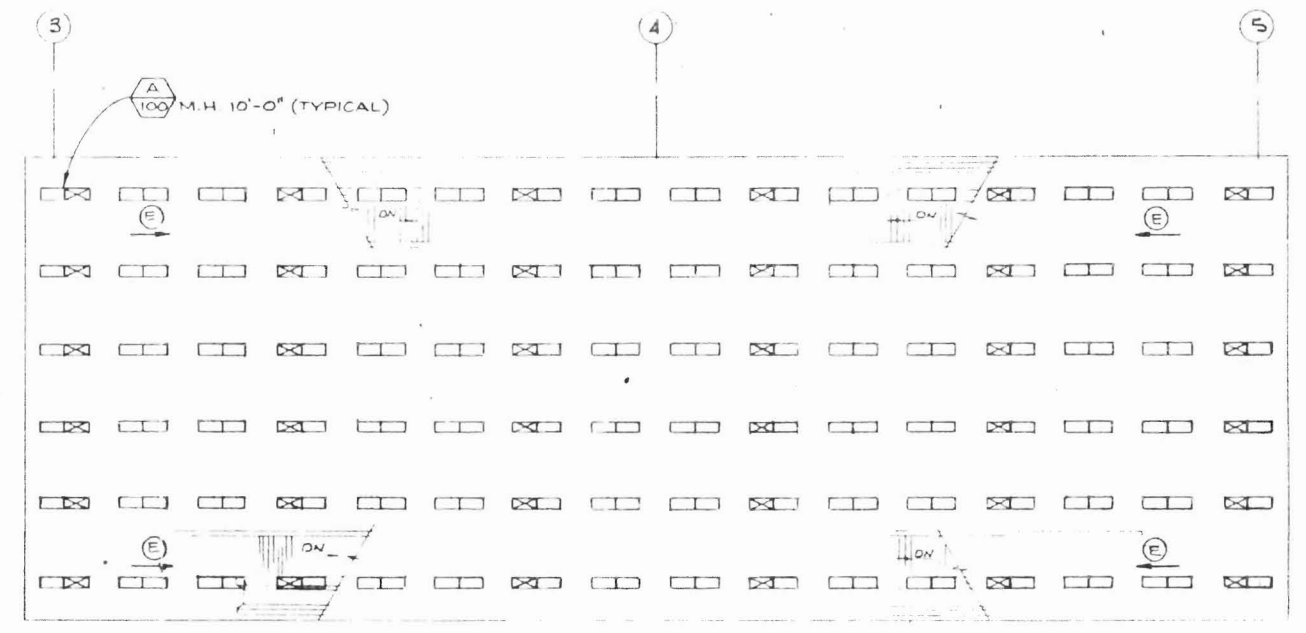
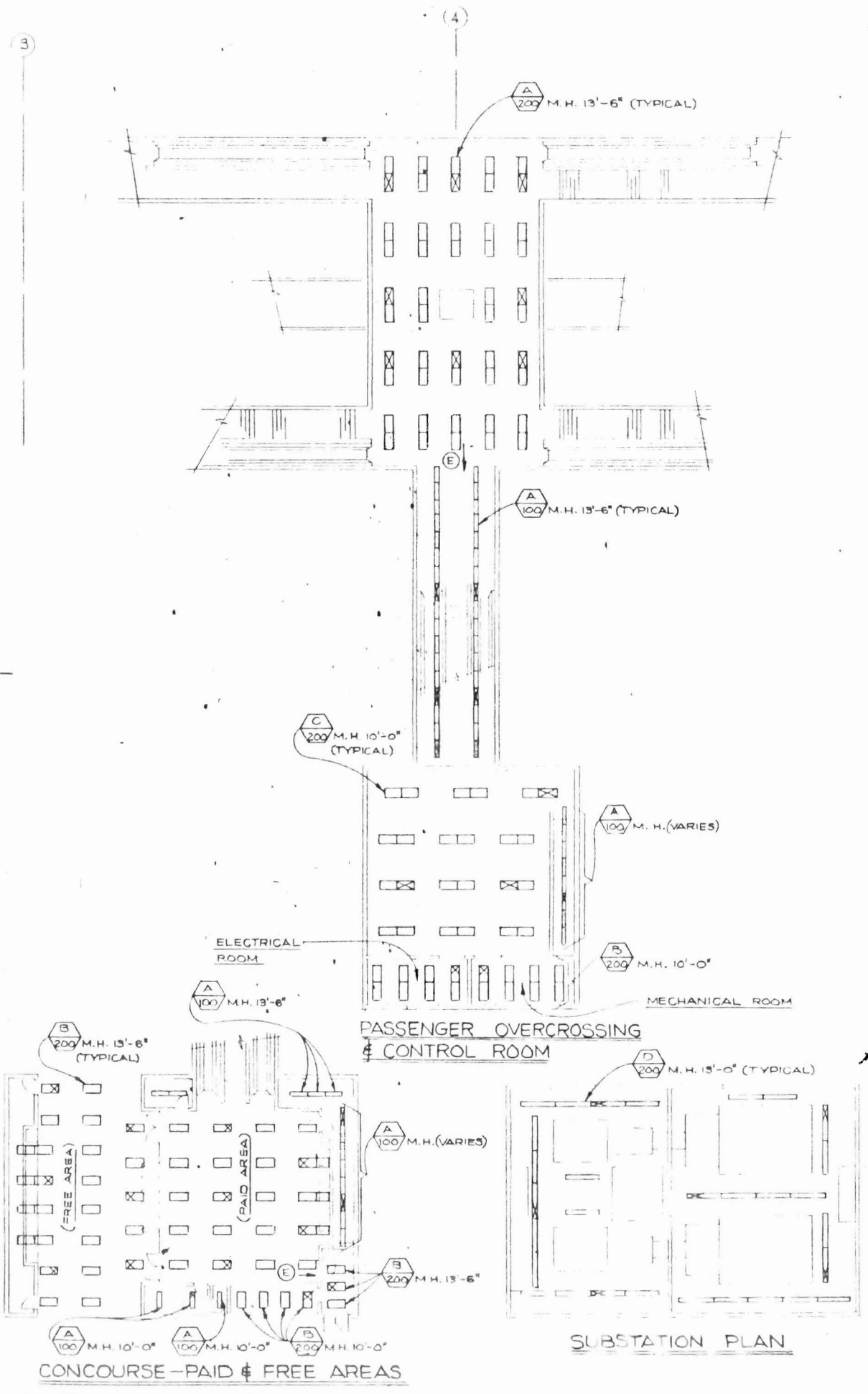


PLAN—RIGHT HALF PLATFORM AREA

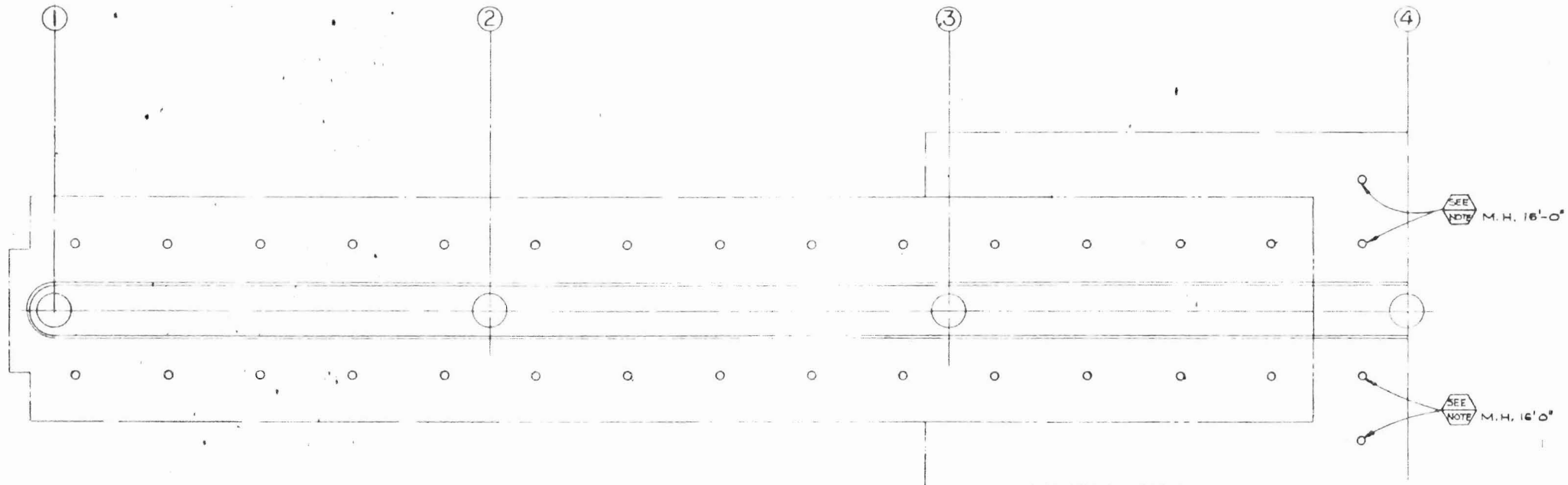
SCALE: 1/16" = 1'-0"

