



OFFICE OF CHIEF ENGINEER

General Specifications for Sub-grade and Above Grade Utility Crossings of Railway's Right-of-Way

I. General Provisions

- A. A plan and profile drawing containing all pertinent details measured in U. S. lineal feet for the proposed crossing shall be submitted to the Engineering Department for approval prior to the preparation of any agreement. (Metric Units, not accepted). All crossings (above grade/sub-grade) shall be substantially perpendicular to the Railroad Main Line and location of crossing shall be limited to crossing as few tracks as possible.
- B. The plan will show all information for the proposed crossing installation with reference to the nearest Railroad Mile Post or centerline of nearest street intersection.
- C. Request for installation shall be accompanied with a letter signed by the owner, company officer, or government agent.
- D. The lessee will be responsible for any and all costs of repairs or maintenance of the Railroad's property and structures disturbed or damaged due to the installation or construction aftereffects.
- E. The lessee of an installation approved by agreement will be required to provide proof of protective insurance for and during construction.
- F. As-built drawing of the installation shall be submitted with the completion report, which will include exact location referenced to nearest Railroad milepost or centerline of nearest street intersection of installation, exact profile showing subgrade elevations, and cross-sections.

II. Subgrade Pipelines and Cables

- A. All subgrade carrier pipelines and electrical wirelines shall be installed within a casing pipe, except for telecommunication wirelines that may be installed without casings.
 - 1. All casing pipes will extend from right-of-way line to right-of-way line and shall be equipped with shut-off valves each side, protecting the entire R/W crossing.
 - 2. The Railroad will not permit casing installation by open-cut method through the track(s) roadbed.
 - 3. All electrical and gas pipelines shall be encased with steel pipe in accordance with Section II(C).

B. Application will be accompanied with plans showing profile in relation to actual ground, track, and other facilities at the project site.

1. The method of installation will be detailed, including the location of jacking pit as measured from centerline of nearest track.
2. The casing pipe must be installed at least 5.5 feet below bottom of crosstie or a minimum of 4' from natural ground grade (whichever is greater).
3. Jacking pit locations must be outside of Railroad right-of-way lines. No open-cut lateral crossings will be allowed. The pit will be protected with adequate sheeting, bulkheads, and sidewalls to protect the Railroad's roadbed. Proper barricades and lights, if necessary will be set around the pit for positive protection.

C. Casing pipe specifications are as follows.

1. Metal casing pipe shall have a minimum diameter of 2.0 inches. Size 2.0 through 8.0-inch diameters, must be galvanized, and meet standard weight ASTM Specification A53, Grade B. Thread coupling is allowed.
2. Casing pipe 8.0 inches and larger in diameter may be used, complying with section C-3. All joints or couplings, supports, insulators or centering devices for the carrier pipe shall be considered in the selection of the casing diameter.
3. Casing pipe shall have a minimum cover of 5 ½ ft. below bottom of tie (see Section II, Item B2), and shall have a **minimum** wall thickness as shown in the table provided below, unless computations indicate that a thicker wall is required (see section C-4). All casing pipe shall be protected by black bituminous coating for protection against corrosion (Coated steel pipe that is bored or jacked into place shall conform to the wall thickness requirements for non-coated steel pipe since the coating may be damaged during installation). Wall thickness designations for steel casing pipe for Cooper E-80 loading including impact are as follows:

Diameter (Inch)	Thickness (Inch)
8 – 16	9/32
18 – 20	11/32
22 – 24	3/8
26 – 28	7/16
30 – 34	17/32
36 – 38	9/16
40 – 48	11/16
52 – 56	13/16
60 – 66	15/16
72 – 78	1-1/16 (*)
84 – 90	1-3/32 (*)
96 – 102	1-1/8 (*)
108 – 114	1-5/16 (*)
120	1-1/2 (*)

(*) = Casing Pipe diameters exceeding 72 inches require review and approval from Railroad Chief Engineer prior to use.

