NOTES:

1. SCOPE

PIPELINES INCLUDED UNDER THESE SPECIFICATIONS ARE THOSE INSTALLED TO CARRY STEAM, WATER OR ANY NON-FLAMMABLE SUBSTANCE WHICH FROM ITS NATURE OR PRESSURE, MIGHT CAUSE DAMAGE IF ESCAPING ON OR IN THE VICINITY OF SCRRA PROPERTY. ADDITIONAL PIPELINES COVERED UNDER THESE STANDARDS INCLUDE SMALL DIAMETER PIPES USED TO INSTALL OR PROTECT FIBER OPTIC SYSTEMS AND TELECOMMUNICATION LINES, AND ELECTRICAL SYSTEMS (INCLUDING STREET LIGHTS, TRAFFIC SIGNALS AND ELECTRICAL SYSTEMS). THESE STANDARDS SHALL BE USED IN CONJUNCTION WITH THE SCRRA DESIGN CRITERIA MANUAL, CHAPTER 10, UTILITIES AND THE AREMA MANUAL OF RAILWAY ENGINEERING CHAPTER 1, PART 5.

2. GENERAL REQUIREMENTS

a. PIPELINES UNDER SCRRA TRACKS AND ACROSS SCRRA RIGHTS-OF-WAY SHALL BE ENCASED IN A LARGER PIPE OR CONDUIT CALLED THE CASING PIPE AS INDICATED IN FIGURE 1. EXCEPTION MAY BE GRANTED ON CASE BY CASE BASIS FOR NON-PRESSURE PIPELINE.
b. CASING PIPE AND NON-CASED PIPELINES SHALL BE DESIGNED TO CARRY COOPER'S E-80 RAILROAD LIVE LOADING WITH DIESEL IMPACT FACT OR AS PER AREMA.
c. PIPELINES SHALL BE LOCATED, WHERE PRACTICABLE, TO CROSS TRACKS AT APPROXIMATELY RIGHT ANGLES BUT PREFERABLY AT NO LESS THAN 45 DEGREES AND SHALL NOT BE PLACED WITHIN CULVERTS NOR UNDER RAILWAY BRIDGES.
d. TEST BORING OR OTHER SOIL INVESTIGATIONS, APPROVED BY SCRRA SHALL BE MADE, TO DETERMINE THE NATURE OF THE UNDERLYING MATERIAL FOR ALL PIPELINES WITH SIZES EQUAL OR GREATER THAN 48 INCHES IN DIAMETER AND A DEPTH FROM TOP OF PIPE TO BASE OF RAIL BETWEEN FIVE FEET SIX INCHES AND TEN FEET. THE TEST BORING SHOULD BE MADE ON THE CENTERLINE OF THE PIPE NEAR THE END OF THE BALLAST SECTION (IF POSSIBLE) ON EACH SIDE OF THE TRACKS AND AS DEEP AS THE BOTTOM OF THE BORE.
e. EXCEPTION TO ANY DESIGN, CONSTRUCTION, LOCATION OR SPECIFICATIONS CONTAINED IN THIS STANDARD MUST BE AUTHORIZED BY SCRRA. REQUESTS FOR EXCEPTIONS WILL BE CONSIDERED ONLY WHERE IT IS SHOWN THAT EXTREME HARDSHIP AND/OR UNUSUAL CONDITIONS PROVIDE JUSTIFICATION AND WHERE ALTERNATE MEASURES CAN BE USED IN KEEPING WITH THE INTENT OF THIS STANDARD. ALL REQUESTS FOR EXCEPTIONS SHALL BE FULLY DOCUMENTED WITH DESIGN DATA, CALCULATIONS, COST COMPARISONS AND OTHER PERTINENT INFORMATION.
f. ALL PIPELINES SHALL BE PROMINENTLY MARKED BY SIGNS OR MARKERS (MAINTAINED BY OWNER) LOCATED OVER THE PIPE.

3. CARRIER PIPE

a. CARRIER LINE PIPE AND JOINTS SHALL BE OF ACCEPTED MATERIAL AND CONSTRUCTION AS APPROVED BY THE SCRRA ASSISTANT DIRECTOR, DESIGN. JOINTS FOR CARRIER LINE PIPE OPERATING UNDER PRESSURE SHALL BE MECHANICAL OR WELDED TYPE. THE PIPE SHALL BE LAID WITH SUFFICIENT SLACK SO THAT IT IS NOT IN TENSION.
b. CARRIER PIPES SHALL BE MANUFACTURED IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND SPECIFICATIONS:
   A. STEEL PIPE - ASTM OR API.
   B. DUCTILE IRON PIPE - ANSI A21.51/AWWA C151, CLASS 56.
   C. REINFORCED CONCRETE PIPE - ASTM C76, MINIMUM OF CLASS V (3000 D) RCP IS ACCEPTABLE WITHOUT CASING FOR LONGITUDINAL PIPE LOCATED 45 FEET OR MORE FROM THE CENTERLINE OF THE NEAREST TRACK.
   D. VITRIFIED CLAY PIPE - ASTM C700.
   E PVC PLASTIC PIPE - ASTM D1784, MINIMUM SCHEDULE 40 PIPE.
   F. HIGH DENSITY POLYETHYLENE (HDPE) SOLID WALL PIPE - ASTM D1248.
   G. SEE AREMA CHAPTER 1, SECTION 5.2 FOR NON-FLAMMABLE GAS PIPE LINES.

4. CASING PIPE

a. CASING PIPE AND JOINTS SHALL BE OF STEEL AND LEAK PROOF CONSTRUCTION, CAPABLE OF AREMA (COOPER E-80 LIVE LOAD) AND HAVE A SPECIFIED MINIMUM YIELD STRENGTH OF AT LEAST 35,000 PSI. THE INSIDE DIAMETER OF THE CASING PIPE SHALL BE AT LEAST TWO INCHES GREATER THAN THE LARGEST OUTSIDE DIAMETER OF THE CARRIER PIPE, JOINTS OR COUPLINGS FOR CARRIER PIPE LESS THAN SIX INCHES IN DIAMETER; AND AT LEAST FOUR INCHES GREATER FOR CARRIER PIPE SIX INCHES AND OVER IN DIAMETER. IN ALL CASES THE SPACE PROVIDED SHALL BE ADEQUATE TO ALLOW FOR REMOVAL WITHOUT DISTURBING THE CASING PIPE OR ROADBED.
b. TABLE 1 INDICATES A MINIMUM THICKNESS BASED UPON SUPERIMPOSED LOADS ONLY AND IT IS THE RESPONSIBILITY OF THE LICENSEE AND/OR THE INSTALLER TO PROVIDE A CASING WHICH IS ADEQUATE FOR THE LOADS THAT RESULT DURING INSTALLATION. THE WALL THICKNESS MAY BE DECREASED BY 0.063 INCH, IF THE CASING IS INSTALLED WITH A PROTECTIVE COATING AND IS CATHODICALLY PROTECTED, EXCEPT FOR DIAMETERS UNDER 14 INCHES.
c. CASING PIPE UNDER SCRRA TRACKS AND ACROSS SCRRA RIGHT-OF-WAY SHALL EXTEND THE GREATER OF THE FOLLOWING DISTANCES, MEASURED AT RIGHT ANGLE TO CENTERLINE OF TRACK. IF ADDITIONAL TRACKS ARE CONSTRUCTED IN THE FUTURE, THE CASING SHALL BE EXTENDED AT THE LICENSEE'S EXPENSE.
   A. ACROSS THE ENTIRE WIDTH OF THE SCRRA RIGHT-OF-WAY.
   B. THREE FEET BEYOND THE DITCH LINE.
   C. TWO FEET BEYOND THE TOE OF SLOPE.
   D. A MINIMUM DISTANCE OF 25 FEET FROM EACH SIDE OF THE CENTERLINE OF OUTSIDE TRACK WHEN CASING IS SEALED AT BOTH ENDS AND,
   E. A MINIMUM DISTANCE OF 45 FEET FROM EACH SIDE OF THE CENTERLINE OF OUTSIDE TRACK WHEN CASING IS OPEN AT BOTH ENDS.
d. THE DEPTH OF THE CASING SHALL NOT BE LESS THAN AS SHOWN IN FIGURE 1. HORIZONTAL DIRECTIONAL DRILLING OF A PIPELINE NOT CARRYING LIQUID SUBSTANCES AND HAVING A NOMINAL DIAMETER OF SIX INCHES OR LESS SHALL HAVE A MINIMUM COVER OF SIX FEET FROM BASE OF RAIL TO TOP OF PIPELINE. HORIZONTAL DIRECTIONAL DRILLING FOR ALL PIPELINES EXCEEDING SIX INCHES NOMINAL DIAMETER, OR FOR ANY NOMINAL DIAMETER PIPELINE CARRYING LIQUID SUBSTANCES SHALL HAVE A MINIMUM COVER FROM BASE OF RAIL TO TOP OF PIPELINE OF 12 FEET. INSTALLATION SHALL BE BY THE DRY BORE METHOD ONLY.
e. FOR FIBER OPTIC AND ELECTRICAL CONDUITS INSTALLED WITH HORIZONTAL DIRECTIONAL DRILLING, A STEEL CASING IS NOT REQUIRED FOR CONDUITS 6" OR LESS IF HDPE OR SCHEDULE 80 PVC IS USED AND IS 12 FEET BELOW THE BASE OF RAIL.

5. CONSTRUCTION

a. CASING PIPE SHALL BE CONSTRUCTED AS TO PREVENT LEAKAGE OF ANY SUBSTANCE FROM THE CASING THROUGHOUT ITS LENGTH, EXCEPT AT ENDS. CASING SHALL BE INSTALLED AS TO PREVENT THE FORMATION OF A WATERWAY UNDER THE ROADBED, AND WITH AN EVEN BEARING THROUGHOUT ITS LENGTH, AND SHALL SLOPE TO ONE END (EXCEPT FOR LONGITUDINAL OCCUPANCY).
b. THE FACES OF ALL PITS (JACKING AND RECEIVING) SHALL BE LOCATED A MINIMUM OF 25 FEET FROM THE CENTERLINE OF THE NEAREST TRACK, MEASURED AT RIGHT ANGLES TO TRACK. SHORING, IF REQUIRED, SHALL MEET SCRRA'S EXCAVATION SUPPORT GUIDELINES.
c. FOR ALL PIPELINES WITH SIZES EQUAL OR GREATER THAN 48 INCHES, RAIL ELEVATIONS OVER THE WORK MUST BE MONITORED AT INTERVALS PRESCRIBED BY SCRRA TO DETECT ANY TRACK MOVEMENT. MOVEMENTS OVER 1/4" VERTICALLY SHALL BE IMMEDIATELY REPORTED TO SCRRA. SCRRA WILL SURFACE THE TRACK SEVERAL TIMES IN ONE YEAR IF THERE IS ANY MOVEMENT AT LICENSEE AND/OR INSTALLER'S COST.
d. THE METHOD OF CONSTRUCTION SHALL MEET ALL CURRENT AREMA AND "GREEN BOOK" SPECIFICATIONS AND REQUIREMENTS.
e. THE BORING, TUNNELING OR JACKING OPERATION SHALL BE PROGRESSED ON A 24 HOUR BASIS WITHOUT STOPPAGE WHEN THE CASING IS 20 FEET FROM THE CENTERLINE OF THE NEAREST TRACK.
f. THE BORING, TUNNELING OR JACKING INSTALLATION SHALL HAVE A BORED HOLE DIAMETER ESSENTIALLY THE SAME AS THE OUTSIDE DIAMETER OF THE PIPE PLUS THE THICKNESS OF THE PROTECTIVE COATING. IF VOIDS SHOULD DEVELOP OR IF THE BORED HOLE DIAMETER IS GREATER THAN THE OUTSIDE DIAMETER OF THE PIPE (INCLUDING COATING) BY MORE THAN APPROXIMATELY 1 INCH, THE SPACE SHALL BE FILLED BY GROUTING OR OTHER REMEDIAL MEASURES TAKEN AS APPROVED BY SCRRA.
g. THE BORE AND JACK METHOD (PUSHING PIPE INTO THE EARTH WITH A BORING AUGER ROTATING WITHIN PIPE TO REMOVE SPOIL) IS ACCEPTABLE.
h. JACKING METHOD (PUSHING SECTIONS OF PIPE INTO POSITION WITH JACKS PLACED AGAINST A BACKSTOP AND EXCAVATION PERFORMED BY HAND FROM WITHIN THE JACKING SHIELD AT THE HEAD OF THE PIPE) IS ACCEPTABLE. IMMEDIATELY AFTER COMPLETION OF JACKING OPERATION, THE INSTALLATION SHALL BE PRESSURE GROUTED.
i. TUNNELING METHOD (PLACING RINGS OF LINER PLATE WITHIN THE TAIL SECTION OF A TUNNELING SHIELD OR TUNNELING MACHINE) IS ACCEPTABLE. TUNNELING SHALL NOT BE CONSIDERED WHERE LESS THAN SIX FEET OF COVER EXISTS OR WHERE EXCESSIVELY SANDY, LOOSE OR ROCKY SOILS ARE ANTICIPATED.
j. HORIZONTAL DIRECTIONAL DRILLING METHOD (BORING A SMALL DIAMETER PILOT HOLE ON A DESIRED VERTICAL AND HORIZONTAL ALIGNMENT USING A CUTTING HEAD WITH VISCOUS SLURRY AND PULLING A PIPE WITH A REAMER) IS ACCEPTABLE.
k. PIPE RAMMING METHOD (PUSHING A SOLID STEEL ROD UNDER THE ROADBED, ATTACHING A CONE SHAPED EXPANDER TO THE END OF THE ROD, ATTACHING A CASING PIPE TO THE EXPANDER AND PULLING BACK THE ROD) IS NOT ACCEPTABLE.
l. THE USE OF WATER JETTING TO FACILITATE CASING PLACEMENT AND SPOIL REMOVAL IS NOT PERMITTED.
m. JACKING, BORING, OR TUNNELING PIPES EQUAL TO OR GREATER THAN 48 INCHES NOMINAL DIAMETER WILL NOT BE ALLOWED WITH LESS THAN ONE AND ONE HALF TIMES THE PIPES NOMINAL DIAMETER OF COVER FROM BASE OF RAIL TO TOP OF PIPELINE.
n. JACKING AND BORING OF PIPELINES WITH A NOMINAL DIAMETER GREATER THAN 72 INCHES SHALL NOT BE ALLOWED UNLESS OTHERWISE APPROVED BY SCRRA.

6. SEALS AND SUPPORTS

THE ENDS OF CASING ARE TO BE SUITABLY SEALED AGAINST THE ENTRANCE OF FOREIGN MATERIAL, BUT ARE NOT TO BE TIGHTLY SEALED. ALL SUPPORTS, INSULATORS AND CENTERING DEVICES FOR THE CARRIER PIPE SHALL BE SO DESIGNED AND CONSTRUCTED THAT NO LOADS FROM THE ROADBED, TRAFFIC OR CASING PIPE ITSELF ARE TRANSMITTED TO CARRIER PIPE. THE SPACING OF SUCH SUPPORTS LONGITUDINALLY SHALL NOT BE GREATER THAN TEN FEET.

7. SHUT-OFF VALVES

ACCESSIBLE EMERGENCY SHUT-OFF VALVES SHALL BE INSTALLED WITHIN EFFECTIVE DISTANCES EACH SIDE OF THE TRACK AS MUTUALLY AGREED TO BY SCRRA AND THE PIPELINE COMPANY. WHERE PIPELINES ARE PROVIDED WITH AUTOMATIC CONTROL STATIONS AT LOCATIONS AND WITHIN DISTANCES APPROVED BY SCRRA ASSISTANT DIRECTOR, DESIGN, NO ADDITIONAL VALVES SHALL BE REQUIRED. SHUT-OFF VALVES ON SCRRA RIGHT-OF-WAY SHOULD BE AVOIDED.

8. LONGITUDINAL PIPELINES

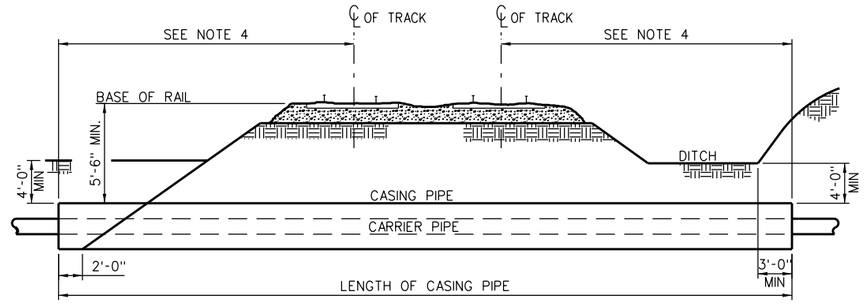
PIPELINES LAID LONGITUDINALLY ON SCRRA RIGHT-OF-WAY SHALL BE LOCATED AS FAR AS PRACTICABLE FROM ANY TRACKS OR OTHER IMPORTANT STRUCTURES AND AS CLOSE TO THE RAILROAD PROPERTY LINE AS POSSIBLE. IF LOCATED WITHIN 25 FEET OF THE CENTERLINE OF ANY TRACK OR WHERE THERE IS DANGER OF DAMAGE TO ANY BRIDGE, BUILDING OR STRUCTURE, THE CARRIER PIPE SHALL BE ENCASED OR OF SPECIAL DESIGN AS APPROVED BY SCRRA ASSISTANT DIRECTOR, DESIGN. PIPELINES SHALL BE BURIED NOT LESS THAN FOUR (4) FEET FROM THE GROUND SURFACE TO THE TOP OF THE PIPE.

9. APPROVAL OF PLANS

SCRRA'S RIGHT-OF-WAY ENCROACHMENT APPLICATION, PLAN REVIEW FEES, AND PLANS FOR PROPOSED INSTALLATION SHALL BE SUBMITTED TO SCRRA FOR APPROVAL PRIOR TO CONSTRUCTION. PLANS SHALL BE DRAWN TO SCALE SHOWING THE RELATION OF THE PROPOSED PIPELINE TO SCRRA TRACKS, ANGLE OF CROSSING, LOCATION OF VALVES, SCRRA SURVEY STATION, RIGHT-OF-WAY LINES AND GENERAL LAYOUT OF TRACKS AND SCRRA FACILITIES. PLANS SHOULD ALSO SHOW A CROSS SECTION (OR SECTIONS) FROM FIELD SURVEY, SHOWING PIPE IN RELATION TO ACTUAL PROFILE OF GROUND AND TRACKS. ADDITONAL INFORMATION ON APPROVAL PROCESSES AND REQUIREMENTS ARE AVAILABLE ON SCRRA'S WEBSITE AT WWW.METROLINKTRAINS.COM.

10. EXECUTION OF WORK

THE PIPELINE REAL ESTATE AGREEMENT AND SCRRA'S TEMPORARY RIGHT-OF-ENTRY AGREEMENT (SCRRA FORM NO. 36) SHALL BE FULLY EXECUTED BEFORE ANY WORK WILL BE ALLOWED ON SCRRA RIGHT-OF-WAY. THE EXECUTION OF WORK ON SCRRA RIGHTS-OF-WAY, INCLUDING THE SUPPORTING OF TRACKS, SHALL BE SUBJECT TO THE INSPECTION AND DIRECTION OF SCRRA RIGHT-OF-WAY ENGINEER OR HIS/HER AUTHORIZED REPRESENTATIVE. THE INSTALLER SHALL PERFORM THE CONSTRUCTION OR MAINTENANCE WORK IN SUCH A MANNER AND AT SUCH TIMES AS SHALL NOT ENDANGER OR INTERFERE WITH SCRRA'S OPERATIONS, INCLUDING RELATION TO THE PROPER MANNER OF PROTECTING THE TRACKS, SIGNALS, FIBER OPTIC CABLES, PIPELINES, OTHER PROPERTY AND TENANTS OR LICENSEES AT OR IN THE VICINITY OF THE WORK DURING THE PERIOD OF CONSTRUCTION.



CASING REQUIREMENTS - FIGURE 1

TABLE 1

STEEL CASING (UNCOATED AND UNPROTECTED)

NOMINAL DIAMETER (INCHES)	MIN. WALL THICKNESS (INCHES)	NOMINAL DIAMETER (INCHES)	MIN. WALL THICKNESS (INCHES)
14" & UNDER	0.250" (1/4")	44" & 46"	0.656" (21/32")
16"	0.281" (9/32")	48"	0.688" (11/16")
18"	0.312" (5/16")	50"	0.719" (23/32")
20" & 22"	0.344" (11/32")	52"	0.750" (3/4")
24"	0.375" (3/8")	54"	0.781" (25/32")
26"	0.406" (13/32")	56" & 58"	0.812" (13/16")
28"	0.438" (7/16")	60"	0.844" (27/32")
30"	0.469" (15/32")	62"	0.875" (7/8")
32"	0.500" (1/2")	64"	0.906" (29/32")
34" & 36"	0.531" (17/32")	66" & 68"	0.938" (15/16")
38"	0.562" (9/16")	70"	0.969" (31/32")
40"	0.594" (19/32")	72"	1.000" (1")
42"	0.625" (5/8")	OVER 72" MUST BE APPROVED BY SCRRA	

REV.	DATE	DESCRIPTION	DES.	ENG.
B	06-05-20	REVISED VARIOUS NOTES	AC	JMM
A	5-31-16	REVISED CARRIER PIPE NOTES	AC	NDP

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

PIPE LINES
FOR NON-FLAMMABLE SUBSTANCES
ACROSS OR ALONG RIGHT-OF-WAY

STANDARD 5001
SCALE: NTS
REVISION B SHEET 1 OF 1
CADD FILE: ES5001

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NOTES:

1. SCOPE

PIPELINES INCLUDED UNDER THESE SPECIFICATIONS ARE THOSE INSTALLED TO CARRY LIQUID FLAMMABLE PRODUCTS, HAZARDOUS PRODUCTS OR OTHER, HIGHLY VOLATILE SUBSTANCES UNDER PRESSURE. THESE STANDARDS SHALL BE USED IN CONJUNCTION WITH THE SCRRA DESIGN CRITERIA MANUAL, CHAPTER 9, UTILITIES, AND THE AREMA MANUAL OF RAILWAY ENGINEERING CHAPTER 1, PART 5.

2. GENERAL REQUIREMENTS

a. PIPELINES UNDER SCRRA TRACKS AND ACROSS SCRRA RIGHTS-OF-WAY SHALL BE ENCASED IN A LARGER PIPE OR CONDUIT CALLED THE CASING PIPE AS INDICATED IN FIGURE 1.
b. CASING PIPE AND NON-CASED PIPELINES SHALL BE DESIGNED TO CARRY COOPER'S E-80 RAILROAD LIVE LOADING WITH DIESEL IMPACT FACTOR AS PER AREMA.
c. PIPELINES SHALL BE LOCATED, WHERE PRACTICABLE, TO CROSS TRACKS AT APPROXIMATELY RIGHT ANGLES BUT PREFERABLY AT NO LESS THAN 45 DEGREES AND SHALL NOT BE PLACED WITHIN CULVERTS NOR UNDER RAILWAY BRIDGES.
d. TEST BORING OR OTHER SOIL INVESTIGATIONS, APPROVED BY SCRRA SHALL BE MADE, TO DETERMINE THE NATURE OF THE UNDERLYING MATERIAL FOR ALL PIPELINES WITH SIZES EQUAL OR GREATER THAN 48 INCHES IN DIAMETER AND A DEPTH FROM TOP OF PIPE TO BASE OF RAIL BETWEEN FIVE FEET SIX INCHES AND TEN FEET. THE TEST BORING SHOULD BE MADE ON THE CENTERLINE OF THE PIPE NEAR THE END OF THE BALLAST SECTION (IF POSSIBLE) ON EACH SIDE OF THE TRACKS AND AS DEEP AS THE BOTTOM OF THE BORE.
e. EXCEPTION TO ANY DESIGN, CONSTRUCTION, LOCATION OR SPECIFICATION CONTAINED IN THIS STANDARD MUST BE AUTHORIZED BY SCRRA. REQUESTS FOR EXCEPTIONS WILL BE CONSIDERED ONLY WHERE IT IS SHOWN THAT EXTREME HARDSHIP AND/OR UNUSUAL CONDITIONS PROVIDE JUSTIFICATION AND WHERE ALTERNATE MEASURES CAN BE USED IN KEEPING WITH THE INTENT OF THIS STANDARD. ALL REQUESTS FOR EXCEPTIONS SHALL BE FULLY DOCUMENTED WITH DESIGN DATA, CALCULATIONS, COST COMPARISONS AND OTHER PERTINENT INFORMATION.
f. ALL PIPELINES SHALL BE PROMINENTLY MARKED BY SIGNS OR MARKERS (MAINTAINED BY OWNER) LOCATED OVER THE PIPELINE.

3. CARRIER PIPE

a. CARRIER LINE PIPE SHALL BE OF STEEL AND CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI B 31.4 LIQUID TRANSPORTATION SYSTEMS FOR HYDROCARBONS, LIQUID PETROLEUM GAS, ANHYDROUS AMMONIA, AND ALCOHOLS, AND OTHER APPLICABLE ANSI CODES, EXCEPT THAT THE MAXIMUM ALLOWABLE STRESSES FOR DESIGN FOR STEEL PIPE SHALL NOT EXCEED THE FOLLOWING PERCENTAGES OF THE SPECIFIED MINIMUM YIELD STRENGTH (MULTIPLIED BY LONGITUDINAL JOINT FACTOR) OF THE PIPE AS DEFINED IN THE ABOVE CODES.

   A. THE FOLLOWING PERCENTAGES APPLY TO HOOP STRESS IN STEEL PIPE WITHIN A CASING UNDER SCRRA TRACKS AND ACROSS SCRRA RIGHTS-OF-WAY.

      SEVENTY-TWO PERCENT ON OIL PIPELINES
      FIFTY PERCENT FOR PIPELINES CARRYING CONDENSATE, NATURAL GASOLINE, NATURAL GAS LIQUIDS, LIQUIFIED PETROLEUM GAS, OTHER LIQUID PETROLEUM PRODUCTS, HAZARDOUS PRODUCTS, OR OTHER HIGHLY VOLATILE SUBSTANCES.

   B. THE FOLLOWING PERCENTAGES APPLY TO HOOP STRESS IN STEEL PIPE LAID LONGITUDINALLY ON SCRRA RIGHTS-OF-WAY.

      SIXTY PERCENT ON OIL PIPELINES
      FORTY PERCENT FOR PIPELINES CARRYING CONDENSATE, NATURAL GASOLINE, NATURAL GAS LIQUIDS, LIQUIFIED PETROLEUM GAS, OTHER LIQUID PETROLEUM PRODUCTS, HAZARDOUS PRODUCTS, OR OTHER HIGHLY VOLATILE SUBSTANCES.

   C. SEE AREMA CHAPTER 1, SECTION 5.2 FOR GAS PIPELINES.

b. THE PIPE SHALL BE LAID WITH SUFFICIENT SLACK SO THAT IT IS NOT IN TENSION.

4. CASING PIPE

a. CASING PIPE AND JOINTS SHALL BE OF STEEL AND OF LEAK PROOF CONSTRUCTION, CAPABLE OF WITHSTANDING AREMA (COOPER E80 LIVE LOAD) AND HAVE A SPECIFIED MINIMUM YIELD STRENGTH OF AT LEAST 35,000 PSI. THE INSIDE DIAMETER OF THE CASING PIPE SHALL BE AT LEAST TWO INCHES GREATER THAN THE LARGEST OUTSIDE DIAMETER OF THE CARRIER PIPE, JOINTS OR COUPLINGS FOR CARRIER PIPE LESS THAN SIX INCHES IN DIAMETER: AND AT LEAST FOUR INCHES GREATER FOR CARRIER PIPE SIX INCHES AND OVER IN DIAMETER. IN ALL CASES THE SPACE PROVIDED SHALL BE ADEQUATE TO ALLOW FOR REMOVAL WITHOUT DISTURBING THE CASING PIPE OR ROADBED.
b. TABLE 1 INDICATES A MINIMUM THICKNESS BASED UPON SUPERIMPOSED LOADS ONLY AND IT IS THE RESPONSIBILITY OF THE LICENSEE AND/OR THE INSTALLER TO PROVIDE A CASING WHICH IS ADEQUATE FOR THE LOADS THAT RESULT DURING INSTALLATION. THE WALL THICKNESS MAY BE DECREASED BY 0.063 INCH, IF THE CASING IS INSTALLED WITH A PROTECTIVE COATING AND IS CATHODICALLY PROTECTED, EXCEPT FOR DIAMETERS UNDER 14 INCHES.
c. CASING PIPE UNDER SCRRA TRACKS AND ACROSS SCRRA RIGHT-OF-WAY SHALL EXTEND TO THE GREATER OF THE FOLLOWING DISTANCES, MEASURED AT RIGHT ANGLE TO CENTERLINE OF TRACK. IF ADDITIONAL TRACKS ARE CONSTRUCTED IN THE FUTURE, THE CASING SHALL BE EXTENDED AT THE LICENSEE'S EXPENSE.
   A. ACROSS THE ENTIRE WIDTH OF THE SCRRA RIGHT-OF-WAY.
   B. THREE FEET BEYOND THE DITCH LINE.
   C. TWO FEET BEYOND THE TOE OF SLOPE.
   D. A MINIMUM DISTANCE OF 25 FEET FROM EACH SIDE OF THE CENTERLINE OF OUTSIDE TRACK WHEN CASING IS SEALED AT BOTH ENDS, AND
   E. A MINIMUM DISTANCE OF 45 FEET FROM EACH SIDE OF THE CENTERLINE OF OUTSIDE TRACK WHEN CASING IS OPEN AT BOTH ENDS.
d. THE DEPTH OF THE CASING SHALL NOT BE LESS THAN AS SHOWN IN FIGURE 1. HORIZONTAL DIRECTIONAL DRILLING OF A PIPELINE CARRYING FLAMMABLE, HAZARDOUS, OR HIGHLY VOLATILE SUBSTANCES SHALL HAVE A MINIMUM COVER FROM BASE OF RAIL TO TOP OF PIPELINE OF 25 FEET. INSTALLATION SHALL BE BY THE DRY BORE METHOD ONLY.

5. CONSTRUCTION

a. CASING PIPE SHALL BE CONSTRUCTED AS TO PREVENT LEAKAGE OF ANY SUBSTANCE FROM THE CASING THROUGHOUT IT'S LENGTH, EXCEPT AT THE ENDS. CASING SHALL BE INSTALLED AS TO PREVENT THE FORMATION OF A WATERWAY UNDER THE ROADBED, AND WITH AN EVEN BEARING THROUGHOUT IT'S LENGTH, AND SHALL SLOPE TO ONE END (EXCEPT FOR LONGITUDINAL OCCUPANCY).
b. THE FACES OF ALL PITS (JACKING AND RECEIVING) SHALL BE LOCATED A MINIMUM OF 25 FEET FROM THE CENTERLINE OF THE NEAREST TRACK, MEASURED AT RIGHT ANGLES TO TRACK. SHORING, IF REQUIRED, SHALL MEET SCRRA'S EXCAVATION SUPPORT GUIDELINES.
c. FOR ALL PIPELINES WITH SIZES EQUAL OR GREATER THAN 48 INCHES, RAIL ELEVATIONS OVER THE WORK MUST BE MONITORED AT INTERVALS PRESCRIBED BY SCRRA TO DETECT ANY TRACK MOVEMENT. MOVEMENTS OVER 1/4" VERTICALLY SHALL BE IMMEDIATELY REPORTED TO SCRRA. SCRRA WILL SURFACE THE TRACK SEVERAL TIMES IN ONE YEAR IF THERE IS ANY MOVEMENT AT LICENSEE AND/OR INSTALLERS'S COST.
d. THE METHOD OF CONSTRUCTION SHALL MEET ALL CURRENT AREMA AND "GREEN BOOK" SPECIFICATIONS AND REQUIREMENTS.
e. THE BORING, TUNNELING OR JACKING OPERATION SHALL BE PROGRESSED ON A 24-HOUR BASIS WITHOUT STOPPAGE WHEN THE CASING IS 20 FEET FROM THE CENTERLINE OF THE NEAREST TRACK.
f. THE BORING, TUNNELING OR JACKING INSTALLATIONS SHALL HAVE A BORED HOLE DIAMETER ESSENTIALLY THE SAME AS THE OUTSIDE DIAMETER OR THE PIPE PLUS THE THICKNESS OF THE PROTECTIVE COATING. IF VOIDS SHOULD DEVELOP OR IF THE BORED HOLE DIAMETER IS GREATER THAN THE OUTSIDE DIAMETER OF THE PIPE (INCLUDING COATING) BY MORE THAN APPROXIMATELY 1 INCH, THE SPACE SHALL BE FILLED BY GROUTING OR OTHER REMEDIAL MEASURES TAKEN AS APPROVED BY SCRRA.
g. THE BORE AND JACK METHOD (PUSHING PIPE INTO THE EARTH WITH A BORING AUGER ROTATING WITHIN PIPE TO REMOVE SPOIL) IS ACCEPTABLE.
h. JACKING METHOD (PUSHING SECTIONS OF PIPE INTO POSITION WITH JACKS PLACED AGAINST A BACKSTOP AND EXCAVATION PERFORMED BY HAND FROM WITHIN THE JACKING SHIELD AT THE HEAD OF THE PIPE) IS ACCEPTABLE. TUNNELING SHALL NOT BE CONSIDERED WHERE LESS THAN SIX FEET OF COVER EXISTS OR WHERE EXCESSIVELY SANDY, LOOSE OR ROCKY SOILS ARE ANTICIPATED.
i. TUNNELING METHOD (PLACING RINGS OF LINER PLATE WITHIN THE TAIL SECTION OF A TUNNELING SHIELD OR TUNNELING MACHINE) IS ACCEPTABLE. TUNNELING SHALL NOT BE CONSIDERED WHERE LESS THAN SIX FEET OF COVER EXISTS OR WHERE EXCESSIVELY SANDY, LOOSE OR ROCKY SOILS ARE ANTICIPATED.
j. HORIZONTAL DIRECTIONAL DRILLING METHOD (BORING A SMALL DIAMETER PILOT HOLE ON A DESIRED VERTICAL AND HORIZONTAL ALIGNMENT USING A CUTTING HEAD WITH VISCOUS SLURRY AND PULLING A PIPE WITH A REAMER) IS ACCEPTABLE.
k. PIPE RAMMING METHOD (PUSHING A SOLID STEEL ROD UNDER THE ROADBED, ATTACHING A CONE SHAPED EXPANDER TO THE END OF THE ROD, ATTACHING A CASING PIPE TO THE EXPANDER AND PULLING BACK THE ROD) IS NOT ACCEPTABLE.
l. THE USE OF WATER JETTING TO FACILITATE CASING PLACEMENT AND SPOIL REMOVAL IS NOT PEMITTED.
m. JACKING, BORING, OR TUNNELING PIPES EQUAL TO OR GREATER THAN 48 INCHES NOMINAL DIAMETER WILL NOT BE ALLOWED WITH LESS THAN ONE AND ONE HALF TIMES THE PIPES NOMINAL DIAMETER OF COVER FROM BASE OF RAIL TO TOP OF PIPELINE.
n. JACKING AND BORING OF PIPELINES WITH A NOMINAL DIAMETER GREATER THAN 72 INCHES SHALL NOT BE ALLOWED UNLESS OTHERWISE APPROVED BY SCRRA.