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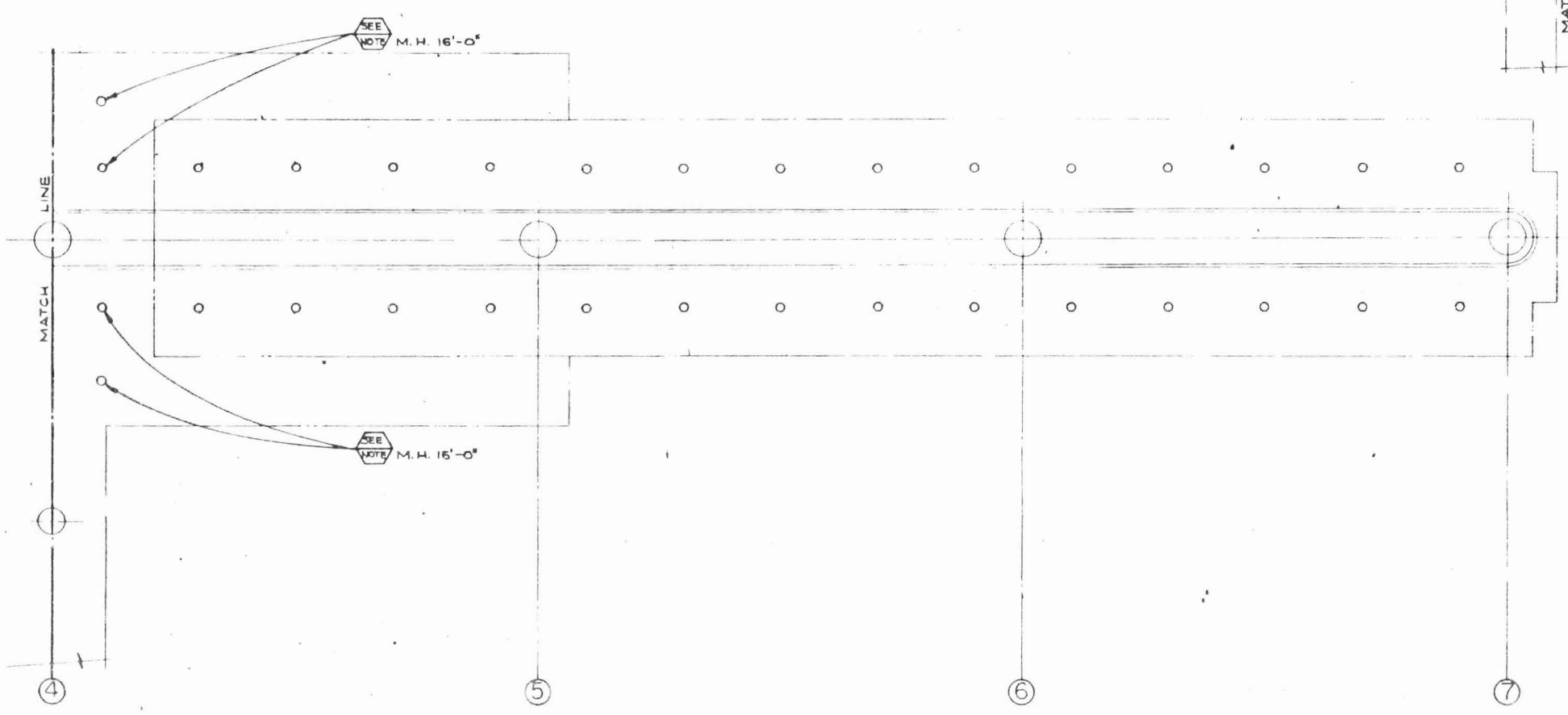
DATE: 11/15/12	APPROVALS: [Signature]	DRAWING NO: E204
DRAWN BY: L. H. [Signature]	CHECKED BY: [Signature]	
M. A. NISHKIAN & CO. CONSULTING ENGINEERS, LOS ANGELES, CALIFORNIA		
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT, LOS ANGELES, CALIFORNIA		
TITLE: LIGHTING PLAN UNDERGROUND PASSENGER STATIONS AIRPORT—SOUTHWEST CORRIDOR		
DATE: 11/15/12	PROJECT: AIRPORT—SOUTHWEST CORRIDOR	DRAWING NO: E204



PRELIMINARY ENGINEERING ONLY
FOR COST ESTIMATING PURPOSES
SUBJECT TO CHANGE IN FINAL DESIGN



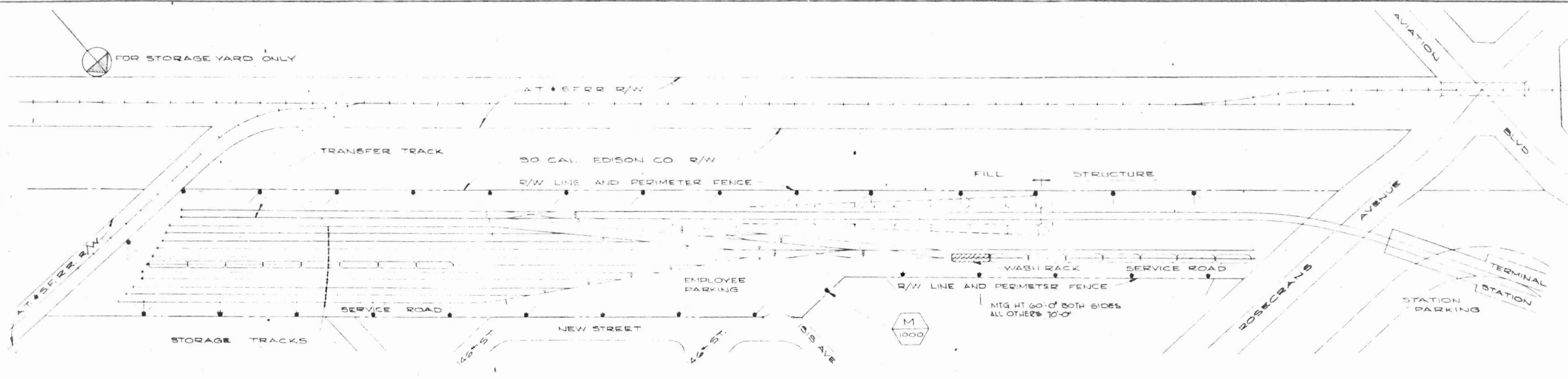
PLATFORM ABOVE STREET RIGHT-OF-WAY



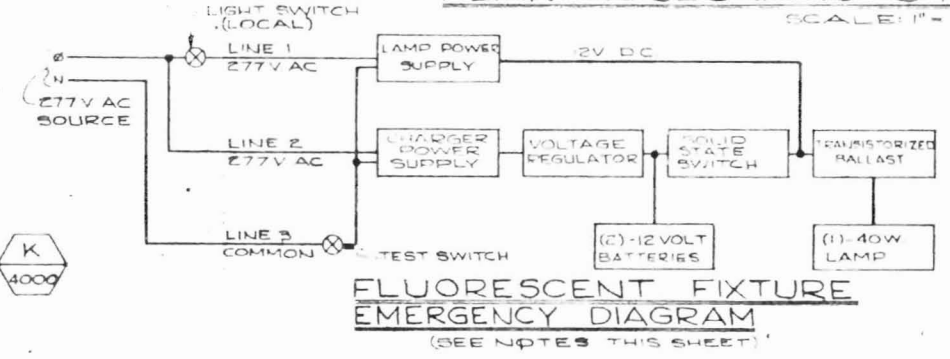
NOTE:
 ALL FIXTURES SHALL BE TYPE "F"-250W.
 FIXTURES SHALL BE MOUNTED AT 29'-3"
 UNLESS OTHERWISE NOTED.