4. All Casing thickness determinations will be based on Cooper E-80 Railway Loading, using applicable formulas and computations performed by a registered professional engineer, State of Florida. The (Signed/Sealed) computation results will accompany the plans for review by the Engineering Department.
5. All casing pipe joints will be welded in accordance with AISC Specifications, Section 1-7-2. All joint welds will be full penetration.
6. At no time will construction interfere with the normal and safe operation of the Railroad. No construction, manpower, or equipment will enter or operate right-of-way within a safety clearance of 25.0 feet from the centerline of near track.
7. All casing pipe installations, where the diameter is greater than 48 inches, will require a pre-construction conference with all parties, at the project location.
8. Pre-construction arrangements will be made with the Engineering Department at least one week prior to construction. A Railroad inspector must be present during the entire construction of the casing pipe. The inspector will have complete authority over the project on the Railroad's right-of-way.
9. All Safety Inspection Costs will be borne by the lessee.

D. Tunnel liner requirements are as follows.

1. All applicable preceding sections will govern tunnel liner usage.
2. Tunnel liner plate will be 12-gauge, galvanized, and all bolts and nuts will be galvanized.
3. Live load will be based on Cooper E-80 Railway Loading, using applicable formulas and computations performed by a registered professional engineer, State of Florida. The (signed/Sealed) computation results will accompany the plans for review by the Engineering Department.
4. Grout holes, if required will be provided at 10-foot intervals along the roof and sides.
5. The tunnel liner-jacking shield will protect 180 degrees of the upper section and material removed to allow for a minimum 1:1 slope, with a minimum 2.0 feet of undisturbed soil supporting the overburden.
6. The tunnel liner installation will progress with sufficient manpower and supervision for around-the-clock construction until the liner is completed, through the limits of the right-of-way.

E. Carrier pipeline specifications are as follows.

1. Reinforced concrete pipe:
 - a. Materials: Modified bell and spigot or tongue and groove in accordance with current ASTM Specification C76 Class V for Railway strength pipe or current specification for prestressed concrete pipe.

- b. Joints: Rubber and steel joint for prestressed pipe in accordance with current Lock Joint Pipe Company Specification on SP5, or equivalent. Joints for bell and spigot and tongue and groove pipe to be in accordance with current standard practice. Joints may be made using confined continuous rubber gasket.
 - 2. Cast iron pipe:
 - a. Materials: Pipe must conform to current ASTM Specification A142 for "Standard Pipe."
 - b. Joints: Bell and spigot, caulked with lead and oakum, or approved mechanical type joint.
 - 3. Polyethylene pipe (HDPE):
 - a. Materials: Pipe must conform to current ASTM Specifications D2104, Schedule 40, for standard pipe.
 - 4. Steel pipe:
 - a. Materials: Pipe must conform to current ASTM Specification A120.
 - b. Joints: All joints must be welded or of an approved mechanical type.
- F. Carrier Pipe Shut-Off Valves - Carrier pipe under pressure shall have a sufficient shut-off valve(s) at each end outside of Railroad's right-of-way limits. The Utility Owner shall install accessible emergency shut-off valves within effective distances on each side of the Railroad. Valves shall not be located within the Railroad right of way. The carrier pipe must be installed within a steel casing.
- G. Casing Pipe Vents - All casing pipes shall be properly vented. Vent pipes shall be of sufficient diameter, but in no case less than four (4) inches in diameter and shall be attached near each end of casing, projecting through ground surface and located outside of Railroad property limits. Where possible, they shall be marked and located at the vent location. The markers shall display the Railroad Milepost location, the name and address of the utility owner, and a phone number contact in case of emergency. Vent pipes shall extend not less than four (4) feet above ground surface. Top of vent pipes shall be fitted with a down-turned elbow, properly screened; or a relief valve installed.
- H. The inside diameter of the casing pipe shall be such as to allow the carrier pipe to be removed subsequently without disturbing the casing or the roadbed. For steel pipe casings, the inside diameter of the casing pipe shall be:
 - 1. For carrier pipe less than 6 inches in diameter, the interior diameter of the casing pipe will be at least 2 inches greater than the largest outside diameter of the carrier pipe joints or couplings.
 - 2. For carrier pipe 6 inches in diameter and over, the interior diameter of the casing pipe will be at least 4 inches greater than the largest outside diameter of the carrier pipe joints or couplings.
- I. All Casing pipe ends shall sufficiently constructed as to prevent leakage of any substance from the casing throughout its length. Each end of the casing shall require a sufficient permanent seal to prevent the potential from leakage of any substance from the casing pipe. Grout fill is an acceptable method installed by pressure grouting. If used, the grout material should consist of non-shrink sand cement slurry or Railroad approved equivalent, and sufficiently seal the casing pipe ends to the satisfaction of the Railroad. If deemed necessary, and at the sole discretion of the Chief Engineer, the entire void between the carrier pipe and casing pipe throughout the entire length of the casing pipe may be required to be filled upon notification from the Railroad.

