



Guidelines for Design and Construction of Industry Tracks

August 1, 2017

KANSAS CITY SOUTHERN

DISCLAIMER

The following designs and specifications are guidelines to be followed in construction, maintenance and repair of track and related facilities of The Kansas City Southern Railway Company, Gateway Eastern Railway Company and The Texas Mexican Railway Company. Application or adaptation of each of these guidelines to individual circumstances requires application of professional engineering judgment based on the site location and operating conditions, existing contractual obligations, and on the provisions of currently applicable Federal Railroad Administration regulations and other federal requirements such as the Manual on Uniform Traffic Control Devices.

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I. General

The Kansas City Southern Railway Company (hereinafter called "KCS") shall approve in writing all plans prior to commencement of work. These recommendations are intended to supplement plans. In case of conflict between drawings and these recommendations, the drawings shall take precedence.

A. Approved Plan

An Approved Plan should be developed by communication between the Industry and the Railroad Company through formal and informal channels. The Approved Plan will be the basis of a formal Industry Track Agreement (ITA), between the parties in the matters of track ownership, operation and maintenance. This plan should also serve as a part of the Industry's contract documents of track construction.

Conditions may preclude compliance with each and every provision of this publication. The Industry is urged to seek the Railroad Company's approval of any anticipated variance prior to presenting a plan for approval. Any approval given or supervision exercised by the Railroad Company hereunder, or failure of the Railroad Company to object to any work done, material used, or design or method of construction employed, shall not be construed as an admission of responsibility of the Railroad Company nor as a waiver of any of the obligations of the Industry or such party constructing the track.

B. General Notes

Any detail not specifically covered herein shall be governed by the applicable section of the current Manual of for Railway Engineering promulgated by AREMA, the current KCS Standards, the current KCS Standard Technical Specifications for Construction Projects and the Western Common Standards.

1. KCS Work:

The Railroad Company, in general, will perform all track work from the Point of Switch in its main or side track, to the Right-Of-Way at the Industries cost. The Point of Switch is where the turnout rails begin to diverge from the main or side track running rails. Construction beginning in a Lead Track off Railroad Company's right-of-way is, in general, the Track Owner's responsibility.

2. Track Owner's Work

The Track Owner is expected, in general, to construct the subgrade, drainage and sub ballast for the entire project and to build the track from the right-of-way to the end. Any requirement for a flagman to protect the property and operation of the Railroad Company during the activities of the Owner's Contractor on the Railroad Company's right-of-way will be as directed by the Railroad Company's Division Engineer at Track owner's expense.

The Owner's Contractor is not to enter the property of the Railroad Company until a proper "Right-of-Entry" agreement has been executed between the Owner and the Railroad Company, including insurance, Roadway Worker Safety Training and flagging protection.

3. Railroad's Prerogative

The Owner is advised that the acceptance or denial of a track constructed by a Contractor is the prerogative of the Railroad Company. The agreement between the Owner and his Contractor should be made so that Owner's final acceptance of the Contractor's work is based on the issuance of a Track-In-Service Bulletin by the Railroad Company.

4. Track Contractors

There are a number of firms in the business of railroad track engineering, construction and maintenance. The Simmons-Boardman Publishing Corporation in the magazine publication "Railway Track and Structures" annually lists in its "NRC Directory Issue" a directory of companies specializing in one or more phases of railroad track contracting. A reprint of the listing is available from the magazine's office at 222 South Riverside Plaza, Suite 1870, Chicago, IL 60606, Phone: (312) 466-1870, fax: (312) 466-1055 at a nominal cost.

Also, there is a non-profit organization of railroad track contractors. This group, the National Railroad Construction and Maintenance Association, Inc. can be addressed at 6300 Walker Street, Suite 109, Minneapolis, MN 55416, Phone: (612) 920-6220.

It shall be understood by the Contractor (or Sub-Contractor) that any and all work not specifically mentioned in these recommendations, or in the attached plans/drawings, which may be necessary, either directly or indirectly, for the proper carrying out of the intent thereof, shall be required and the Contractor shall perform all such work just as though it were particularly delineated or described. Also, the Contractor shall understand that final approval of the track for service is subject to inspection and approval of the "KCS" prior to acceptance

by Owner. Close contact with KCS's supervisory officials is encouraged. No work shall be performed on KCS's right-of-way, or in such proximity which may interfere with KCS's tracks or roadbed, without advance permission of KCS, including insurance, Roadway Worker Safety Training and flagging protection.

5. Underground Utilities

Underground utility pipeline crossings shall conform to American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual, Volume 1, Part 5.

II. Standard Specifications

A. AREMA

The American Railway Engineering and Maintenance-of-Way Association (AREMA) publishes a Manual of Railway Engineering (Fixed Properties) as a recommended practice in the engineering, design and construction of railroad fixed properties, with the exception of signals and communications. This manual contains information on design, materials, principles and practices recommended for railway use. It is used by individual railroad companies in whole, in part, or with modification, with a view to promoting efficient and economical location, construction, operation and maintenance of railways.

Chapters and Parts of the AREMA Manual are referenced in this publication as AREMA Chapter, then Part. The various chapters are available separately from the Executive Director, American Railway Engineering Association, 50 F Street, NW, Washington, DC 20001 , Telephone: (202) 639-2190 Fax: (202) 639-2183, at a nominal charge.

B. ASTM

The American Society for Testing and Materials (ASTM) publishes standard specifications for materials and materials testing. ASTM designations are referred to in this publication in the usual manner, except the year of issue is omitted. The most current year of issue is intended.

C. State Highway Department Specifications

Each of the Highway Departments in the states served by the Railroad Company issues a Standard Specification for Road and Bridge Construction. This Standard Specification is useful in developing project specifications in most matters of railroad facility construction except railroad track, grade crossings and bridges. Use of this Standard Specification offers the advantage of a familiar document to local contractors, and inclusion of sections from it, in whole, in part, or with modification, for project construction and materials is suggested.

D. Track work and Grade Crossing Specifications

These recommendations offer a collection of suggested track and grade crossing material and construction specifications. The Track Owner's Engineer is invited to use these recommendations in whole, in part, or with modification, as his specifications for track work and grade crossing materials and construction. The FRA regulates grade crossings, which must be permitted and properly signed with a DOT number. See KCS Drawing No. S-120 & S-127. Contact KCS Public Safety Director 318-676-6296 prior to construction to apply for a crossing permit.

E. Welded Track, Other Special Track Work, and Track Scales Specifications

Industry Lead Tracks shall be continuously welded if longer than one mile or carry 10 million gross tons or more annually. Specifications for continuous welded

rail track, track-on-slab, rail crossings, other special track work and track scales are not included in this publication.

F. Railroad Bridge and Track Supporting Structure Specifications

Railroad bridges and track supporting structures are to be proportioned to a design load of Cooper's E-80, to included impact without hammer blow, where an impact factor is required.

AREMA Chapter 7 addresses the details of designs in wood, Chapter 8 in concrete, and Chapter 15 in steel. Owner is required to be familiar with all pertinent chapters and sections as they pertain to railway bridges.

Plans requiring track bridges or other track supporting structures must be reviewed and approved by the Railroad Company's Engineering Department.

III. Track Classifications

This section will define two categories of track constructed to serve industry, two categories of service, and will note other track use description terms. In general, the tracks will be classified as "Class I as defined by FRA (Section 49 CFR, item 213)"

A. Industry Track Categories

1. Industry Lead Track:

A track which begins on a main or side track of the Railroad Company and extends into an area of business. Its ownership is held so that other businesses may, upon agreement with the tracks owner and the Railroad Company, construct tracks beginning on the Industry Lead Track to serve their individual places of business.

2. Industry Service Track:

A track which begins on a main or side track of the Railroad Company or on an Industry Lead Track served by the Railroad Company and extends to a place of business.

B. Service Categories

1. Unit Train Service:

A service using cuts or trains of 35 or more similar cars. The phrase “for Unit Train Service” is to be added to the Industry Track Category when writing about these tracks. Unit train loop unloading facilities have specific design standards. Please refer to KCS Guidelines for Unit Train Facilities.

2. General Service:

A service using single cars, or cuts or trains of similar or mixed cars, expected to be less than 35 in number. The phrase “for General Service” is assumed, unless otherwise noted, and needs not be added when writing about these tracks.

C. Other Use Descriptions

1. KCS Switched:

A track on which cars are switched by Railroad Company's equipment and crews. The phrase "KCS Switched" is assumed, unless otherwise noted, and needs not be added when writing about these tracks.

2. Owner Switched:

A track on which cars are switched by locomotive or other car moving arrangements in the control of the track owner. The phrase "Owner Switched" is to be added to the Industry Track and Service Categories when writing about these tracks.

IV. Clearances

Minimum horizontal clearance from center line of tangent track to any and all structures or obstructions at the top of rail or above, shall be 9.0 feet, except when the structure is adjacent to tangent track with the track being curved within 80 feet, the horizontal clearance on each side of track shall be increased as follows:

| Distance From Structure <u>To Curved Track (In Feet)</u> | Increase Per Degree <u>Of Curvature (In Inches)</u> |
|---|--|
| 0 – 20 | 1.00 |
| 21 – 40 | 0.75 |
| 41 – 60 | 0.50 |
| 61 – 80 | 0.25 |

On a curved track the horizontal clearance on each side of track shall be increased 1 inch per degree of curvature with a maximum increase of eighteen (18) inches.

Any clearance less than the above must have PRIOR written approval of KCS and the appropriate State Public Service Commission or Corporate Commission. In the event variance from any standard of clearance is granted, the Industry must erect and maintain any warning signs, telltales and/or other devices required by the Railroad Company and/or a legal body. Refer to KCS Drawing No. RB-703, for STATE LEGAL CLEARANCE REQUIREMENTS and additional notes on **KCS standard clearance requirements**.

V. Overhead and Underground Utilities

Overhead and underground utilities which cross or are adjacent to tracks which Railroad Company operates shall be governed by the applicable section of the Manual for Railway Engineering promulgated by AREMA and the National Electric Code. Wires and/or cables shall not be placed in or through culverts. Overhead clearance or various classes of wires above the tops of rails shall not be permitted to become less than specified in KCS Drawing No. RB-704 or the or the current provisions of the NEC.

VI. Roadbed Construction

The Industry or Owner shall construct or cause to be constructed, the grade and/or all drainage structures necessary for the track, including the grade and drainage for that portion of the track on KCS's right-of-way. This work will include all necessary clearing and grubbing, cutting and sloping of ditches, and sub-grade for drainage, filling and compacting area, and stabilization. Disposal areas of surplus and unsuitable material will be located so as not to interfere with maintenance and operation of the track. Roadbed crown widths shall be as shown on the KCS Drawing No. RB-205. Pursuant to current Missouri law, roadway crown widths will be increased to accommodate a walkway adjacent to railroad industrial trackage as follows:

Walkways shall be constructed along each side of industrial railroad trackage a minimum of 8' 6" from the center of track, measured at right angles thereto. Walkways shall be reasonably level with the top of the rail ties and beginning at the end of the railroad ties shall not exceed a drop of two inches (2") per foot to provide drainage and a surface reasonably level on which to walk, as well as permit the safe performance of trackside duties, taking into consideration existing structures and tracks. (KCS Drawing No. RB-206)

Superelevation will not be permitted on Industry track curves. On Lead Track curves, superelevation shall be referred to KCS's authorized representative. Ditches shall conform to plan, with minimum being dimensioned on KCS Drawing No.'s RB-205, RB-206, and/or RB-305. Proper drainage is of paramount importance to stable track structure and shall be completed prior to acceptance of the work.

VII. Grading

Minimum back slopes shall be 2 feet horizontal to 1 foot vertical for "fill" or "cut" sections. Sub-grade shall be sloped to provide a 2% slope in cross-section to effect positive drainage (KCS Drawing NO.'s RB-205, RB-206, & RB-305). At switch stand locations, additional walkway shoulder shall be required for 15 feet in length and 17 feet from center line of track, centered about switch stand location (Drawing No. RB-204).

Compaction shall be such as to insure that all soils are uniformly compacted to 95 % maximum dry density, in accordance with Standard Effort Compaction Test (ASTM Designation D 698). All soils in the embankment and 12 inches below finished grade in cuts

that are found to be less than this specified density shall be removed and re-spread or replaced, so that the required density is obtained.

VIII. Drainage

Design of the drainage system, including alterations of the existing drainage system on KCS right of way, is the responsibility of the Industry. Drainage shall not be diverted, directed toward KCS, or increased in quantity without prior approval and agreement with KCS. All ditches, pipes, and culverts shall be adequately sized to carry the drainage without ponding of water against the roadbed (This shall be based on a 100 year storm). Track roadbed fills shall not be used as dams or levees for retention of water nor shall KCS right of way be utilized for retention or settling basins. All drainage facilities must be shown on the drawings submitted by the industry.

Pipes and culverts shall conform to current AREMA Recommendations and ASTM Specifications. All such structures shall be designed to carry Cooper's E-80 loading with diesel impact. Corrugated metal pipe under KCS owned track shall be steel fiber bonded and asphalt coated or steel polymer precoated in accordance with AASHTO specification M-246, with minimum 24 inch wide connecting bands. The minimum recommended diameter of pipe under KCS owned track is 36 inches.