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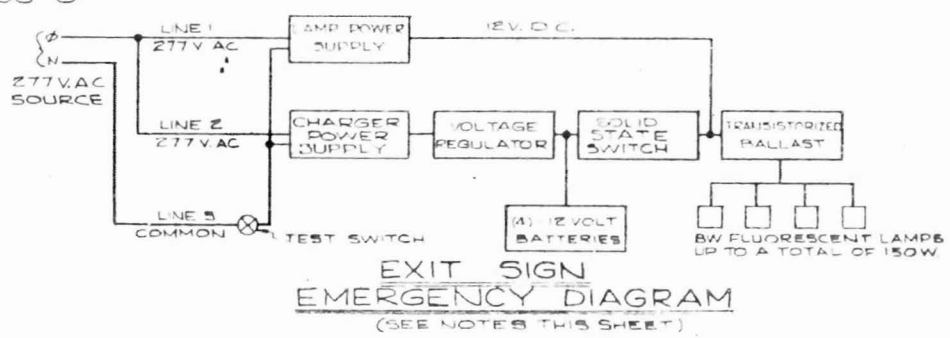
APPROVALS M. A. NISHKIAN & CO. CONSULTING ENGINEERS LOS ANGELES, CALIFORNIA 90015	DRAWING NO. E206
DRAWN BY: [Signature] CHECKED BY: [Signature]	DATE: 11/15/88 SCALE: AS SHOWN SHEETS: 1 OF 1
M. A. NISHKIAN & CO. CONSULTING ENGINEERS LOS ANGELES, CALIFORNIA 90015	TITLE LIGHTING PLAN ASU & AST PASSENGER STATION AIRPORT-SOUTHWEST CORRIDOR
	DRAWING NO. E206



PLAN-ROSECRANS STORAGE YARD
 SCALE: 1"=100'-0"



FLUORESCENT FIXTURE EMERGENCY DIAGRAM
 (SEE NOTES THIS SHEET)



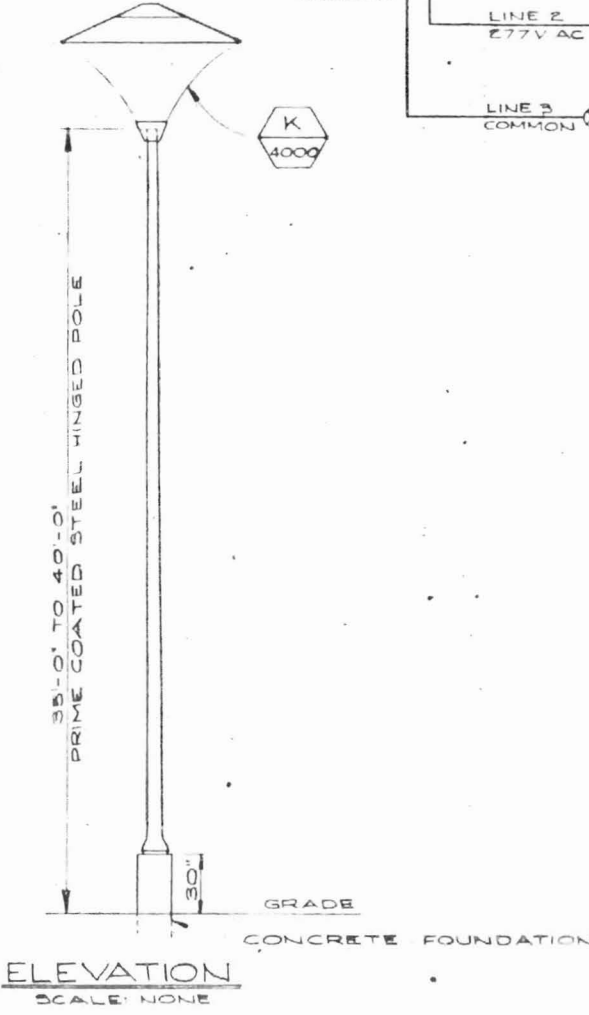
EXIT SIGN EMERGENCY DIAGRAM
 (SEE NOTES THIS SHEET)

FIXTURE SCHEDULE
 (THIS SHEET ONLY)

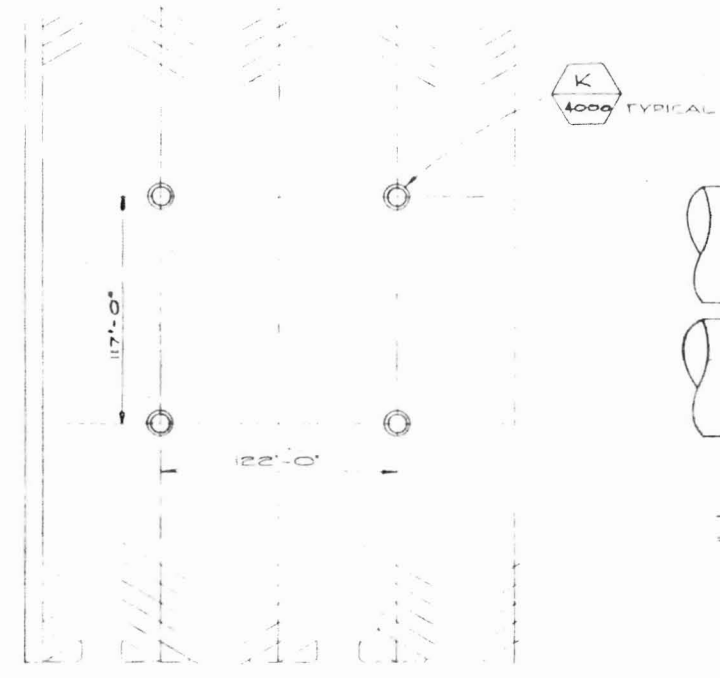
TYPE	DESCRIPTION	LOCATION	MTG. HT.
K	MERCURY VAPOR, FIXTURE W/4-1000W LAMPS, POLE MOUNTED	PARKING AREA	AS INDICATED
L	FLUORESCENT, SURFACE MOUNTED VAPORTIGHT W/1-40W LAMP	TUNNELS	AS INDICATED
M	MERCURY VAPOR, 1000W POLE MOUNTED FLOOD LIGHTS (NUMBER OF FIXTURES)	ROSECRANS STORAGE YARD	AS INDICATED