6. CATHODIC PROTECTION

WHERE CASING AND/OR CARRIER PIPE IS CATHODICALLY PROTECTED, SCRRA SHALL BE NOTIFIED AND A SUITABLE TEST MADE TO VERIFY THAT OTHER SCRRA STRUCTURES AND FACILITIES ARE ADEQUATELY PROTECTED FROM THE CATHODIC CURRENT IN ACCORDANCE WITH THE RECOMMENDATION OF CURRENT REPORTS OF CORRELATING COMMITTEE OF CATHODIC PROTECTION, PUBLISHED BY THE NATIONAL ASSOCIATION OF CORROSION ENGINEERS.

7. INSPECTION AND TESTING

CURRENT ANSI CODES, SHALL GOVERN THE INSPECTION AND TESTING OF THE FACILITY WITHIN SCRRA RIGHTS-OF-WAY EXCEPT AS FOLLOWS:

1. ONE-HUNDRED PERCENT OF ALL FIELD WELDS SHALL BE INSPECTED BY RADIOGRAPHIC EXAMINATION, AND SUCH FIELD WELDS SHALL BE INSPECTED FOR 100% OF THE CIRCUMFERENCE.
2. THE PROOF TESTING OF THE STRENGTH OF THE CARRIER PIPE SHALL BE IN ACCORDANCE WITH ANSI REQUIREMENTS.

8. SEALS AND SUPPORTS

THE ENDS OF CASING ARE TO BY SUITABLY SEALED AGAINST THE ENTRANCE OF FOREIGN MATERIAL, BUT ARE NOT TO BE TIGHTLY SEALED. ALL SUPPORTS, INSULATORS OR CENTERING DEVICES FOR THE CARRIER PIPE SHALL BE SO DESIGNED AND CONSTRUCTED THAT NO LOADS FROM THE ROADBED, TRAFFIC OR CASING PIPE ITSELF ARE TRANSMITTED TO THE CARRIER PIPE. THE SPACING OF SUCH SUPPORTS LONGITUDINALLY SHALL NOT BE GREATER THAN 10 FEET.

9. VENTS

CASING PIPE WHEN SEALED, SHALL BE PROPERLY VENTED. VENT PIPES SHALL BE SUFFICIENT DIAMETER, BUT IN NO CASE LESS THAN 2 INCHES IN DIAMETER, SHALL BE ATTACHED NEAR END OF CASING AND PROJECT THROUGH GROUND SURFACE AT RIGHT-OF-WAY LINES OR NOT LESS THAN 45 FEET (MEASURED AT RIGHT ANGLES) FROM CENTERLINE OF NEAREST TRACK. VENT PIPE, OR PIPES, SHALL EXTEND NOT LESS THAN 4 FEET ABOVE GROUND SURFACE. TOP OF VENT PIPE SHALL BE FITTED WITH DOWN-TURNED ELBOW PROPERLY SCREENED, OR A RELIEF VALVE. VENTS IN LOCATIONS SUBJECT TO HIGH WATER SHALL BE EXTENDED ABOVE THE MINIMUM ELEVATION OF HIGH WATER AND SHALL BE SUPPORTED AND PROTECTED IN A MANNER THAT MEETS THE APPROVAL OF SCRRA RIGHT-OF-WAY ENGINEER OR HIS/HER DESIGNATED REPRESENTATIVE. VENT PIPES SHALL NOT BE CLOSER THAN 4 FEET (VERTICALLY) FROM ELECTRIC WIRES.

10. SHUT-OFF VALVES

ACCESSIBLE EMERGENCY SHUT-OFF VALVES SHALL BE INSTALLED WITHIN EFFECTIVE DISTANCES EACH SIDE OF THE TRACK AS MUTUALLY AGREED TO BY SCRRA AND THE PIPELINE COMPANY. WHERE PIPELINES ARE PROVIDED WITH AUTOMATIC CONTROL STATIONS AT LOCATIONS AND WITHIN DISTANCES APPROVED BY SCRRA DIRECTOR OF ENGINEERING AND CONSTRUCTION, NO ADDITIONAL VALVES SHALL BE REQUIRED. SHUT-OFF VALVES ON SCRRA RIGHT-OF-WAY SHOULD BE AVOIDED.

11. LONGITUDINAL PIPELINES

PIPELINES LAID LONGITUDINALLY ON SCRRA RIGHT-OF-WAY SHALL BE LOCATED AS FAR AS PRACTICABLE FROM ANY TRACKS OR OTHER IMPORTANT STRUCTURES AND AS CLOSE TO THE SCRRA PROPERTY LINE AS POSSIBLE. THEY MUST NOT BE WITHIN 25 FEET OF ANY TRACK AND MUST HAVE MINIMUM OF SIX (6) FEET GROUND COVER OVER THE PIPELINE UP TO 50 FEET FROM THE CENTERLINE OF TRACK. WHERE PIPELINE IS LAID MORE THAN 50 FEET FROM CENTERLINE OF TRACK, MINIMUM COVER SHALL BE AT LEAST FIVE (5) FEET. PIPELINE MUST BE MARKED BY A SIGN APPROVED BY SCRRA EVERY 500 FEET AND AT EVERY ROAD CROSSING, STREAMBED, OTHER UTILITY CROSSING AND AT LOCATIONS OF MAJOR CHANGE IN DIRECTION OF THE PIPE.

12. APPROVAL OF PLANS

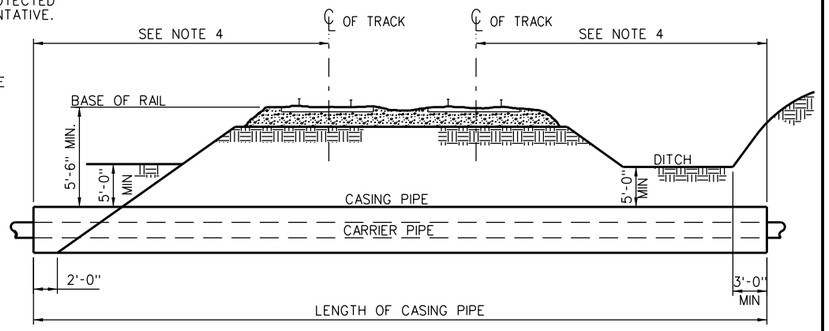
SCRRA'S RIGHT-OF-WAY ENCROACHMENT APPLICATION, PLAN REVIEW FEES, AND PLANS FOR PROPOSED INSTALLATION SHALL BE SUBMITTED TO SCRRA FOR APPROVAL PRIOR TO CONSTRUCTION. PLANS SHALL BE DRAWN TO SCALE SHOWING THE RELATION OF THE PROPOSED PIPELINE TO SCRRA TRACKS, ANGLE OF CROSSING, LOCATION OF VALVES, SCRRA SURVEY STATION, RIGHT-OF-WAY LINES AND GENERAL LAYOUT OF TRACKS AND SCRRA FACILITIES. PLANS SHOULD ALSO SHOW A CROSS SECTION (OR SECTIONS) FROM FIELD SURVEY, SHOWING PIPE IN RELATION TO ACTUAL PROFILE OF GROUND AND TRACKS. ADDITONAL INFORMATION ON APPROVAL PROCESSES AND REQUIREMENTS ARE AVAILABLE ON SCRRA'S WEBSITE AT WWW.METROLINKTRAINS.COM.

13. EXECUTION OF WORK

THE PIPELINE REAL ESTATE AGREEMENT AND SCRRA'S TEMPORARY RIGHT-OF-ENTRY AGREEMENT (SCRRA FORM NO. 36) SHALL BE FULLY EXECUTED BEFORE ANY WORK WILL BE ALLOWED ON SCRRA RIGHT-OF-WAY. THE EXECUTION OF WORK ON SCRRA RIGHTS-OF-WAY, INCLUDING THE SUPPORTING OF TRACKS, SHALL BE SUBJECT TO THE INSPECTION AND DIRECTION OF SCRRA RIGHT-OF-WAY ENGINEER OR HIS/HER AUTHORIZED REPRESENTATIVE. THE INSTALLER SHALL PERFORM THE CONSTRUCTION OR MAINTENANCE WORK IN SUCH A MANNER AND AT SUCH TIMES AS SHALL NOT ENDANGER OR INTERFERE WITH SCRRA'S OPERATIONS, INCLUDING RELATION TO THE PROPER MANNER OF PROTECTING THE TRACKS, SIGNALS, FIBER OPTIC CABLES, PIPELINES, OTHER PROPERTY AND TENANTS OR LICENSEES AT OR IN THE VICINITY OF THE WORK DURING THE PERIOD OF CONSTRUCTION.

TABLE 1

STEEL CASING (UNCOATED AND UNPROTECTED)			
NOMINAL DIAMETER (INCHES)	MIN. WALL THICKNESS (INCHES)	NOMINAL DIAMETER (INCHES)	MIN. WALL THICKNESS (INCHES)
14" & UNDER	0.250" (1/4")	44" & 46"	0.656" (21/32")
16"	0.281" (9/32")	48"	0.688" (11/16")
18"	0.312" (5/16")	50"	0.719" (23/32")
20" & 22"	0.344" (11/32")	52"	0.750" (3/4")
24"	0.375" (3/8")	54"	0.781" (25/32")
26"	0.406" (13/32")	56" & 58"	0.812" (13/16")
28"	0.438" (7/16")	60"	0.844" (27/32")
30"	0.469" (15/32")	62"	0.875" (7/8")
32"	0.500" (1/2")	64"	0.906" (29/32")
34" & 36"	0.531" (17/32")	66" & 68"	0.938" (15/16")
38"	0.562" (9/16")	70"	0.969" (31/32")
40"	0.594" (19/32")	72"	1.000" (1")
42"	0.625" (5/8")	OVER 72" MUST BE APPROVED BY SCRRA	



CASING REQUIREMENTS - FIGURE 1

REV.	DATE	DESCRIPTION	DES.	ENG.
A	06-05-20	REVISE NOTE 7	AC	JMM

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

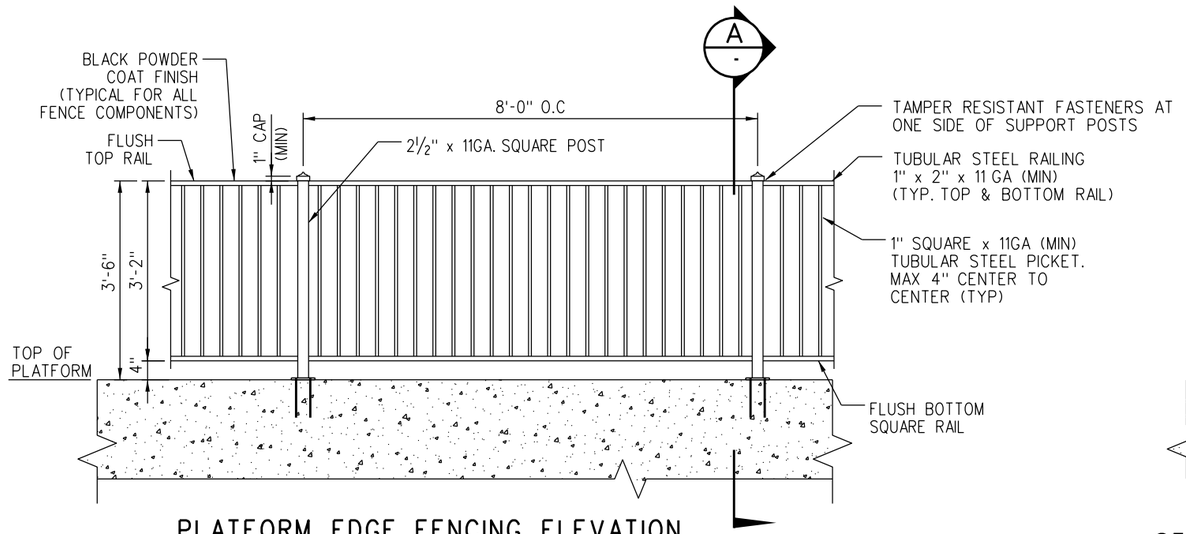
METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

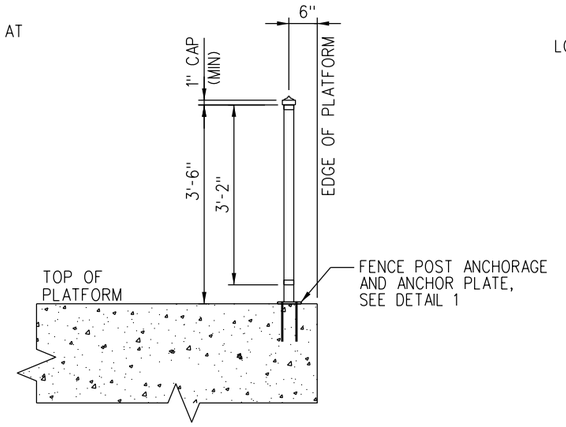
PIPE LINES FOR FLAMMABLE AND HAZARDOUS SUBSTANCES ACROSS OR ALONG RIGHT-OF-WAY

STANDARD 5002
SCALE: NTS
REVISION A SHEET 1 OF 1
CADD FILE: ES5002



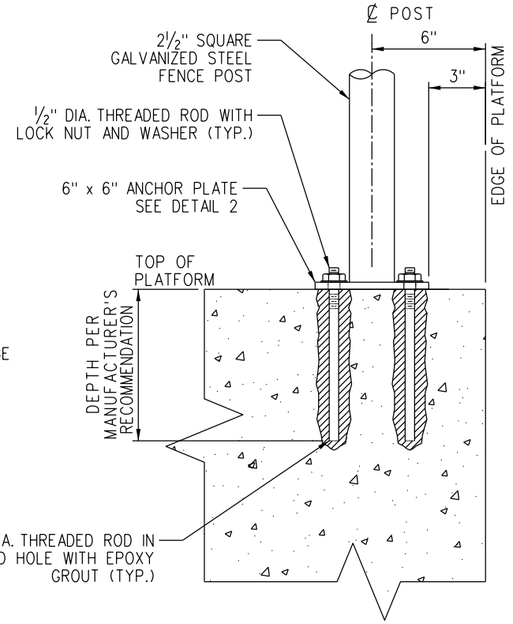
PLATFORM EDGE FENCING ELEVATION

SCALE: ¾" = 1'-0"



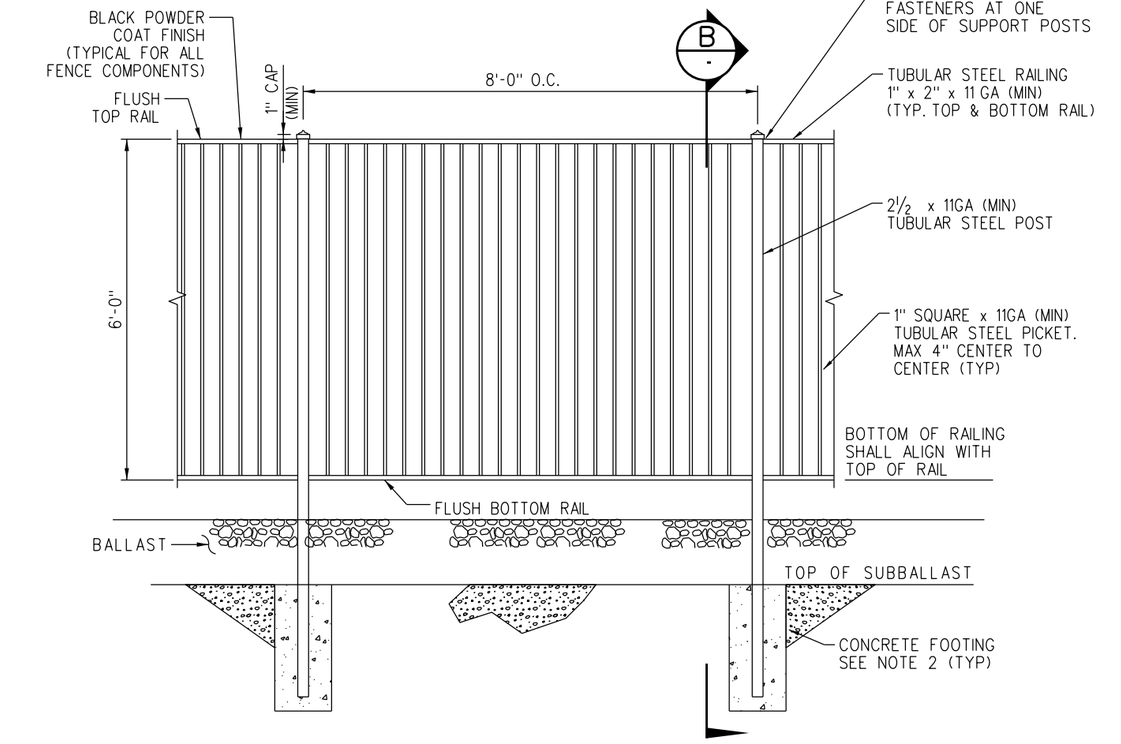
SECTION A

SCALE: ¾" = 1'-0"



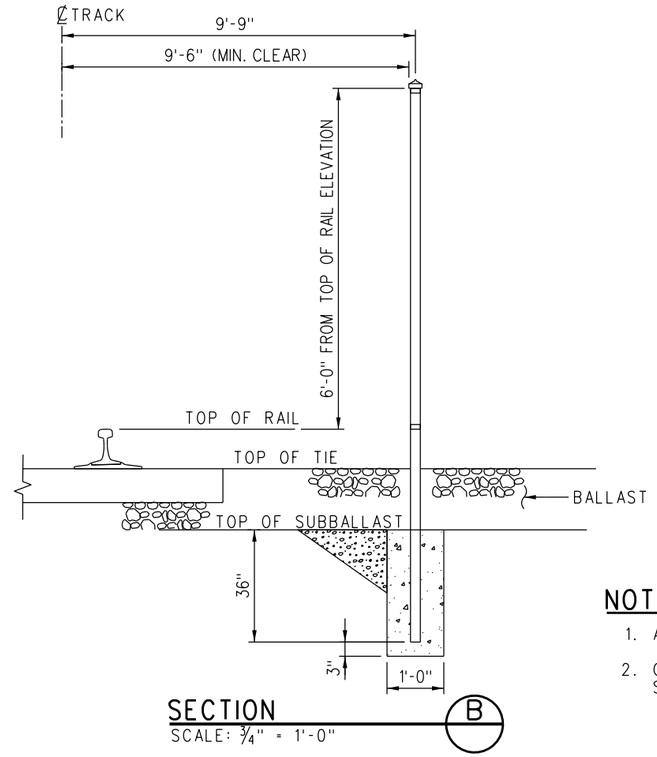
DETAIL 1
FENCE POST ANCHORAGE

SCALE: 3" = 1'-0"



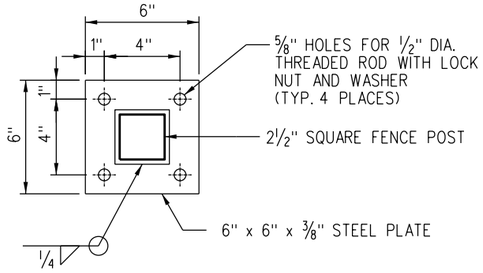
INTER-TRACK FENCE ELEVATION

SCALE: ¾" = 1'-0"



SECTION B

SCALE: ¾" = 1'-0"



DETAIL 2
ANCHOR PLATE

SCALE: 3" = 1'-0"

NOTES:

1. ALL METAL SHALL BE HOT-DIP GALVANIZED STEEL.
2. CONCRETE FOOTINGS TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS.

REV.	DATE	DESCRIPTION	DES.	ENG.
C	06-05-20	REVISED ALL DETAILS	AC	JMM
B	10-15-15	REVISED ALL DETAILS	AC	NDP
A	12-05-14	REVISED SECTION "B"	AC	NDP

DRAWN BY: A. CARLOS DATE: 05/24/07

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

STATION FENCING
PLATFORM EDGE FENCE
AND INTER-TRACK FENCE

STANDARD 5102
SCALE: AS NOTED
REVISION C SHEET 1 OF 1
CADD FILE: ES5102

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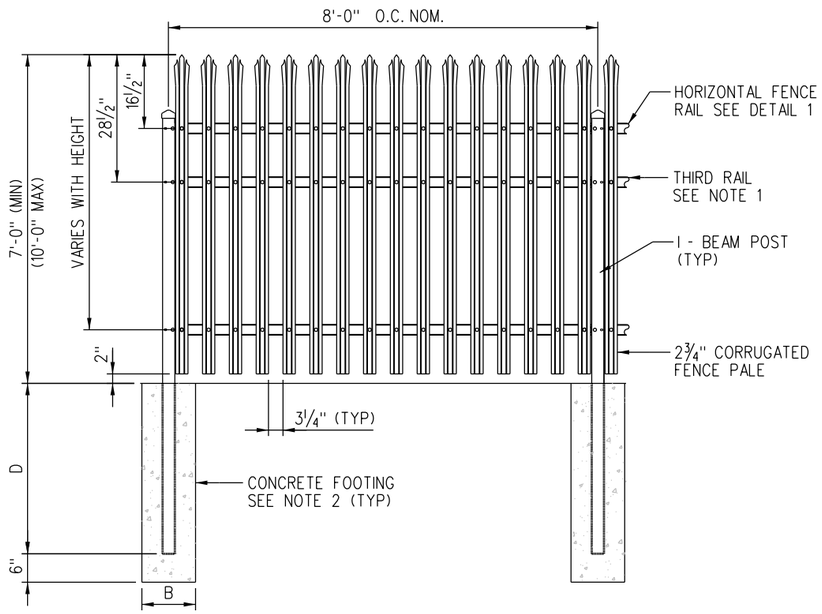
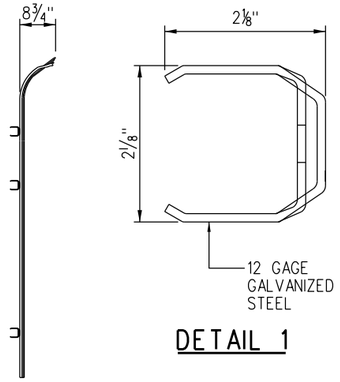
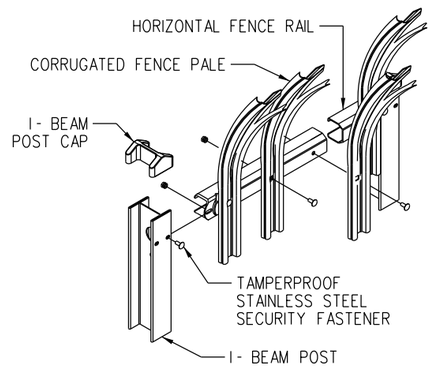


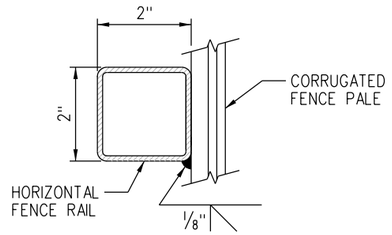
TYPICAL FENCE ELEVATION



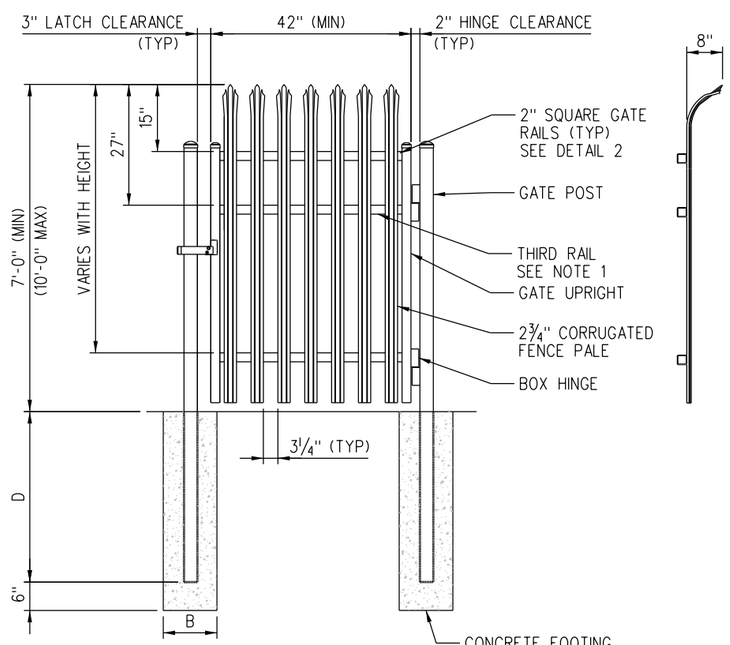
DETAIL 1



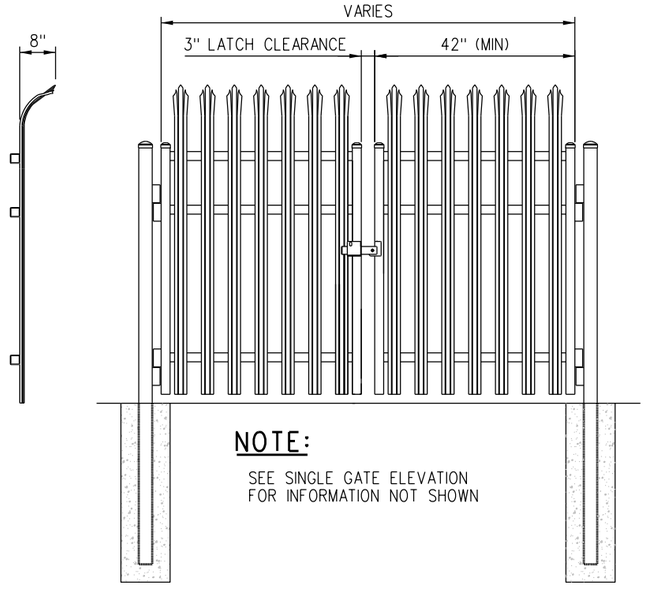
ISOMETRIC VIEW



DETAIL 2



SINGLE GATE



NOTE:

SEE SINGLE GATE ELEVATION FOR INFORMATION NOT SHOWN

DOUBLE GATE

TABLE 1
MINIMUM SIZES FOR STEEL FENCE, GATE POSTS & CONCRETE FOOTINGS

MAXIMUM FENCE HEIGHT	POSTS	FOOTINGS	
		B (in.)	D (ft.)
8'-0"	3" x 2.75" x 12 GA. I-BEAM	12"	3'-0"
10'-0"	4" x 2.75" x 11 GA. I-BEAM	14"	3'-6"
	MAXIMUM GATE HEIGHT		
MAXIMUM GATE LEAF LENGTH	8'-0"	10'-0"	
4'-0"	3" X 12 GA.	4" X 12 GA.	
6'-0"	3" X 12 GA.	4" X 12 GA.	
8'-0"	6" X 3/16"	6" X 3/16"	
10'-0"	6" X 3/16"	6" X 3/16"	
12'-0"	6" X 3/16"	6" X 3/16"	
16'-0"	6" X 3/16"	8" X 1/4"	

NOTES:

1. THIRD RAIL IS REQUIRED FOR FENCE HEIGHT OF 8'-0" OR HIGHER.
2. CONCRETE FOOTING TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS.

MATERIAL SPECIFICATIONS:

A. STEEL MATERIAL FOR FENCE FRAMEWORK (I.E., CORRUGATED PALES, RAILS AND POSTS), WHEN GALVANIZED PRIOR TO FORMING, SHALL CONFORM TO THE REQUIREMENTS OF ASTM A924/A924M, WITH A MINIMUM YIELD STRENGTH OF 35,000 PSI. THE STEEL SHALL BE HOT-DIP GALVANIZED TO MEET THE REQUIREMENTS OF ASTM A653/A653M WITH A MINIMUM ZINC COATING WEIGHT OF 0.90 OZ/FT2 (276 G/M2), COATING DESIGNATION G-90.

B. MATERIAL FOR CORRUGATED PALES SHALL BE A NOMINAL 2.75" X .75" X 14 GAGE. THE CROSS-SECTIONAL SHAPE OF THE HORIZONTAL FENCE RAIL SHALL CONFORM TO A NOMINAL 2" X 2" X 11 GAGE. PRE-DRILLED HOLES IN THE HORIZONTAL FENCE RAIL SHALL BE SPACED 6" ON CENTER, PROVIDING A PALE AIRSPACE OF NO GREATER THAN 3.25". TAMPERPROOF STAINLESS STEEL SECURITY FASTENERS SHALL BE USED TO FASTEN EACH PALE TO RAIL AT EVERY INTERSECTION. FENCE POSTS AND GATE POSTS SHALL MEET THE MINIMUM SIZE REQUIREMENTS OF TABLE 1.

C. MATERIAL FOR STEEL FENCE PRIVACY SCREENING, IF REQUIRED BY SCRRA, SHALL BE 18 GAGE PREFORMED SLATS, PROVIDING COMPLETE SCREENING COVERAGE BETWEEN PALES AND AT PALE TO POST CONNECTIONS. PRIVACY SCREENING SHALL PROVIDE SCREENING FROM TOP RAIL TO BOTTOM RAIL, AND BE CAPABLE OF TRAVERSING TERRAIN WITHOUT IMPEDING THE RAKING CAPABILITIES OF THE FENCING PANEL.

FENCE SELECTION CRITERIA

1. CHAIN LINK FENCING SHALL BE USED ONLY FOR MAINTENENACE OF EXISTING CHAIN LINK FENCES.
2. WELDED WIRE MESH OR HIGH SECURITY ORNAMENTAL FENCING SHALL BE USED FOR ALL RIGHT-OF-WAY FENCES AS DIRECTED BY SCRRA.
3. TUBULAR STEEL FENCING WILL BE USED FOR PROPERTY LEASES AND STORAGE FACILITIES WHERE AESTHETICS ARE A MAJOR CONCERN AND AS DIRECTED BY SCRRA.
4. INTER-TRACK FENCING SHALL BE USED BETWEEN THE TRACKS AT ALL STATIONS.
5. CONCRETE BLOCK WALLS SHALL BE USED FOR COMMERCIAL, AND RESIDENTIAL DEVELOPMENTS. REMOVAL OF GRAFFITI ON BOTH SIDES OF THE WALL SHALL BE THE OWNER/ DEVELOPER'S RESPONSIBILITY.
6. TEMPORARY RAILING (TYPE K) WITH WELDED WIRE MESH FENCING SHALL BE USED FOR ALL PARKING LEASES. K-RAIL AND FENCE ANCHORS SHALL BE AS PER CALTRANS STANDARD PLANS T3 AND T4.
7. LANDSCAPE VINES SHALL NOT BE ALLOWED TO GROW ON THE FENCE UNLESS WRITTEN APPROVAL IS GRANTED BY SCRRA. IF LANDSCAPE VINES ARE ALLOWED TO GROW, THEY WILL BE TRIMMED REGULARLY SO THAT THEY WILL NOT EXTEND OVER THE WALL. SAFETY MEASURES REQUIRED BY SCRRA SHALL BE FOLLOWED IN THE TRIMMING OF THE VINES.