Extension of pipes, culverts, or other drainage structures previously installed under KCS owned track shall be made with culvert or drainage structures having the same size, shape, and dimensions as the existing pipe. In no case shall the existing drainage structure be extended so that the hydraulic capacity is decreased or obstructed. In some cases, it may be necessary to extend existing outlets with pipe or culvert of a larger size. Details of connections to mismatched culverts shall be submitted for KCS approval.

For waterway openings requiring a bridge, the design shall be for a ballast deck structure, approved by KCS's authorized representative. Corrugated metal pipe shall be provided with wall thickness as shown in the following Tables for E-80 loading:

TABLE 1
STANDARD GAUGES FOR CORRUGATED METAL PIPE
WITH 2-2/3" x 1/2" CORRUGATIONS (For Use Under Track)

| Diameter | Up to 10' | 10' to 20' | 20' to 30' | 30' to 40' |
|----------|-----------|------------|------------|------------|
| 18" | 14 | 14 | 14 | 14 |
| 21" | 12 | 12 | 12 | 12 |
| 24" | 12 | 12 | 12 | 12 |
| 30" | 12 | 12 | 12 | 12 |
| 36" | 12 | 12 | 12 | 12 |
| 42" | 12 | 12 | 12 | 12 |
| 48" | 12 | 12 | 12 | 12 |

Minimum height of cover D/2 but not less than 2.0' (3.0' below base of rail where possible)

TABLE 2
STANDARD GAUGES FOR CORRUGATED METAL CULVERT PIPE
WITH 3" x 1" CORRUGATIONS (For Use Under Track)

| Diameter | Up to 10' | 10' to 20' | 20' to 30' | 30' to 40' |
|----------|-----------|------------|------------|------------|
| 54" | 10 | 10 | 10 | 10 |
| 60" | 10 | 10 | 10 | 10 |
| 66" | 10 | 10 | 10 | 10 |
| 72" | 10 | 10 | 10 | 10 |

- 1) 54" diameter pipe and up - to be ordered with 5% vertical elongation with pick-up lugs attached.
- 2) Use 78" diameter pipe for cattle pass - to be supplied with 5% vertical elongation with pick-up lugs attached.
- 3) High Density Polyethylene Pipe (HDPE) shall be ADS N-12 or accepted equal and designed for Cooper E-80 loading and include adequate cover.
- 4) Any other type or size drainage structure shall have written approval of KCS prior to installation. Reinforced concrete pipe is not authorized.

Riveted pipe shall be placed with the inside circumferential laps pointing down-stream and with the longitudinal laps at the side. The desirable pipe gradient is 2% to 4% with 0.5% being the minimum. Pipes shall be installed with a camber suitable to the height of the cover over the pipe and bearing capacity of the supporting soil.

To insure adequate strength in a corrugated metal pipe, proper bedding, backfilling and tamping shall be obtained. Soft, spongy and other unsuitable material under the pipe shall be removed and replaced with suitable material. Selected firm material shall be used for backfilling next to the pipe. It shall be free from any material over 3 inches in size and shall be free from any perishable matter, frozen lumps or other objectionable substance. The fill material shall be deposited alternately on opposite sides of the pipe in layers not exceeding 6 inches deep, for a distance each side of the pipe equal to its diameter and each layer thoroughly tamped.

Drainage structures other than pipe and/or culverts, if any, shall be designed by a professional engineer registered in the state in which the structure is located. Plans for such structures shall be approved in writing by KCS.

IX. Roadbed Stabilization

Roadbed stabilization shall be the full width of embankment. One or a combination of two or more of the following methods will be utilized: (Soil analysis may require variation or percent or depth of treatment.)

A. Sub-Ballast

Sub-ballast shall be crushed rock with a minimum of one fractured face meeting quality requirements of ASTM D 1241 and shall meet the following gradation requirements:

100% passing 1" Sieve

92-100% passing ¾" Sieve

65-90% passing ½" Sieve

20-65% passing No. 4 Sieve

10-25% passing No. 30 Sieve

7-15% passing No. 200 Sieve

With prior approval by the KCSR, the subballast may conform to the gradation specified for aggregate base by the State Department of Transportation for the state in which the work is to be performed which most nearly matches the gradation of impervious subballast, as specified. Should the State Department of Transportation material specifications not include the full sieve range given above, additional sieves shall be used in the gradation testing to allow comparison to this specification.

Sub-ballast thickness shall be as indicated on KCS Drawing No. RB-301. At least 14 days prior to the placement of sub-ballast the owner shall submit test reports from an approved geotechnical materials testing laboratory showing the gradation (ASTM D 422), Atterberg Limits (ASTM D 4318) and the United Soil Classification System

designation (ASTM D 2487) and Standard Effort Moisture – Density Relationship (ASTM D 6938).

B. Soil Cement/Lime Stabilization

If the finished roadbed cannot be stabilized by mechanical means then the top 8 inches of the finished roadbed shall be treated with a Portland cement mixture or hydrated lime (calcium hydroxide), quicklime (calcium oxide), or commercial lime slurry. The Portland cement shall conform to the latest provisions of ASTM Specification C-150 and the Lime shall conform to the latest provisions of ASTM Specification C-977. The quantity of cement/lime and water to be used shall be determined by the Owner's laboratory and provided to KCS.

C. Geotextile Sub-Grade Stabilization

Filter fabric of the continuous filament, nonwoven polyester fibers, mechanically interlocked by needle punching, shall be used. The fabric, not less than 15 feet in width, shall be placed directly on firmly compacted sub-grade and centered on the proposed track with a 24" overlap. Fabric shall meet or exceed the following specification:

Grab Tensile Strength (ASTM D 4632) 250 lbs

Elongation at Failure (ASTM 4632) 60% min 115% max

Mullen Burst Strength (ASTM D 3786) 350 psi

Trapezoidal Tear (ASTM D 4533) 100 lbs

Puncture Strength (5/16" flat tip end) (ASTM 4833) 130 lbs

Coefficient of Normal Permeability (ASTM D 4491) 0.7 cm/sec

Permittivity (sec-1) (ASTM D 4491) .25

Minimum weight of 10.0 ounces per square yard

X. Material Recommendations

All material shall be approved by KCS. Material for Railroad-owned tracks shall be designated by KCS. Industry-owned tracks may utilize:

A. Rail

New material is to be used for Industrial Lead Tracks in Unit Train Service, KCS Switched and within the KCS right of way. Secondhand track rail of relay quality is acceptable in other construction. Minimum acceptable rail shall be 115-pound Relay. (See Drawing 998-029) Standard full length or cropped rail shall be furnished, with not more than 20% shorter than standard lengths. The minimum short length shall not be less than 20 feet and be free from defects from engine burns or other defects which affect the strength of the rail. Head wear shall not exceed 3/8 inch. Refer to AREMA Manual for Railway Engineering Volume 5 Part 4.3 for more detail.

B. Ties

Industry cross ties shall be new, minimum size 6" x 8" x 8' 6", with preservative of creosote or solution of creosote and coal tar, to a minimum net retention of 8 pounds per cubic foot. Switch ties shall be new, minimum cross section of 7" x 9" and minimum lengths shall conform to AREMA Manual for Railway Engineering Volume 1, Chapter 4. Cross ties and switch ties should be a minimum 40% oak, and the remaining 60% can be mixed hardwoods, such as gum, maple, birch, elm, etc.

Steel cross ties (Narstco M-10 or an approved equal) are approved for use outside the KCS right of way only and shall be installed with a maximum spacing of 24" on center on tangent track or on curves of less than 4 degrees. On curves greater than 4 degrees, ties will be spaced on 22" centers or per the manufacturer's recommendations.

Concrete cross ties (Rocla KCS 101L 18 wire tie with Vossloh insert or an approved equal) shall be designed and manufactured in accordance with AREMA Chapter 7, Part 4, for prestressed concrete ties.

Careful consideration must be made for the type of products to be loaded or unloaded and the surrounding environment when choosing a tie material. Follow all manufacturer's recommendations.

C. Switches, Frogs & Guard Rails

All parts shall be new or good secondhand, although No. 2 relay rail and secondhand parts free of injurious defects may be used in their construction. These parts shall be of heavy-duty construction. All switch materials installed in the KCS right of way will be new 136# Western Common Standard NO. 11.

D. Switch Stands

Racor 36E Switch-stands (KCS Drawing No. TO-126) with 4'-6" connecting rod, similar or equal to that manufactured by RACOR Corporation. Targets shall be painted on both sides. The green target should be in alignment with the main line and the yellow target in alignment with the track being switched to. Sizes of targets may be regulated by regulatory agencies which vary from state to state. Three-foot six-inch (3'-6") connecting rods shall be used only on stands located between tracks or where unusual conditions dictate, such as restricted side clearance locations, etc., with prior approval of KCS.

Switch stands shall, wherever possible, be placed on the side of track which places the switch connecting rod in tension when lined for the predominant traffic and located on the inside of curves when possible.

E. Tie Plates

Double shoulder tie plates may be new or secondhand. Tie plates must be free from injurious defects and foreign material, conforming to AREMA Specifications, and shall fit the rail section being used.

F. Tie Pads

In general, tie pads are only required for Industry Lead Tracks and are optional for Industry Service Tracks. When used, tie pads shall have the same dimensions as the tie plate and a nominal thickness of 1/4". Tie pads shall be manufactured by A. Schulman, Inc./Konvex, or an approved equal.

G. Joint Bars (Angle Bars)

New or secondhand angle bars with 6 bolt holes, conforming to AREMA requirements may be used and shall be free of foreign material and without injurious defects. All bars shall fit rail section for which they are designed. Bars shall be fully bolted. Joints shall not be located less than 5 feet from end of bridge or point of switch on turnouts.

H. Compromise Bars

Compromise bars shall be used where rail section (weight and design) changes. All compromise bars shall fit rail section for which they are designed and shall be free of foreign material and without injurious defects. Bars shall be fully bolted. Joints shall not be located less than 5 feet from end of bridge or point of switch on turnouts. Two rail sections shall not be compromised where difference in rail weight is in excess of 25 pounds. When this becomes necessary, a rail of some weight between the two different rail sections, in excess of 25 pounds, shall be used and the compromise made in two or more steps.

I. Track Bolt Assemblies

Track bolt assemblies shall consist of an oval-shouldered track bolt, a spring washer and a nut. Metal for the bolt, spring washer and nut shall be in accordance with AREMA Chapter 4, Part 2.9 & 2.10. Secondhand track bolt assemblies are not allowed.

J. Spikes

New 9/16" x 5-1/2" or 5/8" x 6" track spikes shall be used for all weights of rail. All spikes shall conform to AREMA Specifications and will be correct size and length to fit rail.

K. Ballast

Broken limestone, granite, slag, chat, gravel or other hard durable material, screened to conform to AREMA size Nos. 24, 3, 4, 5 or 57, shall be used for ballast material. Ballast shall be free from loam, dust and other foreign particles.

L. End of Track Protection

A suitable car-stopping device such as a mound of dirt shall protect all stub tracks (See KCS Drawing No. RB-306) or an approved bumping post similar or equal to Hayes Type "WD" for general use, or Type "WA" for heavy duty use.

M. Turnouts

All turnout material shall be compatible with the rail section from which it diverges and shall be subject to the inspection and approval of KCS. The minimum size of a turnout in KCS main track shall be a Western Common Standard No. 11 (Drawing 343100); out of a side track, not less than a Western Common Standard No. 9 (Drawing 341100).

N. Derails

Derail protection is required on all tracks leading out of a main track, siding, industrial lead or any other track on which considerable switching is performed, where the possibility exists of loose cars fouling these tracks. The only approved type derail is the switch point type. Careful consideration shall be given to the location and direction of the derail so that a derailed car will not foul the track being protected.

O. Anchors

Rail anchors may be any one of various types and must fit the rail section used. Generally, rail anchors shall be used on jointed tracks over 1000 feet long per Drawing No. 99108 A & B. The physical track layout (such as steep gradients and/or other track departures) along with high traffic volumes may require the use of anchors on shorter tracks. Ties should be box-anchored to and including third tie from rail ends using a minimum of 12 anchors on each rail (Drawing No. 999-108 A&B). That portion of the track on the KCS R/W will be boxed anchored from the last long tie of the turnout to the KCS R/W.

P. Track & Highway Crossing

All crossings shall be DOT permitted and have prior approval of KCS Director of Public Safety as to type, design and location. Refer to KCS Drawing No. RB-602, for detail drawing of an At-Grade Prefabricated Sectional Treated Timber Road Crossings and KCS Drawing No. 200100-200102, for detail drawing of an at grade Precast Concrete Road Crossings. Refer to KCS Drawing No. RA-115 for details on the EPFLEX Rail seal required at road crossings.

1. Types

A. Prefabricated Treated Timber:

The Prefabricated Treated Timber Crossing is to be used where automotive traffic, including light trucks, is expected.

B. Precast Reinforced Concrete:

The Precast Reinforced Concrete crossing is to be used in cases of high volume, heavy wheel load traffic. This crossing is particularly suited for use under the solid Wheels of forklift type trucks and may be advantageous in a situation where a large number of semi-trailer trucks are expected. This crossing is more resistant to wheel wear than the other common types.