L INDICATES LIGHT WITH EMERGENCY POWER PACK

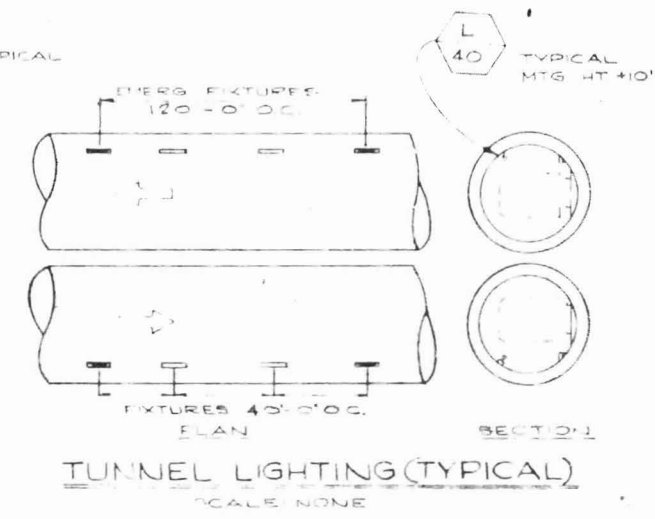
- NOTES**
 (THIS SHEET ONLY)
1. THE POWER PACKS OPERATE FLUORESCENT LIGHT FIXTURES AND EXIT SIGNS IN THE EVENT OF A POWER FAILURE. IT INCORPORATES ALL OF THE ELEMENTS NECESSARY TO OPERATE STANDARD FLUORESCENT LAMPS DIRECTLY FROM EITHER NORMAL POWER SOURCES OR SELF-CONTAINED BATTERIES.
 2. METHOD OF OPERATION: WITH CURRENT APPLIED TO BOTH LINE 1 AND LINE 2, THE LAMP POWER SUPPLY PRODUCES 12 VOLTS DC DIRECTLY TO THE BALLAST WHICH OPERATES THE LAMP. WITH POWER REMOVED FROM THE LINE, THE LAMP GOES OUT. LINE 2 OPERATES AS AN EMERGENCY LIGHT AS DESCRIBED ABOVE. THERE IS NO INTERACTION BETWEEN THE TWO POWER SUPPLIES. HOWEVER, SHOULD POWER FAIL TO BOTH HOT LINES, EVEN THOUGH LINE 1 IS SWITCHED OFF, THE LAMP WILL COME ON AND OPERATE AS AN EMERGENCY LIGHT.
 3. BATTERIES IN THE POWER PACKS HAVE A LIFE EXPECTANCY OF FIVE TO EIGHT YEARS OR 200 COMPLETE DISCHARGE-RECHARGE CYCLES.



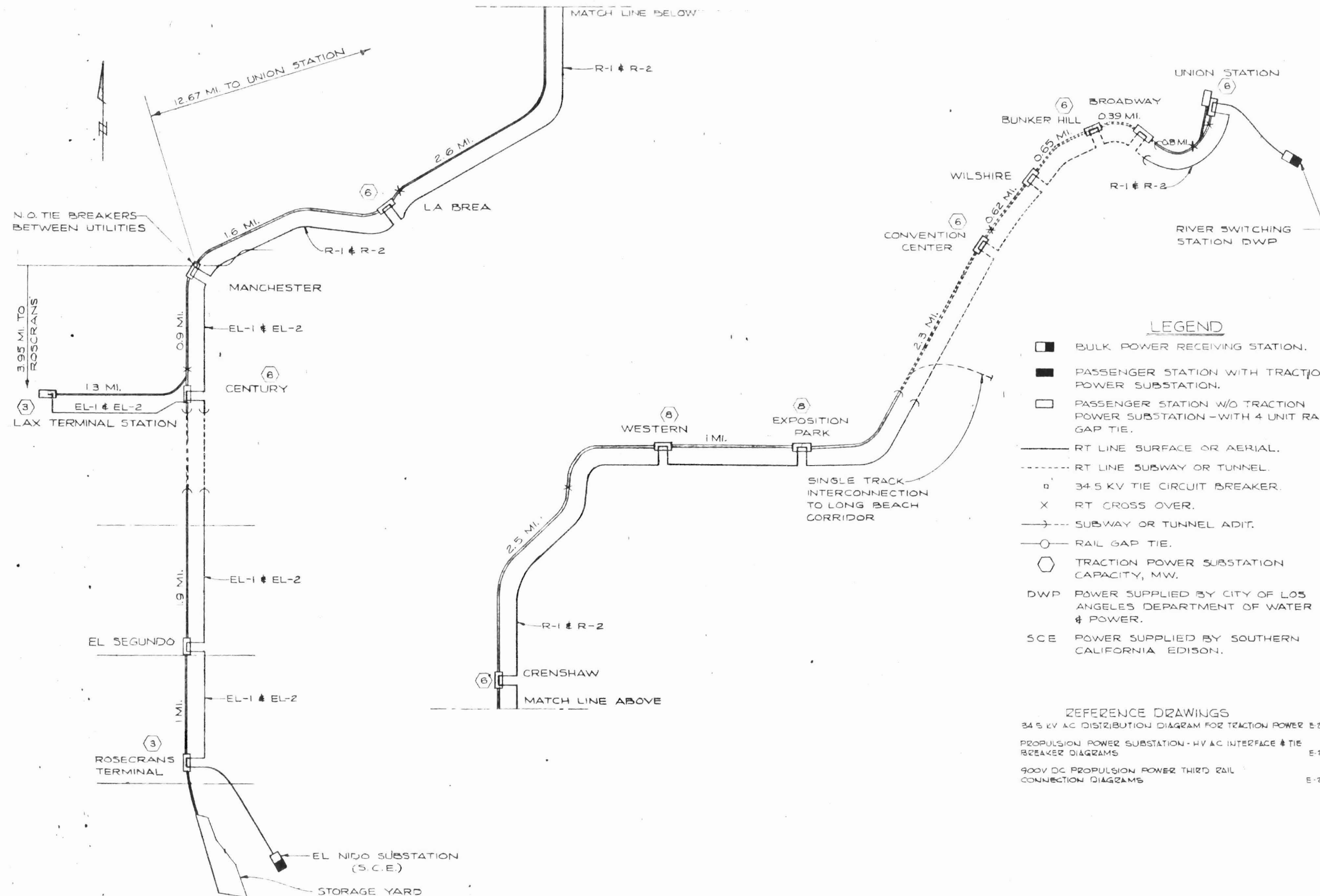
ELEVATION
 SCALE: NONE



PARKING LOT PARTIAL PLAN
 SCALE: 1"=50'-0"



TUNNEL LIGHTING (TYPICAL)
 SCALE: NONE



- ### LEGEND
- BULK POWER RECEIVING STATION.
 - PASSENGER STATION WITH TRACTION POWER SUBSTATION.
 - PASSENGER STATION W/O TRACTION POWER SUBSTATION - WITH 4 UNIT RAIL GAP TIE.
 - RT LINE SURFACE OR AERIAL.
 - - - RT LINE SUBWAY OR TUNNEL.
 - 34.5 KV TIE CIRCUIT BREAKER.
 - X RT CROSS OVER.
 - SUBWAY OR TUNNEL ADIT.
 - RAIL GAP TIE.
 - ⬡ TRACTION POWER SUBSTATION CAPACITY, MW.
 - DWP POWER SUPPLIED BY CITY OF LOS ANGELES DEPARTMENT OF WATER & POWER.
 - SCE POWER SUPPLIED BY SOUTHERN CALIFORNIA EDISON.

- ### REFERENCE DRAWINGS
- 34.5 KV AC DISTRIBUTION DIAGRAM FOR TRACTION POWER E-209
 - PROPULSION POWER SUBSTATION - HV AC INTERFACE & TIE BREAKER DIAGRAMS E-210
 - 900V DC PROPULSION POWER THIRD RAIL CONNECTION DIAGRAMS E-211