REV.	DATE	DESCRIPTION	DES.	ENG.
A	06-05-20	REVISE MATERIAL SPECIFICATIONS, NOTE 6 & OMIT NOTE 8	AC	JMM

DRAWN BY: A. CARLOS DATE: 09/22/14

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

RIGHT OF WAY FENCING
HIGH SECURITY ORNAMENTAL FENCING

STANDARD 5103
SCALE: NTS
REVISION A SHEET 1 OF 1
CADD FILE: ES5103

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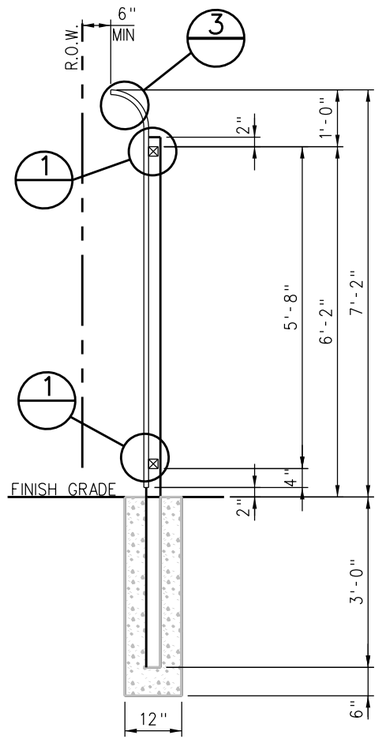
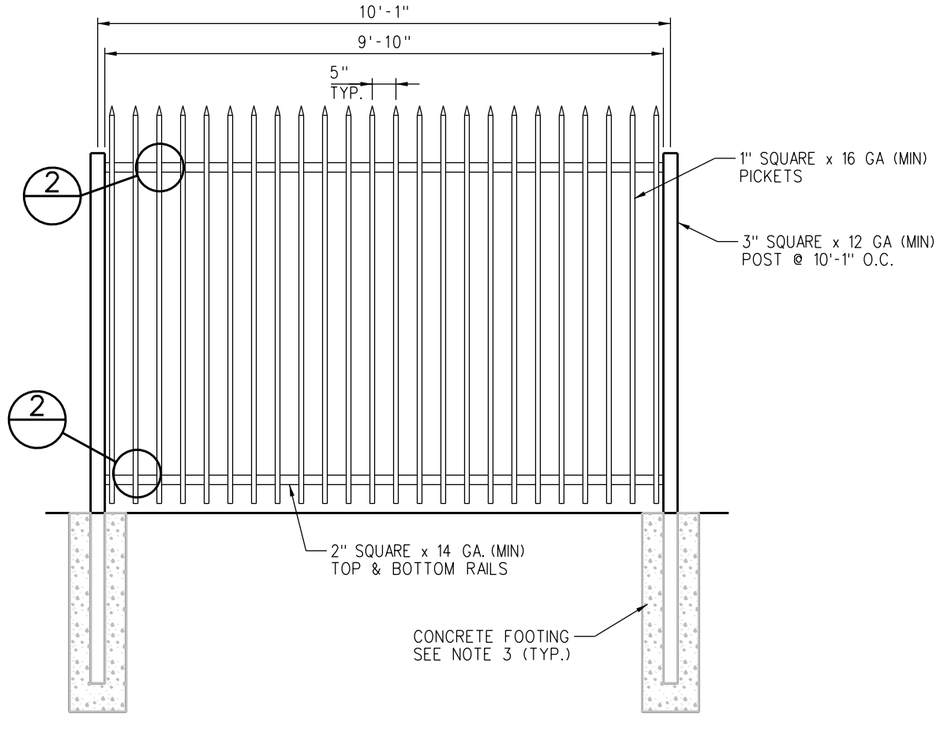


SIDE VIEW

SCALE: 3/4" = 1'-0"



FRONT VIEW

SCALE: 3/4" = 1'-0"

NOTES:

1. SEE ES5103 FOR FENCE SELECTION CRITERIA.
2. ALL STEEL TUBING TO BE HOT-DIP GALVANIZED PER ASTM A123 AND ASTM A653.
3. ALL CONCRETE FOOTINGS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2,500 PSI.
4. FINISH GRADE REQUIRED PRIOR TO FENCE INSTALLATION. LOCATION OF START / END POSTS, CORNER POSTS AND GATE POSTS REQUIRED PRIOR TO FENCE INSTALLATION.

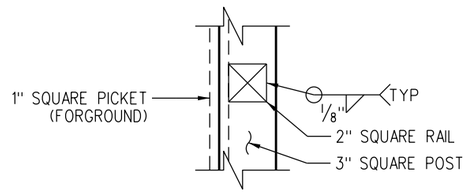
NOTES:

A. PICKETS: 1 INCH. SQUARE STEEL TUBULAR MEMBERS MANUFACTERED PER ASTM A-500 AND ASTM A653 HAVING A YIELD STRENGTH OF 35,000 PSI. WALL THICKNESS SHALL BE 16 GAUGE, MINIMUM. ATTACH EACH PICKET TO RAILS BY WELDING WITH GAS METAL ARC METHOD.

B. RAILS: 2 INCH SQUARE STEEL TUBULAR MEMBERS MANUFACTURED PER ASTM A-500 AND ASTM A653 HAVING A YIELD STRENGTH OF 35,000 PSI. WALL THICKNESS SHALL BE 14 GAUGE, MINIMUM. ATTACH EACH RAIL TO POSTS BY WELDING WITH THE GAS METAL ARC METHOD.

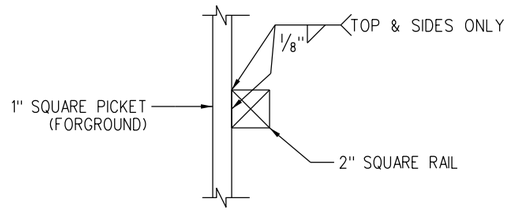
C. POSTS: 3 INCH SQUARE STEEL TUBULAR MEMBERS MANUFACTURED PER ASTM A-500 AND ASTM A653 HAVING A YIELD STRENGTH OF 35,000 PSI. WALL THICKNESS SHALL BE 12 GAUGE, MINIMUM.

D. FINISH: ALL COMPONENTS TO BE GIVEN A 4-STAGE PRE-TREATMENT PROCESS THAT CLEANS AND PREPARES THE GALVANIZED SURFACE FOR THE FINISH COAT. ALL METAL IS THEN TO BE GIVEN A POLYESTER RESIN BASED POWDER COATING APPLIED BY THE ELECTROSTATIC SPRAY PROCESS, TO A THICKNESS OF 2.5 MILS. THE FINISH IS THEN TO BE BAKED IN A 450 DEG. OVEN FOR 20 MINUTES. COLOR FOR FINISH TO BE BLACK.



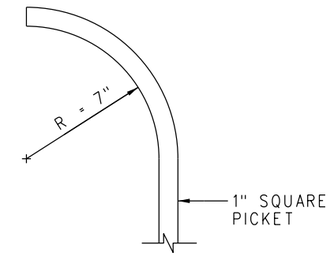
DETAIL 1

SCALE: 3" = 1'-0"



DETAIL 2

SCALE: 3" = 1'-0"



DETAIL 3

SCALE: 3" = 1'-0"

REV.	DATE	DESCRIPTION	DES.	ENG.
C	06-05-20	REVISED NOTES, DETAILS AND DRAWING TITLE	AC	JMM
B	10-15-15	REVISED MATERIAL SPECIFICATIONS	AC	NDP
A	06-19-15	REVISED FENCE SELECTION CRITERIA NOTE 2	AC	NDP

DRAWN BY: A. CARLOS DATE: 11/20/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

RIGHT OF WAY FENCING
TUBULAR STEEL FENCING

STANDARD: 5104
SCALE: AS NOTED
REVISION: C
SHEET: 1 OF 1
CADD FILE: ES5104

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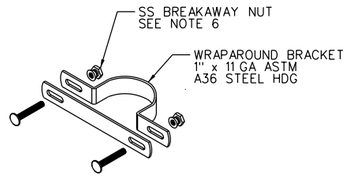
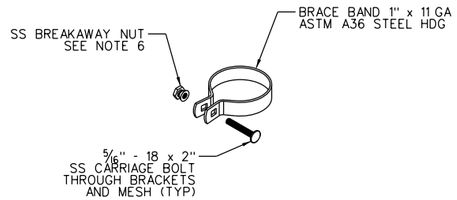
NOTES:

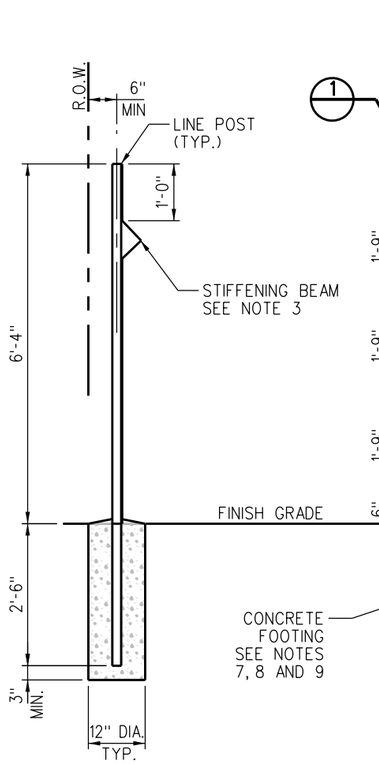
1. SEE ES5103 FOR FENCE SELECTION CRITERIA.
2. WELDED WIRE FENCE FABRIC TO BE #6 GAUGE HARDENED STEEL WIRE WELDED INTO A 2" X 6" RECTANGULAR PATTERN PER ASTM A123, CLASS C1, 1.2 OZ. PER SQUARE FOOT. HOT-DIP GALVANIZED AFTER WELDING.
3. TRIANGULAR SHAPED STIFFENING BEAM TO BE PLACED HORIZONTALLY, 1'-0" DOWN FROM TOP OF WELDED WIRE MESH PANEL.
4. POSTS, BRACE RAILS AND GATE FRAMES SHALL BE STANDARD WEIGHT SHEDULE 40 GALVANIZED PIPE PER ASTM A53 WITH A MINIMUM YIELD STRENGTH OF 35,000 PSI.
5. DIAGONAL BRACING AT 500 FT. MAXIMUM SPACING AND AT ALL END, GATE AND CORNER POSTS.
6. BREAKAWAY NUT SHALL BE PLACED ON THE INSIDE (TRACK SIDE) OF THE FENCE PANEL.
7. CONCRETE FOOTINGS TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS.
8. POST EMBEDMENT AND FOOTING FOR LINE POST SHOWN ON THIS DRAWING. POST EMBEDMENT AT GATE POST AND END POSTS TO BE 3'-0" DEEP.
9. ALL FOOTINGS TO BE CROWNED AT TOP FOR DRAINAGE.
10. GATE FRAME, POSTS AND BRACE SHALL BE AS PER CHAIN LINK FENCE STANDARD, ES5106.



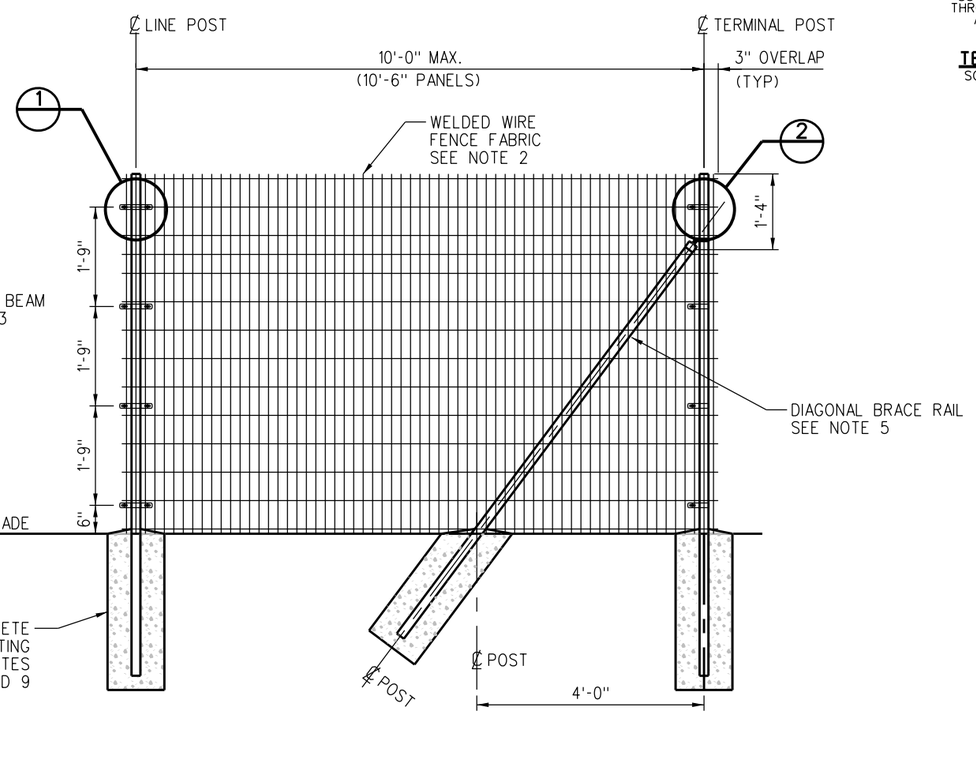
LINE WRAP AROUND BRACKET (1)
SCALE: NTS



TERMINAL BRACE BAND (2)
SCALE: NTS



SIDE VIEW LINE POST



FRONT VIEW LINE POST

REV.	DATE	DESCRIPTION	DES.	ENG.
B	06-05-20	REVISED NOTES AND DETAILS	AC	JMM
A	06-19-15	REVISED FENCE SELECTION CRITERIA NOTE 2	AC	NDP

DRAWN BY: A. CARLOS DATE: 11/20/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

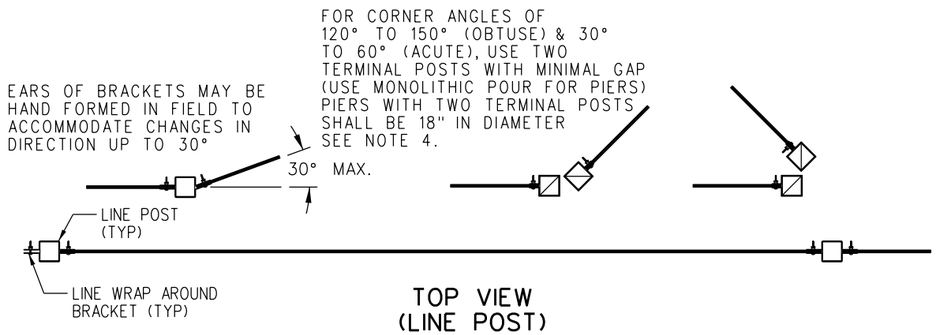
RIGHT OF WAY FENCING
WELDED WIRE MESH FENCING (TYPE A)

STANDARD 5105
SCALE: NTS
REVISION B
SHEET 1 OF 3
CADD FILE: ES5105

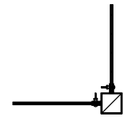
UserName=> scrrapw11ics01$ Date Plotted: 3/27/2023 4:14:49 PM Plot Driver=> C:\Program Files (x86)\Common Files\InterPlot\IPLOT\bin\iplotdrvn.plt FileName=> \\scrrapw11ics01\iCS_pdf_work_dir\90\494_6\ES5105-01.dgn

NOTES:

1. TERMINAL BRACE BAND TO BE USED AT TERMINAL AND CORNER POSTS. STACK BANDS AS CLOSELY AS POSSIBLE WHERE APPLICABLE.
2. AT TERMINAL AND CORNER POST WHERE SPACING BETWEEN POST IS LESS THAN 10'-4" O.C., REDUCE POST SPACING BY INCREMENTS OF 3" TO ENSURE VERTICAL WIRE CAN BE CAPTURED BY BRACKET. CUT PANEL TO FIT IN FIELD.
3. PRELIMINARY FOOTING SIZES AND EMBEDMENT ONLY. FOOTING AND EMBEDMENT MAY CHANGE UPON ENGINEERING REVIEW OF WIND LOAD AND SOIL BEARING CONDITIONS.
4. SQUARE POSTS SHOWN ON PLANS. ROUND POSTS MAY BE USED, BUT MUST BE UNIFORM FOR ALL POSTS. A SINGLE ROUND POST WITH TERMINAL BRACE BANDS MAY BE USED IN LIEU OF TWO POSTS AT ANGLE POINTS ALONG FENCE ALIGNMENT. POSTS AND BRACKETS SHALL MEET ALL OTHER CRITERIA AS SPECIFIED ON THESE STANDARD DRAWINGS.

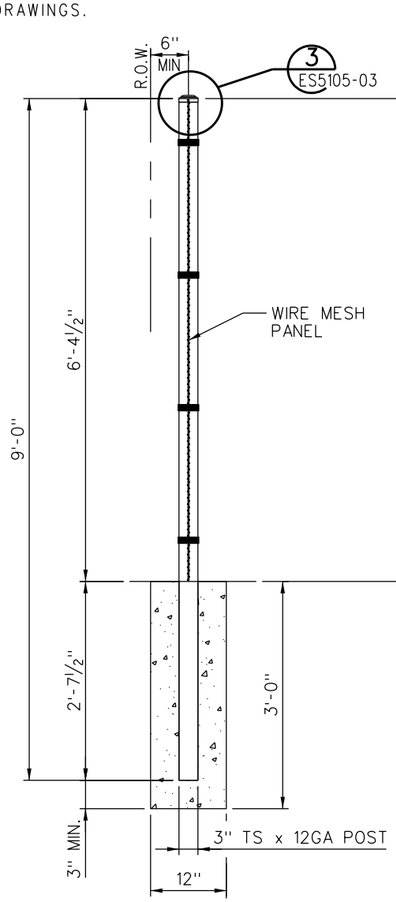


TOP VIEW (LINE POST)

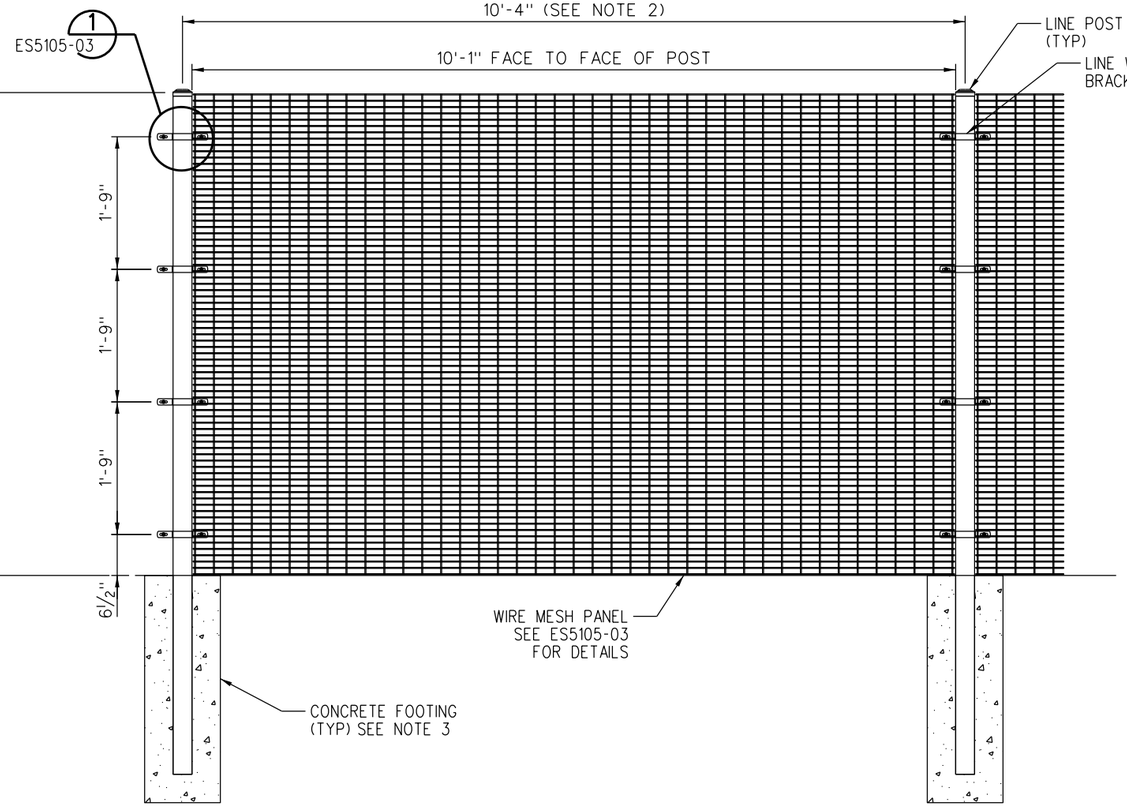


TOP VIEW (CORNER POST)

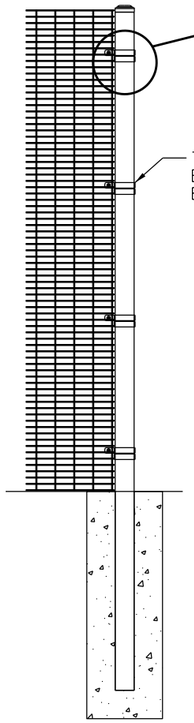
TOP VIEW (TERMINAL POST)



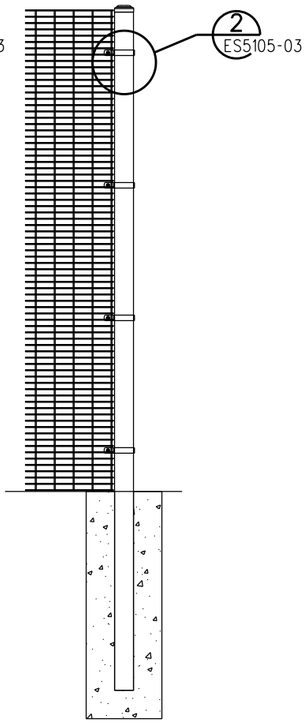
SIDE VIEW



FRONT VIEW (LINE POST)



FRONT VIEW (CORNER POST)



FRONT VIEW (TERMINAL POST)

REV.	DATE	DESCRIPTION	DES.	ENG.
A	06-05-20	REVISE SIDE VIEW	AC	JMM

DRAWN BY: A. CARLOS DATE: 11/02/17

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

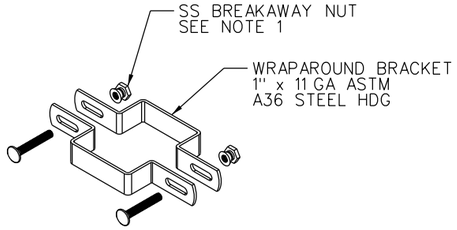
RIGHT OF WAY FENCING
WELDED WIRE MESH FENCING (TYPE B)

STANDARD 5105
SCALE: 1" = 1'-0"
REVISION A
SHEET 2 OF 3
CADD FILE: ES5105-02

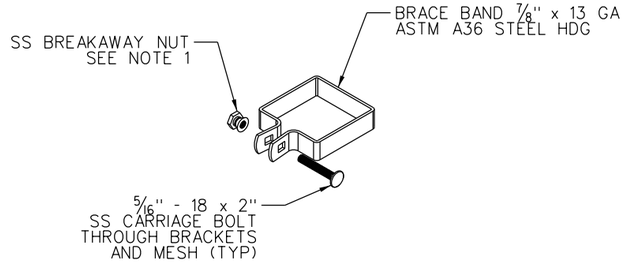
UserName•› scrrapw11ics01$ Date Plotted: 3/27/2023 4:15:59 PM Plot Driver•› C:\Program Files (x86)\Common Files\InterPlot\IPLOT\bin\iplotdrvn.plt FileName•› \\scrrapw11ics01\iCS_pdf_work_dir\90\494_36\ES5105-02.dgn

NOTES:

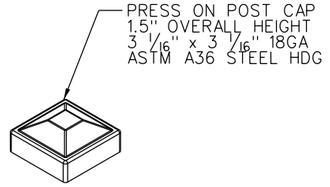
1. BREAKAWAY NUT SHALL BE PLACED ON THE INSIDE (TRACK SIDE) OF THE FENCE PANEL.
2. WIRE MESH PANEL SHALL BE HOT-DIP GALVANIZED AFTER WELDING.
3. ALL STEEL MATERIALS SHALL BE GALVANIZED TO PREVENT CORROSION, UNLESS OTHERWISE NOTED.



LINE WRAP AROUND BRACKET (1)
SCALE: NTS

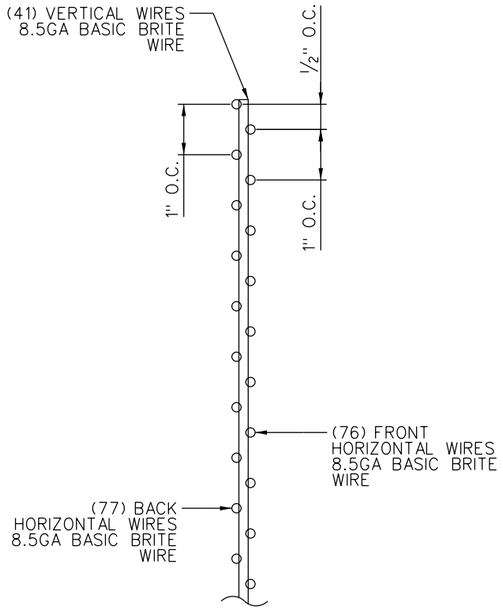


TERMINAL BRACE BAND (2)
SCALE: NTS

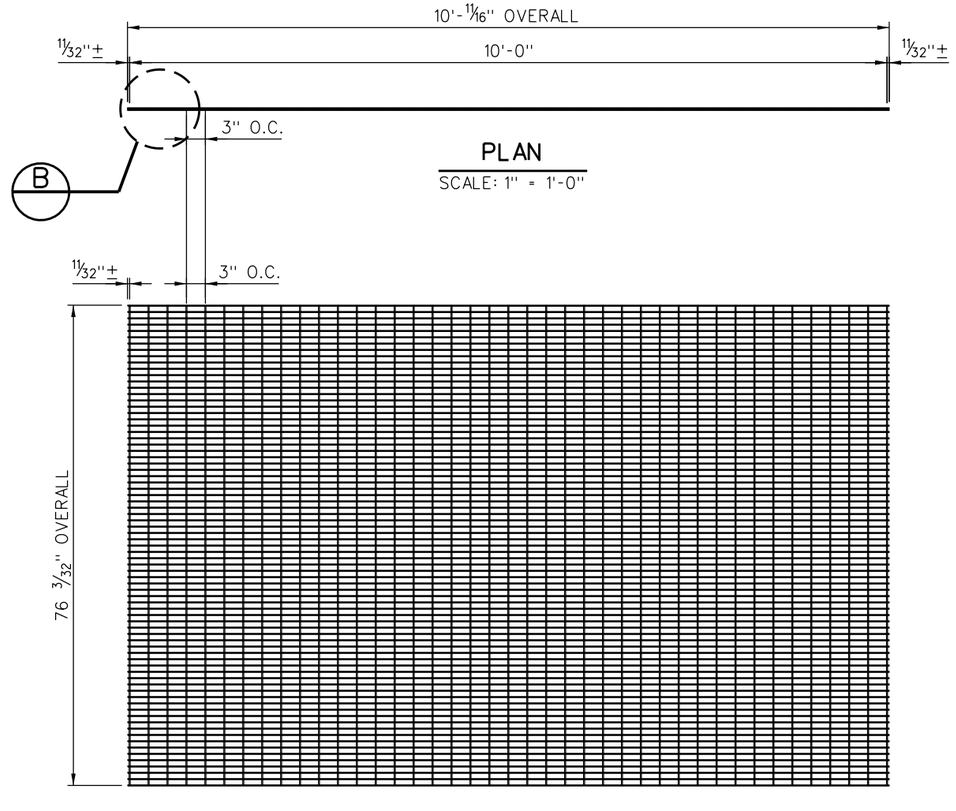


PRESS ON POST CAP (3)
SCALE: NTS

DETAIL (B)
SCALE: NTS



DETAIL (A)
SCALE: NTS



REV.	DATE	DESCRIPTION	DES.	ENG.
A	06-05-20	REVISE DETAIL CALLOUTS	AC	JMM

DRAWN BY: A. CARLOS DATE: 11/02/17

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

RIGHT OF WAY FENCING
WELDED WIRE MESH FENCING (TYPE B)
PANEL AND POST DETAILS

STANDARD 5105
SCALE: AS NOTED
REVISION A SHEET 3 OF 3
CADD FILE: ES5105-03

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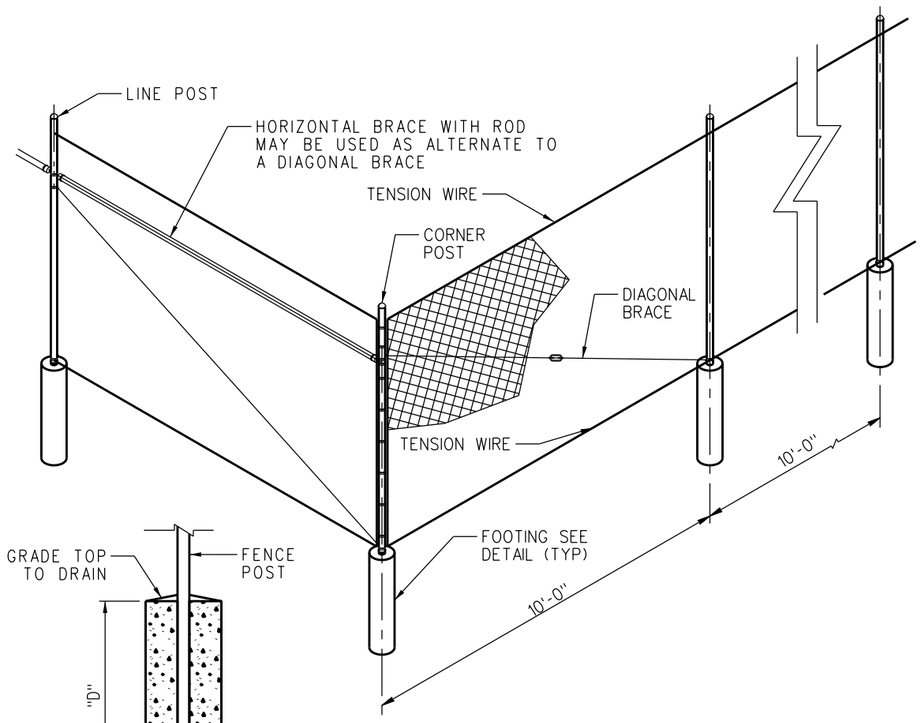
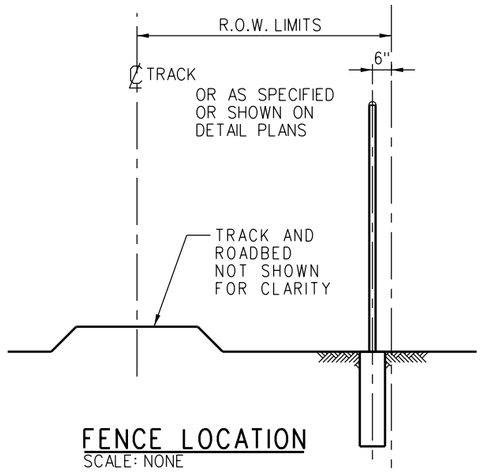


FOOTING DETAIL
SCALE: NONE



FENCE LOCATION
SCALE: NONE

NOTES:

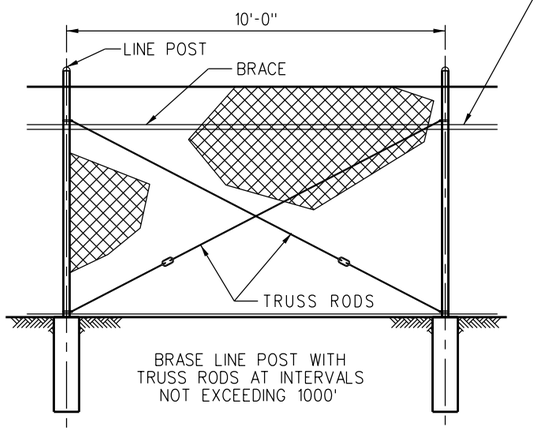
1. FOR FENCE SELECTION CRITERIA, SEE ES5103.
2. TABLE 1 BELOW SHOWS TYPICAL, MINIMUM DIMENSIONS FOR POSTS AND BRACES.
3. STRENGTH REQUIREMENTS THAT REQUIRE SECTIONS THAT DEVIATE FROM WHAT IS SHOWN IN TABLE 1 REQUIRE APPROVAL OF SCRRA
4. OPTIONS EXERCISED SHALL BE UNIFORM ON ANY ONE PROJECT.
5. DIMENSIONS SHOWN ARE NOMINAL.
6. WIRE GAGE TO BE 11 GA. FOR FENCES 6'-0" AND LESS AND 9 GA. FOR FENCES OVER 6'-0" AS DETERMINED BY FIELD CONDITIONS.
7. FOR ADDITIONAL INFORMATION REFER TO CALTRANS STANDARD SPECIFICATIONS GENERAL PROVISIONS SECTION 80, RIGHT OF WAY AND TRAFFIC CONTROL FACILITIES - FENCING.
8. FENCE POSTS SHALL BE SET IN CONCRETE FOOTINGS INTO SUITABLE SOIL CONFORMING TO THE DETAILS SHOWN ON THIS DRAWING AND CROWNED AT THE TOP TO SHED WATER.
9. PORTLAND CEMENT CONCRETE FOR METAL POST FOOTINGS AND FOR DEADMEN SHALL BE PRODUCED FROM COMMERCIAL QUALITY AGGREGATES AND CEMENT AND SHALL CONTAIN NOT LESS THAN 17.6 LBS OF CEMENT PER CUBIC FEET.
10. FENCE FABRIC SHALL BE WOVEN INTO 1" MESH.
11. CONCRETE FOOTINGS TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS

FABRIC TYPES:

TYPE CL-4 = 48" FABRIC.
TYPE CL-6 = 72" FABRIC.