*Note: full-depth rubber or asphalt crossings shall also be permitted.

2. Approaches

The approaches to a grade crossing will have a measurable effect on the useful life of the crossing. The road profile should be in the plane of the tops of the rail at the crossing for a distance of not less than 10 feet on each side of the centerline of track. Approaches to this line should not exceed +/- 0.8333% for a distance of at least 30 feet. The proper sight triangle must be maintained at all road crossings.

Q. Signs

On tracks over which trains and/or engines of Kansas City Southern Lines operate, track signs and roadway signs must have prior approval of KCS.

XI. Track Geometry

Tracks shall be built to correct line, grade and clearances as indicated on the approved plans.

A. Components of Horizontal Alignment

The components of the horizontal alignment are the turnout, and curved, spiraled and tangent track.

1. Turnout:

Turnouts are to be of the Turnout size stated in KCS Drawing No. RB-301, for the track classification under design. KCS Drawing No. 341100 & 343100, provides details of geometry for two Western Common Standard turnouts as an aid in calculating the fit of a turnout into a track plan.

2. Horizontal Curves:

Horizontal curves are to be circular curves of a numerical Degree of Curve equal to, or less than, that stated in Drawing No. 999-022 for the track classification under design. The curves are to be calculated by Chord Definition. This defines degree of curve as; **the central angle subtended by a 100-foot chord.** **The degree of curve is denoted by Dc, where:**

$\sin(\frac{1}{2}Dc) = 50/r$ and r is the radius of the curve.

Track should be designed using the minimum degree (maximum radius) of curve practicable. Special circumstances, including the use of long cars or special equipment, may require a lesser degree of curvature. Sharper curves may restrict the size of locomotives and opportunity to provide timely switching service due to locomotive restrictions. While a maximum curvature of 10° (radius of 573.69') is highly recommended, under no circumstance without written approval of the Chief Engineer, will the degree of curvature for the track exceed 12° (radius of 478.34'). Reverse curves are to be separated by a minimum length of tangent of 60 feet. Extreme long car-short car combinations should not be

operated over reverse curves having one or both curves numerically greater than 10°.

A segment of curve may not begin nor end within the Limits of Turnout; however, the entire turnout may be in a curve. Wherever practicable, a curve should begin beyond the last switch tie, but, if required by special circumstances, a curve may extend onto the switch ties. In no case shall a curve begin between the point of switch and the heel of frog. A curve should be avoided at the loading point of a bulk loading facility or at an under track unloading structure.

3. Horizontal Spirals:

Spiralization, or easement, of curves may be required in the case of the Industry Lead Track for Unit Train Service. These cases are to be brought to the attention of the Railroad Company's Engineering Department, which will advise as to the required spiral functions and the amount of superelevation, for the design.

4. Tangent Track:

Tangent track is straight track.

B. Components of Vertical Alignment

The components of the vertical alignment are the top of rail grade and vertical curves. Gradients shall be limited to 1.5% or less, with 100-foot minimum vertical curves provided at break points in the grade. (KCS Drawing No. RB-806)

1. Grade:

The top of rail grade may not exceed the value stated in Drawing No 998-022 for the track classification under design. On segments of track where railway cars

are expected to remain stationary after placement, the grade must not exceed 0.20%.

2. Vertical Curves:

- a. Vertical curves should be used to round off all intersecting grades. Turnouts and switch point derails shall not be place within the limits of a vertical curve.
- b. The length of a vertical curve is determined by the grades to be connected and the speed of the traffic.
- c. The rate of change for tracks with a vertical curve concave upward (sag) should be one-half the rate of change of a vertical curve concave downward (summit).
- d. The rate of change for high-speed main tracks (>50 MPH) should not be more than 0.05 feet per station (of 100 feet) in sags, and not more than 0.10 feet per station in sags, and not more than 0.20 feet per station on summits.
- e. For secondary main tracks (speed<50 MPH), the rate of change should not be more than 0.10 feet per station in sags, and not more than 0.20 feet per station on summits.
- f. For industry tracks and non-main tracks with speeds not greater than 20 MPH, the rate of change should not be more than 2.0 feet per station for both sags and summits.
- g. The rate of change per station is calculated as follows:

$R=D/L$ Where:

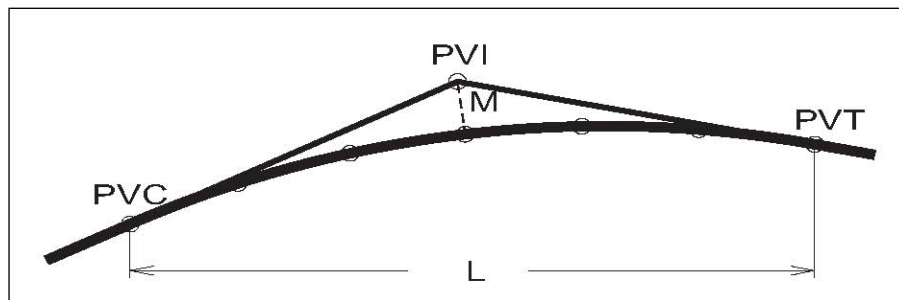
R= Rate of change per station

D= Algebraic difference of the two intercepting grades

L = Length of vertical curve in 100-ft. stations

M = Correction from the straight grade to the vertical curve

A parabola is used for the vertical curve in which the correction from the straight grade for the first station is one half the rate of change, and the others vary as the square of the distance from the point of tangency. Where points fall on full stations, it will be necessary to figure these for only on half the vertical curve, as they are the same for corresponding points each side of the vertex. Corrections are (-) when the vertical curve is concave downwards (summit), and (+) when the vertical curve is concave upwards (sag). The rate of change may be assumed and the length of vertical curve computed, or preferable the length assumed and the rate computed.



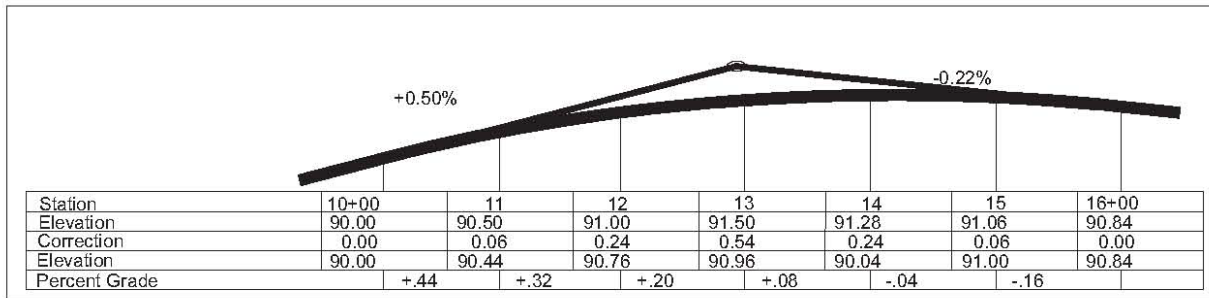
For example:

Assume length = 600 feet (6 stations)

$D - 0.50 \text{ minus } -0.22 = 0.72$

$R = 0.72 / 6 = 0.12$

Calculate the straight-grade elevations for each station. The correction for the first station is one-half the rate of change (R). So, the correction for station 11 is 0.06 (minus since it concaves downwards).



The correction for the Station 12 is $4(0.06) = 0.24$. This is the correction to the first station (one-half the rate of change) multiplied by the square of the length, in stations, from the PVC. At Station 13 (the PVI), the correction is $9(0.06) = 0.54$. Notice the correction for Stations 11 and 15 are the same. Likewise for 12 and 14, since they are the same distance from the PVC and PVT. So, only one-half of the curve's corrections need to be calculated.

Next, apply the correction at each station to the straight-grade elevation to obtain the elevation on the vertical curve.

A simpler method of computing this and one that furnishes a check throughout is the following:

| | | |
|---------|--------------|--|
| Sta. 10 | 90.00 | |
| | <u>+0.44</u> | (% grade sta. 9 to 10) minus one half rate = $0.50 - 0.06$ |
| Sta. 11 | 90.44 | |
| | <u>+0.32</u> | (% grade sta. 10 to 11) minus rate = $0.44 - 0.12$ |
| Sta. 12 | 90.76 | |
| | <u>+0.20</u> | (% grade sta. 11 to 12) minus rate = $0.32 - 0.12$ |
| Sta. 13 | 90.96 | |
| | <u>+0.08</u> | (% grade sta. 12 to 13) minus rate = $0.20 - 0.12$ |
| Sta. 14 | 91.04 | |
| | <u>-0.04</u> | (% grade sta. 13 to 14) minus rate = $0.08 - 0.12$ |

Sta. 15 91.00

-0.16 (% grade sta. 14 to 15) minus rate = -0.04 - 0.12

Sta. 16 90.84

3. Curve Compensation

Grades on curved track are to be reduced to compensate for the increase in train resistance caused by the curve.

The amount of reduction is calculated as:

Gd = D(Cc):

Where Gd = Amount of design grade reduction (%)

D = Degree of curve (decimal degrees)

Cc = 0.04 (%/Degree)

Curve compensation is not necessary on level (0% grade) track or on Industry Service Tracks in General Service.

4. Superelevation

In the event the Railroad Company's Engineering Department advises that superelevation of a curve is necessary, it is to be achieved by continuing the rail on the inside of the curve at the design grade and raising the rail on the outside of the curve through the amount of the superelevation. Curves with superelevation must also have beginning and ending spirals of the length specified by the Railroad Company's Engineering Department.

The amount of superelevation is to be zero at the point of tangent-to-spiral and increase lineally to the full amount at the point of spiral-to-curve.

Superelevation is not permitted to begin nor end within the Limits of Turnout. However, the entire turnout may be uniformly superelevated.

Superelevation of a turnout will result in the track of the diverging line being on an inclined plane.

XII. Final Inspection and Acceptance

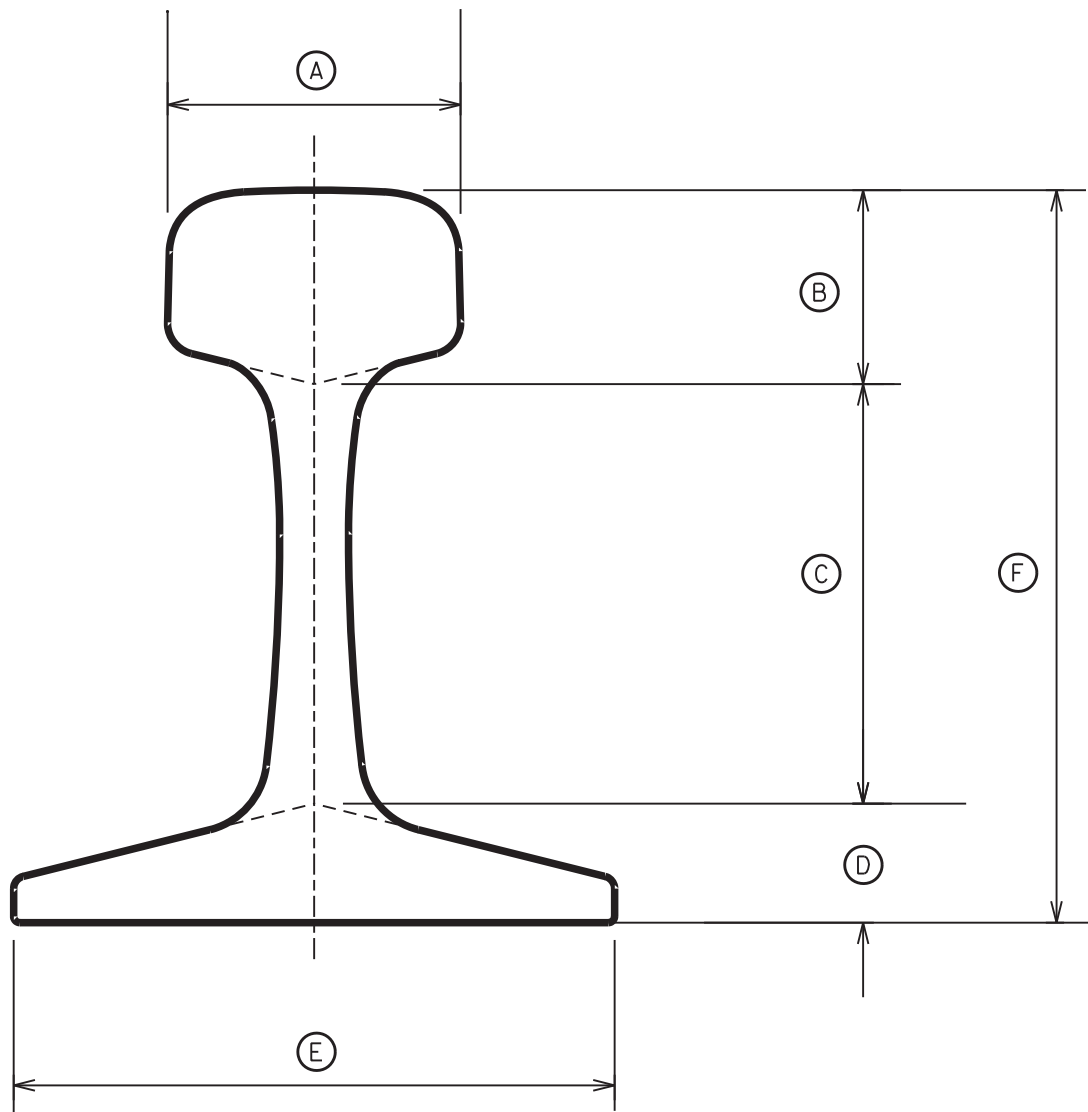
After the track has been laid, ballasted, lined and surfaced, and completed, Contractor shall call for a final inspection.