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DRAWING NO. **E208**

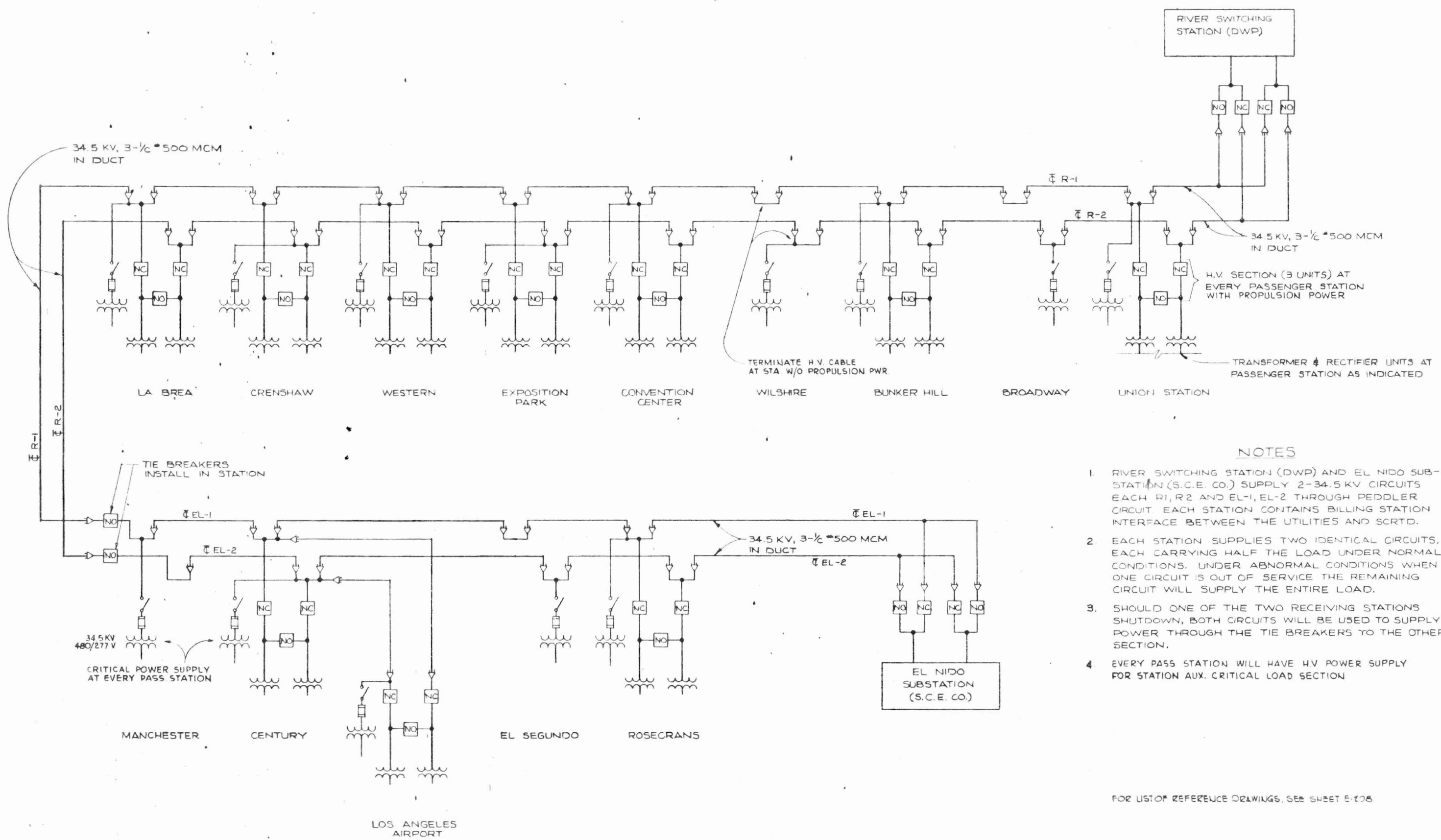
APPROVALS

M. A. NISHKIAN & CO. CONSULTING ENGINEERS
LOS ANGELES, CALIFORNIA 90015

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
LOS ANGELES, CALIFORNIA 90015

TITLE
**ELECTRICAL PLOT PLAN
AIRPORT-SOUTHWEST CORRIDOR**

DRAWING NO. **E208**



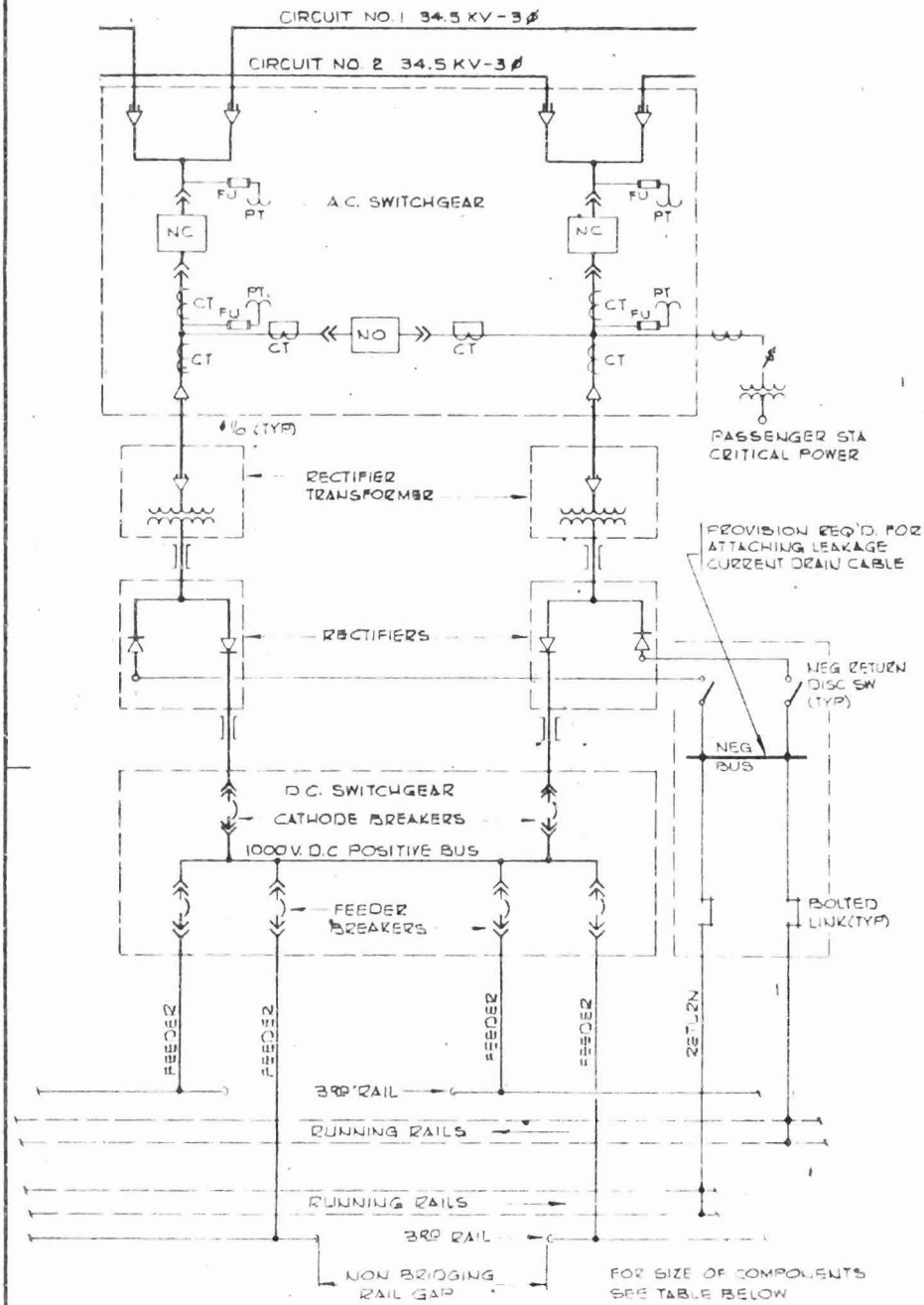
NOTES

1. RIVER SWITCHING STATION (DWP) AND EL NIDO SUB-STATION (S.C.E. CO.) SUPPLY 2-34.5 KV CIRCUITS EACH R1, R2 AND EL-1, EL-2 THROUGH PEDDLER CIRCUIT. EACH STATION CONTAINS BILLING STATION INTERFACE BETWEEN THE UTILITIES AND SCRTD.
2. EACH STATION SUPPLIES TWO IDENTICAL CIRCUITS, EACH CARRYING HALF THE LOAD UNDER NORMAL CONDITIONS. UNDER ABNORMAL CONDITIONS WHEN ONE CIRCUIT IS OUT OF SERVICE THE REMAINING CIRCUIT WILL SUPPLY THE ENTIRE LOAD.
3. SHOULD ONE OF THE TWO RECEIVING STATIONS SHUTDOWN, BOTH CIRCUITS WILL BE USED TO SUPPLY POWER THROUGH THE TIE BREAKERS TO THE OTHER SECTION.
4. EVERY PASS STATION WILL HAVE H.V. POWER SUPPLY FOR STATION AUX. CRITICAL LOAD SECTION