- J. For directional bore installations:
 - 1. Minimum cover within 25.0 feet centerline any track, 10-foot from bottom of the crosstie to top of pipe or casing.
 - 2. Minimum cover outside 25.0 feet centerline near track, 5-foot from natural ground to top of pipe or casing.

III. Above Grade Structures

- A. Standard overhead clearances for fixed structures, such as bridges and other overhead fixed structures shall provide a minimum of 23.5 feet vertical clearance above top of rail (T/R).
- B. Pre-design conference with the Engineering Department will set forth horizontal clearance of subgrade, grade, and above grade construction and structural limits.

IV. Above Grade Wirelines

- A. All installation of aerial lines and cables will provide a minimum clearance above top of rail (T/R) of highest track. Standard overhead clearance for all aerial line crossings, both power and non-power line crossings, shall provide the following clearances:
 - 1. 43 feet above T/R for lines 0 to 75,000 volts.
 - 2. For lines over 75,000 volts, review and approval from Chief Engineer required.
- B. For installation of aerial line and cable crossings at or near other fixed facilities, such as automated crossing gate arms at highway grade crossings and any other facility that the Railroad might deem additional clearance requirements necessary, aerial lines and cables must provide a minimum 43' vertical clearance above top of rail (T/R) of highest track, except as otherwise noted in Section IV(C).
- C. Exceptions: At Roadway Grade Crossings, provide safe clearances between warning device and electrical transmission, distribution cables (including messenger and neutral wires), and all communication lines. All overhead utility crossings shall provide a minimum 43' vertical clearance from top of rail (T/R) of highest track, or additional clearances necessary to obtain operational clearances from crossing warning device assemblies as follows:
 - 1. 43' Minimum or 6'0" vertical clearance from Gate tip in vertical position or structure mast (whichever is greater).
 - 2. 43' Minimum or 13'-6" vertical clearance from Cantilever arm or structure mast (whichever is greater).
- D. Should the Railroad add or modify existing crossing warning devices of facilities at any highway grade crossing, existing wire lines or cables shall be raised or relocated immediately on notice from Railroad to lessee and at the sole cost and expense of the lessee.
- E. All parallel electrical lines will require an electromagnetic compatibility (EMC) study to determine the effects the facility may have on railroad and signal communication systems. The Railway requires the cost of the EMC study to be paid in full by the potential lessee prior to the field study being conducted.

V. Miscellaneous

- A. Cathodic protection of pipelines, cables, or casings:
 - 1. When cathodic protection is provided, it shall be installed so as not to induce currents, which will interfere with the signal apparatus of the Railroad. Any change required in the manner, method, or location of such cathodic protection shall be made at the sole cost and expense of the lessee and to the satisfaction of the Engineering Department of the Railroad.
- B. Proposed structures must maintain a minimum 10-foot horizontal clearance to the face of any signal, post, crossing gate or other above grade obstruction.

VI. Standard Drawings

- A. The following Standard Reference drawings in reference to these written specifications are available upon request:
 - 1. **ES8049.1** – Mainline Design & Installation of CMP
 - 2. **ES8090.2** – Overhead Wire Line Permit Information (2 pages)
 - 3. **ES8090.3** – Overhead Bridge Permit Information
 - 4. **ES8090.4** – Information Required for Typical Directional Bore
 - 5. **ES8090.5** – Information Required for Typical Jack & Bore (Carrier Pipe Not Under Pressure)
 - 6. **ES8090.6** – Information Required for Typical Jack & Bore (Carrier Pipe Under Pressure)