The Final Inspection will be made by representative(s) of the Railroad Company. This inspection will determine the adequacy of the construction for railroad operation. A special interest will be taken in working conditions for Railroad Company train crew members.

Violations of law and/or deviation from agreed to construction details will be noted.


Acceptance of a track for operation will be announced by a Track-In-Service Bulletin. Use of a track by locomotives or cars prior to this bulletin does not constitute acceptance.

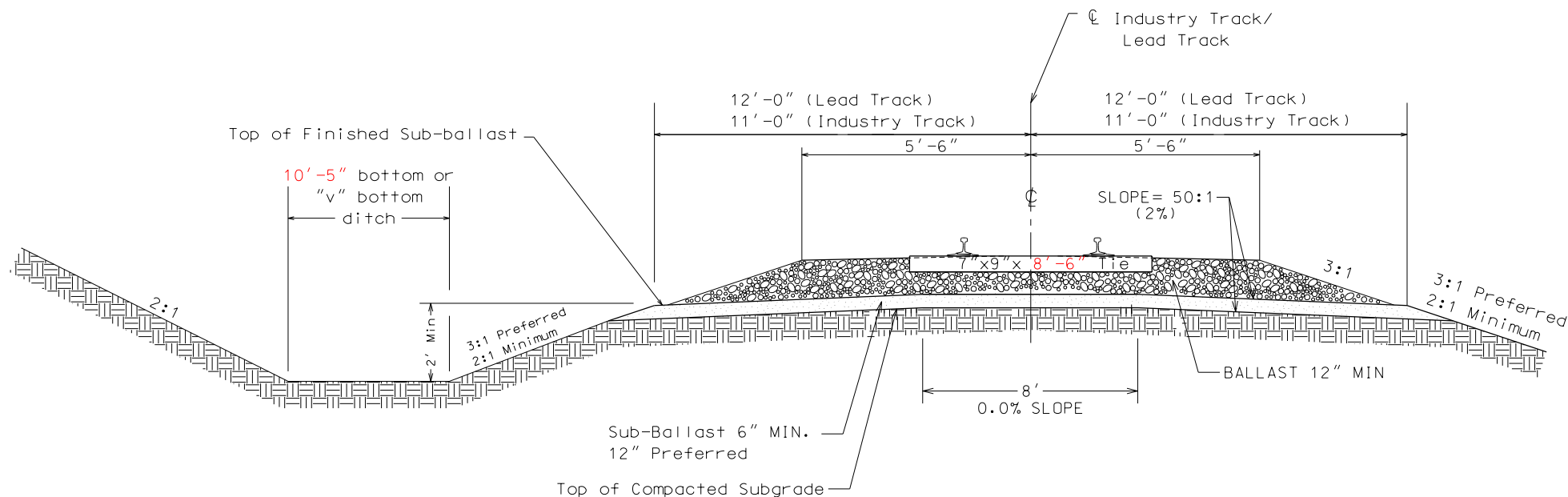
All defects and unsatisfactory conditions must be corrected prior to final acceptance. Industry and/or Owner should reserve the right to withhold final payment until KCS accepts final work.



| RAIL SECTIONS: | | | | | | | |
|----------------|-------|--------------------|--------------------|--------------------|-------------------|------------------|-------------------|
| TYPE | WT/YD | A | B | C | D | E | F |
| A.R.E.A. | 136 | $2\frac{15}{16}''$ | $1\frac{15}{16}''$ | $4\frac{3}{16}''$ | $1\frac{3}{16}''$ | 6" | $7\frac{5}{16}''$ |
| A.R.E.A. | 115 | $2\frac{11}{16}''$ | $1\frac{11}{16}''$ | $3\frac{13}{16}''$ | $1\frac{1}{8}''$ | $5\frac{1}{2}''$ | $6\frac{5}{8}''$ |
| A.R.A. | 90 | $2\frac{9}{16}''$ | $1\frac{15}{16}''$ | $3\frac{5}{32}''$ | 1 | $5\frac{1}{8}''$ | $5\frac{5}{8}''$ |

90 lb Rail shown for informational purposes only. 115 lb Rail is minimum allowed.

| REVISIONS | EXHIBIT | | | | |
|-----------|---|-----------------|-----------------|----------------|------------------------|
| | THE KANSAS CITY SOUTHERN RY. CO. | | | | |
| | RAIL SECTIONS OF COMMONLY USED RAILS | | | | |
| | | | | | |
| |  | DRAWN BY WLC | DATE 8/19/96 | VAL. SEC. . | SHEET NO. 1 |
| | | CHECKED BY . | SCALE NTS | FILE . | DRAWING NO. 998-029 |



TYPICAL CUT SECTION

TYPICAL FILL SECTION

* = not to exceed a drop of two inches (2") per foot to provide drainage and a surface reasonably level on which to walk as well as permit the safe performance of track duties.

Missouri "Code of State Regulations" CSR 265-8.110
Walkway Safety Standards at Industrial Tracks



K.C.S.
STANDARDS

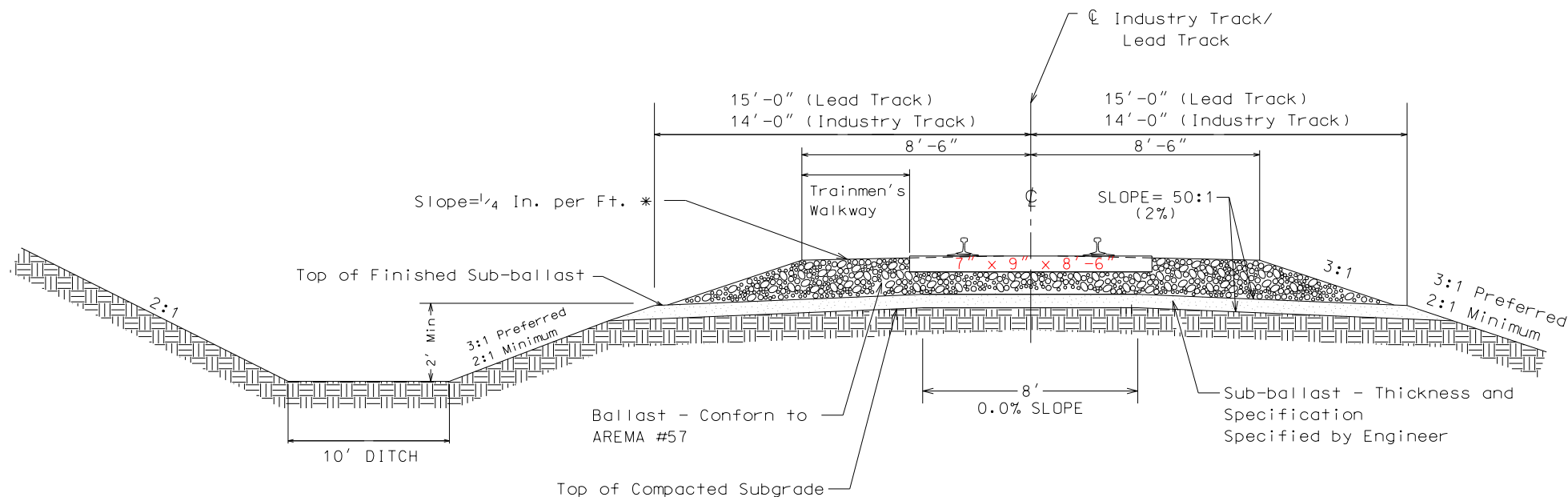
DATE: 4-26-06
REV: 4-27-07
SCALE: NONE
DRAWN BY: MCV

APPROVED BY:
JW Heaven
CHIEF ENGINEER

**TYP FINISHED GRADING AND BALLAST
SECTION FOR INDUSTRIAL TRACKS
(NEW CONSTRUCTION)**

DRAWING NO.

RB-205



TYPICAL CUT SECTION

TYPICAL FILL SECTION

* = not to exceed a drop of two inches (2") per foot to provide drainage and a surface reasonably level on which to walk as well as permit the safe performance of track duties.

Missouri "Code of State Regulations" CSR 265-8.110
Walkway Safety Standards at Industrial Tracks



K.C.S.
STANDARDS

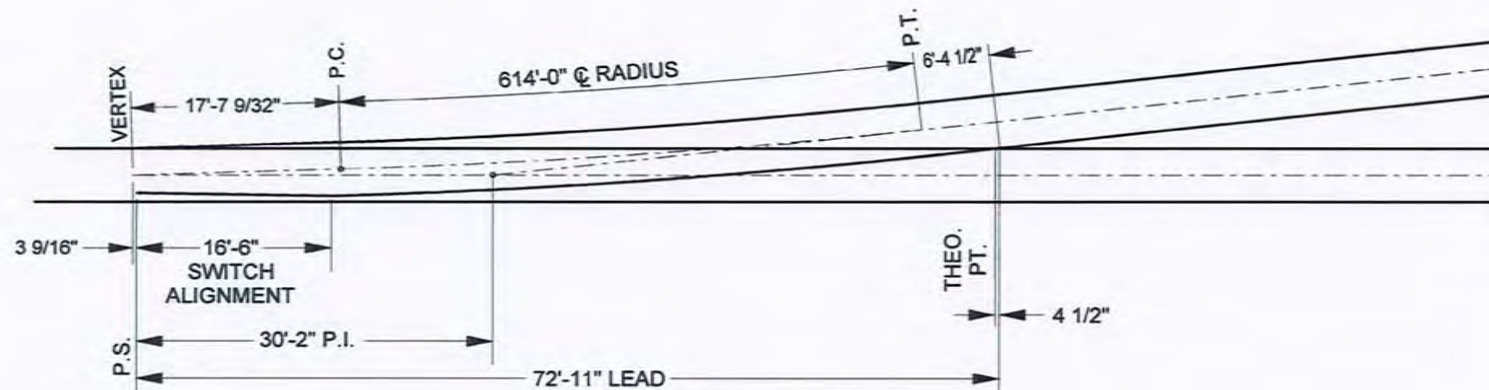
DATE: 4-26-06
REV: 4-27-07
SCALE: NONE
DRAWN BY: MCV

APPROVED BY:
JW Heaven
CHIEF ENGINEER

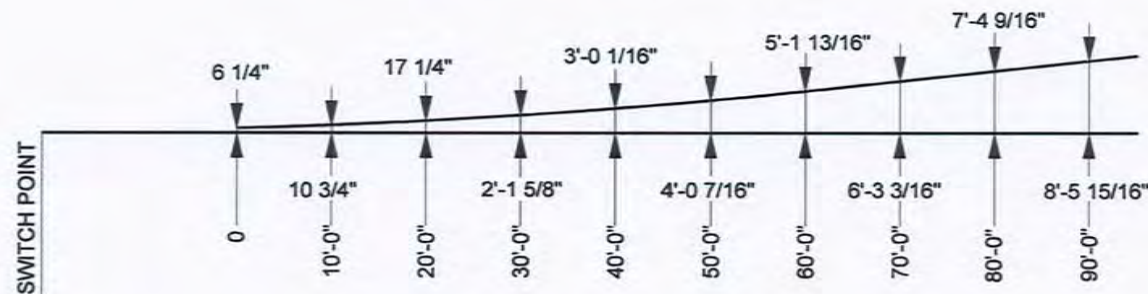
TYPICAL FINISHED GRADING AND
BALLAST SECTION FOR
INDUSTRIAL TRACKS IN MISSOURI

DRAWING NO.