FOR LIST OF REFERENCE DRAWINGS, SEE SHEET E-208

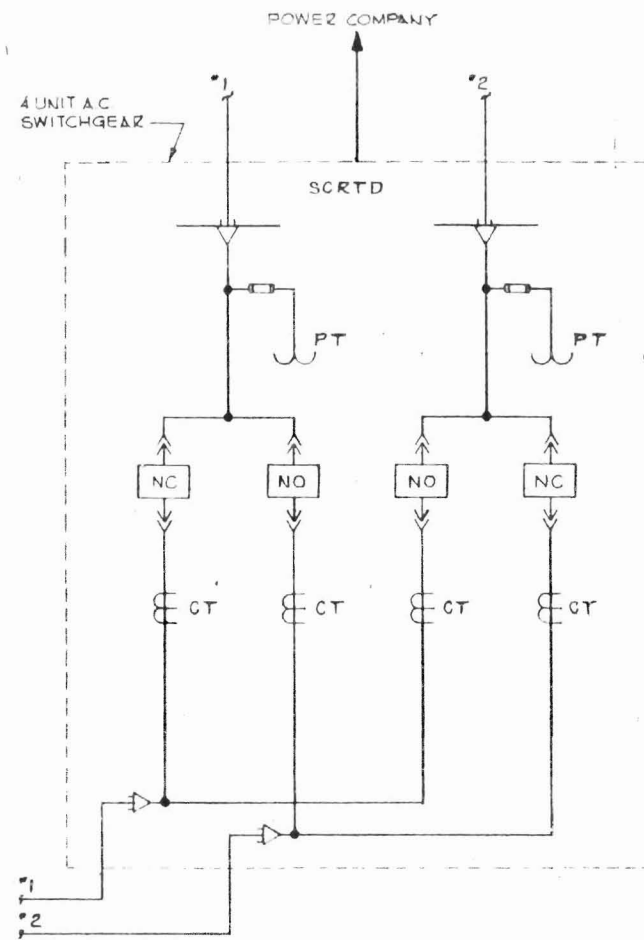
PRELIMINARY ENGINEERING ONLY
FOR COST ESTIMATING PURPOSES
SUBJECT TO CHANGE IN FINAL DESIGN

DRAWING NO. **E209**
 TITLE **34.5 KV AC-DISTRIBUTION DIAGRAM FOR TRACTION POWER AIRPORT-SOUTHWEST CORRIDOR**
 PROJECT **SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA**
 CLIENT **M. A. NISHKIAN & CO. CONSULTING ENGINEERS**
 DATE **1/26/67**
 DRAWN BY **[Signature]**
 CHECKED BY **[Signature]**
 APPROVALS **[Signature]**
 E209

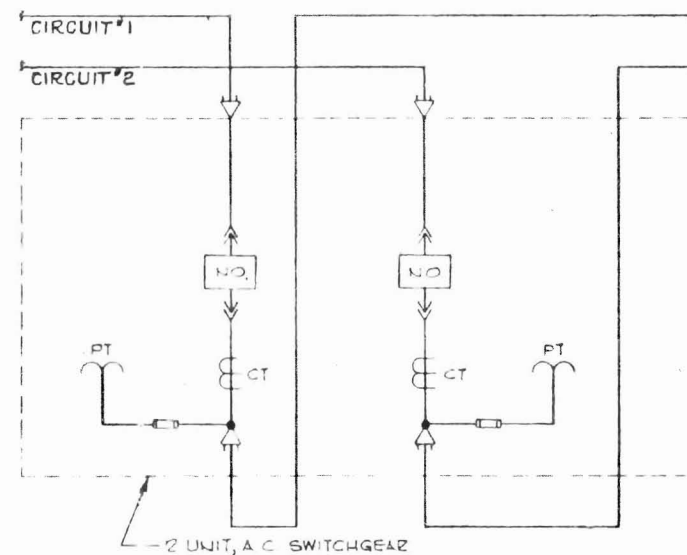


PROPULSION POWER SUBSTATION
TYPICAL SINGLE LINE DIAGRAM

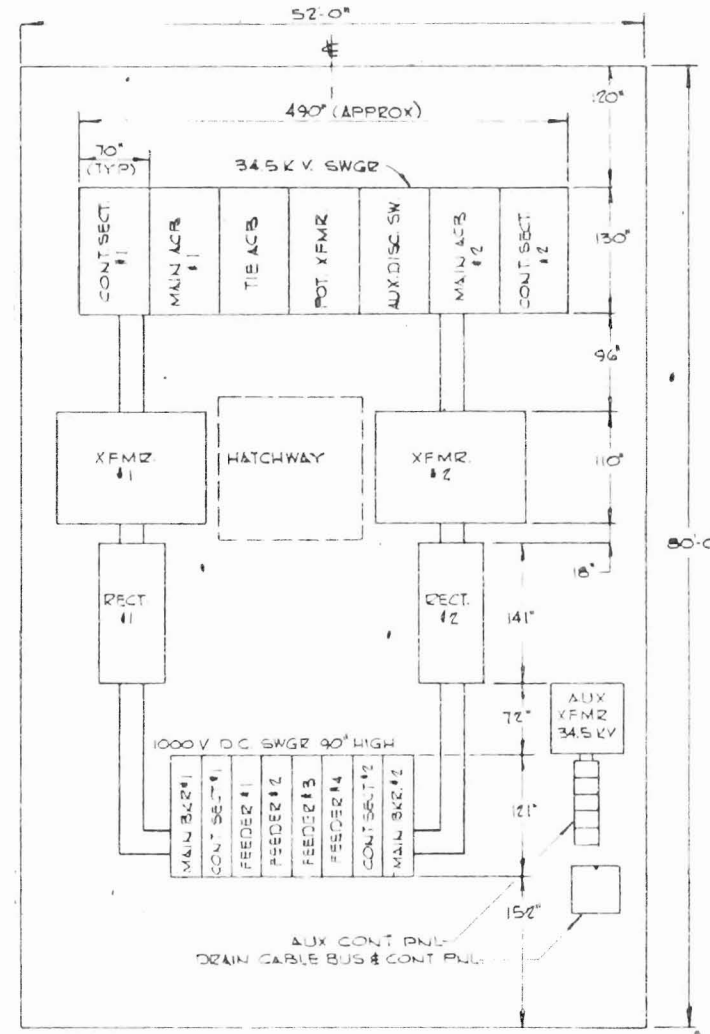
TABLE B - 1000 VOLT D.C.							
SUBSTATION SIZE - MW	SUBSTA. CAPACITY - MW	DC COMPONENT AMPS		CURRENT RATINGS - AMPERES			
		CONT. RATING	2HR. RATING	CATHODE BREAKER	FEEDER BREAKER	FEEDER CABLES	RETURN CABLES
3.0	1.5	1500	2250	3000	3000	2500	2500
4.0	2.0	2000	3000	4000	4000	3300	3300
5.0	2.5	2500	3750	4000	4000	4000	4000
6.0	3.0	3000	4500	6000	6000	4950	4950
7.0	3.5	3500	5250	6000	6000	5800	5800
8.0	4.0	4000	6000	8000	8000	6670	6670