TABLE 1

TYPICAL MEMBER DIMENSIONING (SEE NOTES)												
MAX. FENCE HEIGHT	B (in.)	D (ft.)	LINE POSTS			END, LATCH & CORNER POSTS			BRACES			
			ROUND I.D.	"H"	ROLL FORMED	ROUND I.D.	ROLL FORMED		ROUND I.D.	"H"	ROLL FORMED	
6'-0"	10"	2'-6"	1½"	1⅞" x 1⅝"	1⅞" x 1⅝"	2"	3½" x 3½"	2" x 1¾"	1¼"	1½" x 1⅝"	1⅝" x 1¼"	1¾" x 1¼"
8'-0"	12"	3'-0"	2"	2¼" x 2"	2" x 1¾"	2½"	3½" x 3½"	2½" x 2½"	1¼"	1½" x 1⅝"	1⅝" x 1¼"	1¾" x 1¼"



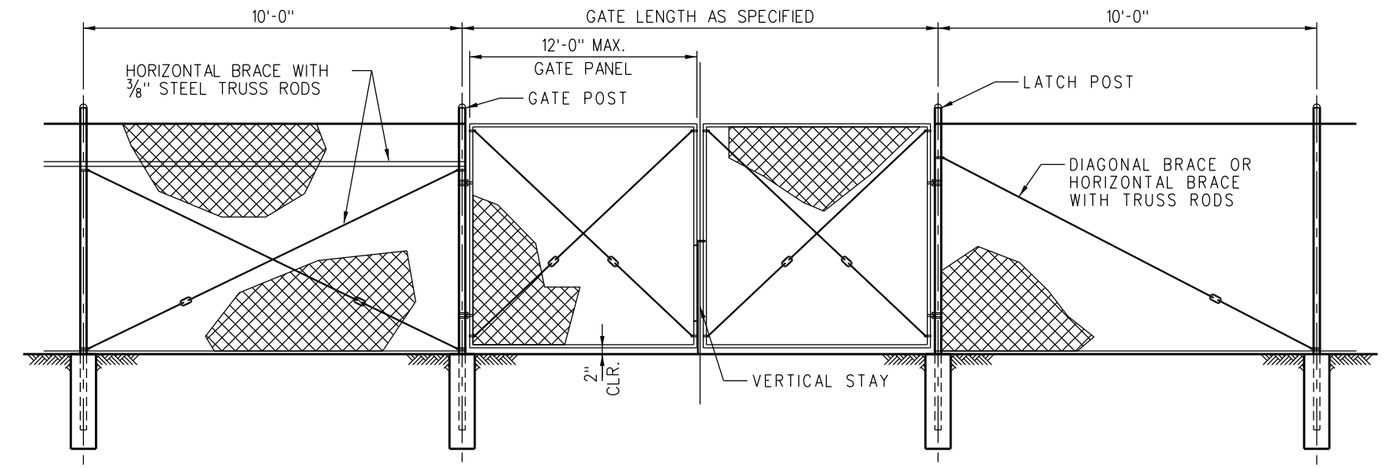


TABLE 2

GATE POST 6'-0" AND LESS		
GATE WIDTHS	NOMINAL I.D.	WEIGHT PER FT.
UP THRU 6'	2½"	4.95
OVER 6' THRU 12'	4"	10.79
OVER 12' TO 18'	5"	14.62
OVER 18' TO 24' MAX.	6"	18.97
GATE POST OVER 6'-0"		
GATE WIDTHS	NOMINAL I.D.	WEIGHT PER FT.
UP THRU 6'	3"	7.58
OVER 6' THRU 12'	5"	14.62
OVER 12' TO 18'	6"	18.97
OVER 18' TO 24' MAX.	8"	28.55

ABOVE POST DIMENSIONS AND WEIGHTS ARE MINIMUMS. LARGER SIZES MAY BE USED ON APPROVAL OF SCRRA.

REV.	DATE	DESCRIPTION	DES.	ENG.
B	06-05-20	REVISED ISOMETRIC AND NOTES	AC	JMM
A	06-19-15	REVISED FENCE SELECTION CRITERIA NOTE 2	AC	NDP

DRAWN BY: A. CARLOS DATE: 11/20/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

RIGHT OF WAY FENCING
CHAIN LINK FENCE

STANDARD 5106
SCALE: ½" = 1'-0"
REVISION B
SHEET 1 OF 1
CADD FILE: ES5106

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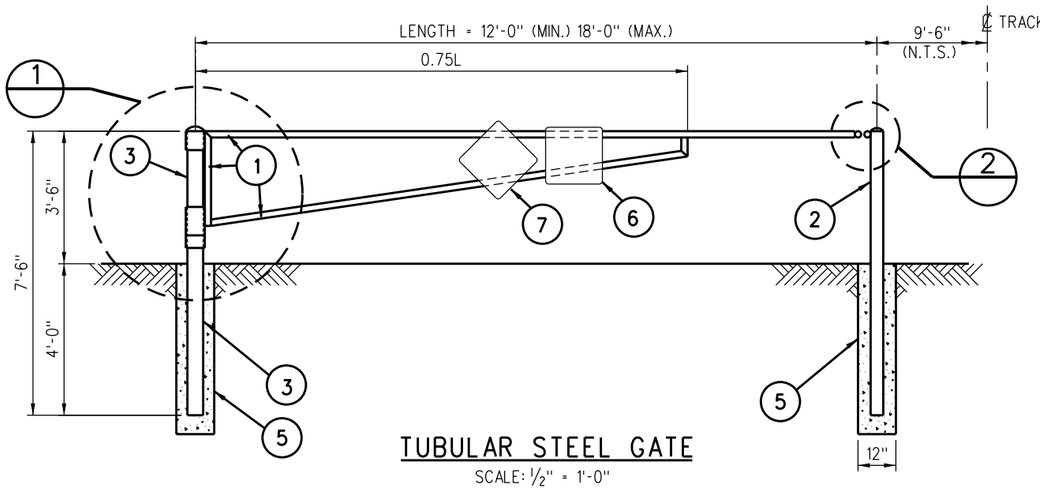
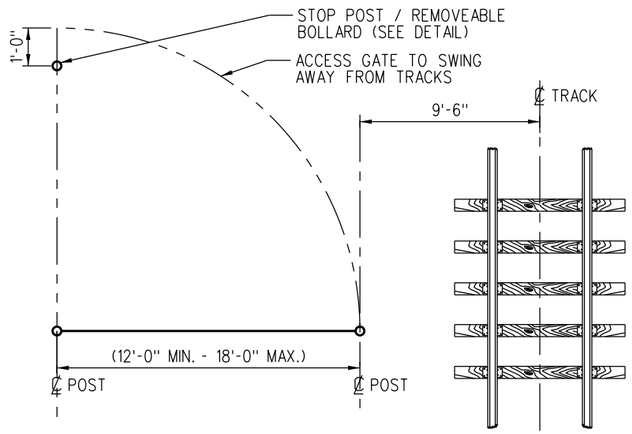


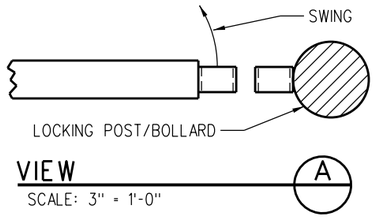
TUBULAR STEEL GATE

SCALE: 1/2" = 1'-0"



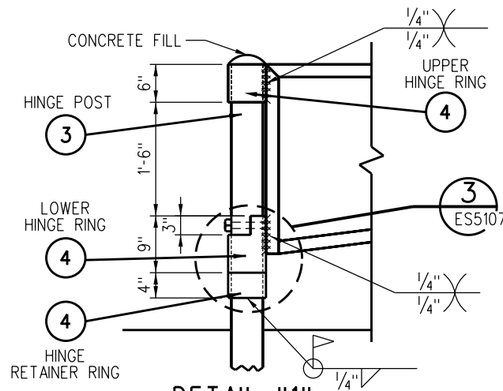
TYPICAL GATE LOCATION PLAN

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



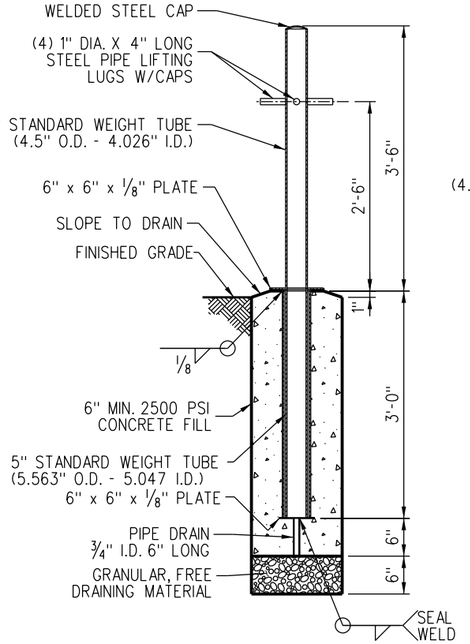
VIEW A

SCALE: 3" = 1'-0"



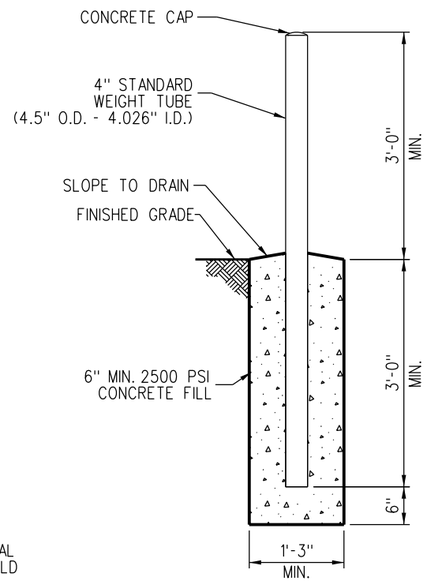
DETAIL "1"

SCALE: 1" = 1'-0"



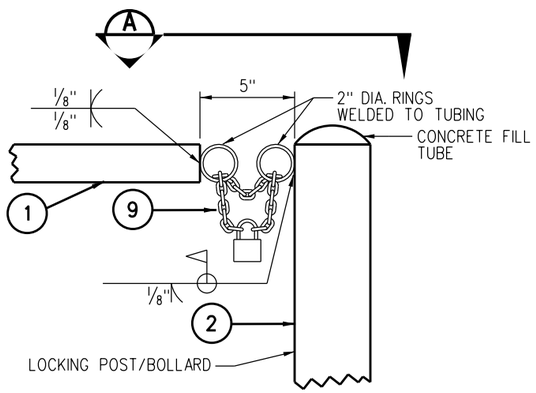
REMOVEABLE BOLLARD DETAIL

SCALE: 1" = 1'-0"



BOLLARD DETAIL

SCALE: 1" = 1'-0"



DETAIL "2"

SCALE: 3" = 1'-0"

NOTES:

1. EXISTING ELEMENTS OF RIGHT-OF-WAY SECURITY WILL BE INTEGRATED INTO THE LAYOUT TO OBTAIN EFFECTIVE DETERRENCE WITH MINIMUM OF NEW CONSRUCTION. BUILDINGS, WALLS, DITCHES, UTILITY POLES, FENCES, SIGNS WITH POSTS (AT LEAST SIX INCHES IN WIDTH), MONUMENTS, ABUTMENTS OR PERMANENT LANDSCAPING MORE THAN THREE FEET TALL ARE ALL ACCEPTABLE DETERRENTS. IF FENCE, WALL OR BUILDING IS WITHIN 12 FEET OF THE CENTERLINE OF TRACK, NO BARRIER IS REQUIRED.
2. SECURITY GATE TYPICAL LAYOUT PLAN PER ES5107-02 ILLUSTRATES FOUR SITUATIONS, ONE IN EACH QUADRANT THAT CAN BE USED TO DENY ACCESS. SCRRA AUTHORIZED PERSONS MAY RECOMMEND OTHER ELEMENTS OF VEHICLE CONTROL TO FIT CONDITIONS.
3. SECURITY GATES WILL BE PLACED AT LEAST 25 FEET FROM THE ROADWAY TO ALLOW AUTHORIZED VEHICLES TO STOP CLEAR OF TRAFFIC TO OPEN/ CLOSE LOCKED GATES. THIS DISTANCE SHALL BE ADJUSTED IN THE FIELD TO ACCOUNT FOR OBSTRUCTIONS, PEDESTRIAN FACILITIES AND SIGNAL HOUSE AS APPROVED BY SCRRA. THE TRACK SIDE OF THE PARKING AREA IS TO BE CLOSED OFF WITH BOLLARDS, K-RAIL, OR OTHER BARRIERS.
4. INSTALLATION OF BOLLARDS OR GATE POSTS MAY BE ADJUSTED TO AVOID CONFLICT WITH SCRRA SIGNAL OR OTHER UNDERGROUND UTILITIES. LOCATIONS OF UNDERGROUND UTILITIES MUST BE CLEARLY ESTABLISHED PRIOR TO ANY EXCAVATION.
5. BOLLARDS WILL BE SPACED 48" TO 66" ON CENTER AND EACH RUN OR LOCATION WILL BE UNIFORM. BOLLARDS AND K-RAIL WILL NOT IMPEAD PEDESTRIAN OR SIDEWALK TRAFFIC.
6. SECURITY GATE, POSTS AND BOLLARDSWILL BE SPRAY PAINTED "SAFETY YELLOW" WITH ONE PRIMER COAT AND ONE FINISH COAT OF WATER BORNE ACRYLIC GLOSS ENAMEL (RUST PREVENTATIVE ENAMEL GLOSS), OR APPROVED EQUAL.
7. APPROPRIATE REGIONAL NOTIFICATION CENTER [UNDERGROUND SERVICE ALERT (DIGALERT) AT (800) 227-2600], RAILWAY COMPANIES, AND UTILITY COMPANIES WILL BE NOTIFIED PRIOR TO PERFORMING ANY EXCAVATION CLOSE TO ANY UNDERGROUND PIPELINE, CONDUIT, DUCT, WIRE, OR OTHER STRUCTURE. SCRRA IS NOT A MEMBER OF DIGALERT, IT IS, THEREFORE, NECESSARY TO CALL SCRRA SIGNAL DEPARTMENT AT (909) 592-1346 TO MARK SIGNAL AND COMMUNICATION CABLES AND CONDUITS.
8. INSTALLATION OF ELEMENTS MUST NOT BLOCK DRAINAGE FROM TRACK OR ALONG THE TRACK, THE "OVERHANGING" BOLLARD WILL BE USED TO SPAN DRAINAGE OR UNDERGROUND UTILITIES AND STILL MAINTAIN A GAP BETWEEN BOLLARDS OF NOT MORE THAN 66 INCHES. LOCAL GRADING OR OTHER WORK IS NEEDED TO DRAIN THE SECURED AREA, IT WILL BE CARRIED OUT AS PART OF THE INSTALLATION.
9. STOP BOLT WILL BE 1" IN DIAMETER BY 7" LONG. BOTH ENDS OF THE BOLT WILL BE WELDED TO HINGE POST THEN CUT AND GRIND THREADED END FLUSH TO HINGE POST SO AS NOT TO IMPEDE ROTATION OF LOWER HINGE RING.
10. THE REMOVEABLE BOLLARD WILL BE USED IF THE LOCATION OF THE BOLLARD WILL BLOCK SIGNAL EQUIPMENT FOR MAINTENANCE PURPOSES AND IF THE SECURITY GATE IS LESS THAN 12 FEET IN LENGTH.
11. K-RAIL PER CALTRANS STANDARD PLAN T3A AND T3B.

LEGEND:

1. 2" STANDARD WEIGHT TUBE (OUTSIDE DIA. - 2.375" - INSIDE DIA. - 2.067")
2. 4" STANDARD WEIGHT TUBE (OUTSIDE DIA. - 4.5" - INSIDE DIA. - 4.026")
3. 5" STANDARD WEIGHT TUBE (OUTSIDE DIA. - 5.563", INSIDE DIA. - 5.047")
4. 6" EXTRA STRENGTH TUBE (OUTSIDE DIA. - 6.625", INSIDE DIA. - 5.761")
5. 6" MINIMUM 2500 PSI CONCRETE BACKFILL
6. NO TRESPASSING SIGN PER METROLINK ENGINEERING STANDARD ES5214. (BOTH SIDES)
7. MODIFIED TYPE "OM1-3" (AS PER MUTCD) WARNING SIGN TO READ; "KEEP GATE LOCKED". (BOTH SIDES)
8. STOP BOLT
9. GRADE 70 HIGH TENSILE STEEL 3/4" APPROXIMATELY 2 FT. LONG CHAIN
10. S & G OR EQUAL ENVIRONMENTAL PADLOCK

REV.	DATE	DESCRIPTION	DES.	ENG.
C	06-05-20	REVISED BOLLARD DETAILS AND NOTES	AC	JMM
B	10-14-16	ADDED BOLLARD DETAIL AND NOTE 11	AC	NDP
A	11/15/11	REVISED LEGEND ITEM 6.	AC	NDP

DRAWN BY: A. CARLOS DATE: 07/18/05

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

R.O.W. SECURITY ACCESS GATE DETAILS

STANDARD 5107
SCALE: AS NOTED
REVISION C SHEET 1 OF 2
CADD FILE: ES5107-01

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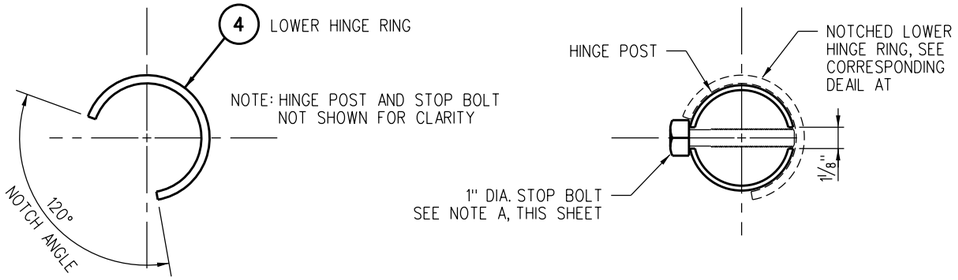
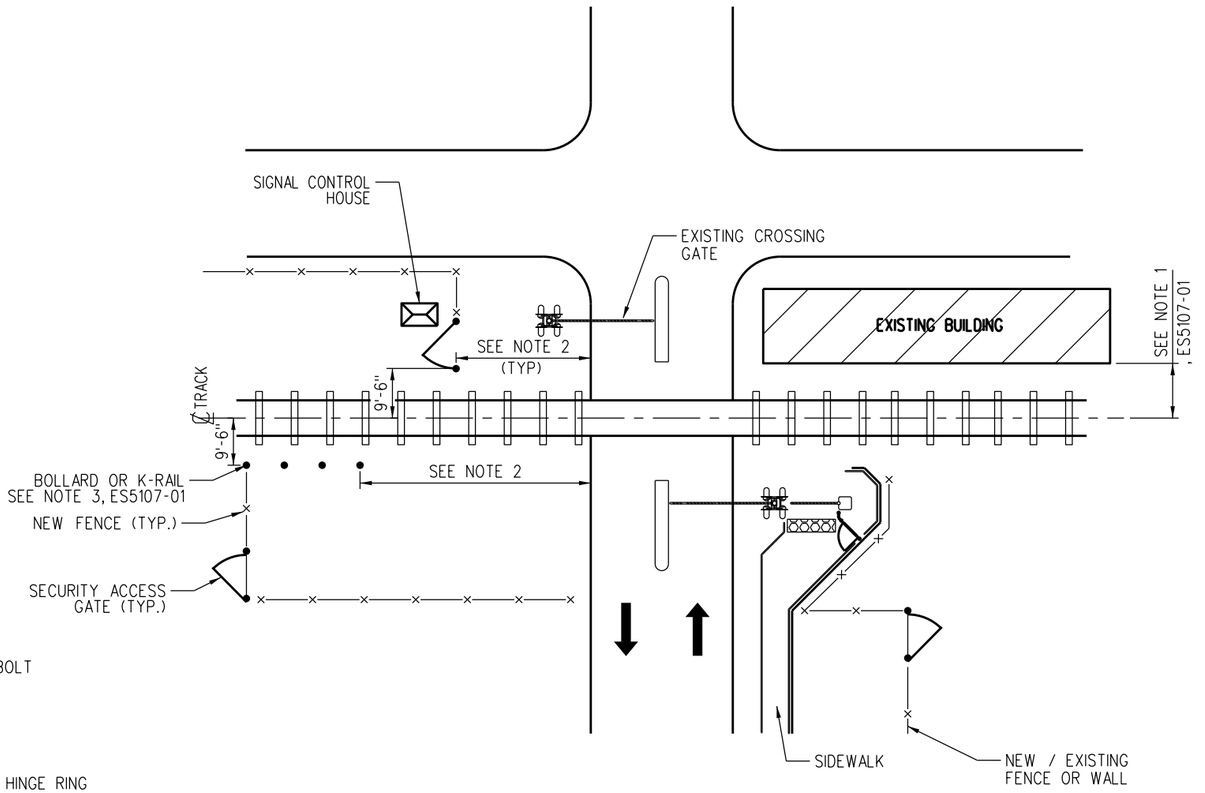
NOTES:

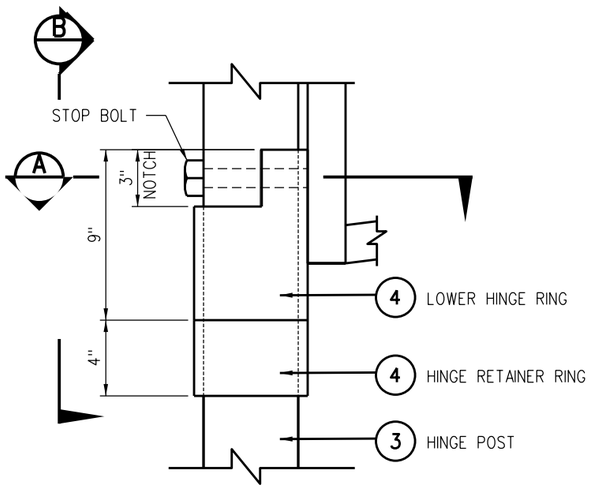
1. FOR NOTES AND LEGEND SEE ES5107-01.
2. TO BE DETERMINED IN FIELD BY SCRRA.



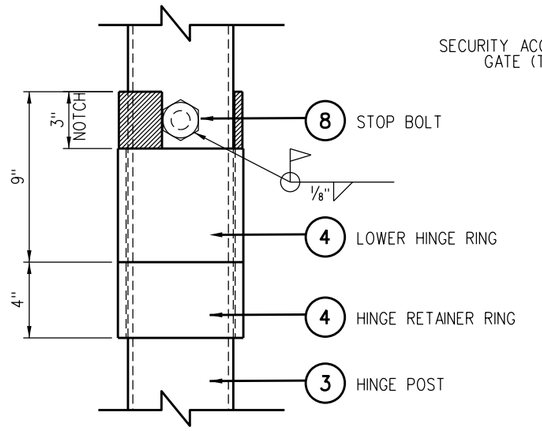
SECTION A
SCALE: 3" = 1'-0"



TYPICAL SECURITY GATE LAYOUT PLAN
SCALE: NONE



DETAIL 3
SCALE: 3" = 1'-0" ES5107-01



VIEW B
SCALE: 3" = 1'-0"

NOTE:
PLAN SHOWS FOUR DIFFERENT SCENARIOS, ONE IN EACH QUADRANT.

REV.	DATE	DESCRIPTION	DES.	ENG.
A	06-05-20	REVISE PLAN AND SECTION A	AC	JMM

DRAWN BY: A. CARLOS DATE: 07/18/05
PRINCIPAL ENGINEER, DESIGN & STANDARDS
ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

R.O.W. SECURITY ACCESS GATE DETAILS

STANDARD 5107
SCALE: AS NOTED
REVISION A SHEET 2 OF 2
CADD FILE: ES5107-02

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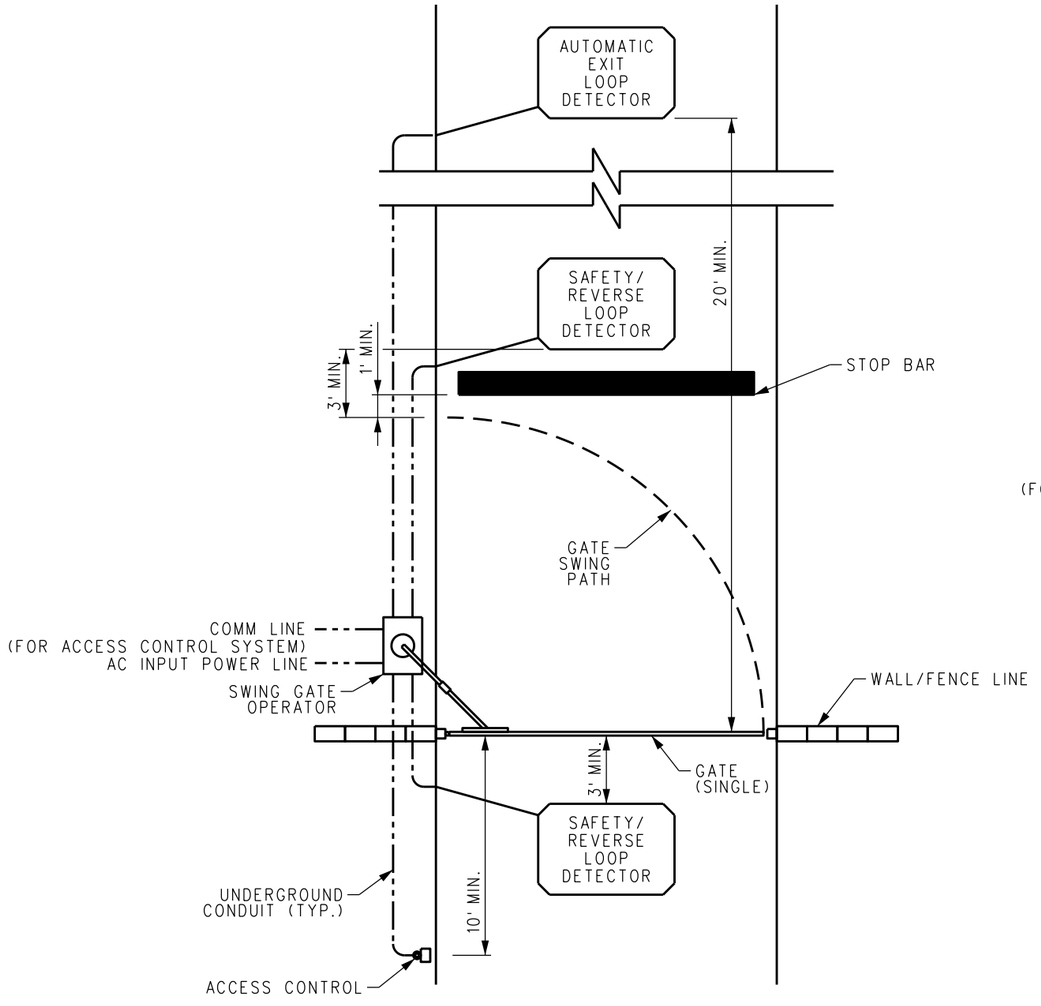
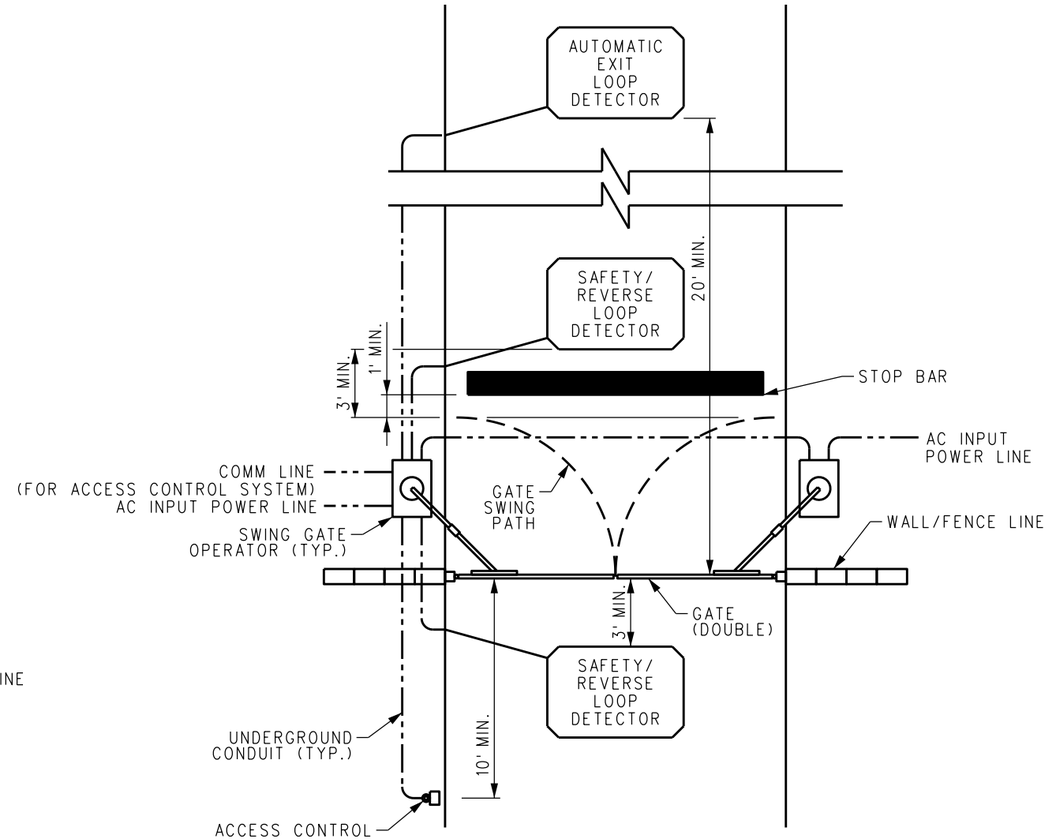


SINGLE SWING GATE LAYOUT



DOUBLE SWING GATE LAYOUT

NOTES:

1. THIS DRAWING IS FOR REFERENCE ONLY. LAYOUT WILL VARY BY LOCATION.
2. FURNISH AND INSTALL FIRE DEPARTMENT KEY ACCESS BOX PER LOCAL FIRE CODE.
3. ACCESS CONTROL SYSTEM PER SECTION 28 13 00 OF THE SCRRA STANDARD SPECIFICATIONS.
4. FURNISH AND INSTALL PAINTED STOP BAR (12" WIDE, SOLID WHITE LINE).
5. GATE OPERATOR PER SECTION 32 31 32 OF THE SCRRA STANDARD SPECIFICATIONS.

REV.	DATE	DESCRIPTION	DES.	ENG.
A	06-05-20	REVISE NOTE 3	AC	JMM

DRAWN BY: L. AQUINO DATE: 09-28-15

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

AUTOMATED VEHICULAR DRIVEWAY GATE
SWING GATE OPERATOR
TYPICAL LAYOUT

STANDARD	5108
SCALE:	NTS
REVISION	A
SHEET	1 OF 2
CADD FILE:	ES5108-01

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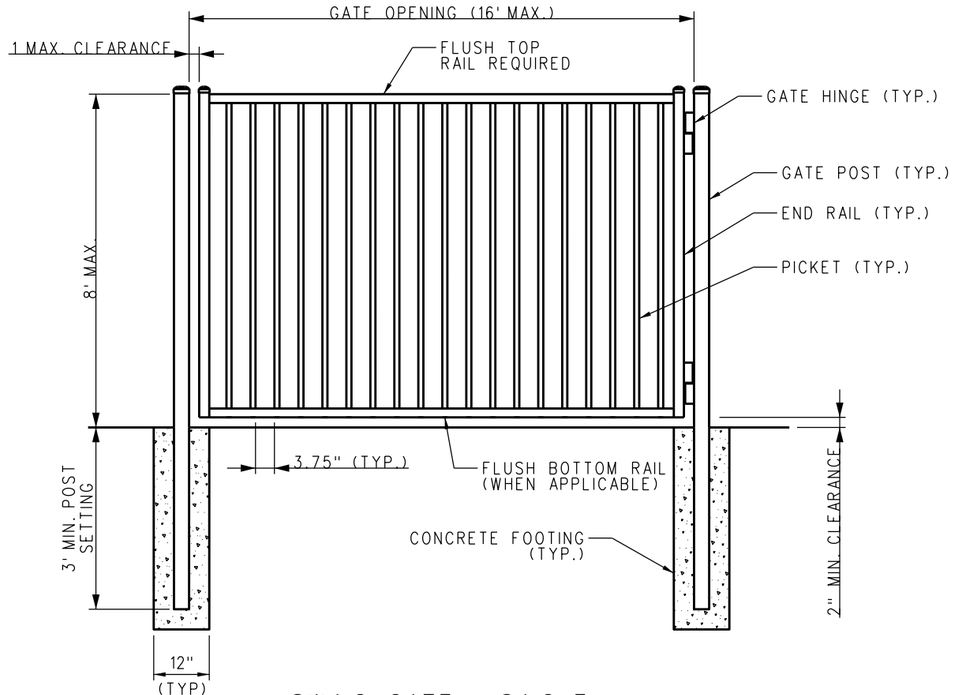
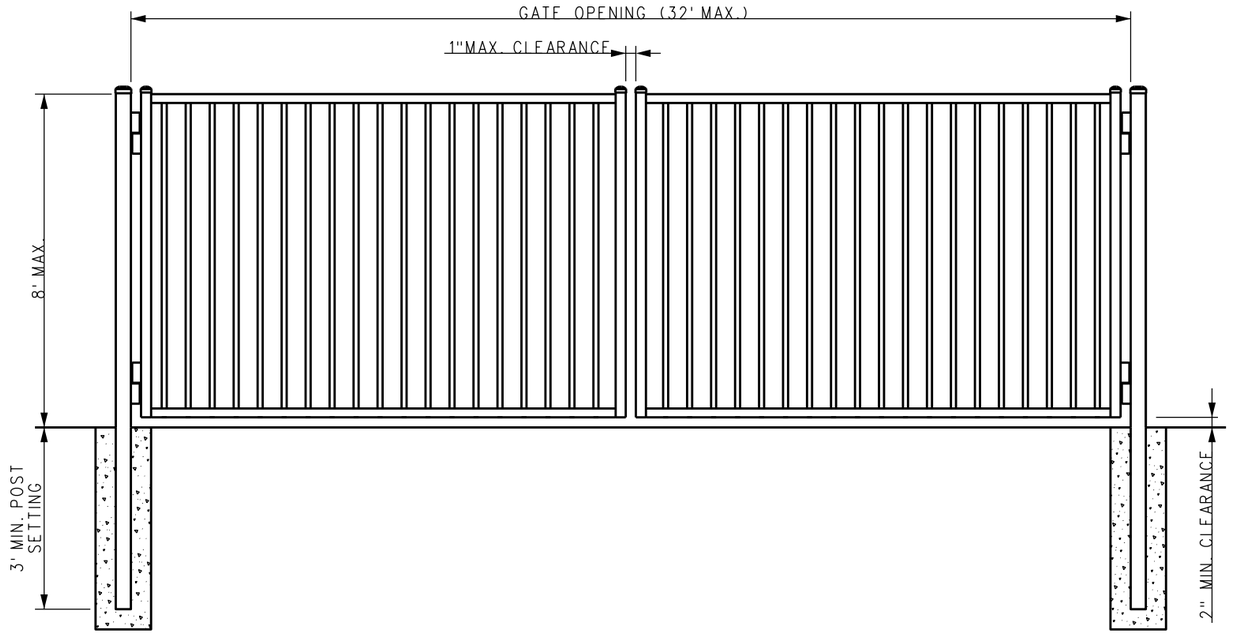


SWING GATE - SINGLE



SWING GATE - DOUBLE

NOTES:

1. THIS DRAWING IS FOR REFERENCE ONLY. GATE CONFIGURATION WILL VARY BY LOCATION.
2. STEEL MATERIAL FOR GATE COMPONENTS SHALL BE COMMERCIAL STEEL WITH A MINIMUM YIELD STRENGTH OF 45,000 PSI.
3. GATE POSTS SHALL BE STEEL, 6" x 3/16" MINIMUM
4. HORIZONTAL RAILS SHALL BE STEEL, 1.75" x 14 GAUGE, MINIMUM.
5. VERTICAL (END) RAILS SHALL BE STEEL, 2" SQUARE x 11 GAUGE, MINIMUM.
6. PICKETS SHALL BE STEEL TUBING, 1" SQUARE x 14 GAUGE, MINIMUM.
7. ALL RAILS AND PICKETS SHALL BE JOINED BY WELDING.
8. ALL GATE HARDWARE (POSTS, ASSEMBLIES, TRACK, FOOTINGS, ETC.) PER MANUFACTURER'S REQUIREMENTS.
9. GATE COLOR SHALL TO MATCH PMS-BLACK UNLESS SPECIFIED OTHERISE (PER SCRRA APPROVAL).
10. GATE SHALL MEET THE COATING PERFORMANCE CRITERIA OF ASTM F2408.