RB-206



GENERAL LAYOUT



SPREAD LAYOUT

SWITCH DATA

| | |
|------------------------|------------|
| SWITCH LENGTH | 16'-6" |
| HEEL SPREAD | 6 1/4" |
| HEEL ANGLE | 1°-46'-22" |
| SWITCH ANGLE | 1°-46'-22" |
| THROW AT ROD #1 | 4 3/4" |
| THICKNESS AT POINT | 0" |
| RADIUS (CLOSURE CURVE) | 616.3542' |
| VERTEX DISTANCE | 7 1/16" |

FROG DATA

| | |
|--------|------------|
| ANGLE | 6°-21'-35" |
| LENGTH | VARIES |

NOTES:

TURNOUT DATA

| | |
|-------------------------------|----------|
| RADIUS OF CENTER LINE | 614' |
| T = | 24.59' |
| CENTRAL ANGLE - CLOSURE CURVE | 4°35'13" |
| DEGREE OF CURVE | 9°20'31" |

341100

TURNOUT POINT



K.C.S.
COMMON
STANDARDS

DATE: 5-12-08
REV: 5-12-08
SCALE: NONE
DRAWN BY: RGT

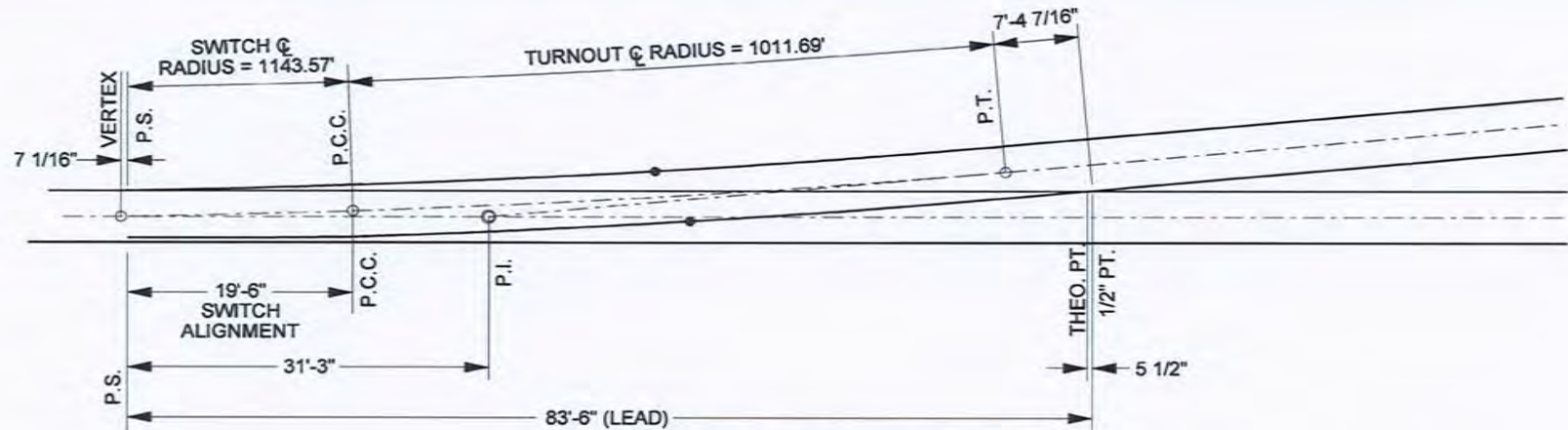
APPROVED BY:

[Signature]
CHIEF ENGINEER

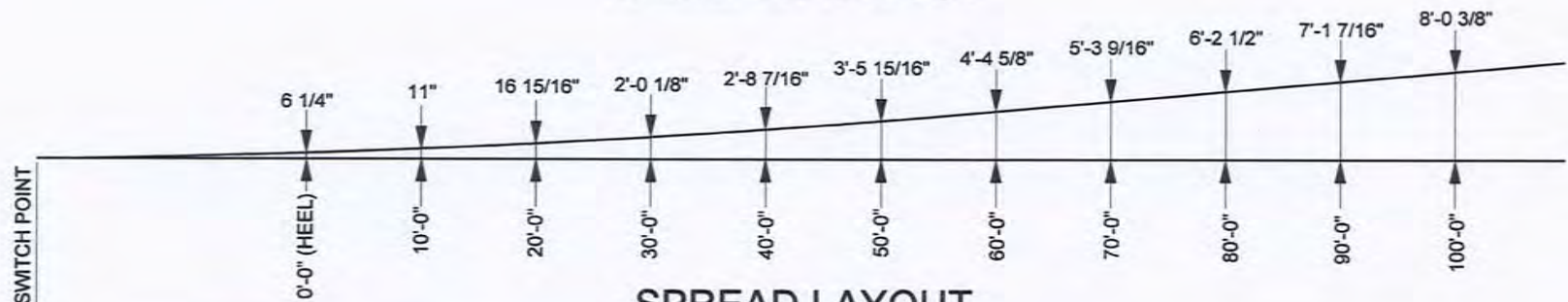
NO. 9 TURNOUT 16'6" STRAIGHT
SWITCH TURNOUT GEOMETRY

DRAWING NO.

341100



GENERAL LAYOUT



SPREAD LAYOUT

SWITCH DATA

| | |
|-------------------------------|------------|
| SWITCH LENGTH | 19'-6" |
| HEEL SPREAD | 6 1/4" |
| HEEL ANGLE | 1°-59'-16" |
| SWITCH ANGLE | 1°-00'-40" |
| THROW AT ROD #1 | 4 3/4" |
| RADIUS (CENTER LINE) | 1143.57' |
| T = | 9.69' |
| CENTRAL ANGLE - CLOSURE CURVE | 0°58'16" |
| DEGREE OF CURVE | 5°00'06" |
| THICKNESS AT POINT | 1/8" |
| RADIUS (CLOSURE CURVE) | 1145.92' |
| VERTEX DISTANCE | 7 1/16" |

FROG DATA

| | |
|--------|------------|
| ANGLE | 5°-12'-18" |
| LENGTH | VARIES |

NOTES:

TURNOUT DATA

| | |
|-------------------------------|----------|
| RADIUS OF CENTER LINE | 1011.69' |
| T = | 28.35' |
| CENTRAL ANGLE - CLOSURE CURVE | 3°13'02" |
| DEGREE OF CURVE | 5°40'44" |

343100

TURNOUT
POINT



K.C.S.
COMMON
STANDARDS

DATE: 5-12-08
REV: 5-12-08
SCALE: NONE
DRAWN BY: RGT

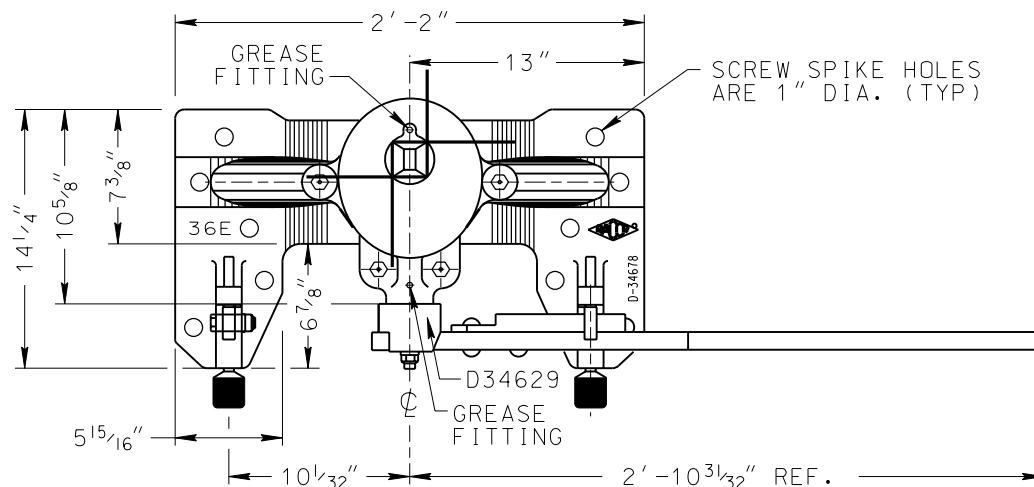
APPROVED BY:

[Signature]
CHIEF ENGINEER

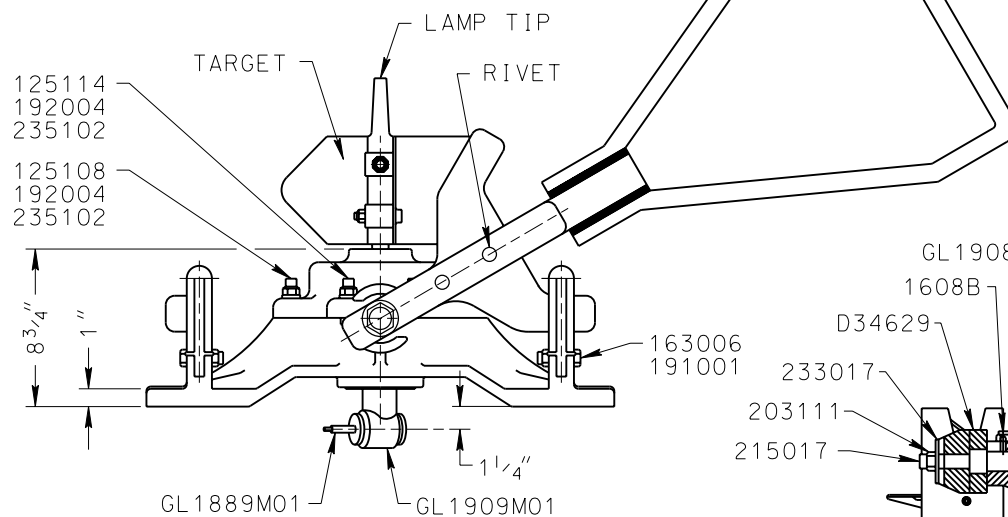
NO. 11 TURNOUT 19'-6" CURVED
SWITCH TURNOUT GEOMETRY

DRAWING NO.

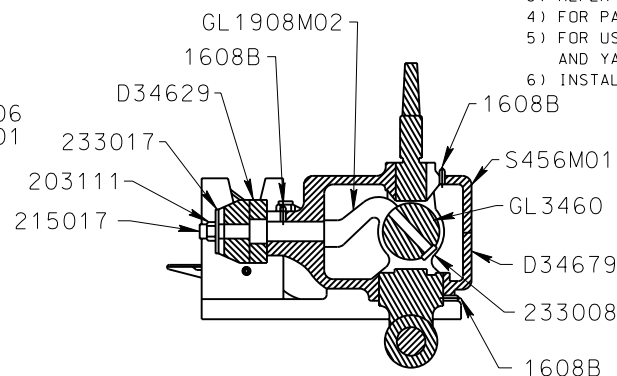
343100



PLAN VIEW



ELEVATION VIEW



SECTION ON CENTER LINE
STAND HALF THROWN

| QUANTITY | ITEM DESCRIPTION | ITEM NUMBER |
|----------|-------------------------------------|-------------|
| 1 | COVER (S-456) | S456M01 |
| 1 | BASE (D-34678) | D34678 |
| 1 | SPINDLE GL1909 DRILLED PER CUST REQ | GL1909M01 |
| 1 | CRANKEYE (GL-1889) | GL1889M01 |
| 1 | TRI-HANDLE LEVER W/YOKE D-34679 | PD9405A02 |
| 1 | SQ. HD. BOLT 3/4" x 3 1/4" LONG | 125114 |
| 1 | HEX SECURITY NUT 3/4" x 10" | 192004 |
| 1 | SPRING WASHER 3/4" | 235102 |
| 1 | SQ. HD. BOLT 3/4" x 4 3/4" LONG | 125108 |
| 1 | HEX NUT HVY 1 1/8" - SLOTTED | 203111 |
| 1 | HUB (D-34629) | D34629 |
| 1 | YOKE FOR TRI-HANDLE | D34679 |
| 1 | LAMP TIP (PER CUST ORDER) | (PER ORDER) |
| 1 | FOOT LATCH | E3819A01 |
| 1 | CRANK BUSHING | GL3460 |
| 1 | CRANK WASHER 3/4" FLAT | 233008 |
| 1 | CRANK | GL1908M02 |
| 1 | CRANK WASHER 1 1/8" FLAT | 233017 |
| 1 | 1/4" x 2" COTTER | 215017 |
| 1 | 1/2" x 2 1/4" HEX CAP SCREW | 163006 |
| 1 | HEX SECURITY NUT 1/2" | 191001 |
| 1 | TARGET (PER CUST ORDER) | (PER ORDER) |
| 1 | GREASE FITTINGS 1/4" x 35/64" | 1608B |

NOTES:

- 1) IT IS RECOMMENDED THAT SWITCH STANDS BE INSPECTED AT LEAST ONCE A YEAR AND GREASED WITH LITHOLINE COMPLEX EP OR EQUAL USING THE THREE GREASE FITTINGS EVERY FOUR MONTHS. (MORE FREQUENT LUBRICATION MAY BE REQUIRED IN BUSY LOCATIONS)
- 2) RECOMMENDED TIE SPACING 22' +/- 1".
- 3) REFER TO BROCHURE MANUAL ABC331/779 FOR INSTALLATION INSTRUCTIONS.
- 4) FOR PARTS, SERVICE OR REPAIR, CONTACT ABC-NACO AT 1-800-222-2239.
- 5) FOR USE IN LOCATIONS WHERE LOW STANDS ARE REQUIRED BOTH MAIN TRACK AND YARDS.
- 6) INSTALL WITH SWITCH STAND MOUNTING KITS.



K.C.S.
STANDARDS

DATE: 5-12-06
REV: 4-27-07
SCALE: NONE
DRAWN BY: RGT

APPROVED BY:
JW Heaven
CHIEF ENGINEER

RACOR 36E SWITCH STAND

DRAWING NO.