34.5 KV-TRANSMISSION SYSTEM
POWER COMPANY INTERFACE



34.5 KV-TRANSMISSION SYSTEM
SECTION TIE-BREAKERS



PLAN VIEW
PROPULSION POWER SUBSTATION
TYPICAL ARRANGEMENT INDOOR

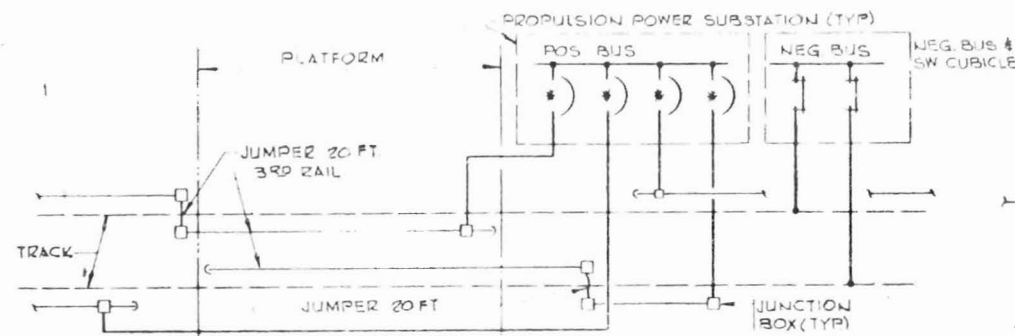
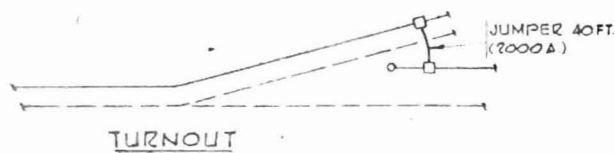
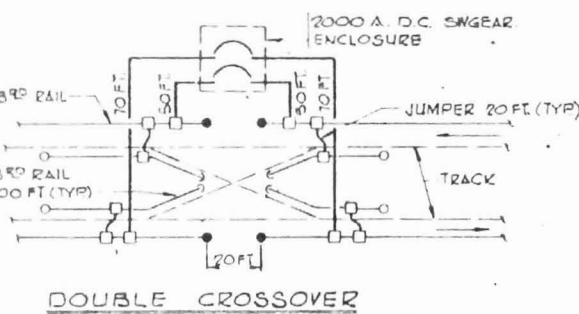
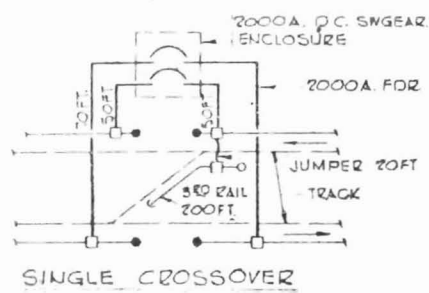
SYMBOL	DESCRIPTION
	TRACTION RECTIFIER SUBSTATION
	34.5 KV CIRCUIT BREAKER
	FUSED POTENTIAL TRANSFORMER
	CURRENT TRANSFORMER
	D.C. CIRCUIT BREAKER (DRAWOUT TYPE)
	CIRCUIT BREAKER NO = NORMALLY OPEN NC = NORMALLY CLOSED
	34.5 KV FUSED DISCONNECT SWITCH
	NEGATIVE RETURN DISCONNECT SWITCH
	A.C. H.V. POTHEAD
	PROPULSION POWER SUBSTATION CAPACITY, MW
	NON BRIDGING RAIL GAP (60 FT. OR OVER)
	BRIDGING RAIL GAP (< 15 FT.)
	RAIL GAP TIE 4 UNIT
	SUBWAY OR TUNNEL ADIT
	BULK POWER RECEIVING STATION
	RT CROSSOVER
	END OF RAIL
	RT LINE, SURFACE OR AERIAL
	RT LINE, SUBWAY OR TUNNEL
	PASSENGER STATION WITH PROPULSION SUBSTATION
	PASSENGER STATION W/O PROPULSION SUBSTATION & W/ 4 UNIT RAIL GAP TIE

LIST OF ABBREVIATIONS	
DWP	DEPARTMENT OF WATER & POWER (IN LOS ANGELES)
SCB	SOUTHERN CALIF EDISON COMPANY
RT	RAPID TRANSIT
HV	HIGH VOLTAGE
XFMZ	TRANSFORMER RECTIFIER
500 MCM	500,000 CIRCULAR MILS
2/0	SIZE #00 AMERICAN WIRE GAGE

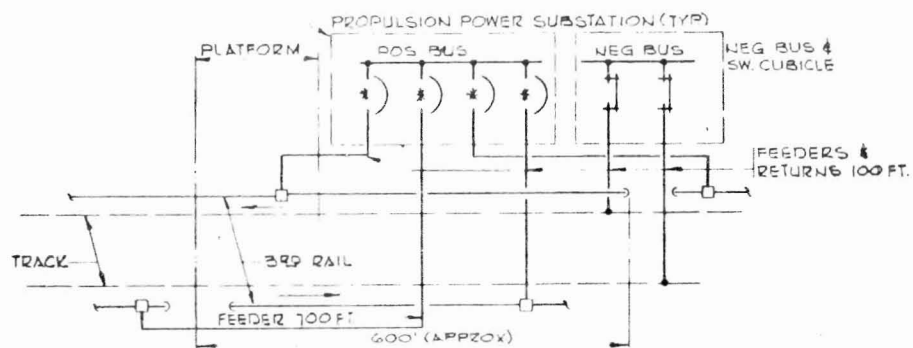
FOR LIST OF REFERENCE DRAWINGS, SEE SHEET E-205.

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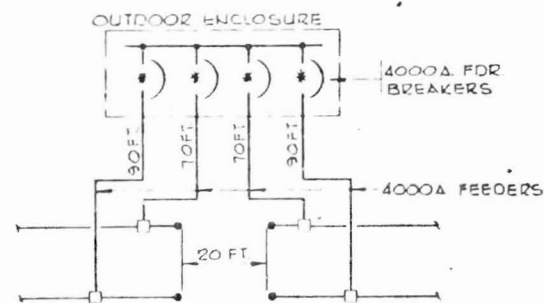
APPROVALS
 M. A. NISHKIAN & CO. CONSULTING ENGINEERS LOS ANGELES, CALIFORNIA
 SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
 PROPULSION POWER SUBSTATION HV AC INTERFACE & TIE BKR'S DIAGRAMS AIRPORT-SOUTHWEST CORRIDOR
 E210