REV.	DATE	DESCRIPTION	DES.	ENG.
A	06-05-20	REVISE NOTE 9	AC	JMM

DRAWN BY: L. AQUINO DATE: 09-28-15

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

AUTOMATED VEHICULAR DRIVEWAY GATE
SWING GATE DETAILS

STANDARD: 5108
SCALE: NTS
REVISION: A
SHEET: 2 OF 2
CADD FILE: ES5108-02

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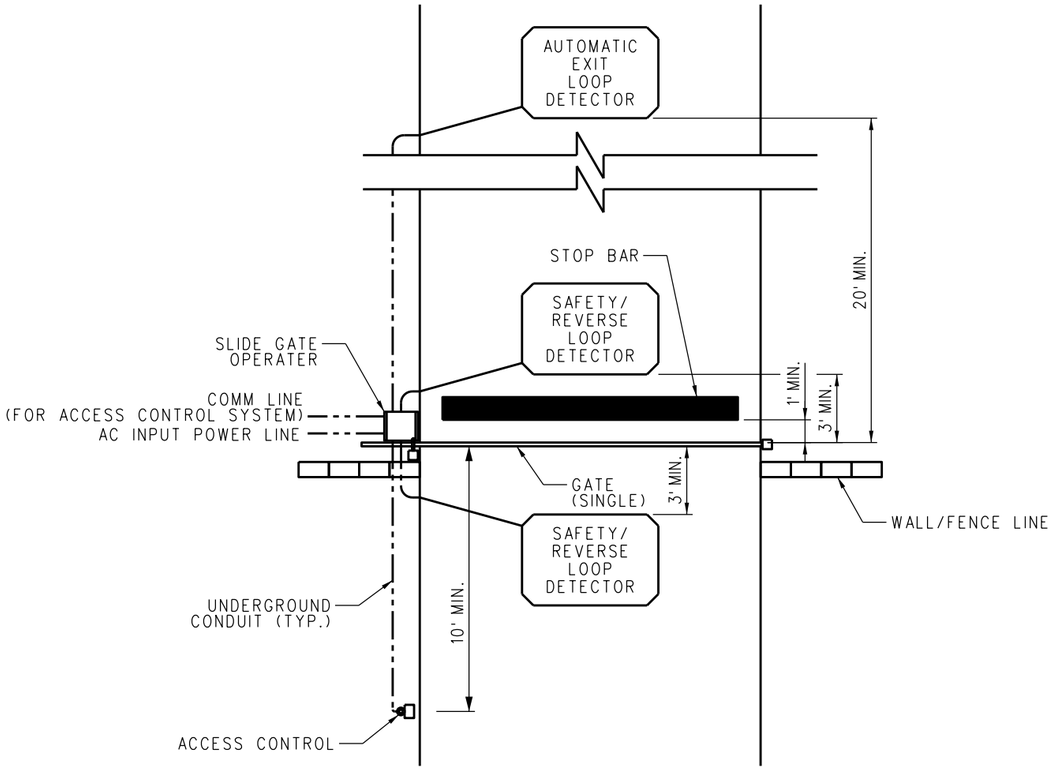
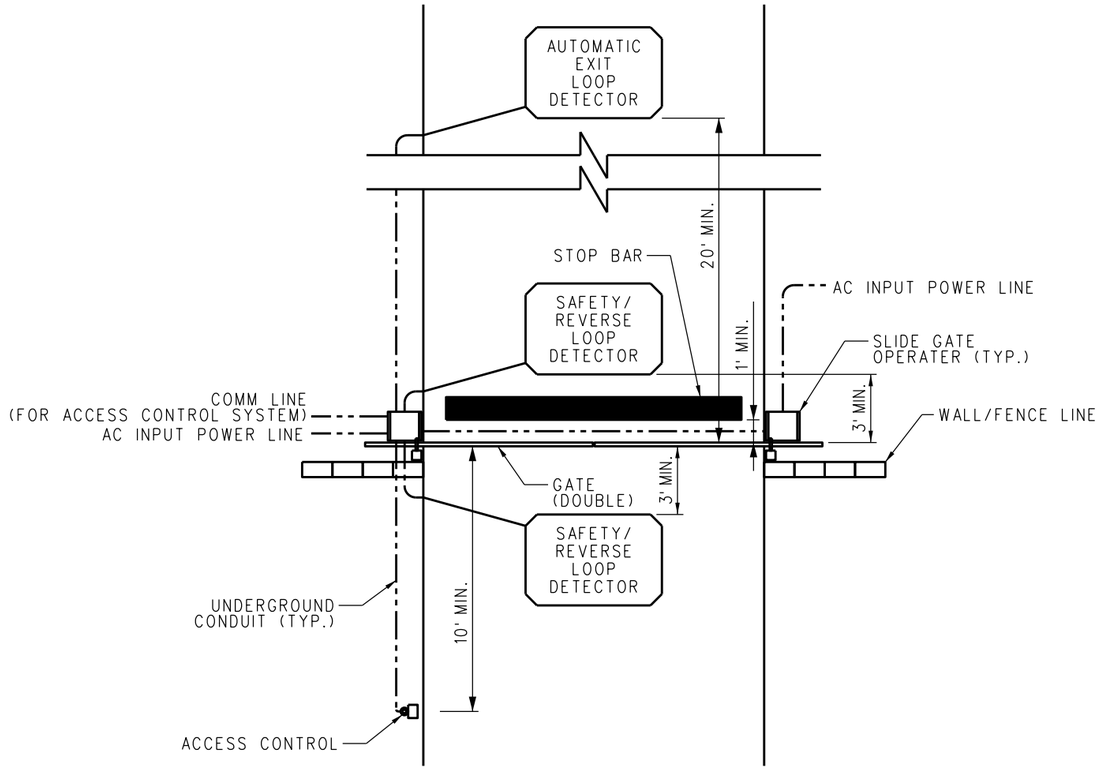


SINGLE SLIDE GATE
LAYOUT



DOUBLE SLIDE GATE
LAYOUT

NOTES:

1. THIS DRAWING IS FOR REFERENCE ONLY. LAYOUT WILL VARY BY LOCATION.
2. FURNISH AND INSTALL FIRE DEPARTMENT KEY ACCESS BOX PER LOCAL FIRE CODE.
3. ACCESS CONTROL SYSTEM PER SECTION 28 13 00 OF THE SCRRA STANDARD SPECIFICATIONS.
4. FURNISH AND INSTALL PAINTED STOP BAR (12" WIDE, SOLID WHITE LINE).
5. GATE OPERATOR PER SECTION 32 31 32 OF THE SCRRA STANDARD SPECIFICATIONS.

REV.	DATE	DESCRIPTION	DES.	ENG.
A	09-25-20	REVISED NOTES	AC	JMM

DRAWN BY: L. AQUINO DATE: 09-28-15

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

AUTOMATED VEHICULAR DRIVEWAY GATE
SLIDE GATE OPERATOR
TYPICAL LAYOUT

STANDARD 5109
SCALE: NTS
REVISION A SHEET 1 OF 2
CADD FILE: ES5109-01

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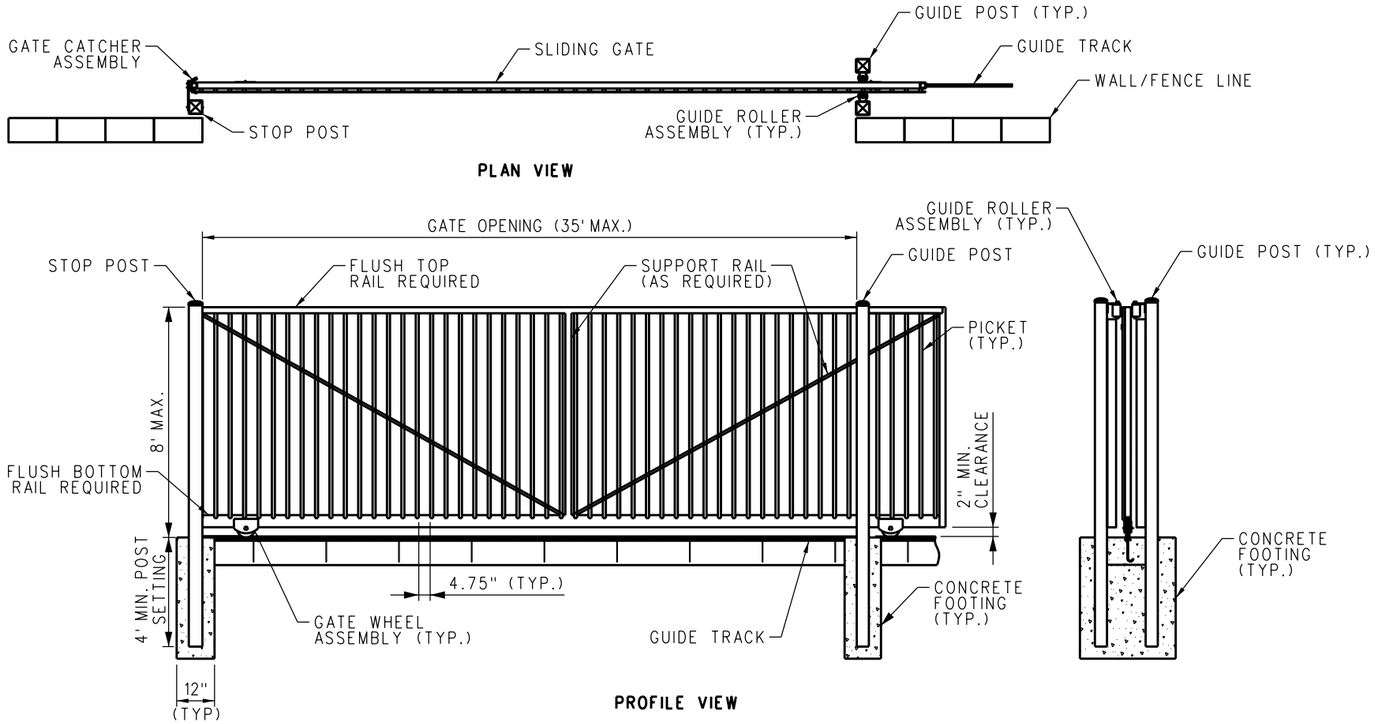
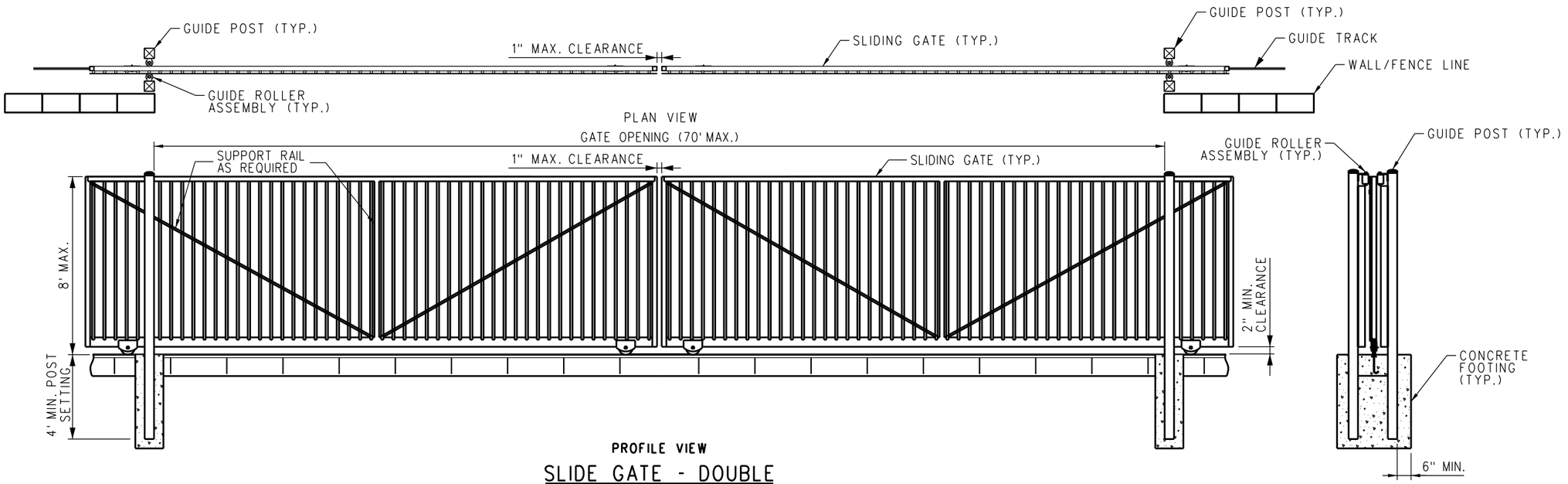


SLIDE GATE - SINGLE

NOTES:

1. THIS DRAWING IS FOR REFERENCE ONLY. GATE CONFIGURATION WILL VARY BY LOCATION.
2. STEEL MATERIAL FOR GATE COMPONENTS SHALL BE COMMERCIAL STEEL WITH A MINIMUM YIELD STRENGTH OF 45,000 PSI.
3. STOP POSTS AND GUIDE POSTS SHALL BE STEEL, 6" x 3/16" MINIMUM.
4. HORIZONTAL RAILS SHALL BE STEEL, 1.75" x 14 GAUGE, MINIMUM.
5. VERTICAL (END) RAILS SHALL BE STEEL, 2" SQUARE x 11 GAUGE, MINIMUM.
6. PICKETS SHALL BE STEEL TUBING, 1" SQUARE x 14 GAUGE, MINIMUM.
7. ALL RAILS AND PICKETS SHALL BE JOINED BY WELDING.
8. ALL GATE HARDWARE (POSTS, ASSEMBLIES, TRACK, FOOTINGS, ETC.) PER MANUFACTURER'S REQUIREMENTS.
9. GATE COLOR SHALL BE PMS-BLACK, UNLESS SPECIFIED OTHERWISE (PER SCRRA APPROVAL).
10. GATE SHALL MEET THE COATING PERFORMANCE CRITERIA OF ASTM F2408.



SLIDE GATE - DOUBLE

REV.	DATE	DESCRIPTION	DES.	ENG.
A	06-05-20	REVISED NOTES 2 & 9	AC	JMM

DRAWN BY: L. AQUINO DATE: 09-28-15

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

AUTOMATED VEHICULAR DRIVEWAY GATE
SLIDE GATE DETAILS

STANDARD 5109
SCALE: NTS
REVISION A SHEET 2 OF 2
CADD FILE: ES5109-02

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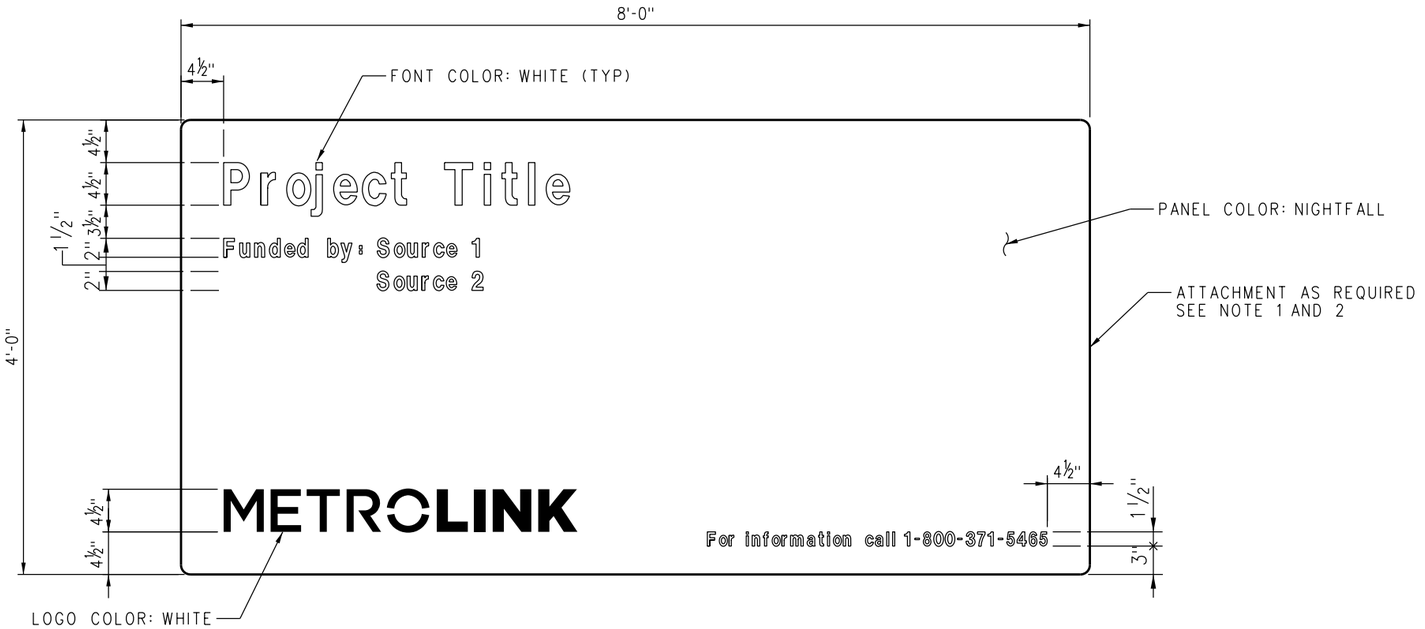
NOTES:

1. SIGN CONTRACTOR SHALL ENGINEER FABRICATION & INSTALLATION OF SIGN STRUCTURE TO SATISFY ALL LOCAL CODES & WIND LOAD FACTORS. FIELD VERIFY SITE CONDITIONS PRIOR TO FABRICATION.
2. CONTRACTOR TO DETERMINE BEST SIGN MOUNTING APPLICATION PER SITE CONDITION.
3. SIGN PANEL TO BE PAINTED DURAPLY OR MEDEX W/ SMOOTH-FINISHED EDGES & SEAMS.
4. FONT SHALL BE PER SCRRA STANDARD ES3301-02.



CONSTRUCTION SIGN DETAIL

REV.	DATE	DESCRIPTION	DES.	ENG.
C	01-01-23	REVISED LOGO AND COLORS	AC	TQ
B	09-25-20	REVISED LOGO AND SIGN CONFIGURATION	AC	JMM
A	03-20-17	REVISED LOGO, NOTES AND SIGN CONFIGURATION	AC	DJM

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

CONSTRUCTION PROJECT FEDERAL FUNDING IDENTIFICATION SIGNS

STANDARD 5201
SCALE: 1" = 1'-0"
REVISION C
SHEET 1 OF 1
CADD FILE: ES5201

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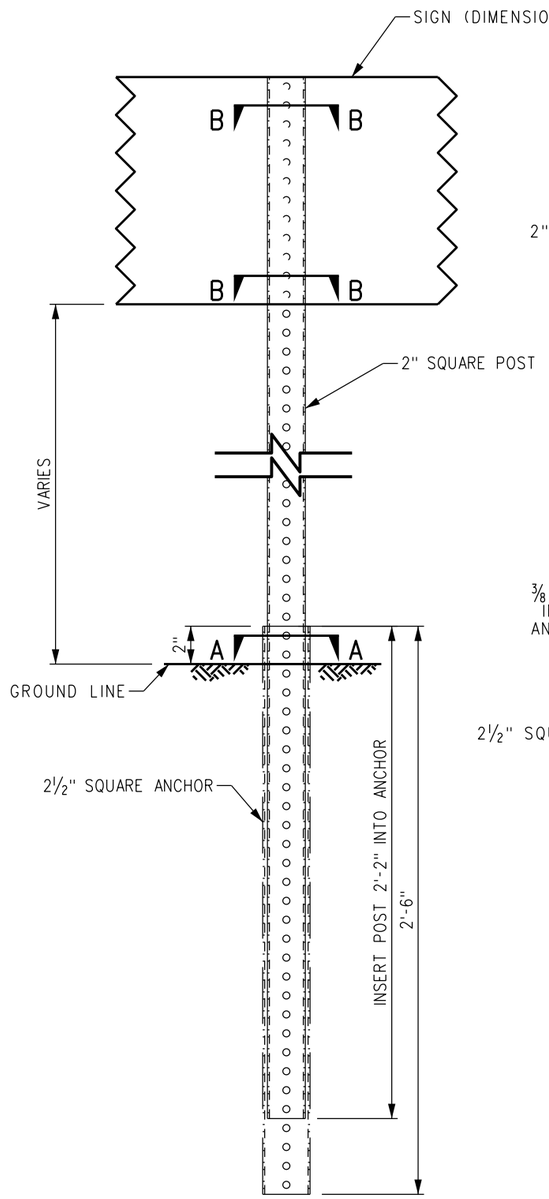
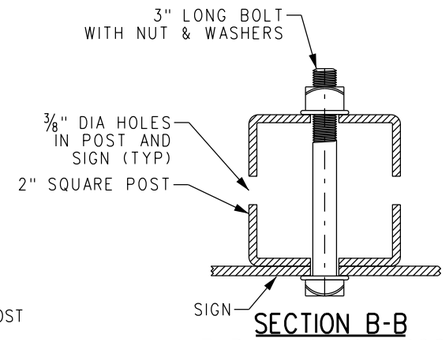
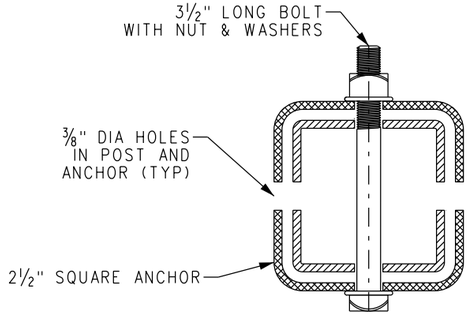


2" SQUARE POST



SECTION B-B
THRU SIGN AND POST



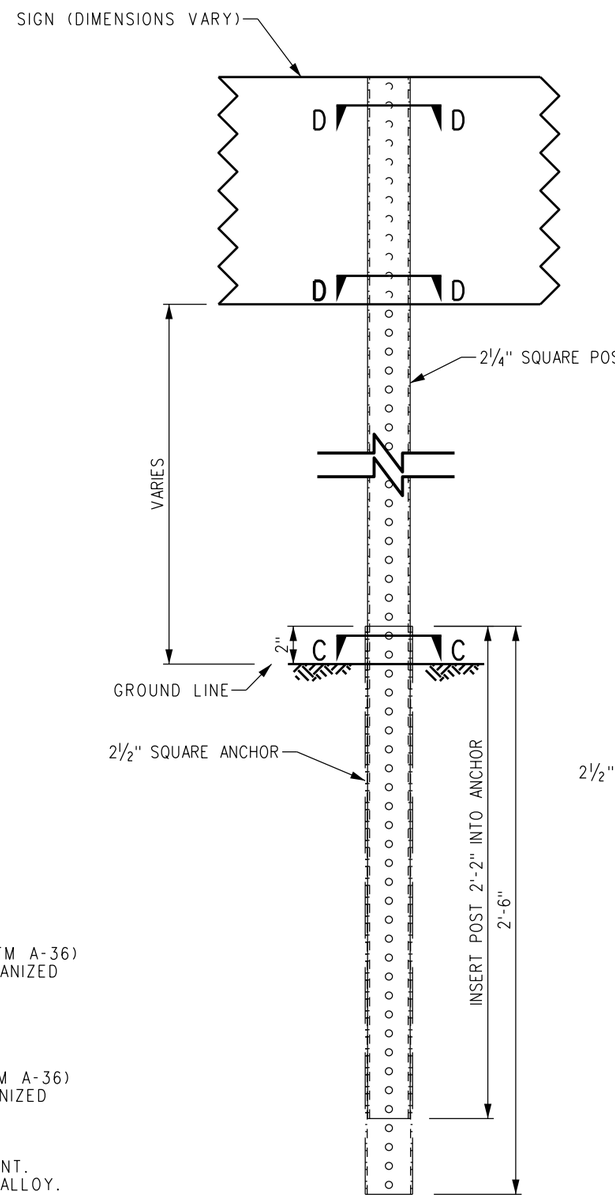
SECTION A-A
THRU POST AND ANCHOR

MATERIAL SPECIFICATIONS:

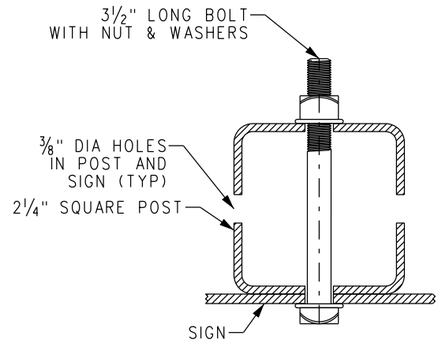
POSTS:
- 12 GAGE (.105" THICK) SQUARE STEEL TUBE (ASTM A-36) WITH ⅜" DIA. MOUNTING HOLES 1" O.C. ALL GALVANIZED IN ACCORDANCE WITH ASTM A-386.
- 2" TUBE @ 2.42 LB/FT.
- 2¼" TUBE @ 2.77 LB/FT.

ANCHORS:
- 12 GAGE (.105" THICK) SQUARE STEEL TUBE (ASTM A-36) WITH ⅜" DIA. MOUNTING HOLES 1" O.C. ALL GALVANIZED IN ACCORDANCE WITH ASTM A-386.
- 2½" TUBE @ 3.14 LB/FT.

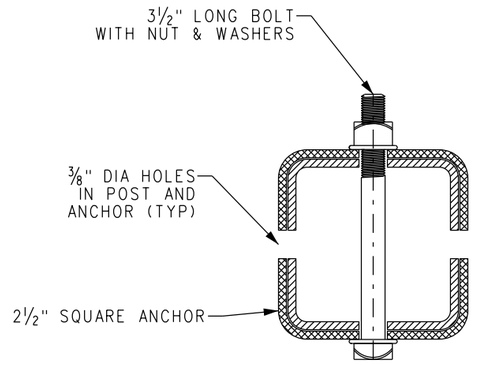
HARDWARE: GALVANIZED ALUMINUM. VANDAL RESISTANT.
- BOLTS: ⅝" DIAMETER CARRIAGE BOLTS, 2024-T4 ALLOY.
- LENGTH: 3" OR 3½".
- NUTS: TAMPER RESISTANT, ALCOA OR EQUAL.
- WASHERS: FLAT. ⅜" I.D., ¾" O.D.



2¼" SQUARE POST



SECTION D-D
THRU SIGN AND POST



SECTION C-C
THRU POST AND ANCHOR

REV.	DATE	DESCRIPTION	DES.	ENG.
A	09-25-20	REVISE MATERIAL SPECIFICATIONS, ADD TITLES	AC	JMM

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

DETAILS FOR INSTALLING SIGNS AT GRADE

STANDARD 5210
SCALE: NTS
REVISION A SHEET 1 OF 1
CADD FILE: ES5210

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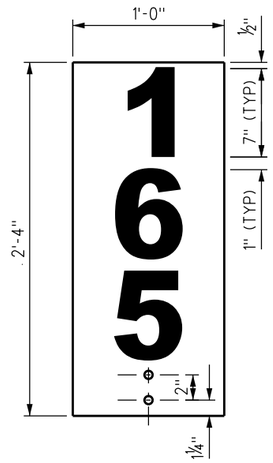
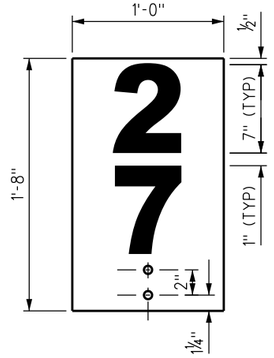
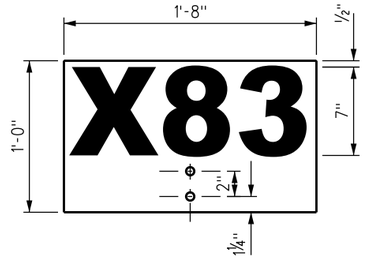


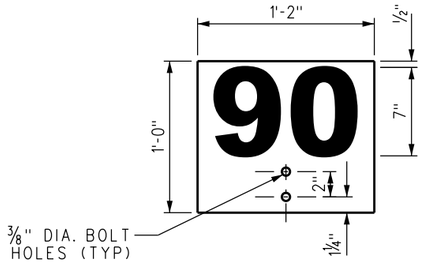
3 CHARACTER SIGN (VERTICAL)



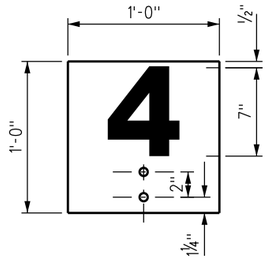
2 CHARACTER SIGN (VERTICAL)



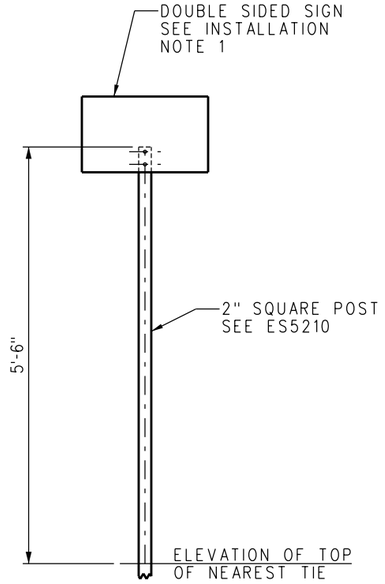
3 CHARACTER SIGN (HORIZONTAL)



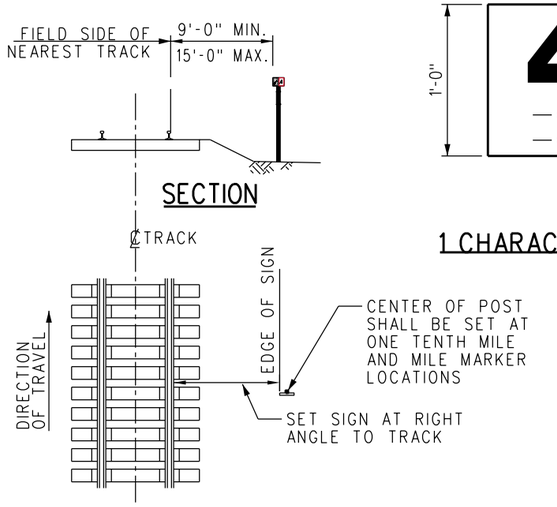
2 CHARACTER SIGN (HORIZONTAL)



1 CHARACTER SIGN



SIGN ELEVATION



PLAN

LOCATION OF SIGN

MATERIAL SPECIFICATIONS

PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
HIGH INTENSITY SHEETING (WHITE)	1	3M SCOTCHLITE HIGH INTENSITY PRISMATIC WHITE GRADE 3930 SHEETING
	2	NIPPON CARBIDE RETRO-REFLECTIVE SHEETING TYPE VIII CRYSTAL GRADE
	3	AVERY DENNISON OMNI-VIEW T-9500 PRISMATIC HIGH INTENSITY SHEETING
FONT / GRAPHICS (BLACK)	1	3M PROCESS COLOR SERIES 8851 INK
	2	NIPPON CARBIDE GRAFFITI RESISTANT 3803 INK
	3	AVERY DENNISON 4930 INK
ANTI - GRAFFITI OVERLAY	1	3M PREMIUM PROTECTIVE OVERLAY FILM 1160
	2	NIKKALITE BRAND HI - SCALE F-40801
	3	AVERY DENNISON OL - 1000 PREMIUM ANTI - GRAFFITI FILM
PANEL	1	⅛" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	PER SCRRA ES5210

SIGN NOTES:

1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. FONT SHALL BE PER SCRRA ES1212, SIZE AS INDICATED.
3. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
4. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.
5. SCREENED-PROCESS COLORS AND NONREFLECTIVE, OPAQUE BLACK FILM SHALL HAVE EQUIVALENT OUTDOOR WEATHERABILITY CHARACTERISTICS AS THE RETROREFLECTIVE SHEETING.

INSTALLATION NOTES:

1. THE SIGN SHALL BE SET PER THE LOCATION OF SIGN DETAIL ON THIS SHEET. EXCEPTIONS SHALL REQUIRE THE APPROVAL OF SCRRA.
2. TO ALLOW MILE POSTS TO BE READ FROM BOTH DIRECTIONS, ONE DOUBLE-FACED ALUMINUM PANEL WITH WHITE REFLECTIVE SHEETING BACKGROUND AND BLACK PLASTIC NUMERALS SHALL BE MOUNTED AT RIGHT ANGLES TO THE TRACK AT EACH LOCATION.
3. IN SINGLE TRACK TERRITORY, MILE POSTS SHALL BE SET ON RIGHT HAND SIDE OF THE TRACK AS ONE FACES IN THE DIRECTION OF INCREASING MILE POSTS. IN MULTIPLE TRACK TERRITORY MILE POSTS SHALL BE SET ON THE FIELD SIDE OF THE TRACK FARTHEST TO THE RIGHT.
4. IN MULTIPLE TRACK TERRITORY WHERE SPREAD TRACKS EXIST, THE LETTER "X" SHALL PRECEDE THE MILE POST NUMBERS ON THE NEWER LINE. AT THE OPTION OF SCRRA, WHERE THE DISTANCE SEPARATING THE TWO LINES IS NOT SUFFICIENT TO WARRANT SUCH DESIGNATION, THE LETTER "X" NEED NOT PRECEDE THE MILE POST NUMBERS ON THE NEWER LINE.
5. WHEN THE EXACT MILE POST STATION FALLS WITHIN THE LIMITS OF A BRIDGE, GRADE CROSSING OR OTHER FEATURE WHERE IT WOULD BE IMPRACTICAL TO LOCATE A SIGN, THE MILE POST SHALL INSTEAD BE SET AT THE END OF THE FEATURE NEAREST THE EXACT MILE POST STATION.
6. HORIZONTAL SIGNS ARE PREFERRED. VERTICAL SIGNS SHALL BE USED ONLY WHERE HORIZONTAL CLEARANCE IS RESTRICTED.