TO-126

| <div> <div>TRACK CLASSIFICATION</div> <div>DESIGN CRITERIA</div> </div> | | <div> <div>(M)</div> <div>(E)</div> <div>Maximum</div> <div>Minimum</div> </div> | INDUSTRY LEAD TRACK | | | | INDUSTRY SERVICE TRACK | | | |
|---|--------|--|-----------------------|--------|-----------------------|--------|------------------------|--------|-----------------|--------|
| | | | UNIT TRAIN | | GENERAL SERVICE | | UNIT TRAIN | | GENERAL SERVICE | |
| | | | KCS | OWNER | KCS | OWNER | KCS | OWNER | KCS | OWNER |
| | | | SWITCHED | | SWITCHED | | SWITCHED | | SWITCHED | |
| Degree of curve | | . | 6° | 8° | 10° | 12° | 8° | 10° | 10° | 12° |
| Grade ⁽¹⁾ | | M | 0.8% | 1.5% | 1.0% | 1.5% | 1.0% | 1.5% | 1.5% | 1.5% |
| Vertical Curve Factor | Sag | . | -0.2% | -0.2% | -0.4% | -0.4% | -2.0% | -2.0% | -2.0% | -2.5% |
| | Summit | . | 0.4% | 0.4% | 0.8% | 0.8% | 4.0% | 4.0% | 4.0% | 5.0% |
| Turnout size | | . | 11 ⁽²⁾ | 11 | 11 | 9 | 11 | 9 | 9 | 9 |
| Rail Wt./Section | | m | 115/25 ⁽³⁾ | 115/25 | 115/25 ⁽⁴⁾ | 115/25 | 115/25 | 115/25 | 115/25 | 115/25 |
| Cross Tie Size | | . | 7"x9"x8'-6" | | | | | | 6"x8"x8'-6" | |
| Cross Tie Spacing | | M | 19 1/2" | | | | | | 21" | |
| Ballast Depth ⁽⁵⁾ | | m | 12" | | | | 10" | | 8" | |
| Sub-ballast Depth | | . | 12" | | 10" | | 8" | | 6" | |
| Operating Speed | | M | 25 MPH | 10 MPH | 10 MPH | 5 MPH | 10 MPH | 5 MPH | 10 MPH | 5 MPH |

NOTES:

That Part of any track which is KCS owned and/or maintained shall conform to "KCS SWITCHED" criteria. Turnouts in KCS owned tracks shall be No. 11 of not less than 115/25 rail.

- (1) Fully Welded Turnout.
- (2) Continuous Welded if more then 10,000,000 Tons of locomotives, cars, and contents annually.
- (3) Continuous Welded if more than 1 mile long.
- (4) Depth below bottom of tie.



K.C.S.
STANDARDS

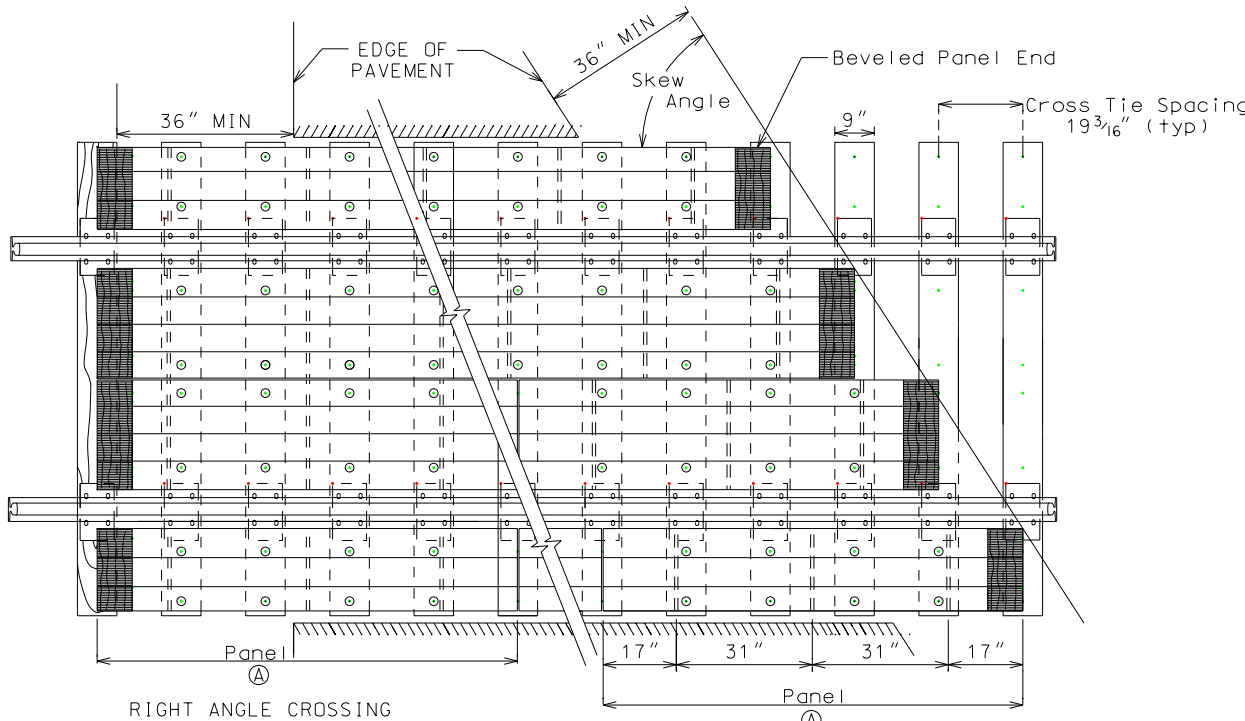
DATE: 8-7-96
REV: 4-27-07
SCALE: NONE
DRAWN BY: WLC

APPROVED BY:
JW Heaven
CHIEF ENGINEER

TABLE No. 1
TRACKS TO SERVE INDUSTRIES
(NEW CONSTRUCTION)

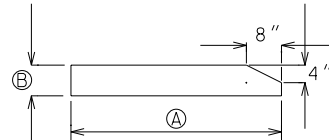
DRAWING NO.

RB-301

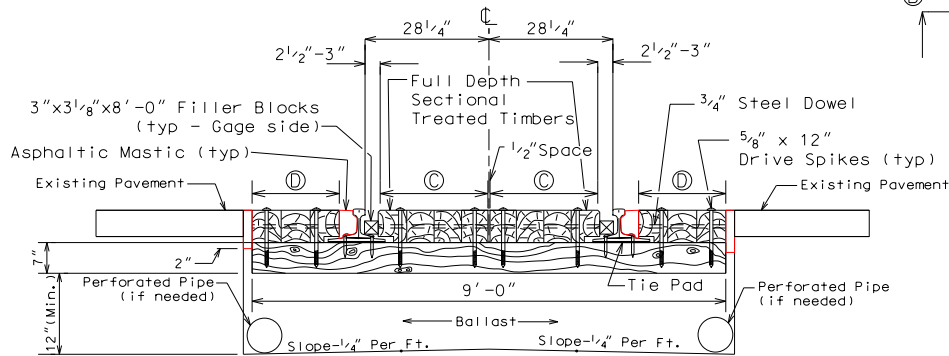


PLAN
NO SCALE

SKewed Crossing



PANEL BEVEL DETAIL
NO SCALE



SECTION
NO SCALE

TABLE OF PANEL SPECIFICATIONS USING 9'-0" CROSSTIES

| | | 90# | 112#/115# | 127# | 136# |
|-----|--------------------------------|---------------------------|-----------------|-----------------|-----------------|
| (A) | PANEL LENGTH | 8'-0" | 8'-0" | 8'-0" | 8'-0" |
| (B) | PANEL HEIGHT | 6 1/4" | 7 3/8" | 7 3/4" | 8 1/8" |
| (C) | PANEL WIDTH (Gage Section) | 3ea 8 7/16" | 4ea 6 1/4" | 4ea 6 1/4" | 4ea 6 1/4" |
| (D) | PANEL WIDTH (Field Section) | 2ea 8 7/16" 1ea 3 5/8" | 3ea 6 5/8" | 3ea 6 5/8" | 3ea 6 5/8" |
| (E) | CUT OUTS (Both Sides) | 1 3/8" X 3 1/2" | 1 3/8" X 3 1/2" | 1 3/8" X 3 1/2" | 1 3/8" X 3 1/2" |

GENERAL NOTES:

PANELS:

Panels shall be constructed of #4/5 gum crossties, properly sized for required panel prior to preservative treatment. Treatment used (type of preservative and retention) shall be a 70/30 solution at 8# per cubic ft. Panels shall be full depth and 8 ft. in length. Shims will not be allowed.

Panels shall be permanently held together using steel dowels. Gage section dowels shall be 3/4" x 24" and field section dowels shall be 3/4" x 19 1/2". Each section shall have 3ea 3/8" prebored holes to receive 3 dowels.

Panels shall be secured to the ties using dome head drive spikes. Spikes for 90# rail shall be 3/4" x 11" and spikes for 112# to 136# shall be 3/4" x 12". Each section shall be drilled in the field to receive 8 spikes.

The top surface of any panel, should it fit against the rail head on the field side, shall have a dap of 1/4" x 3". Panels shall be bored, chamfered, beveled, dapped and cut out as required prior to treatment.

CROSSTIES:

New 7"x9"x9'-0" creosote pressure treated crossties made of oak or similar hardwood shall be accurately spaced at 19 3/16" centers throughout the length of the crossing. After the panel sections have been properly located, 3/16" holes shall be bored.

RAIL:

Continuous welded rail shall be used throughout the crossing and shall extend a minimum of 39 ft beyond the ends of the panel sections.

MASTIC:

Asphaltic mastic such as A.S.T.M. D-491-41 shall be used to fill the open area between the existing pavement and the panel sections and between the field side of the rails and the panel sections after the crossing is in place.

DRAINAGE:

If the crossing has an existing pipe system for drainage, the installation of the new perforated pipes of equal size wrapped with non-woven filter fabric will be required at the locations in the section view.

Ballast through crossing to be a minimum of 12" below tie, ensure tie crib on each side of crossing is empty.

BILL OF MATERIALS

RAIL WEIGHT

115#
136#
135#
136#

ITEM DESCRIPTION

9'-0" CROSSING PLANK EDGE
9'-0" CROSSING PLANK EDGE
9'-0" CROSSING PLANK CENTER
9'-0" CROSSING PLANK CENTER
5/8" X 12" TIMBER DRIVE SPIKE

ITEM NUMBER

-
-
-
-
-



K.C.S.
STANDARDS

DATE: 8-12-96
REV: 4-27-07
SCALE: NONE
DRAWN BY: WLC

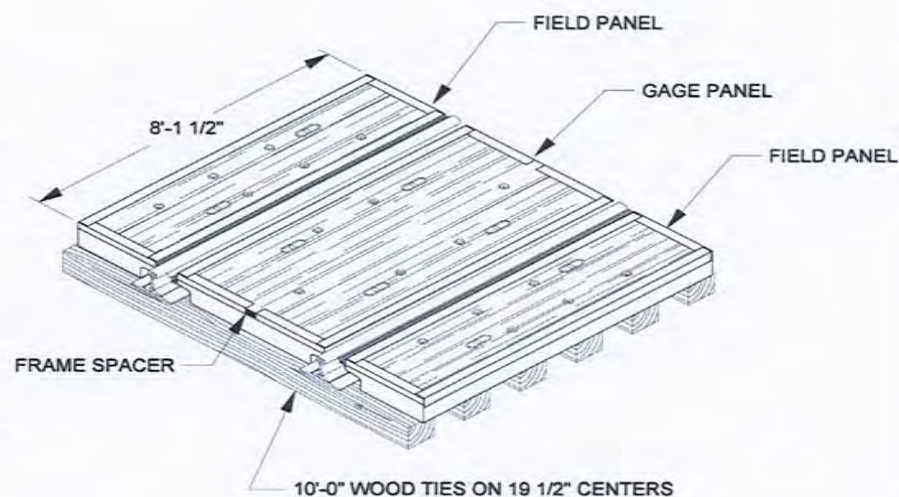
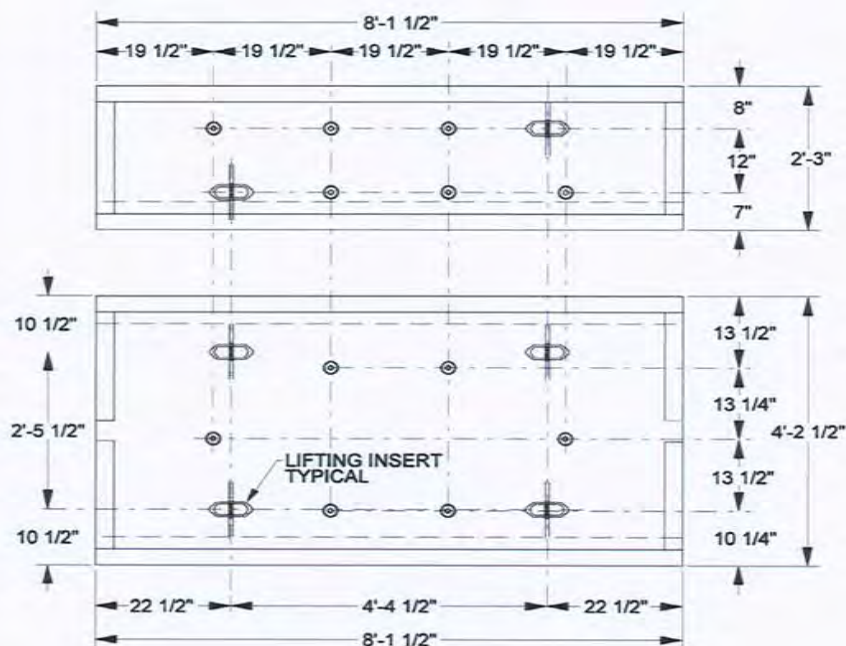
APPROVED BY:

J.W. Heaven
CHIEF ENGINEER

PREFABRICATED SECTIONAL
TREATED TIMBER ROAD CROSSING

DRAWING NO.