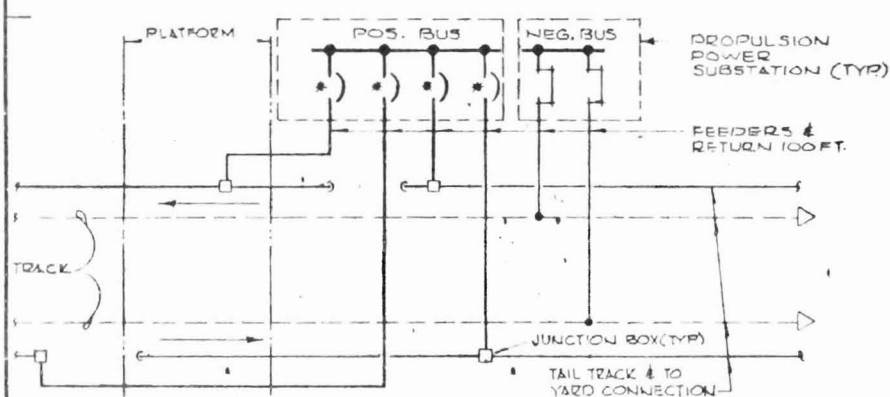
TYPICAL CONNECTIONS AT SIDE PLATFORM STATIONS
3RD RAIL CONNECTIONS



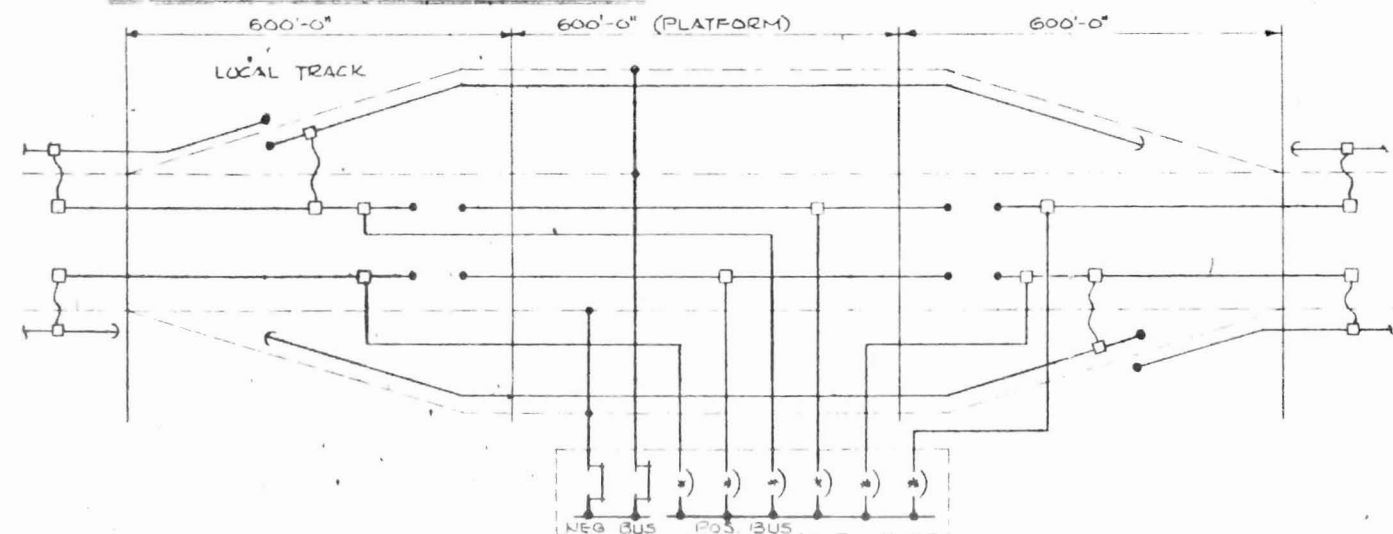
TYPICAL CONNECTIONS AT CENTER PLATFORM STATIONS
3RD RAIL CONNECTIONS



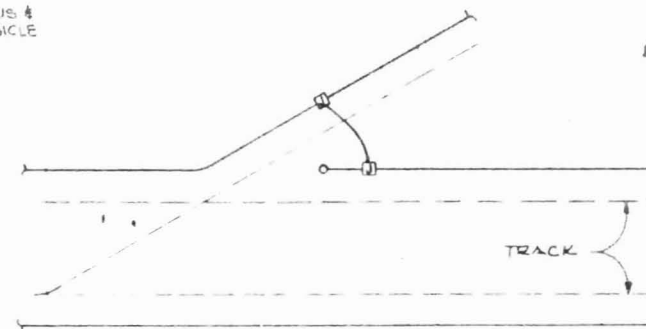
RAIL GAP TIE
3RD RAIL CONNECTIONS



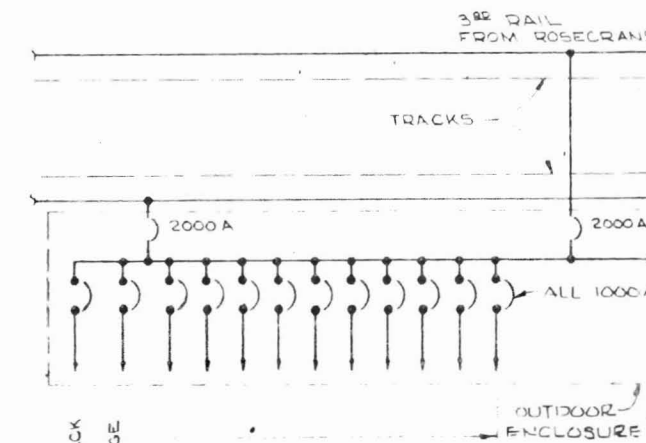
TERMINAL CONNECTION AT ROSECRANS



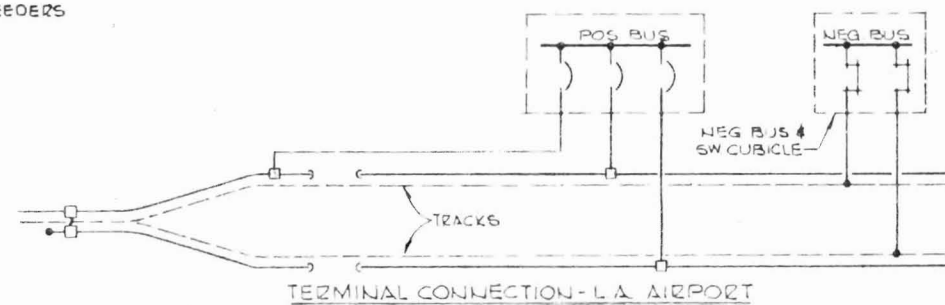
TYPICAL CONNECTION FOR 2 SIDE LOADING PLATFORMS AT WESTERN STATION



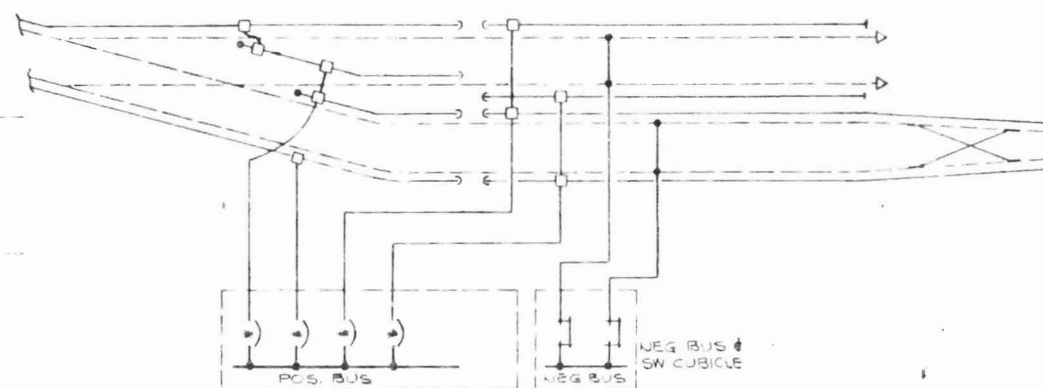
TURNOUT AT UNION STATION 20+00



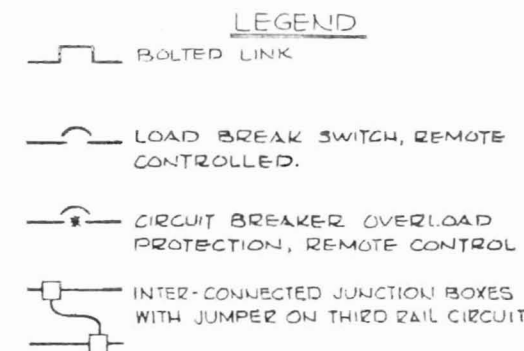
STORAGE YARD PROPULSION POWER
SINGLE LINE DIAGRAM



TERMINAL CONNECTION - L.A. AIRPORT



TERMINAL CONNECTION AT METZOPORT



NOTES

1. RAIL GAP TIES ARE LOCATED AT PASSENGER STATIONS NOT HAVING A SUBSTATION AND MID-WAY BETWEEN STATIONS OF EXTRA LONG RUNS.
2. RAIL GAP TIES AT PASSENGER STATIONS WHERE NO SUBSTATIONS ARE LOCATED ARE SIMILAR TO STATION CONNECTIONS WITH A SUBSTATION, EXCEPT NEGATIVE RETURNS ARE OMITTED.
3. ALL THIRD RAIL GAPS AND RAIL GAP TIES IN PASSENGER STATIONS ARE 60 FEET IN LENGTH, ALL OTHERS ARE 20- FEET. THE 60-FOOT GAPS ARE LOCATED IN THE INCOMING TRACK OF PASSENGER STATIONS OUTSIDE THE PLATFORM AREA.
4. SEE DWG E-210 FOR SYMBOLS, CIRCUIT DETAILS AND ABBREVIATIONS.

FOR LIST OF REFERENCE DRAWINGS, SEE SHEET E-208

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