REV.	DATE	DESCRIPTION	DES.	ENG.
B	09-25-20	REVISED NOTES AND DETAILS	AC	JMM
A	03/22/13	REVISED MATERIAL SPECIFICATIONS	AC	NDP

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

MILE POST

STANDARD 5211
SCALE: NTS
REVISION B SHEET 1 OF 1
CADD FILE: ES5211

UserName=> scrrapw1ics01$ Date Plotted: 3/27/2023 4:15:39 PM Plot Driver=> C:\Program Files (x86)\Common Files\InterPlot\IPLOT\bin\iplotdrvn.plt FileName=> \\scrrapw1ics01\iCS_pdf_work_dir\90\494_16\ES5211.dgn

SIGN NOTES:

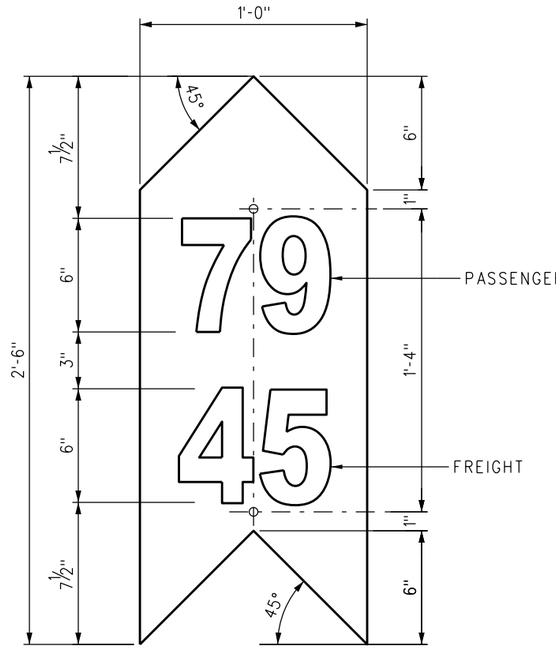
1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. FONT SHALL BE PER SCRRA ES1212, SIZE AS INDICATED.
3. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
4. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.
5. SCREENED-PROCESS COLORS AND NONREFLECTIVE, OPAQUE BLACK FILM SHALL HAVE EQUIVALENT OUTDOOR WEATHERABILITY CHARACTERISTICS AS THE RETROREFLECTIVE SHEETING.

INSTALLATION NOTES

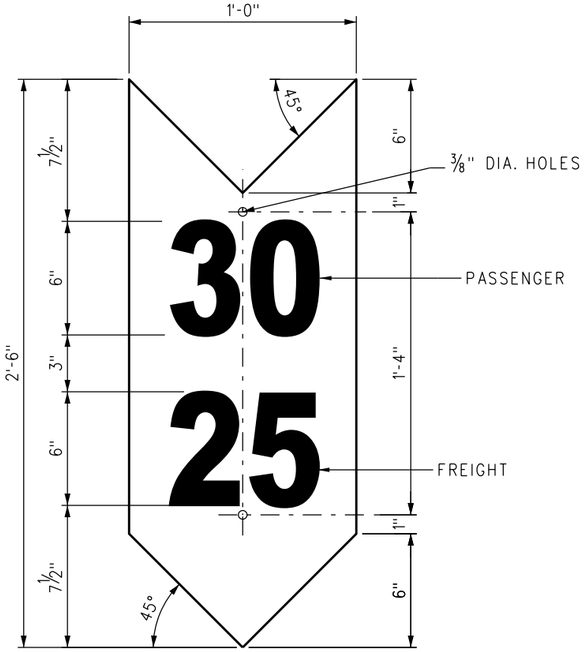
1. THE SIGN SHALL BE SET PER THE LOCATION OF SIGN DETAIL ON THIS SHEET. EXCEPTIONS SHALL REQUIRE THE APPROVAL OF SCRRA.
2. IN SINGLE TRACK TERRITORY, SIGNS SHALL BE LOCATED TO THE RIGHT OF THE TRACK AS VIEWED FROM AN APPROACHING TRAIN. IN MULTIPLE TRACK TERRITORY OR WHERE SIDINGS ARE ADJACENT TO MAIN TRACK(S), THE SIGNS WILL BE PLACED ON THE FIELD SIDE OF THE OUTSIDE TRACKS. ON MULTIPLE MAIN TRACKS WHERE TRACK CENTERS ARE 20 FEET OR GREATER, THE SIGNS WILL BE CENTERED BETWEEN TRACKS TO THE RIGHT OF THE TRACK AS VIEWED FROM AN APPROACHING TRAIN.
3. REDUCE SPEED SIGNS WILL BE LOCATED 2500 FEET IN ADVANCE OF THE RESTRICTED LOCATION AND WILL INDICATE THE MAXIMUM SPEED PERMITTED AS SHOWN IN THE CURRENT TIME TABLE. WHERE TWO SPEEDS ARE SHOWN, THE HIGHER SPEED APPLIES TO PASSENGER TRAINS AND THE LOWER SPEED TO FREIGHT TRAINS. WHERE ONE SPEED IS SHOWN, IT APPLIES TO ALL TRAINS.
4. RESUME SPEED SIGNS WILL BE PLACED AT THE END OF THE PERMANENT SPEED RESTRICTION TO INDICATE WHERE SPEED OF TRAIN MAY BE INCREASED. THIS SIGN SHALL NOT BE PLACED WHERE THERE IS LESS THAN ONE HALF MILE BETWEEN THE END OF ONE SPEED RESTRICTION AND THE BEGINNING OF ANOTHER SPEED RESTRICTION.

MATERIAL SPECIFICATIONS

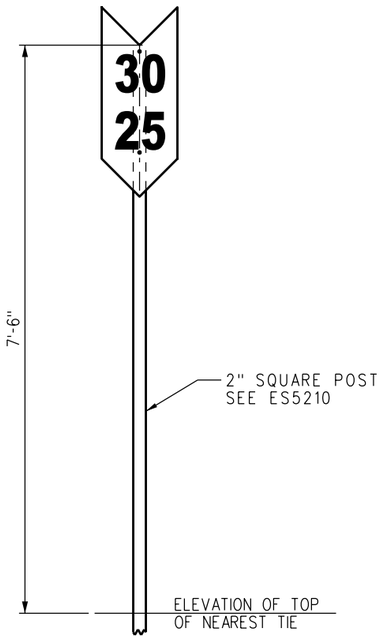
PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
SHEETING (GREEN)	1	AVERY DENNISON OMNI-CUBE T-11507
	2	3M - DG3 4097
SHEETING (YELLOW)	1	AVERY DENNISON OMNI-CUBE T-11501
	2	3M - DG3 4091
FONT / GRAPHICS (WHITE)	1	AVERY DENNISON OMNI-CUBE T-11500
	2	3M-DG3-4090
FONT / GRAPHICS (BLACK)	1	AVERY DENNISON BLACK VINYL OL-2000 OR 4930 INK
	2	3M-EC FILM 1178 OR 8851 INK
ANTI - GRAFFITI OVERLAY	1	NIPPON CARBIDE: F-CAL
	2	AVERY DENNISON OL - 1000 PREMIUM ANTI - GRAFFITI FILM
	3	3M PREMIUM PROTECTIVE OVERLAY FILM - 1160
PANEL	1	1/8" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	PER SCRRA ES5210



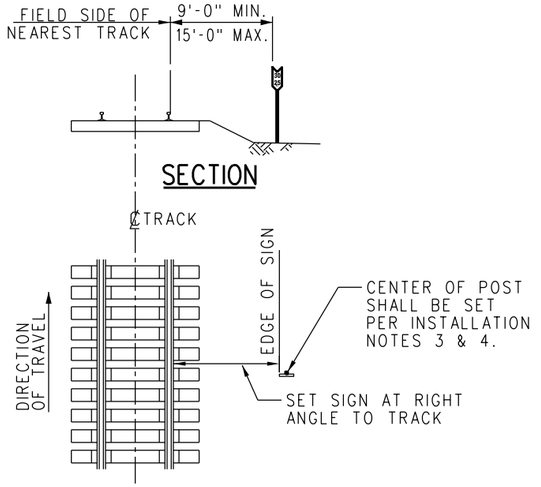
RESUME SPEED SIGN
(GREEN PANEL-WHITE NUMBERS)



REDUCE SPEED SIGN
(YELLOW PANEL-BLACK NUMBERS)



SIGN ELEVATION



PLAN
LOCATION OF SIGN

REV.	DATE	DESCRIPTION	DES.	ENG.
E	03-31-23	REVISED NOTE 4 AND PLAN LOCATION OF SIGN	AC	RG
D	09-25-20	REVISED NOTES, DETAILS AND DRAWING NUMBER	AC	JMM
C	05-02-14	REVISED INSTALLATION NOTE 1	AC	NDP
B	03-22-13	REVISED MATERIAL SPECIFICATIONS	AC	NDP
A	06-25-2012	ADD RESUME SPEED SIGN, REVISE NOTES, BOM & SPEC'S	AC	NDP

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

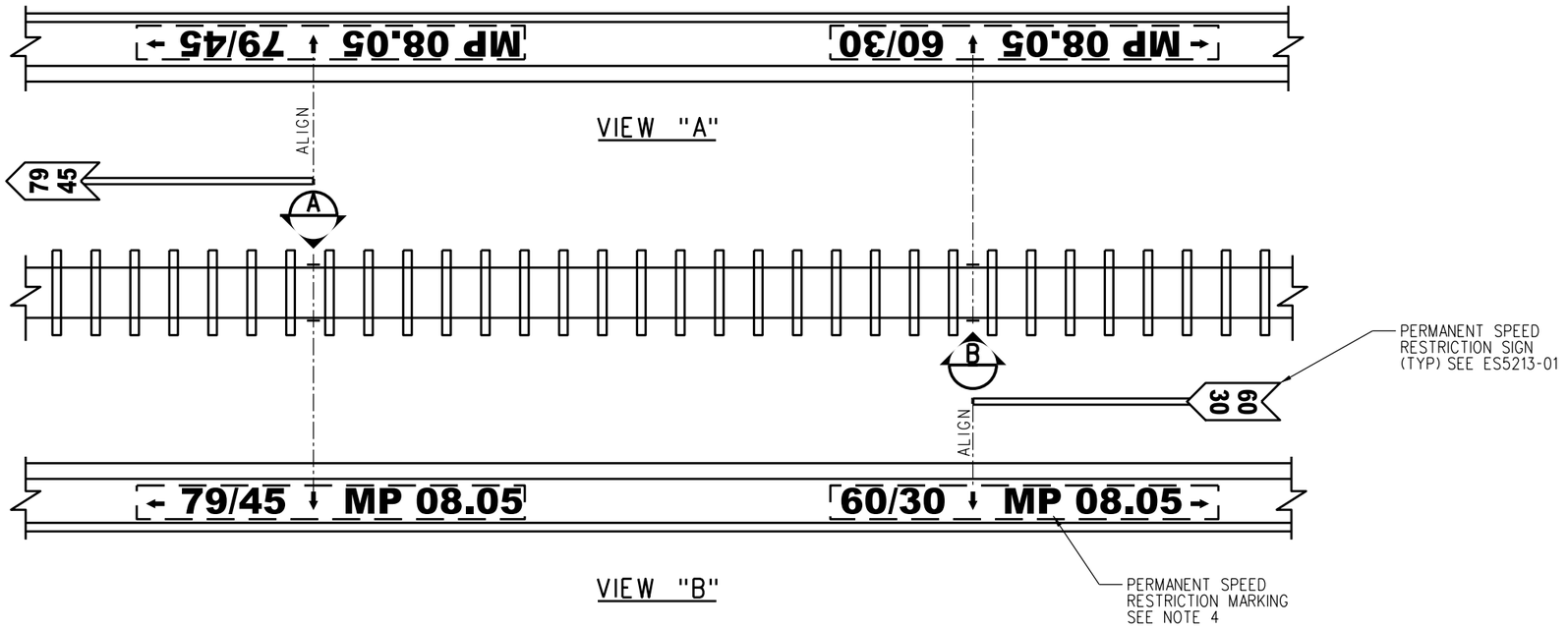
PERMANENT SPEED RESTRICTION SIGNS

STANDARD 5213
SCALE: NTS
REVISION E SHEET 1 OF 2
CADD FILE: ES5213-01

UserName=> scrrapw11ics01$ Date Plotted: 3/28/2023 10:26:00 PM Plot Driver=> C:\Program Files (x86)\Common Files\InterPlot\IPLOT\bin\iplotdrvn.plt FileName=> \\scrrapw11ics01\iCS_pdf_work_dir\99\494_18\ES5213-01.dgn

NOTES:

1. MARKINGS SHALL BE APPLIED TO THE WEB OF THE RAIL WITH OSHA SAFETY WHITE SPRAY PAINT. BLACK PAINT BACKGROUND MAY BE USED WHEN WHITE PAINT ALONE IS DIFFICULT TO SEE.
2. MARKINGS TO BE MADE USING 2¾" GOTHIC LETTERING STENCIL.
3. SPEED CHANGE MARKINGS SHALL BE APPLIED ON BOTH FIELD SIDE OF ALL MAIN AND SIDING TRACKS. SPEED CHANGE MARKINGS SHALL BE ALIGNED WITH THE PERMANENT SPEED RESTRICTION SIGN.
4. PERMANENT SPEED RESTRICTION MARKINGS ON EXISTING RAIL THAT IS BEING REPLACED SHALL BE STENCILED ON THE NEW REPLACEMENT RAIL WITH THE SAME PERMANENT SPEED RESTRICTION IN THE EXACT SAME LOCATION.



VIEW "A"

VIEW "B"

REV.	DATE	DESCRIPTION	DES.	ENG.
-	-	-	-	-

DRAWN BY: A. CARLOS DATE: 09/25/2020

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

PERMANENT SPEED RESTRICTION
RAIL MARKING

STANDARD 5213
SCALE: NTS
REVISION - SHEET 2 OF 2
CADD FILE: ES5213-02

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SIGN NOTES:

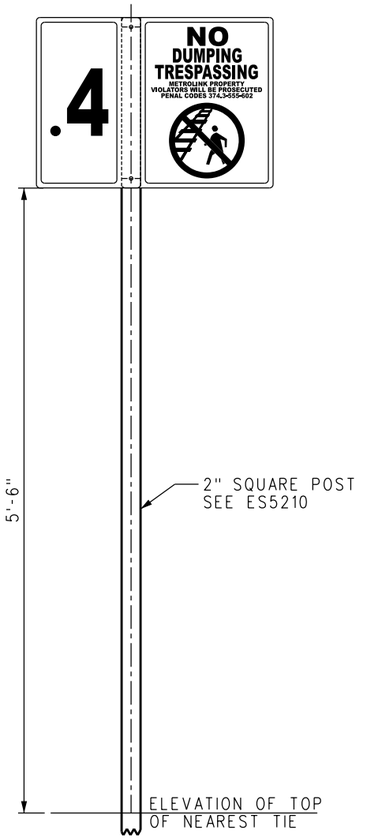
1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. FONT SHALL BE PER SCRRA ES1212, SIZE AS INDICATED.
3. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
4. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.
5. SCREENED-PROCESS COLORS AND NONREFLECTIVE, OPAQUE BLACK FILM SHALL HAVE EQUIVALENT OUTDOOR WEATHERABILITY CHARACTERISTICS AS THE RETROREFLECTIVE SHEETING.

INSTALLATION NOTES

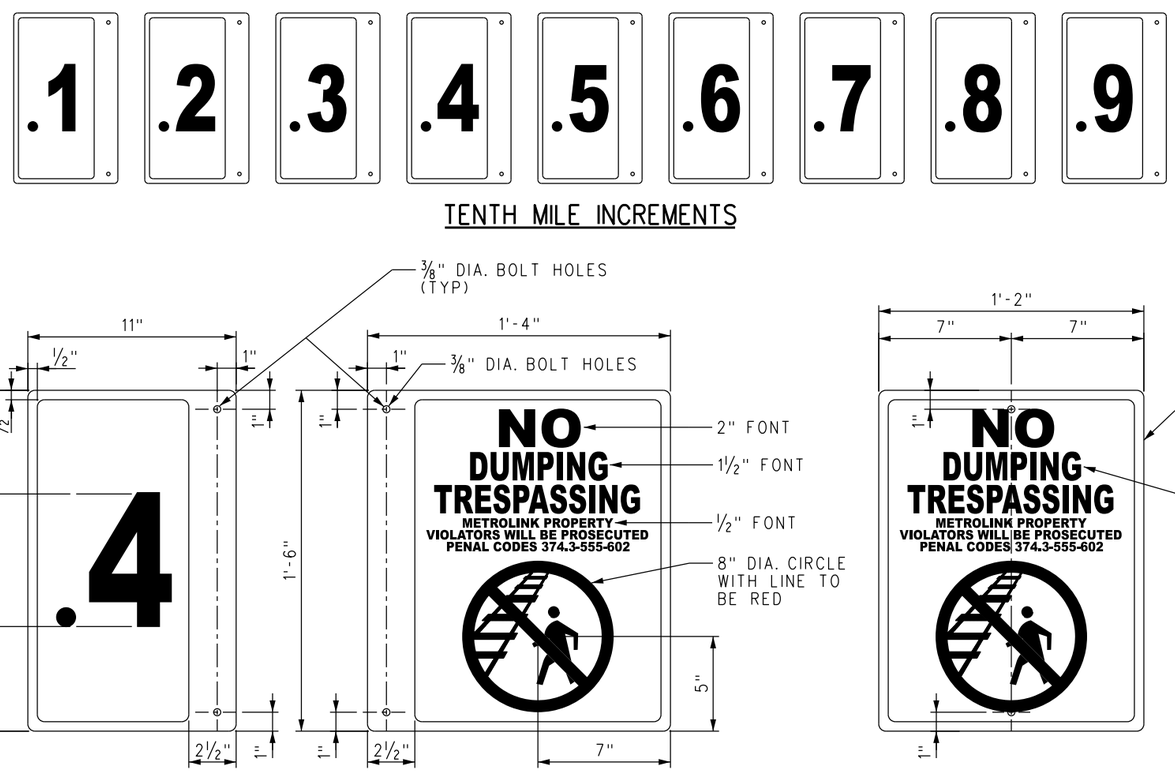
1. TO ALLOW MILE POSTS TO BE READ FROM BOTH DIRECTIONS, ONE DOUBLE-FACED ALUMINUM PANEL SHALL BE MOUNTED AT RIGHT ANGLES TO THE TRACK AT EACH LOCATION.
2. THE SIGN SHALL BE SET PER THE LOCATION OF SIGN DETAIL ON THIS SHEET. EXCEPTIONS SHALL REQUIRE THE APPROVAL OF SCRRA.
3. NO TRESPASSING/TENTH MILE SIGN WITH EVEN NUMBERS SHALL BE SET FOR THE WESTWARD DIRECTION AND WITH ODD NUMBERS ON THE EASTWARD DIRECTION ON THE RIGHT SIDE OF THE TRACK. NO TRESPASSING SIGNS SHALL BE SET FOR BOTH DIRECTIONS WHERE TRESPASSING/TENTH MILE SIGNS ARE NOT PRESENT.
4. WHEN THE EXACT MILE POST STATION FALLS WITHIN THE LIMITS OF A BRIDGE, GRADE CROSSING OR OTHER FEATURE WHERE IT WOULD BE IMPRACTICAL TO LOCATE A SIGN, THE MILE POST SHALL INSTEAD BE SET AT THE END OF THE FEATURE NEAREST THE EXACT MILE POST STATION.
5. NO TRESPASSING SIGN ONLY, WILL BE INSTALLED ON FOUR CORNERS OF HIGHWAY-RAIL GRADE CROSSING WITHIN 50 FEET FROM THE EDGE OF CROSSING.
6. NO TRESPASSING/TENTH MILE SIGN SHALL BE PLACED ON CENTER FENCE AT STATIONS.

MATERIAL SPECIFICATIONS

PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
HIGH INTENSITY SHEETING (WHITE)	1	3M DIAMOND GRADE DG-3-4090
	2	AVERY DENNISON OMNI-CUBE T-11500
FONT / GRAPHICS (BLACK)	1	3M-EC FILM 1178 OR 8851 INK
	2	AVERY DENNISON BLACK VINYL OL-2000 OR 4930 INK
FONT / GRAPHICS (RED)	1	3M DIAMOND GRADE DG-3-4092
	2	AVERY DENNISON OMNI-CUBE T-11508
ANTI-GRAFFITI OVERLAY	1	3M PREMIUM PROTECTIVE OVERLAY FILM 1160
	2	NIKKALITE BRAND HI - SCALE F-40801
	3	AVERY DENNISON OL - 1000 PREMIUM ANTI - GRAFFITI FILM
PANEL	1	1/8" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	PER SCRRA ES5210

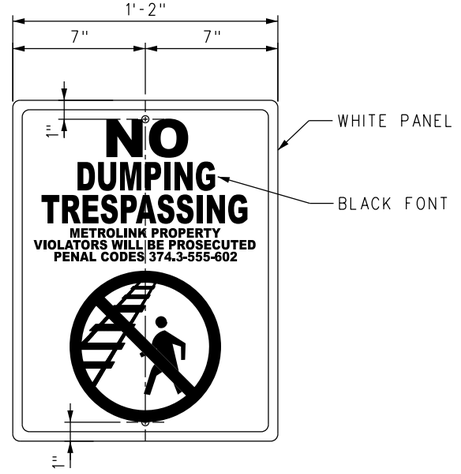


SIGN ELEVATION

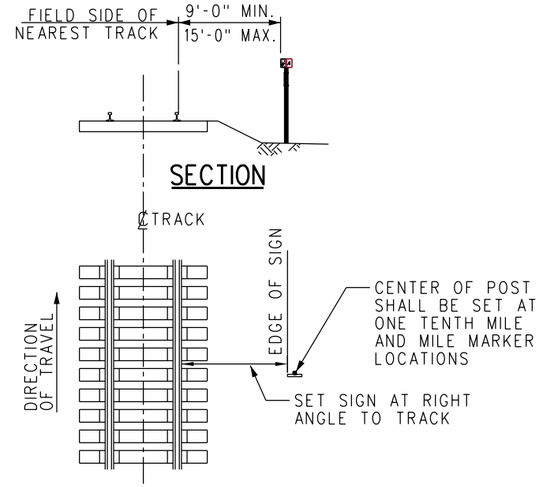


TENTH MILE SIGN
(DOUBLE SIDED)

NO TRESPASSING SIGN
(DOUBLE SIDED)



NO TRESPASSING SIGN
(SINGLE SIDED)



LOCATION OF SIGN

REV.	DATE	DESCRIPTION	DES.	ENG.
D	09-25-20	REVISE NOTES AND DRAWING NUMBER	AC	JMM
C	03-11-14	REVISED SIGN DETAILS	AC	NDP
B	03-22-13	REVISED MATERIAL SPECIFICATIONS	AC	NDP
A	12/21/12	REVISED STANDARD	AC	NDP

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

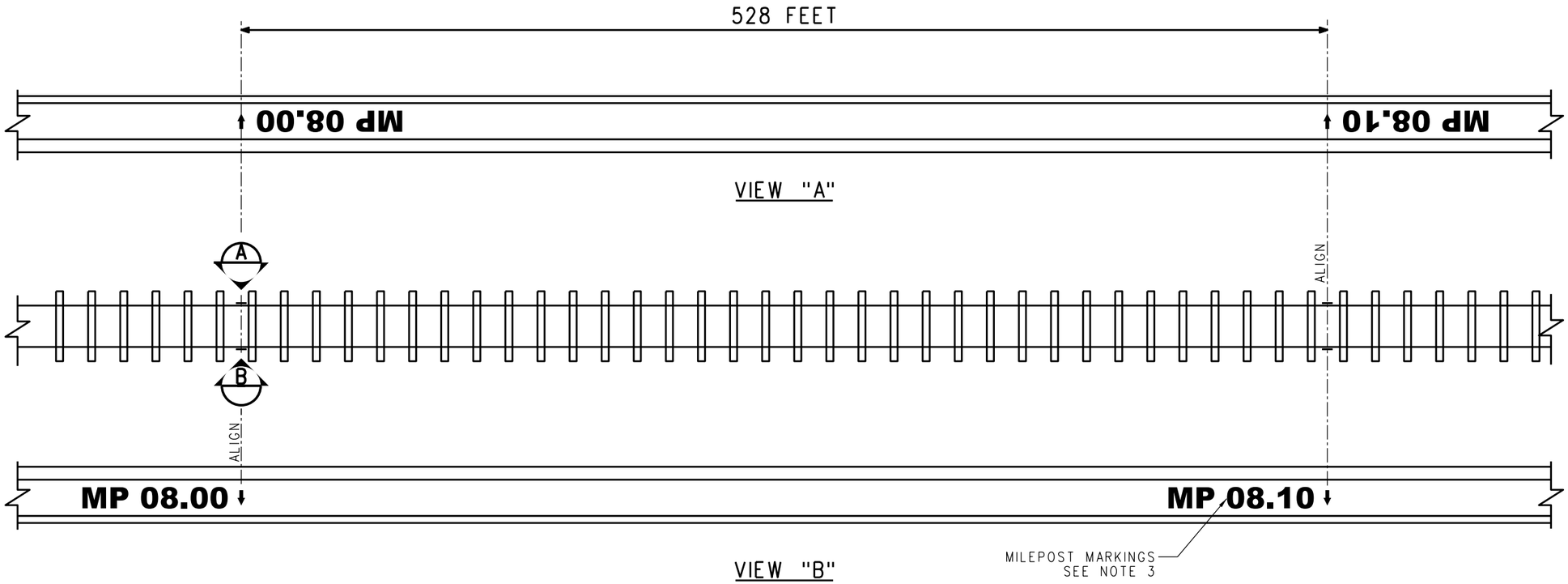
NO TRESPASSING AND
TENTH MILE POST SIGN

STANDARD 5214
SCALE: NTS
REVISION D SHEET 1 OF 2
CADD FILE: ES5214-01

UserName=> scrrapw11ics01$ Date Plotted: 3/27/2023 4:15:25 PM Plot Driver=> C:\Program Files (x86)\Common Files\InterPlot\IPLOT\bin\iplotdrvn.plt FileName=> \\scrrapw11ics01\iCS_pdf_work_dir\90\494_19\ES5214-01.dgn

NOTES:

1. MARKINGS SHALL BE APPLIED TO THE WEB OF THE RAIL WITH OSHA SAFETY WHITE SPRAY PAINT. BLACK PAINT BACKGROUND MAY BE USED WHEN WHITE PAINT ALONE IS DIFFICULT TO SEE.
2. MARKINGS TO BE MADE USING 2¾" GOTHIC LETTERING STENCIL.
3. MILEPOST MARKINGS SHALL BE APPLIED ON BOTH FIELD SIDES OF OF ALL MAIN AND SIDING TRACKS AND EVERY TENTH MILE (0.10) AS LOCATED BY PROPER SURVEY. MILEPOST MARKINGS DO NOT NEED TO BE APPLIED TO SIDING TRACKS.
4. MILEPOST MARKINGS EXISTINGS ON RAIL THAT IS BEING REPLACED SHALL BE STENCILED ON THE NEW REPLACEMENT RAIL WITH THE SAME MILEPOST MARKINGS IN THE EXACT SAME LOCATION.



REV.	DATE	DESCRIPTION	DES.	ENG.
-	-	-	-	-

DRAWN BY: A. CARLOS DATE: 09/25/2020

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

MILE POST RAIL MARKING

STANDARD 5214
SCALE: NTS
REVISION -
SHEET 2 OF 2
CADD FILE: ES5214-02

UserName-> scrrapw11ics01$ Date Plotted: 3/27/2023 4:16:13 PM Plot Driver-> C:\Program Files (x86)\Common Files\InterPlot\IPLOT\bin\iplotdrvn.plt FileName-> \\scrrapw11ics01\iCS_pdf_work_dir\90\494_51\ES5214-02.dgn

SIGN NOTES:

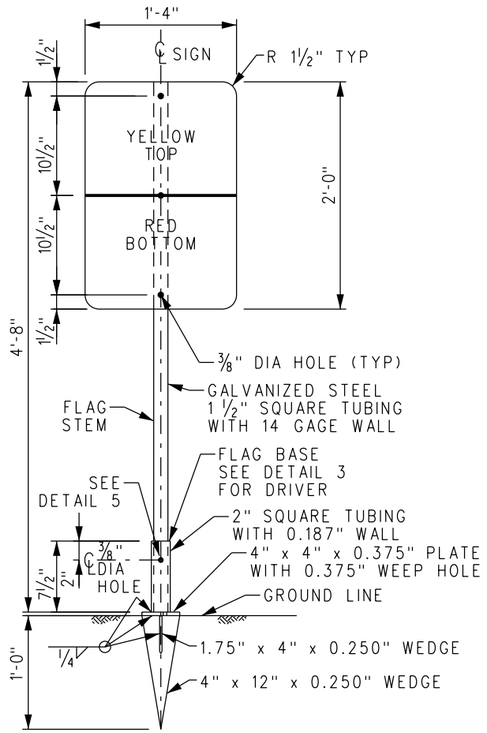
1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
3. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.

INSTALLATION NOTES

1. PURPOSE: TO ASSIST TRAIN CREWS AND OTHERS IN ACCURATELY DETERMINING LOCATIONS FOR SPEED RESTRICTIONS AND FORM B TRACK BULLETINS.
2. WHERE USED: AS SPECIFIED BY THE GENERAL CODE OPERATING RULES.
3. PLACEMENT: ALL SIGNS ON THIS PAGE ARE DISPLAYED TO THE FIELD SIDE OF THE TRACK, FOR THE APPROPRIATE DIRECTION OF TRAFFIC MOVEMENT. ACTUAL LOCATION MAY BE ADJUSTED SLIGHTLY TO AVOID OBSTRUCTIONS AND UTILITIES. CARE MUST BE USED IN PLACEMENT TO ENSURE SIGN DOES NOT OBSTRUCT WALKWAY, MAINTENANCE ROAD, DRAINAGE DITCH, SIDE TRACKS, ETC. IN ALL CASES PLACEMENT MUST CONFORM TO THE CLEARANCES SPECIFIED IN CPUC GO 26-D. WHEN INSTALLING 2-PIECE FLAG HOLDER, DRIVE FLAG BASE WITH FLAG BASE DRIVER ONLY. DO NOT STRIKE REFLECTIVE TAPE APPLIED TO FLAG BASE.
4. DISTANCE FROM FIELD SIDE OF NEAREST RAIL TO THE EDGE OF FLAG SHALL NOT BE LESS THAN 9 FEET NOR MORE THAN 15 FEET, UNLESS OTHERWISE PRESCRIBED BY RULE 5.4.

MATERIAL SPECIFICATIONS

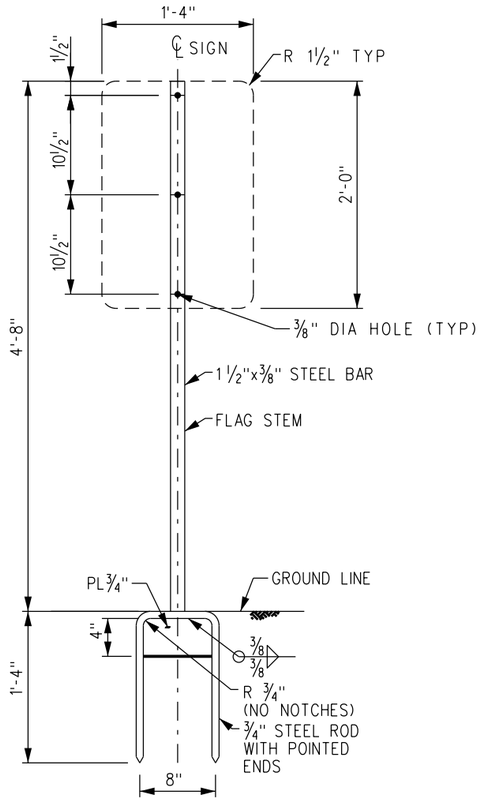
PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
SHEETING (YELLOW)	1	3M DG3 4091
	2	AVERY DENNISON OMNI - CUBE T-11501
SHEETING (RED)	1	3M DIAMOND GRADE DG-3-4092
	2	AVERY DENNISON OMNI - CUBE T-11508
ANTI - GRAFFITI OVERLAY	1	3M PREMIUM PROTECTIVE OVERLAY FILM 1160
	2	NIKKALITE BRAND HI - SCALE F-40801
	3	AVERY DENNISON OL - 1000 PREMIUM ANTI - GRAFFITI FILM
PANEL	1	1/8" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	AS NOTED PER THIS STANDARD



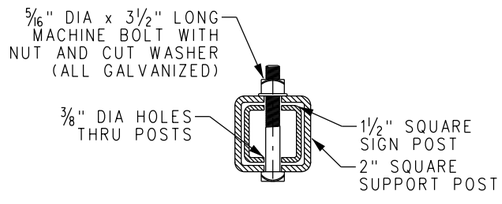
NOTE:

YELLOW-RED FLAG ILLUSTRATED. PURCHASE REQUISITIONS MUST SPECIFY COLOR(S) OF FLAG.