RB-602



NOTES:
1/4" RUBBER INTERFACE PAD TO BE PLACED BETWEEN PANEL AND TIES FOR 141 LB. RAIL SECTION. PAD TO BE NAILED TO TIES.

CROSSING TYPE - 10W

| RAIL SIZE | PANEL HEIGHT | GAGE PANEL WEIGHT | FIELD PANEL WEIGHT |
|-----------|--------------|-------------------|--------------------|
| 115 | 7 1/8" | 2850 LBS. | 1550 LBS. |
| 133-141 | 7 7/8" | 3125 LBS. | 1675 LBS. |

ITEM NUMBERS

133-141 LB. 115 LB.

DATE: 5-12-08
REV: 5-12-08
SCALE: NONE
DRAWN BY: RGT

APPROVED BY:

[Signature]
CHIEF ENGINEER

LAYOUT FOR CONCRETE PANELS
ON 10'-0" LONG WOOD TIES (10W)

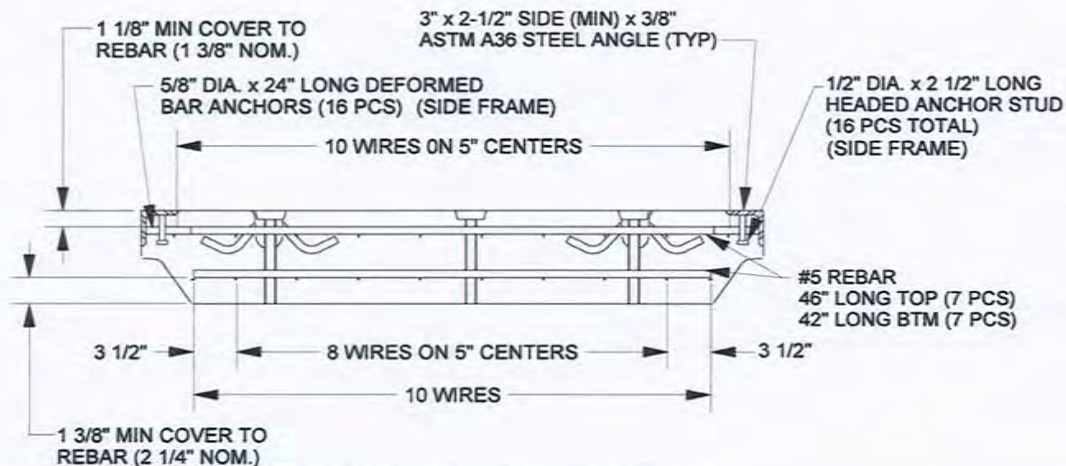
DRAWING NO.

200100

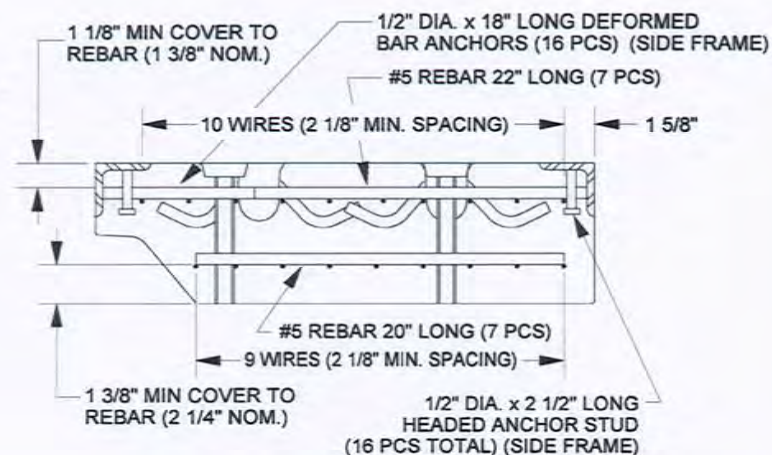
200100



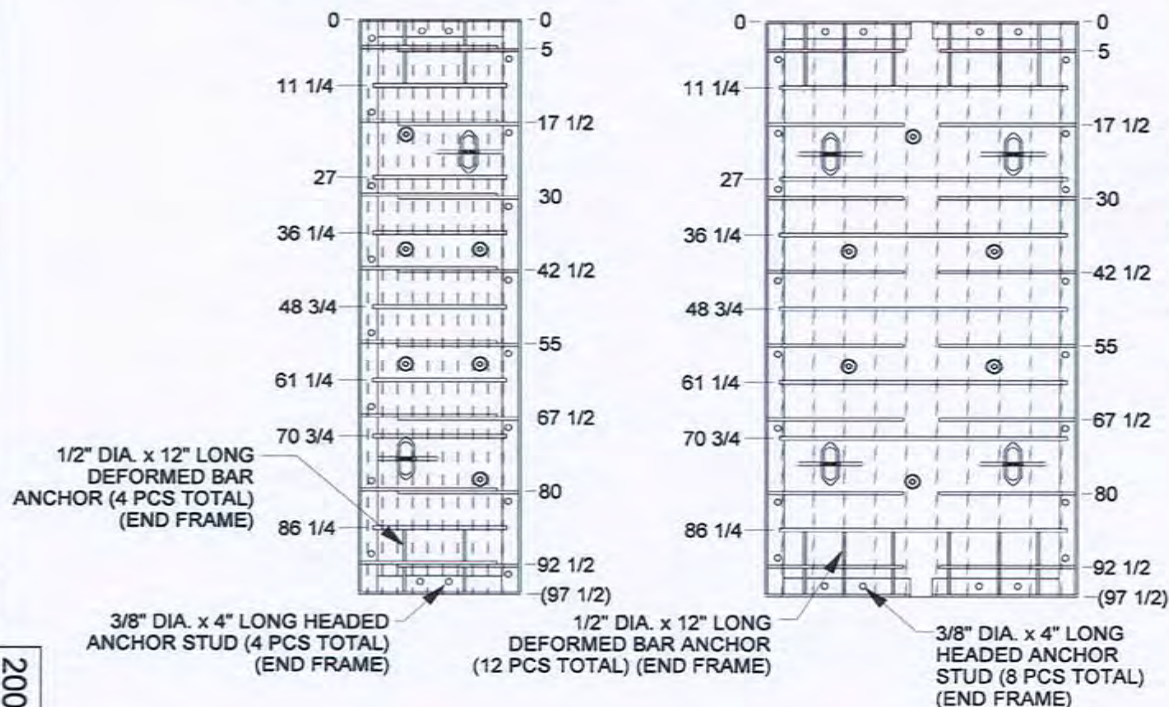
K.C.S.
COMMON
STANDARDS



CROSS SECTION - GAGE PANEL



CROSS SECTION - FIELD PANEL



FIELD PANEL

GAGE PANEL

NOTES:

28 DAY CONCRETE COMPRESSIVE STRENGTH = 7000psi
MIN. TRANSFER COMPRESSIVE STRENGTH = 4500psi

PRESTRESSING WIRE SHALL BE 5.25mm DIA. CONFORMING WITH ASTM A-881 "STEEL WIRE DEFORMED, STRESS RELIEVED OR LOW RELAXATION FOR PRESTRESSED CONCRETE TIES" WITH A MINIMUM BREAKING STRENGTH OF 8800 Lbf.

WIRE SHALL BE TENSIONED IN ACCORDANCE WITH PCI REQUIREMENTS TO 6960Lbf PER WIRE.

CROSSING TYPE - 10W

200101



K.C.S.
COMMON
STANDARDS

DATE: 5-12-08
REV: 5-12-08
SCALE: NONE
DRAWN BY: RGT

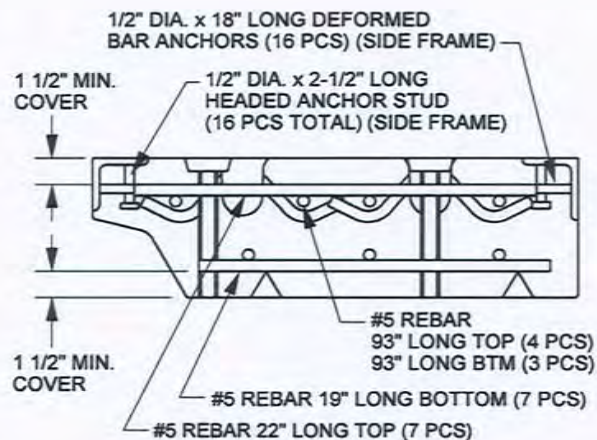
APPROVED BY:

J. W. Heaven
CHIEF ENGINEER

PRESTRESSED CONCRETE PANELS
FOR 10'-0" LONG WOOD TIES (10W)

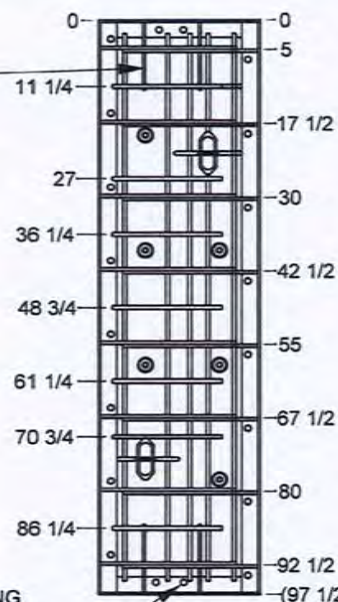
DRAWING NO.

200101

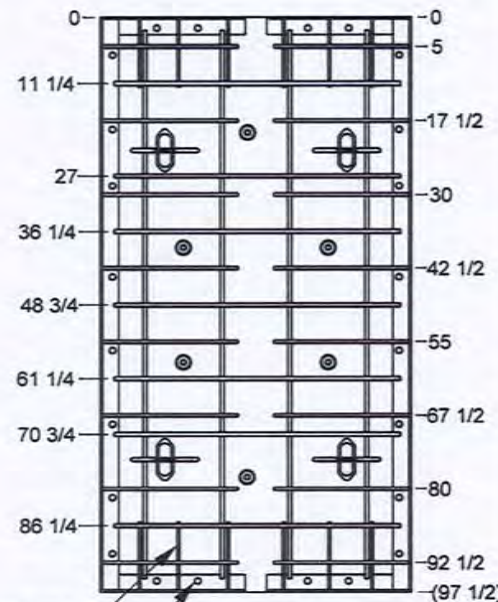


CROSS SECTION - FIELD PANEL

1/2" DIA. x 12" LONG DEFORMED BAR ANCHOR (4 PCS TOTAL) (END FRAME)



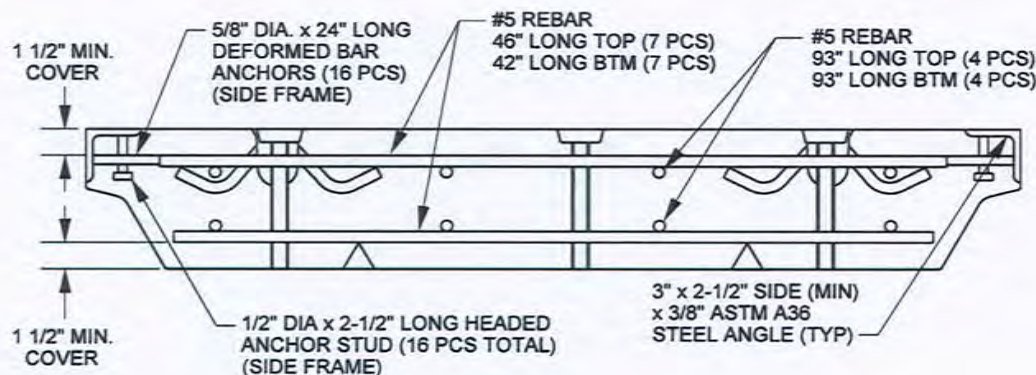
FIELD PANEL



GAGE PANEL

NOTES:
CONCRETE COMPRESSIVE STRENGTH SHALL BE AS FOLLOWS:
@ 28 DAYS = 6000 psi MINIMUM
@ SHIPMENT = 4000 psi MINIMUM
@ REMOVAL FROM FORMS = 2500 psi MINIMUM.

CROSSING TYPE - 10W



CROSS SECTION - GAGE PANEL

200102



K.C.S.
COMMON
STANDARDS

DATE: 5-12-08
REV: 5-12-08
SCALE: NONE
DRAWN BY: RGT

APPROVED BY:

[Signature]
CHIEF ENGINEER

PRECAST CONCRETE PANELS
FOR 10'-0" LONG WOOD TIES (10W)

DRAWING NO.

200102

EPFLEX RAILSEAL
FIELD SIDE
SPEC 12-314

115#
A.R.E.A.

EPFLEX RAILSEAL
GUAGE SIDE
SPEC 12-315

EPLOCK CLIP
SPEC 12-560-10

1:40 TIE PLATE

115# EPFLEX WITH EPLOCK II

EPFLEX RAILSEAL
FIELD SIDE
SPEC 12-326

132#
A.R.E.A.