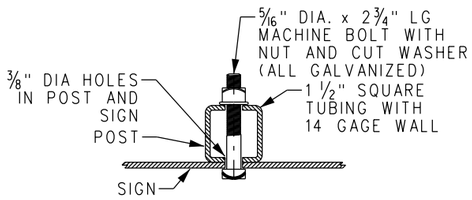
2 - PIECE FLAG HOLDER FLAG BASE, STEM WITH SIGN DETAIL 1



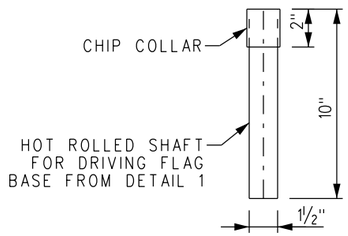
1 - PIECE FLAG HOLDER STEEL ROD FORK AND STEM WITHOUT SIGN DETAIL 2



TYPICAL SECTION THRU POST AND BASE DETAIL 5



TYPICAL SECTION THRU SIGN AND POST DETAIL 4



FLAG BASE DRIVER FOR 2-PIECE FLAG HOLDER DETAIL 3

REV.	DATE	DESCRIPTION	DES.	ENG.
B	09-25-20	REVISED NOTES AND MATERIAL SPECIFICATIONS	AC	JMM
A	03-22-13	REVISED MATERIAL SPECIFICATIONS	AC	NDP

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

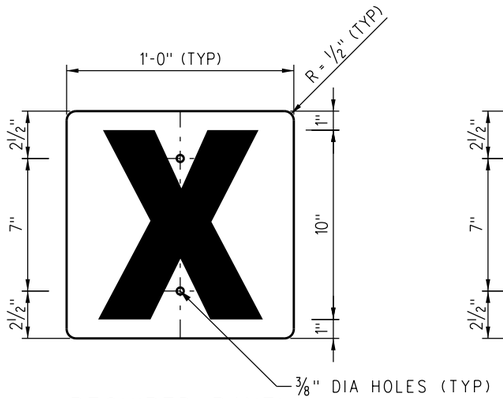
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

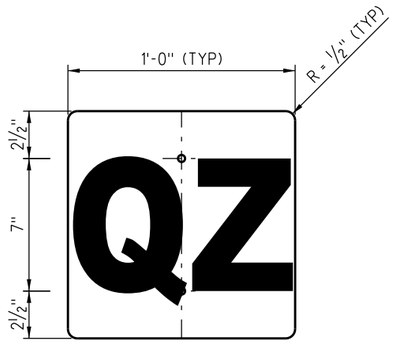
STOP, SLOW AND RESUME SPEED FLAGS AND SIGNS

STANDARD 5215
SCALE: NTS
REVISION B SHEET 1 OF 1
CADD FILE: ES5215

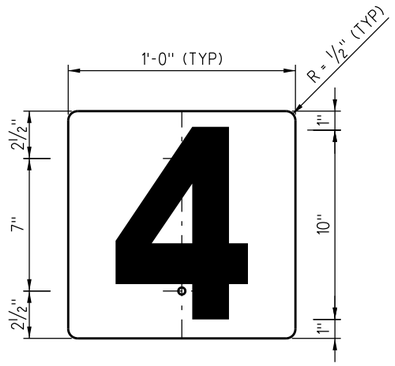
UserName=> scrrapw11ics01$ Date Plotted: 3/27/2023 4:15:39 PM Plot Driver=> C:\Program Files (x86)\Common Files\InterPlot\IPLOT\bin\iplotdrvn.plt FileName=> \\scrrapw11ics01\iCS_pdf_work_dir\90\494_20\ES5215.dgn



REQUIRED PANEL
WHISTLING POINT



OPTIONAL PANEL
QUIET ZONES



OPTIONAL PANEL
FOR MULTIPLE CROSSINGS

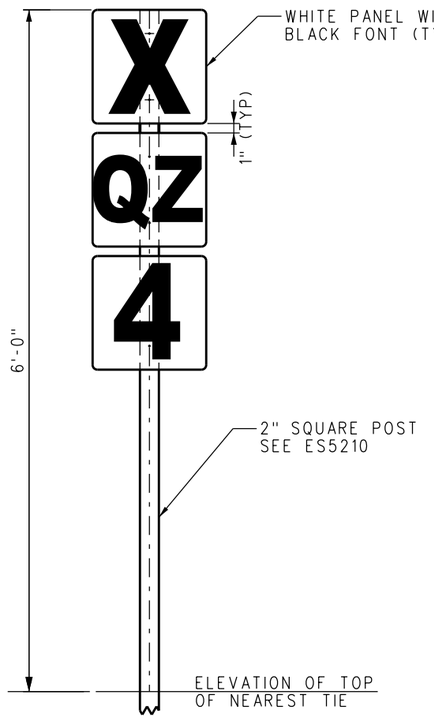
MATERIAL SPECIFICATIONS		
PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
HIGH INTENSITY SHEETING (WHITE)	1	3M SCOTCHLITE HIGH INTENSITY PRISMATIC WHITE GRADE 3930 SHEETING
	2	NIPPON CARBIDE RETRO-REFLECTIVE SHEETING TYPE VIII CRYSTAL GRADE
	3	AVERY DENNISON OMNI-VIEW T-9500 PRISMATIC HIGH INTENSITY SHEETING
FONT / GRAPHICS (BLACK)	1	3M PROCESS COLOR SERIES 8851 INK
	2	NIPPON CARBIDE GRAFFITI RESISTANT 3803 INK
	3	AVERY DENNISON 4930 INK
ANTI - GRAFFITI OVERLAY	1	3M PREMIUM PROTECTIVE OVERLAY FILM 1160
	2	NIKKALITE BRAND HI - SCALE F-40801
	3	AVERY DENNISON OL - 1000 PREMIUM ANTI - GRAFFITI FILM
PANEL	1	⅛" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	PER SCRRA ES5210

SIGN NOTES:

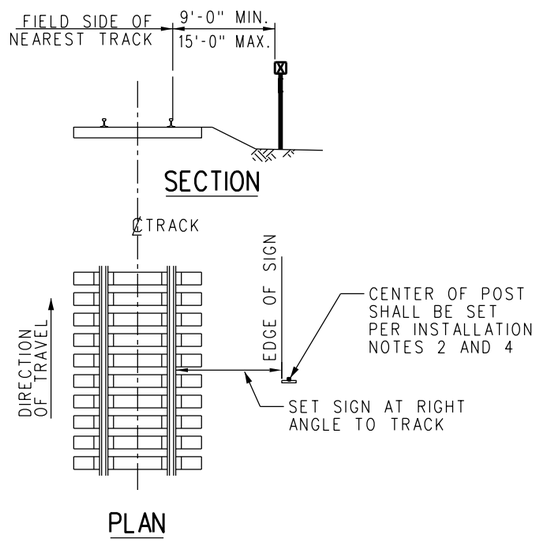
1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. FONT SHALL BE PER SCRRA ES1212, SIZE AS INDICATED.
3. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
4. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.
5. SCREENED-PROCESS COLORS AND NONREFLECTIVE, OPAQUE BLACK FILM SHALL HAVE EQUIVALENT OUTDOOR WEATHERABILITY CHARACTERISTICS AS THE RETROREFLECTIVE SHEETING.

INSTALLATION NOTES

1. THE SIGN SHALL BE SET PER THE LOCATION OF SIGN DETAIL ON THIS SHEET. EXCEPTIONS SHALL REQUIRE THE APPROVAL OF SCRRA.
2. IN SINGLE TRACK TERRITORY, SIGNS SHALL BE LOCATED TO THE RIGHT OF THE TRACK AS VIEWED FROM AN APPROACHING TRAIN. IN MULTIPLE TRACK TERRITORY OR WHERE SIDINGS ARE ADJACENT TO MAIN TRACK(S), THE SIGNS WILL BE PLACED ON THE FIELD SIDE OF THE OUTSIDE TRACKS. ON MULTIPLE MAIN TRACKS WHERE TRACK CENTERS ARE 20 FEET OR GREATER, THE SIGNS WILL BE CENTERED BETWEEN TRACKS TO THE RIGHT OF THE TRACK AS VIEWED FROM AN APPROACHING TRAIN, NO LESS THAN 1320' TO CROSSING.
3. QUIET ZONE SIGN SHALL BE USED ONLY AT LOCATIONS THAT HAVE BEEN LEGISLATED AS QUIET ZONES.
4. WHERE THERE ARE MULTIPLE PUBLIC CROSSINGS LESS THAN 1320' APART, THE SIGN IN ADVANCE OF THE FIRST CROSSING SHALL INCLUDE A SECOND PANEL DISPLAYING A NUMERAL WHICH REPRESENTS THE NUMBER OF CROSSINGS INVOLVED.



SIGN ELEVATION



LOCATION OF SIGN

REV.	DATE	DESCRIPTION	DES.	ENG.
E	04-04-23	REVISED LOCATION DETAIL	AC	RG
D	09-25-20	REVISE NOTES AND LOCATION DETAIL	AC	JMM
C	04/18/19	REVISED INSTALLATION NOTE 1	JK	AT
B	05-02-14	REVISED INSTALLATION NOTE 1	AC	NDP
A	03-22-13	REVISED MATERIAL SPECIFICATIONS	AC	NDP

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

WHISTLING POINT / QUIET ZONE SIGN

STANDARD 5216
SCALE: NTS
REVISION E SHEET 1 OF 1
CADD FILE: ES5216

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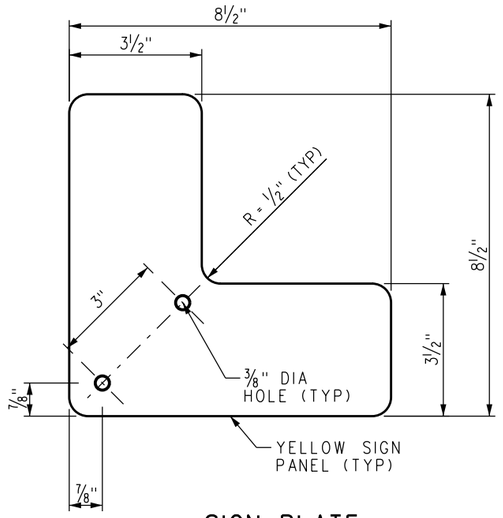
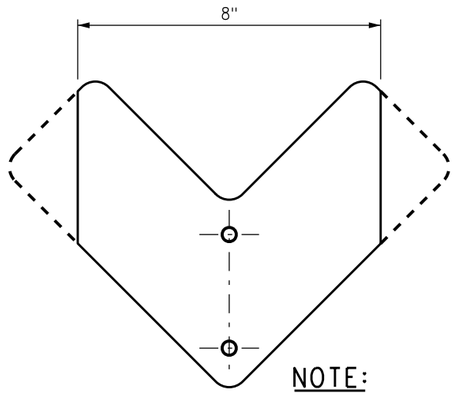
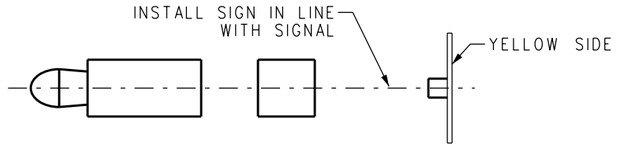


SIGN PLATE
DETAIL 1



NOTE:
ALL OTHER DIMENSIONS
PER DETAIL 1.

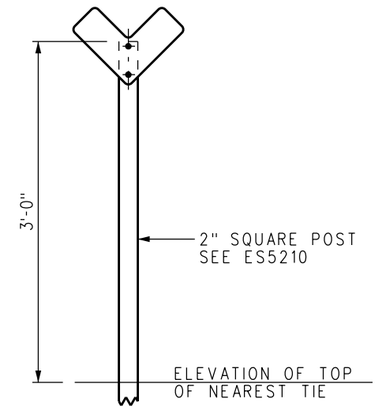
OPTIONAL CUT
FOR LIMITED CLEARANCE
DETAIL 2



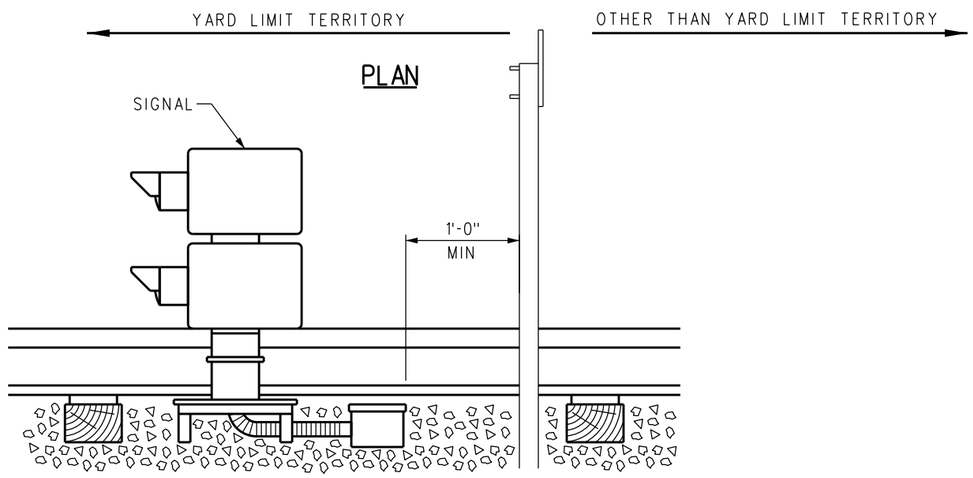
MATERIAL SPECIFICATIONS		
PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
HIGH INTENSITY SHEETING (YELLOW)	1	3M DG3 4091
	2	AVERY DENNISON OMNI - CUBE T-11501
ANTI - GRAFFITI OVERLAY	1	3M PREMIUM PROTECTIVE OVERLAY FILM 1160
	2	NIKKALITE BRAND HI - SCALE F-40801
	3	AVERY DENNISON OL - 1000 PREMIUM ANTI - GRAFFITI FILM
PANEL	1	⅛" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	PER SCRRA ES5210

SIGN NOTES:

1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
3. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.



SIGN ELEVATION
DETAIL 3



ELEVATION
LOCATION OF SIGN
DETAIL 4

INSTALLATION NOTES:

1. THE SIGN SHALL BE SET PER THE LOCATION OF SIGN DETAIL ON THIS SHEET. EXCEPTIONS SHALL REQUIRE THE APPROVAL OF SCRRA.
2. SIGN SHALL BE INSTALLED TO INDICATE LIMIT OF TERRITORY OPERATED UNDER RULE 6.13.

REV.	DATE	DESCRIPTION	DES.	ENG.
B	09-25-20	REVISED NOTES	AC	JMM
A	03/22/13	REVISED MATERIAL SPECIFICATIONS	AC	NDP

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

YARD LIMIT SIGN FOR TERMINAL TRACKS

STANDARD 5217
SCALE: NTS
REVISION B SHEET 1 OF 1
CADD FILE: ES5217

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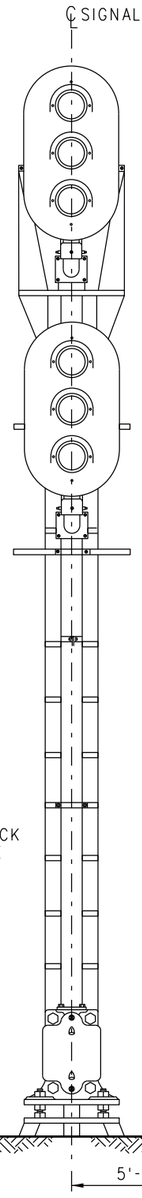
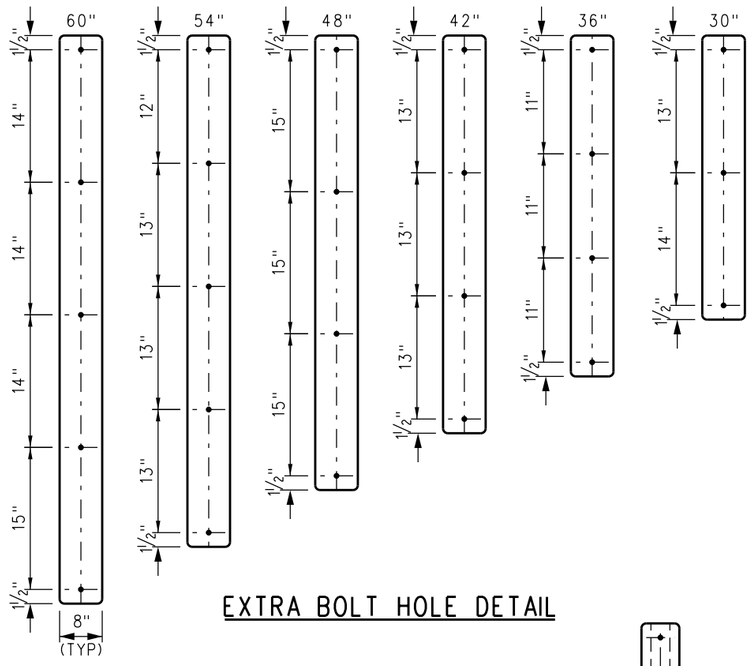
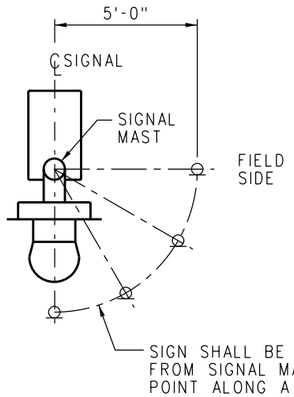


FRONT ELEVATION

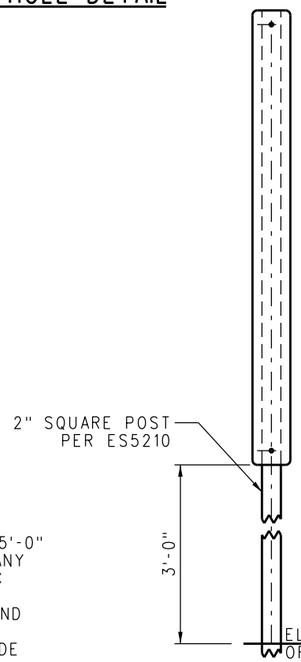


EXTRA BOLT HOLE DETAIL

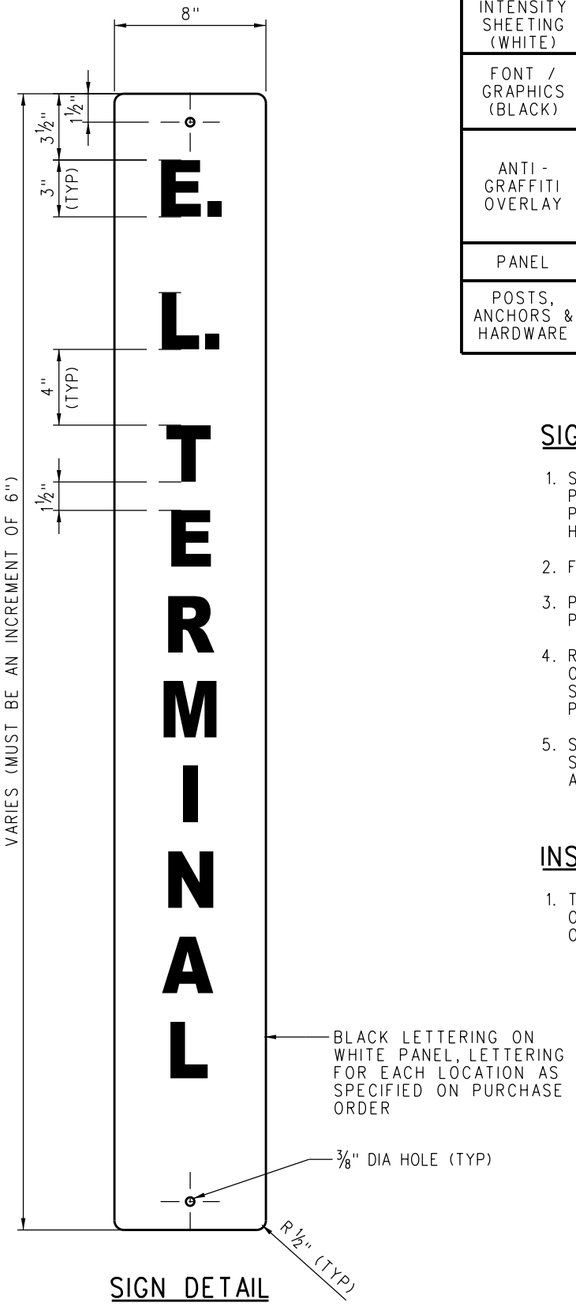


PLAN

LOCATION OF SIGN



SIGN ELEVATION



SIGN DETAIL

MATERIAL SPECIFICATIONS

PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
HIGH INTENSITY SHEETING (WHITE)	1	AVERY DENNISON OMNI-CUBE T-11500
	2	3M-DG3-4090
FONT / GRAPHICS (BLACK)	1	AVERY DENNISON BLACK VINYL OL-2000 OR 4930 INK
	2	3M-EC FILM 1178 OR 8851 INK
ANTI - GRAFFITI OVERLAY	1	NIPPON CARBIDE: F-CAL
	2	AVERY DENNISON OL - 1000 PREMIUM ANTI - GRAFFITI FILM
	3	3M PREMIUM PROTECTIVE OVERLAY FILM - 1160
PANEL	1	⅛" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	PER SCRRA ES5210

SIGN NOTES:

1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. FONT SHALL BE PER SCRRA ES1212, SIZE AS INDICATED.
3. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
4. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.
5. SCREENED-PROCESS COLORS AND NONREFLECTIVE, OPAQUE BLACK FILM SHALL HAVE EQUIVALENT OUTDOOR WEATHERABILITY CHARACTERISTICS AS THE RETROREFLECTIVE SHEETING.

INSTALLATION NOTE:

1. THE SIGN SHALL BE SET PER THE LOCATION OF SIGN DETAIL ON THIS SHEET. EXCEPTIONS SHALL REQUIRE THE APPROVAL OF SCRRA.

REV.	DATE	DESCRIPTION	DES.	ENG.
C	09-25-20	REVISE NOTES	AC	JMM
B	03-22-13	REVISED MATERIAL SPECIFICATIONS	AC	NDP
A	08/16/12	REVISE DETAIL "2", AND DRAWING NUMBER	AC	NDP

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

CONTROL POINT (CP) LIMIT SIGN

STANDARD 5218
SCALE: NTS
REVISION C
SHEET 1 OF 2
CADD FILE: ES5218-01

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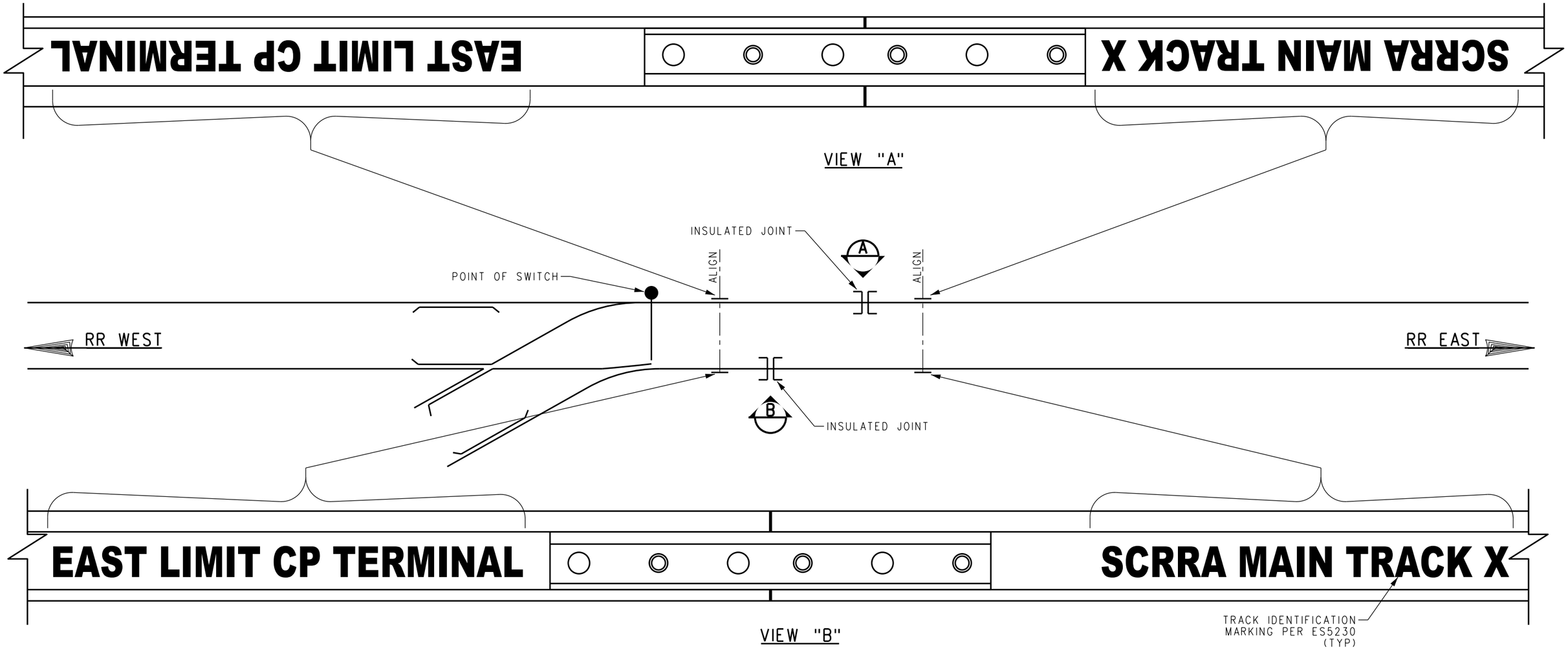

NOTES:

1. BOTH RAILS TO BE MARKED ON THE WEB ON FIELD SIDE WITH OSHA SAFETY ORANGE SPRAY PAINT.
2. MARKING TO BE MADE USING 2¾" GOTHIC LETTERING STENCIL.
3. RAILS TO BE MARKED DIRECTLY OPPOSITE EACH OTHER ALIGNED WITH THE "OUTERMOST INUSLATED JOINT.

REV.	DATE	DESCRIPTION	DES.	ENG.
A	09-25-20	REVISED NOTES	AC	JMM

DRAWN BY: A. CARLOS DATE: 08/16/12

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

CONTROL POINT (CP) LIMIT
RAIL MARKING

STANDARD: 5218
SCALE: NTS
REVISION: A
SHEET: 2 OF 2
CADD FILE: ES5218-02

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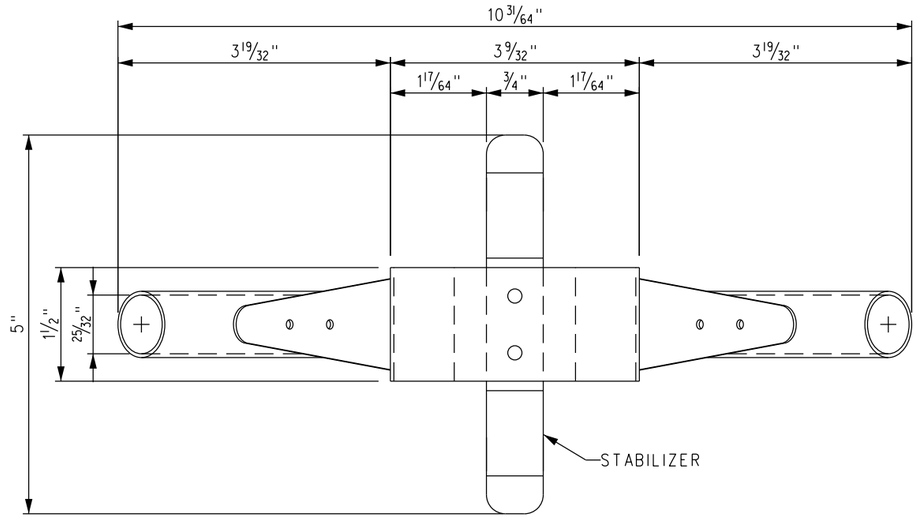
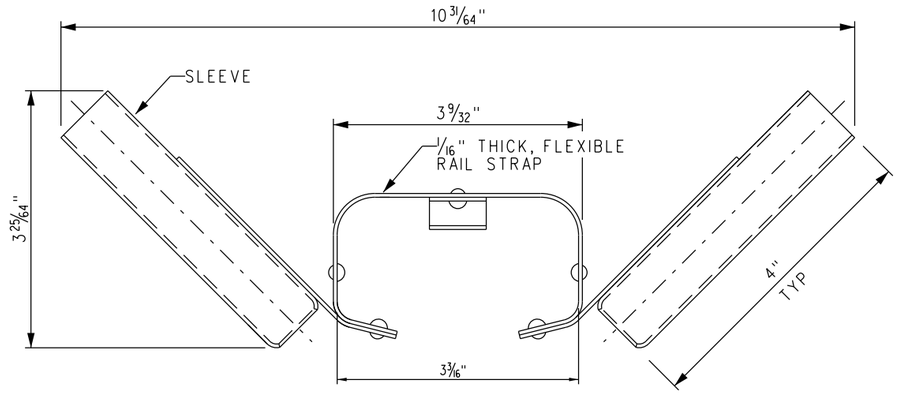
BILL OF MATERIAL	
NUMBER REQUIRED	ITEM
	FLAG STANCHION
	ALL PARTS MADE FROM STEEL



PLAN



ELEVATION

REV.	DATE	DESCRIPTION	DES.	ENG.
X	XX-XX-XX	REVISION	XX	XX

DRAWN BY: A. CARLOS DATE: 04/12/02

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

FLAG STANCHION

STANDARD	5219
SCALE:	NTS
REVISION	-
SHEET	1 OF 1
CADD FILE:	ES5219

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SIGN NOTES:

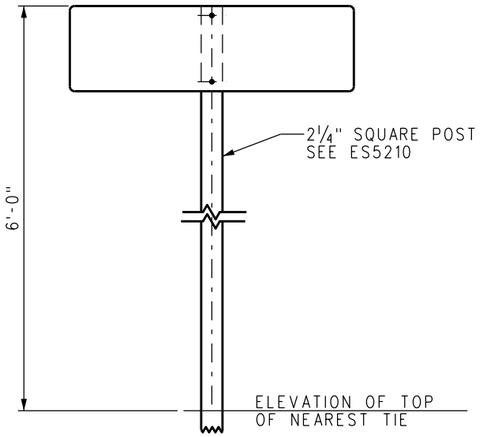
1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. FONT SHALL BE PER SCRRA ES1212, SIZE AS INDICATED.
3. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
4. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.
5. SCREENED-PROCESS COLORS AND NONREFLECTIVE, OPAQUE BLACK FILM SHALL HAVE EQUIVALENT OUTDOOR WEATHERABILITY CHARACTERISTICS AS THE RETROREFLECTIVE SHEETING.

INSTALLATION NOTES:

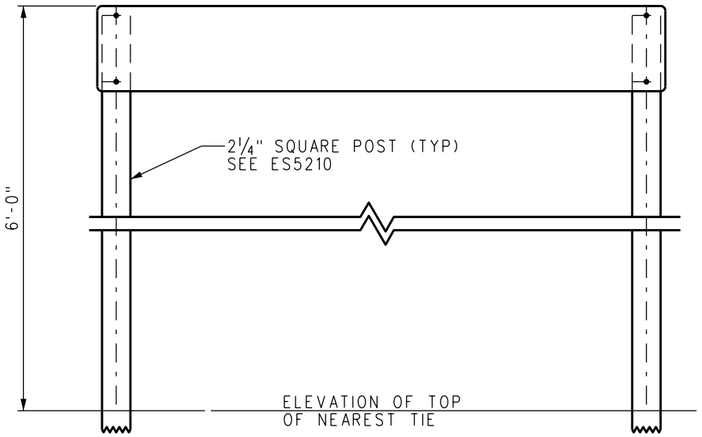
1. THE SIGN SHALL BE SET PER THE LOCATION OF SIGN DETAIL ON THIS SHEET. EXCEPTIONS SHALL REQUIRE THE APPROVAL OF SCRRA.
2. SIGNS SHALL BE PLACED AT ALL STATIONS AND BUSINESS TRACKS LISTED ON TIMETABLE SCHEDULE PAGE.
3. IN TWC TERRITORY, ONE SIGN IS REQUIRED AT EACH END OF SIDINGS IN PLAIN VIEW FROM APPROACHING TRAINS.
4. AT OTHER LOCATIONS IN TWC TERRITORY WHERE SIGNS ARE REQUIRED, SIGNS SHALL BE MOUNTED ON BOTH SIDES OF POST AT TIMETABLE STATION LOCATION.
5. IN OTHER THAN CTC OR TWC TERRITORY, SIGNS SHALL BE MOUNTED ON BOTH SIDES OF POST AND LOCATED AT TIMETABLE STATION LOCATION.
6. TO MINIMIZE THE LENGTH OF THE SIGN, ABBREVIATIONS THAT MAKE MEANING CLEAR MAY BE USED. REQUISITIONS FOR STATION SIGNS SHALL SPECIFY MOUNTING HARDWARE REQUIRED PER TYPICAL MOUNTING DETAILS.
7. STATION SIGN SHALL BE PLACED ON OPPOSITE SIDE OF SWITCH STAND 10'-0" AHEAD OF SWITCH POINTS.

MATERIAL SPECIFICATIONS

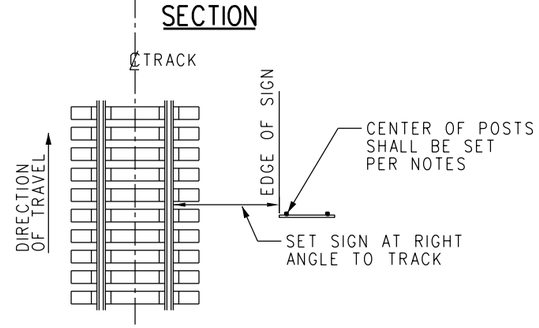
PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
HIGH INTENSITY SHEETING (WHITE)	1	3M SCOTCHLITE HIGH INTENSITY PRISMATIC WHITE GRADE 3930 SHEETING
	2	NIPPON CARBIDE RETRO-REFLECTIVE SHEETING TYPE VIII CRYSTAL GRADE
	3	AVERY DENNISON OMNI-VIEW T-9500 PRISMATIC HIGH INTENSITY SHEETING
FONT / GRAPHICS (BLACK)	1	3M PROCESS COLOR SERIES 8851 INK
	2	NIPPON CARBIDE GRAFFITI RESISTANT 3803 INK
	3	AVERY DENNISON 4930 INK
ANTI-GRAFFITI OVERLAY	1	3M PREMIUM PROTECTIVE OVERLAY FILM 1160
	2	NIKKALITE BRAND HI-SCALE F-40801
	3	AVERY DENNISON OL-1000 PREMIUM ANTI-GRAFFITI FILM
PANEL	1	1/8" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	PER SCRRA ES5210



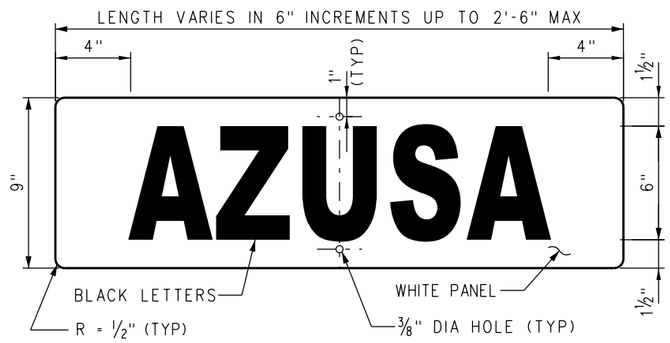
SINGLE POST MOUNT



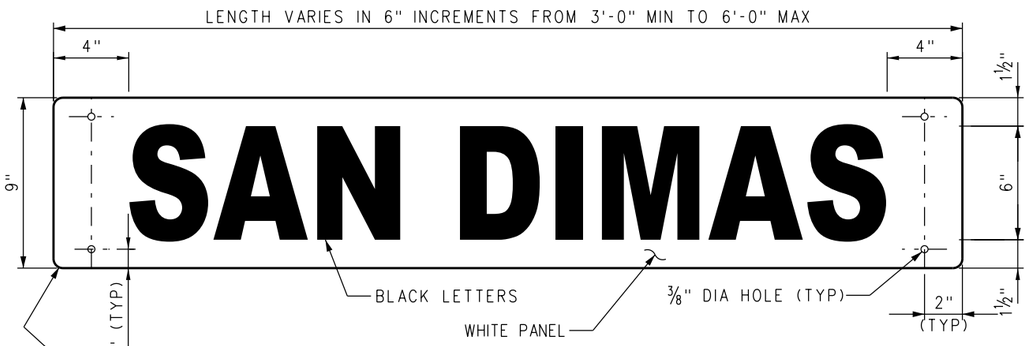
DUAL POST MOUNT



LOCATION OF SIGN



NARROW SIGN



WIDE SIGN

REV.	DATE	DESCRIPTION	DES.	ENG.
C	04-14-23	REVISED SIGN LOCATION DETAIL	AC	RG
B	09-25-20	REVISED NOTES, ADDED SIGN LOCATION DETAIL	AC	JMM
A	03-22-13	REVISED MATERIAL SPECIFICATIONS	AC	NDP

DRAWN BY: A. CARLOS DATE: 04/01/03

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

STATION SIGNS FOR OTHER THAN CTC TERRITORY

STANDARD 5222
SCALE: NTS
REVISION C SHEET 1 OF 1
CADD FILE: ES5222

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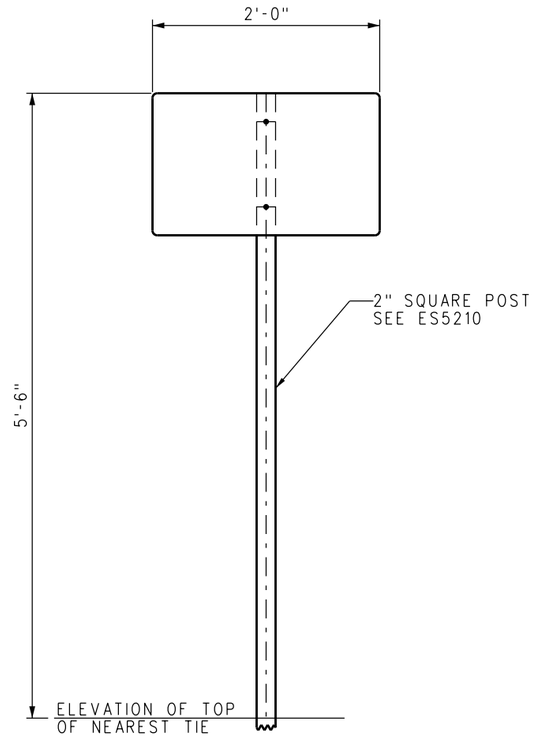
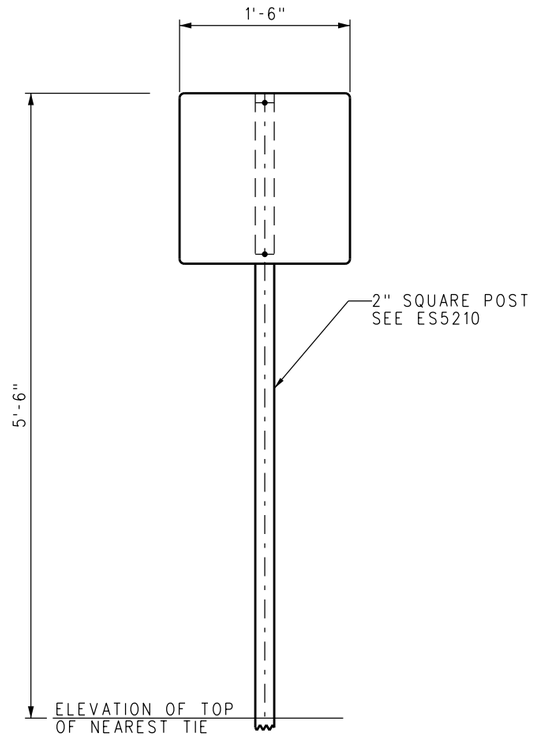




MATERIAL SPECIFICATIONS

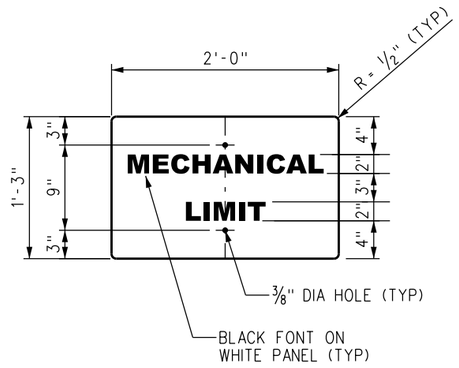
PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
HIGH INTENSITY SHEETING (WHITE)	1	3M SCOTCHLITE HIGH INTENSITY PRISMATIC WHITE GRADE 3930 SHEETING
	2	NIPPON CARBIDE RETRO-REFLECTIVE SHEETING TYPE VIII CRYSTAL GRADE
	3	AVERY DENNISON OMNI-VIEW T-9500 PRISMATIC HIGH INTENSITY SHEETING
FONT / GRAPHICS (BLACK)	1	3M PROCESS COLOR SERIES 8851 INK
	2	NIPPON CARBIDE GRAFFITI RESISTANT 3803 INK
	3	AVERY DENNISON 4930 INK
ANTI - GRAFFITI OVERLAY	1	3M PREMIUM PROTECTIVE OVERLAY FILM 1160
	2	NIKKALITE BRAND HI - SCALE F-40801
	3	AVERY DENNISON OL - 1000 PREMIUM ANTI - GRAFFITI FILM
PANEL	1	1/8" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	PER SCRRA ES5210

SIGN NOTES:

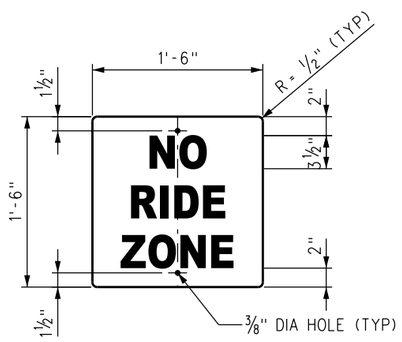
1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. FONT SHALL BE PER SCRRA ES1212, SIZE AS INDICATED.
3. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
4. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.
5. SCREENED-PROCESS COLORS AND NONREFLECTIVE, OPAQUE BLACK FILM SHALL HAVE EQUIVALENT OUTDOOR WEATHERABILITY CHARACTERISTICS AS THE RETROREFLECTIVE SHEETING.

INSTALLATION NOTES:

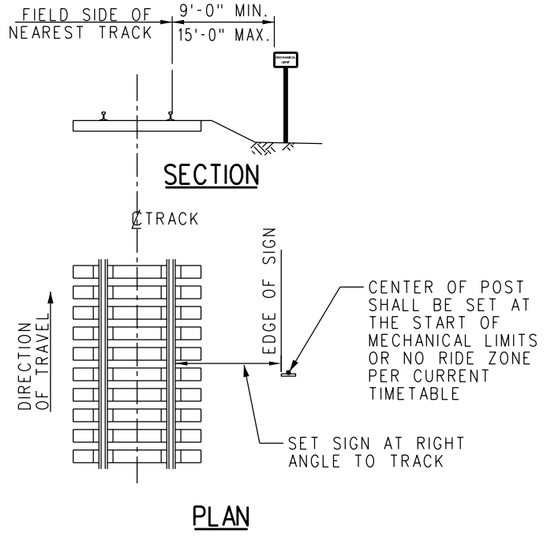
1. THE SIGNS SHALL BE SET PER THE LOCATION OF SIGN DETAIL ON THIS SHEET. EXCEPTIONS SHALL REQUIRE THE APPROVAL OF SCRRA.
2. THE POST SHALL BE SET ON THE RIGHT HAND SIDE OF THE TRACK AS ONE FACES THE YARD.
3. FACE OF THE SIGN SHALL BE SET FACING TRAINS APPROACHING THE YARD.



MECHANICAL LIMIT SIGN



NO RIDE ZONE SIGN



LOCATION OF SIGN

REV.	DATE	DESCRIPTION	DES.	ENG.
C	04-14-23	REVISED INSTALLATION NOTES & SIGN LOCATION DETAIL	AC	RG
B	09-25-20	REVISED NOTES, ADDED LOCATION OF SIGN DETAIL	AC	JMM
A	03-22-13	REVISED MATERIAL SPECIFICATIONS	AC	NDP

DRAWN BY: A. CARLOS DATE: 05/18/05

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

MECHANICAL LIMIT AND
NO RIDE ZONE SIGNS

STANDARD 5223
SCALE: NTS
REVISION C SHEET 1 OF 1
CADD FILE: ES5223

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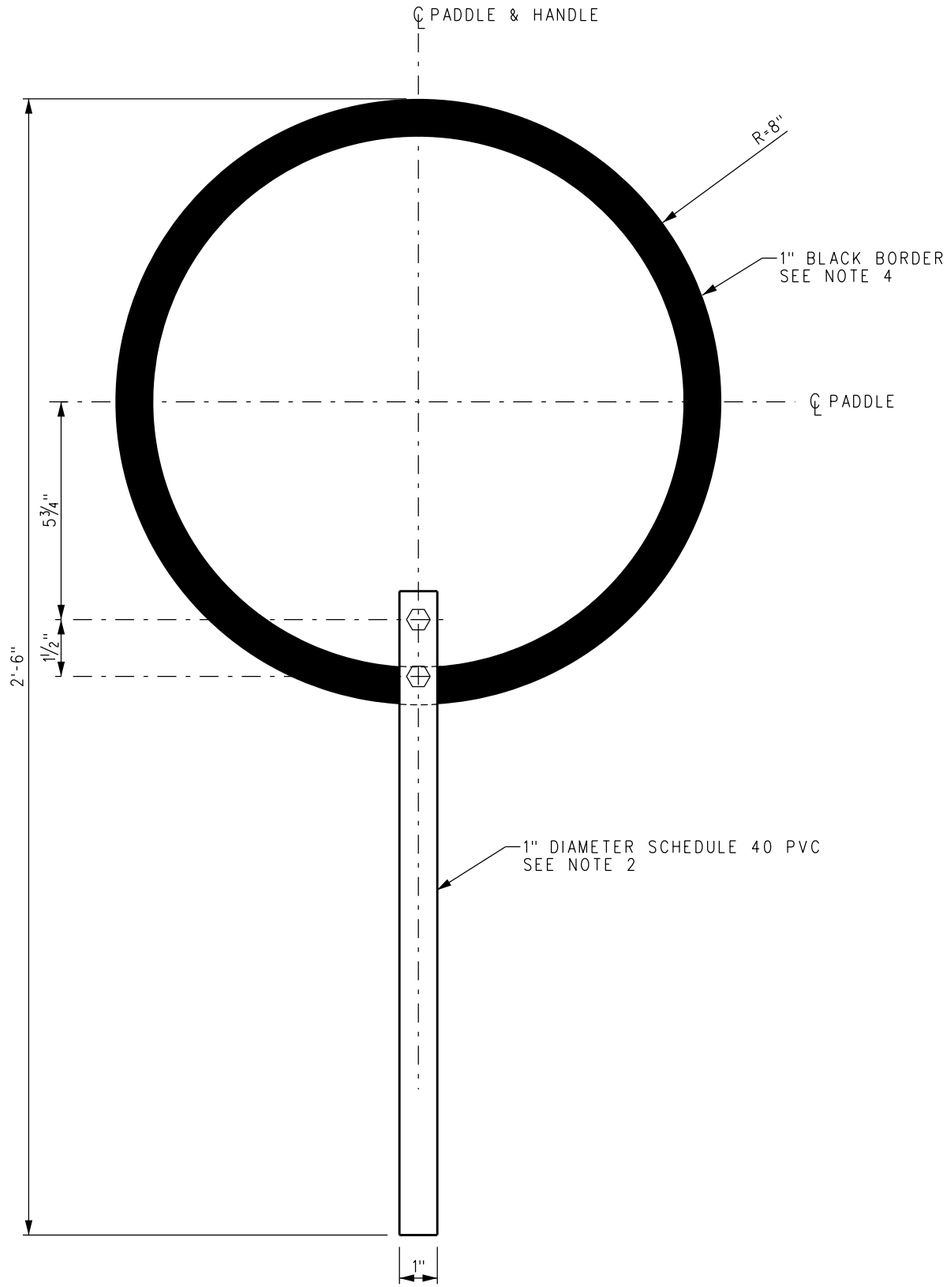
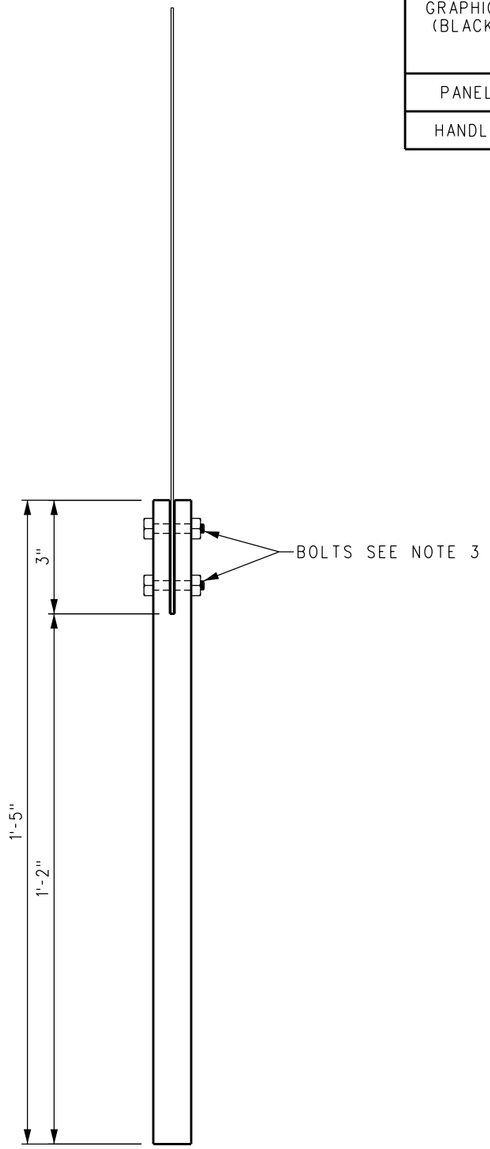




MATERIAL SPECIFICATIONS

PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
SHEETING (WHITE)	1	HEXIS - ECOTAC SHEETING, E3155B
	2	3M GRAPHIC SERIES 50 WHITE
GRAPHICS (BLACK)	1	3M PROCESS COLOR SERIES 8851 INK
	2	NIPPON CARBIDE GRAFFITI RESISTANT 3803 INK
	3	AVERY DENNISON 4930 INK
PANEL	1	16" DIA. x .063 THICK ALODINED ALUMINUM
HANDLE	1	1" DIA SCHEDULE 40 PVC (17" LONG, SLOTTED 3")

NOTES

1. TARGET PLATE TO HAVE NON-REFLECTIVE WHITE VINYL APPLIED TO BOTH SIDES.
2. HANDLE SHALL BE SCHEDULE 40 PVC SLOTTED TO ACCOMODATE TARGET PLATE.
3. HANDLE SHALL BE SECURED TO TARGET PLATE WITH TWO ¼" X 20 X 1¼" PLATED HEX HEAD BOLTS. NUTS SHALL BE ¼" X 20 ROUND BASE WELD NUTS.
4. A 1" BLACK BORDER SHALL BE SILK SCREENED TO BOTH SIDES OF TARGET PLATE WITH NO SPACE BETWEEN EDGE OF TARGET PLATE AND BORDER.

REV.	DATE	DESCRIPTION	DES.	ENG.
X	XX-XX-XX	REVISION	XX	XX

DRAWN BY: A. CARLOS DATE: 04/01/04

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

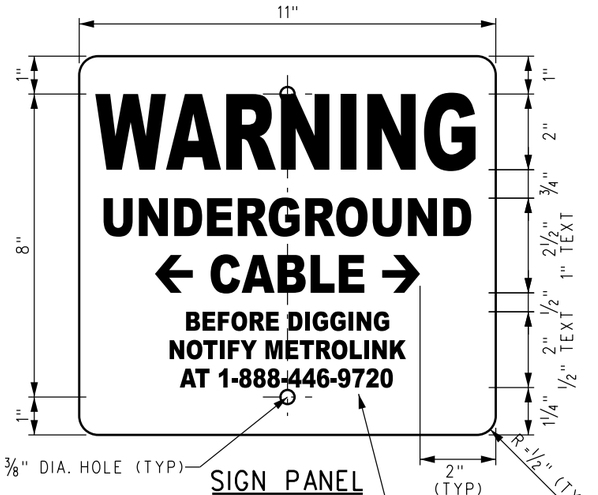
SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

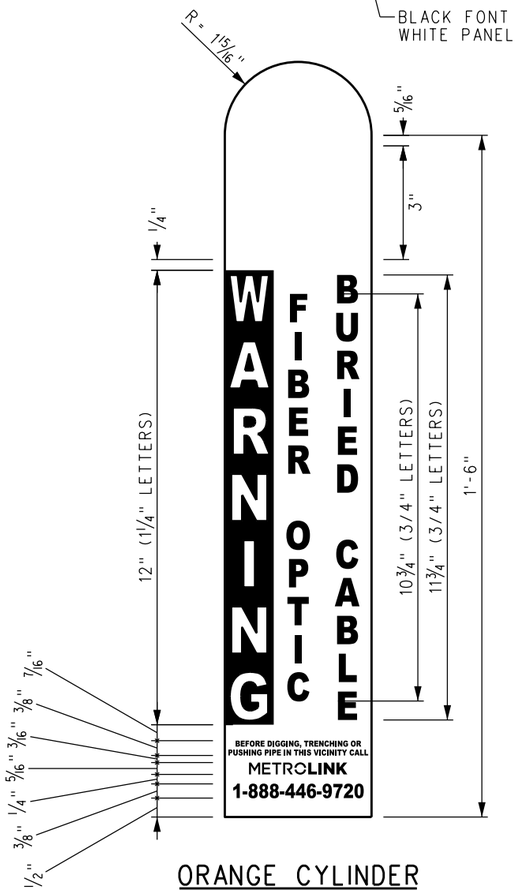
WARNING PADDLE

STANDARD 5225
SCALE: NTS
REVISION -
SHEET 1 OF 1
CADD FILE: ES5225

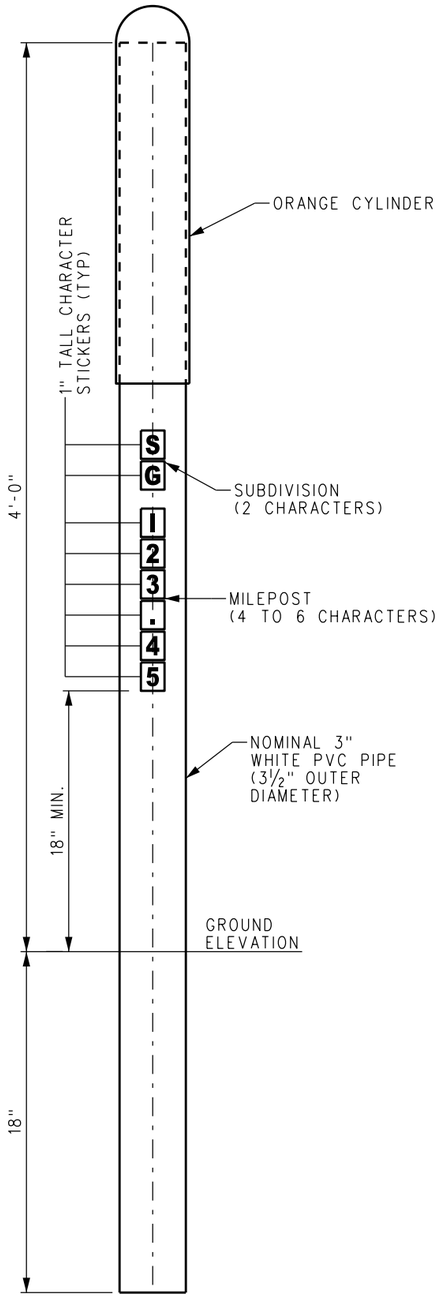
UserName•> scrrapw11ics01$ Date Plotted: 3/27/2023 4:16:02 PM Plot Driver•> C:\Program Files (x86)\Common Files\InterPlot\IPLOT\bin\iplotdrvn.plt FileName•> \\scrrapw11ics01\iCS_pdf_work_dir\90\494_28\ES5225.dgn



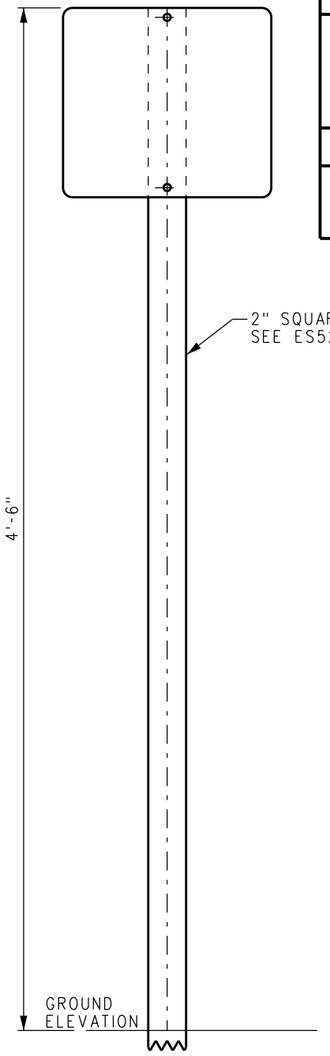
SIGN PANEL



ORANGE CYLINDER



FIBER OPTIC CABLE MARKER



SIGN ELEVATION

MATERIAL SPECIFICATIONS

PRODUCT	SYSTEM	MANUFACTURER AND PRODUCT
HIGH INTENSITY SHEETING (WHITE)	1	3M SCOTCHLITE HIGH INTENSITY PRISMATIC WHITE GRADE 3930 SHEETING
	2	NIPPON CARBIDE RETRO-REFLECTIVE SHEETING TYPE VIII CRYSTAL GRADE
	3	AVERY DENNISON OMNI-VIEW T-9500 PRISMATIC HIGH INTENSITY SHEETING
FONT / GRAPHICS (BLACK)	1	3M PROCESS COLOR SERIES 8851 INK
	2	NIPPON CARBIDE GRAFFITI RESISTANT 3803 INK
	3	AVERY DENNISON 4930 INK
ANTI - GRAFFITI OVERLAY	1	3M PREMIUM PROTECTIVE OVERLAY FILM 1160
	2	NIKKALITE BRAND HI - SCALE F-40801
	3	AVERY DENNISON OL - 1000 PREMIUM ANTI - GRAFFITI FILM
PANEL	1	⅛" THICK ALUMINUM, ALCOA 6016-T6 OR EQUAL
POSTS, ANCHORS & HARDWARE	1	PER SCRRA ES5210

SIGN NOTES:

1. SIGNS SHALL INCLUDE ALUMINUM PANEL, RETROREFLECTIVE SHEETING, POLYURETHANE PAINT, SCREENED-PROCESS COLORS OR FILM, UV PROTECTION OVERLAY, ANTI-GRAFFITI OVERLAY, POSTS, ANCHORS AND HARDWARE.
2. FONT SHALL BE PER SCRRA ES1212, SIZE AS INDICATED.
3. PANEL SHALL BE PAINTED ON ALL SIDES WITH TWO PART ACRYLIC POLYURETHANE PAINT COATING.
4. RETROREFLECTIVE SHEETING SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4956, CLASS IX OR GREATER. RETROREFLECTIVE SHEETING SHALL HAVE CLASS 1, 3, OR 4 ADHESIVE BACKING WHICH SHALL BE PRESSURE SENSITIVE AND FUNGUS RESISTANT.
5. SCREENED-PROCESS COLORS AND NONREFLECTIVE, OPAQUE BLACK FILM SHALL HAVE EQUIVALENT OUTDOOR WEATHERABILITY CHARACTERISTICS AS THE RETROREFLECTIVE SHEETING.

INSTALLATION NOTES

1. SIGNS OR MARKERS SHALL BE PLACED ADJACENT TO ALL SCRRA AND 3RD PARTY UNDERGROUND SIGNAL, COMMUNICATION AND ELECTRICAL CABLES.
2. SIGN FACE SHALL BE ORIENTED PARALLEL TO CABLE.
3. EDGE OF SIGN OR MARKER POST SHALL BE SET NO CLOSER THAN 9'-0" FROM THE FIELD SIDE OF THE NEAREST RAIL. EXCEPTIONS SHALL REQUIRE THE APPROVAL OF SCRRA. INSTALLER SHALL AVOID DAMAGING UNDERGROUND UTILITY.
4. SIGNS OR MARKERS SHALL BE PLACED:
   a. NO MORE THAN 500' APART
   b. AT EVERY SPLICE LOCATION
   c. AT EVERY POINT OF CHANGE OF DIRECTION
   d. ON EACH SIDE OF BORE OR BRIDGE ATTACHMENT
   e. WITHIN SIGHT OF MARKERS BEFORE AND AFTER.
   f. 1' OFFSET FROM THE UNDERGROUND RUNNING LINE WHEREVER POSSIBLE. THE ACTUAL OFFSET SHALL BE PERMANENTLY NOTED ON THE SIGN OR MARKER.
5. MARKERS SHALL BE INDIVIDUALLY NUMBERED AND SHOWN ON THE AS-BUILT DRAWINGS.

REV.	DATE	DESCRIPTION	DES.	ENG.
C	01-01-23	REVISED LOGO	AC	TQ
B	06-05-20	REVISED NOTES AND DRAWING TITLE	AC	JMM
A	03-22-13	REVISED MATERIAL SPECIFICATIONS	AC	NDP

DRAWN BY: HDR DATE: 12/12/10

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

UNDERGROUND ELECTRIC AND
FIBER OPTIC CABLE SIGN AND MARKER

STANDARD: 5229
SCALE: NTS
REVISION: C SHEET: 1 OF 1
CADD FILE: ES5229

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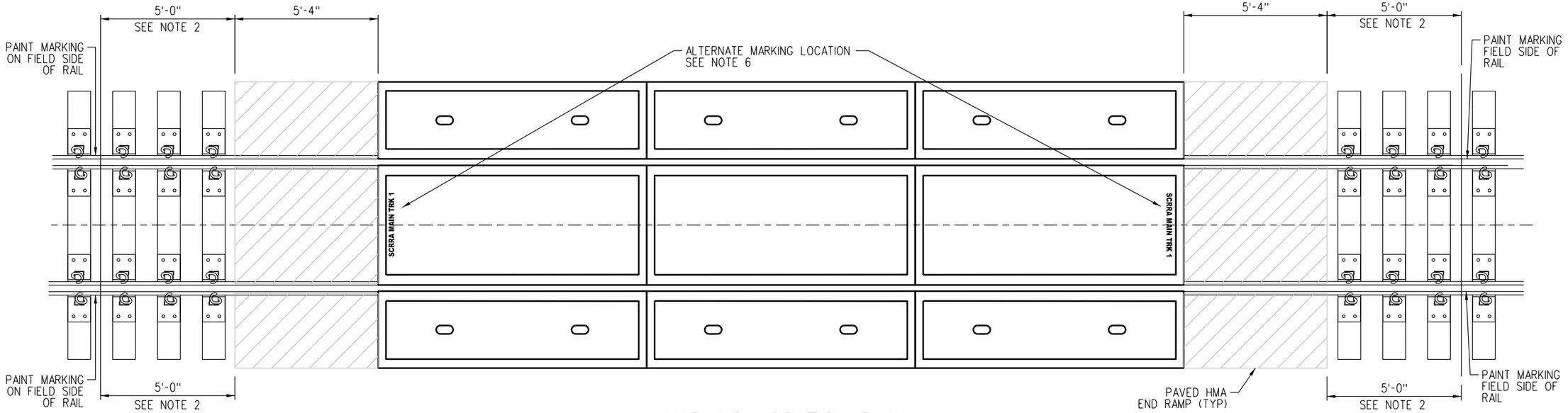
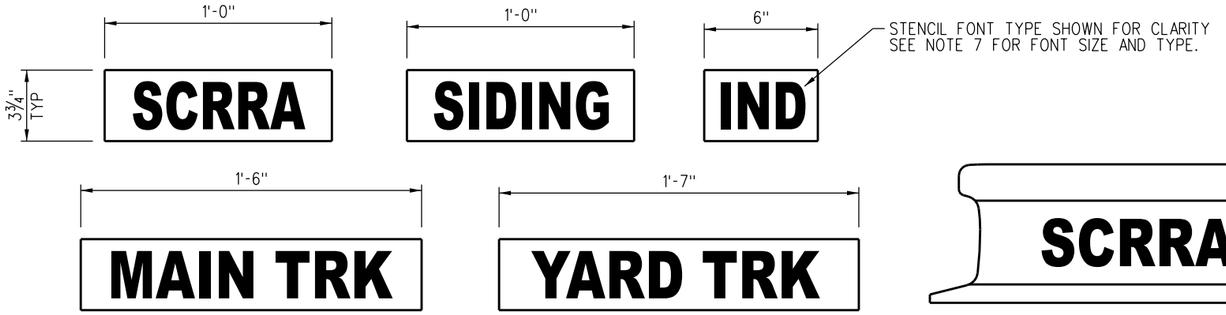


MARKING LOCATION PLAN



STENCIL OPTIONS

TYPICAL MARKING ON WEB OF RAIL

NOTES:

1. TRACK IDENTIFICATION MARKINGS TO BE UTILIZED AT ALL TRACK CROSSINGS.
2. RAIL TO BE MARKED ON THE WEB WITH TEXT FACING THE FIELD SIDE OF THE TRACK. MARKING TO BE MADE 5'-0" FROM THE END OF THE PAVED HMA END RAMP.
3. MARKING WILL MATCH WHAT THE TRACK IS DESIGNATED IN SCRRA TIMETABLE.
4. LOCATIONS WITH MULTIPLE MAIN LINE TRACKS SHALL BE MARKED WITH SCRRA MAIN TRK FOLLOWED BY THE TRACK NUMBER. EXAMPLE: SCRRA MAIN TRK 2.
5. SIDING, INDUSTRY AND YARD TRACKS WILL BE MARKED WITH THE MATCHING STENCIL.
6. IN LOCATIONS WHERE WEB OF RAIL IS BLOCKED FROM VIEW, THE IDENTIFICATION MARKING MAY BE MADE ON THE TOP SURFACE OF THE CROSSING PLANKS. TEXTS TO BE LOCATED ON THE OUTER EDGE READABLE WHEN FACING AWAY FROM THE CENTER OF THE CROSSING.
7. MARKING TO BE MADE USING 2¾" GOTHIC LETTERING STENCIL.
8. MARKINGS SHALL BE APPLIED TO THE WEB OF THE RAIL WITH OSHA SAFETY WHITE SPRAY PAINT. BLACK PAINT BACKGROUND MAY BE USED WHEN WHITE PAINT ALONE IS DIFFICULT TO SEE.

REV.	DATE	DESCRIPTION	DES.	ENG.
B	09-25-20	REVISED PLAN AND NOTES	AC	JMM
A	8-30-12	REVISED NOTE 8	AC	NDP

DRAWN BY: A. CARLOS DATE: 03/31/2011

PRINCIPAL ENGINEER, DESIGN & STANDARDS

ASSISTANT DIRECTOR, DESIGN

METROLINK

SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY
900 WILSHIRE BLVD., SUITE 1500, L. A., CA. 90017

ENGINEERING STANDARDS

MARKING FOR TRACK IDENTIFICATION

STANDARD 5230
SCALE: AS NOTED
REVISION B
SHEET 1 OF 1
CADD FILE: ES5230

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