EPFLEX RAILSEAL
GUAGE SIDE
SPEC 12-327

EPLOCK CLIP
SPEC 12-560-10

1:40 TIE PLATE

132/136# EPFLEX RAILSEAL



K.C.S.
STANDARDS

DATE: 10-30-06
REV: 4-27-07
SCALE: NONE
DRAWN BY: RGT

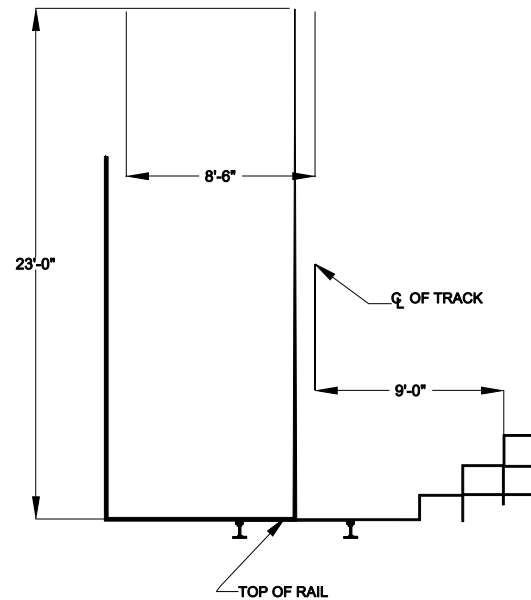
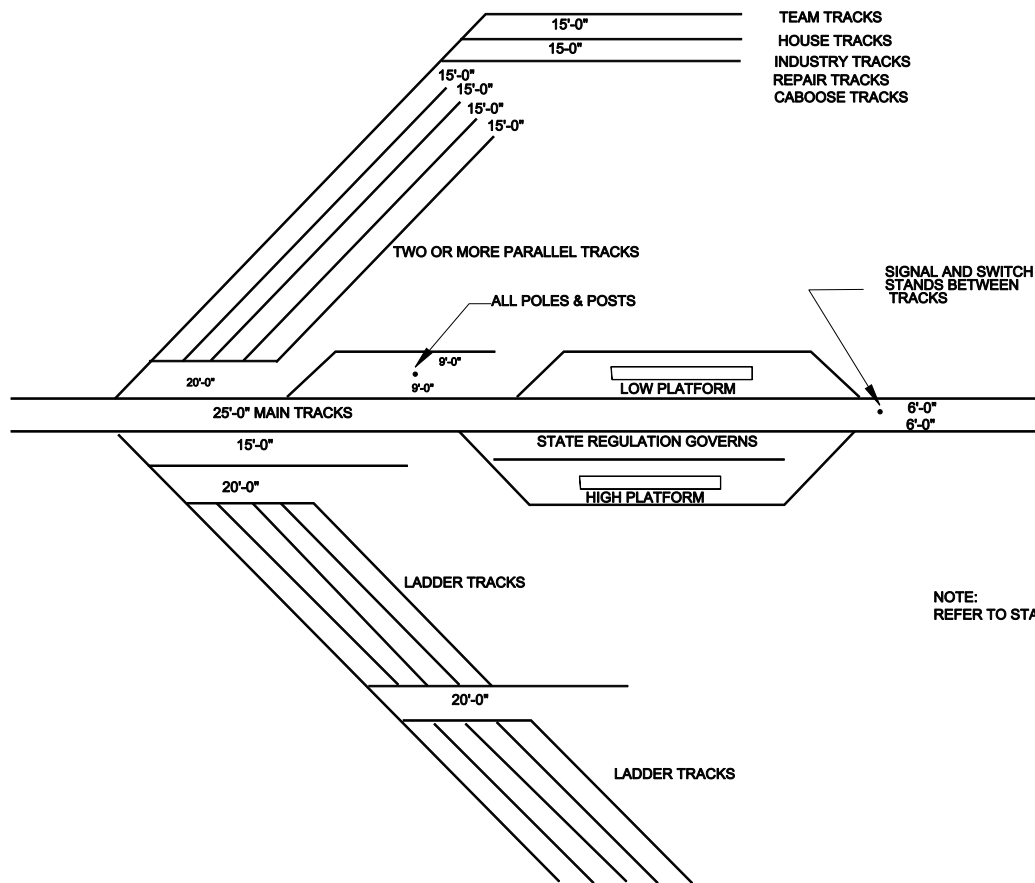
APPROVED BY:

JW Heaven
CHIEF ENGINEER

EPFLEX RAILSEAL

DRAWING NO.

RA-115



ALL STRUCTURES

NOTE:
REFER TO STATE MINIMUM REGULATIONS



K.C.S.
STANDARDS

DATE: 4-21-06
REV: 4-27-07
SCALE: NONE
DRAWN BY: DLL

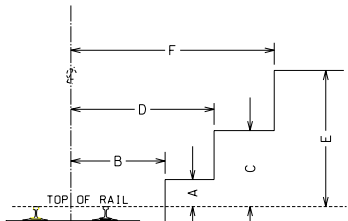
APPROVED BY:
JW Heaven
CHIEF ENGINEER

STANDARD CLEARANCES
FOR NEW INSTALLATIONS

DRAWING NO.

RB-702

CLEARANCE REQUIREMENTS ⁽¹⁾

| STATES | REGULATION REFERENCE | | TRACK CENTERS | | | | | VERTICAL | | | | | HORIZONTAL | | | | | | | | PLATFORMS | | | | | | | | | | | | | | | |
|-------------|----------------------|----------|---------------------------|---|---|-------------------------------------|------------------------------|--------------------|-----------------|-----------------|----------------|------------------------|------------------------|-----------------|-----------------|-----------------------|-------------------------|-------------------------------|----------------------|---|-----------|-------|-----------------------|-----------------------|-------|-------|--|--|--|--|--|--|--|--|--|--|
| | | | ANY TWO SUBSIDIARY TRACKS | ADJACENT SUBSIDIARY TRACK TO ANY MAIN TRACK | LADDER TRACK ADJACENT TO ANY PARALLEL TRACK | TWO ADJACENT PARALLEL LADDER TRACKS | UNLOADING TRACKS AT PLATFORM | GENERAL STRUCTURES | THROUGH BRIDGES | HIGHWAY BRIDGES | BUILDING DOORS | STRUCTURES IN BUILDING | GENERAL STRUCTURES | THROUGH BRIDGES | HIGHWAY BRIDGES | BUILDING DOORS | STRUCTURES IN BUILDINGS | TIPPLES, STONE CRUSHERS, ETC. | POLES, POST, & SIGNS |  | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | A | B | C | D | E | F | | | | | | | | | | | |
| ALABAMA | | | | | | | CURRENTLY NO REGULATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ARKANSAS | CASE R-1012 | 1/1/56 | 14'-0" | 14'-0" | 17'-0" | 20'-0" | 13'-0" | 22'-0" | 22'-0" | 22'-0" | 22'-0" | 17'-0" | 18'-0" ⁽¹⁴⁾ | 8'-6" | 8'-0" | 8'-6" | 7'-0" ⁽¹³⁾ | 7'-0" ⁽⁶⁾ | 8'-6" | 8'-6" | 0'-8" | 5'-0" | 4'-0" | 5'-9" ⁽¹⁷⁾ | 4'-0" | 8'-0" | | | | | | | | | | |
| KANSAS | KSA 66-141 | 5/1/81 | 14'-0" | 14'-0" | 17'-0" | 20'-0" | 13'-0" | 22'-6" | 22'-0" | 22'-6" | 17'-0" | 18'-0" | 8'-6" | 8'-0" | 8'-6" | 7'-0" ⁽²⁰⁾ | 7'-0" ⁽²¹⁾ | 8'-6" | 8'-6" | 0'-8" | 5'-0" | 4'-0" | 6'-2" ⁽¹⁷⁾ | 4'-0" | 8'-6" | | | | | | | | | | | |
| LOUISIANA | | | | | | | CURRENTLY NO REGULATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MISSISSIPPI | | | | | | | CURRENTLY NO REGULATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MISSOURI | CSR 240-100 | 9/1/83 | 14'-0" | 14'-0" | 17'-0" | 19'-0" | 13'-6" | 22'-0" | 22'-0" | 22'-0" | 22'-0" | 22'-0" | 8'-6" | 8'-0" | 8'-6" | 8'-6" | 8'-6" ⁽¹³⁾ | 8'-6" | 8'-6" | 8'-6" | 0'-4" | 4'-6" | 4'-0" | 5'-1" ⁽⁹⁾ | CFH | 5'-9" | | | | | | | | | | |
| OKLAHOMA | ORDER 33347 | 12/21/56 | 14'-0" | 14'-0" | 17'-0" | 20'-0" | 13'-0" | 22'-0" | 22'-0" | 22'-0" | 17'-0" | 18'-0" | 8'-6" | 8'-0" | 8'-6" | 7'-0" ⁽¹³⁾ | 7'-0" ⁽⁶⁾ | 8'-6" | 8'-6" | 0'-8" | 5'-0" | 4'-0" | 5'-9" | 4'-0" | 8'-0" | | | | | | | | | | | |
| TENNESSEE | RULE 1220-3-1-J2 | 2/1/70 | 13'-0" | 14'-0" | 18'-0" | 18'-0" | 13'-0" | 22'-0" | 22'-0" | 22'-0" | 17'-0" | 17'-0" | 8'-0" | 8'-0" | 8'-0" | 8'-0" | 8'-0" | 8'-0" | 8'-0" | 0'-8" | 4'-8" | 4'-0" | 5'-9" | 4'-0" | 7'-6" | | | | | | | | | | | |
| TEXAS | SECT. 5.611 | 7/1/83 | | | | | | 22'-0" | 22'-0" | 22'-0" | 22'-0" | 22'-0" | 8'-6" | 7'-6" | 8'-6" | 8'-6" ⁽¹³⁾ | 8'-6" | 8'-6" | 8'-6" | 1'-0" | 4'-6" | | | | | | | | | | | | | | | |

DIMENSIONS:

SHOWN IN FEET AND INCHES - ARE FOR TANGENT TRACK.
MOST LAWS SPECIFY INCREASES FOR CURVED
AND SUPERELEVATED TRACK.

VERTICAL - MEASURED FROM TOP OF RAIL.

HORIZONTAL - MEASURED FROM CENTERLINE OF TRACK.

APPLY TO NEW CONSTRUCTION, RECONSTRUCTION, AND EXTENSIONS.

ALL ARE MINIMUM EXCEPT - COLUMNS 21, 22, 23, 24, 25 AND 26
WHICH ARE MAXIMUM.

OTHER SYMBOLS:

CFH - CAR FLOOR HEIGHT = 42" +/-

COLUMNS:

- 2 SHOWS BASIC REGULATION.
- 3 SHOWS BASIC DATE.
- 6 & 7 APPLY TO HAND AND MECHANICAL OPERATED SWITCHES
EXCEPT AS NOTED.
- 9 & 14 PREVAILS FOR ALL ITEMS NOT OTHERWISE PROVIDED FOR.
- 10 & 15 BRIDGES SUPPORTING TRACKS.
- 11 & 16 BRIDGES SPANNING TRACKS.
- 21 & 22 PASSENGER PLATFORMS.
- 23 & 24 FREIGHT PLATFORMS ON SIDE TRACKS EXCEPT AS NOTED.
- 25 & 26 FREIGHT PLATFORMS ON SIDE TRACKS - STEPPED PLATFORMS
ARE NOT GENERALLY ALLOWED.

NOTES:

- 1 TAKEN FROM A.R.E.M.A. MANUAL FOR RAILWAY ENGINEERING 28-3-25.
- 3 ENGINE HOUSES AND SHOP BUILDINGS EXCEPTED AND PERMITTED.
- 4 ONLY IF TRACKS END WITHIN BUILDINGS.
- 5 MAY BE REDUCED TO 5'-9" IF 8'-3" IS PROVIDED ON OPPOSITE SIDE.
- 6 MAY BE REDUCED TO 5'-9" IF 8'-00" IS PROVIDED ON OPPOSITE SIDE.
- 7 ONLY IF 8'-0" IS PROVIDED ON OPPOSITE SIDE.
- 9 PASSENGER PLATFORMS ONLY.
- 10 MAY BE REDUCED TO 6'-2" IF 8'-3" IS PROVIDED ON OPPOSITE SIDE.
- 11 MAY BE REDUCED TO 6'-2" IF 8'-3" IS PROVIDED ON OPPOSITE SIDE.

THE KANSAS CITY SOUTHERN LINES CONTRACTURAL CLEARANCE REQUIREMENTS

Industry shall not erect or maintain or allow to be erected, maintained or exist, any building, structure or obstruction of any kind adjacent to said Sidetrack less than twenty three feet six inches (23'-06") above top of rail, or alongside of the Sidetrack less than nine feet (9'-0") from center of track, with necessary additional clearance on curves (increase 1" for each degree of curve); provided, however, that a low platform, height not above four feet (4') above top of rail, may be constructed at a distance not less than six feet four inches (6'-04") from the center of the Sidetrack except as to wires. The minimum overhead clearance of which shall be in accordance with specifications of the current National Electrical Safety Code, and in no case less than Twenty-Eight (28) feet above the top of rails of said Sidetrack.



K.C.S.
STANDARDS

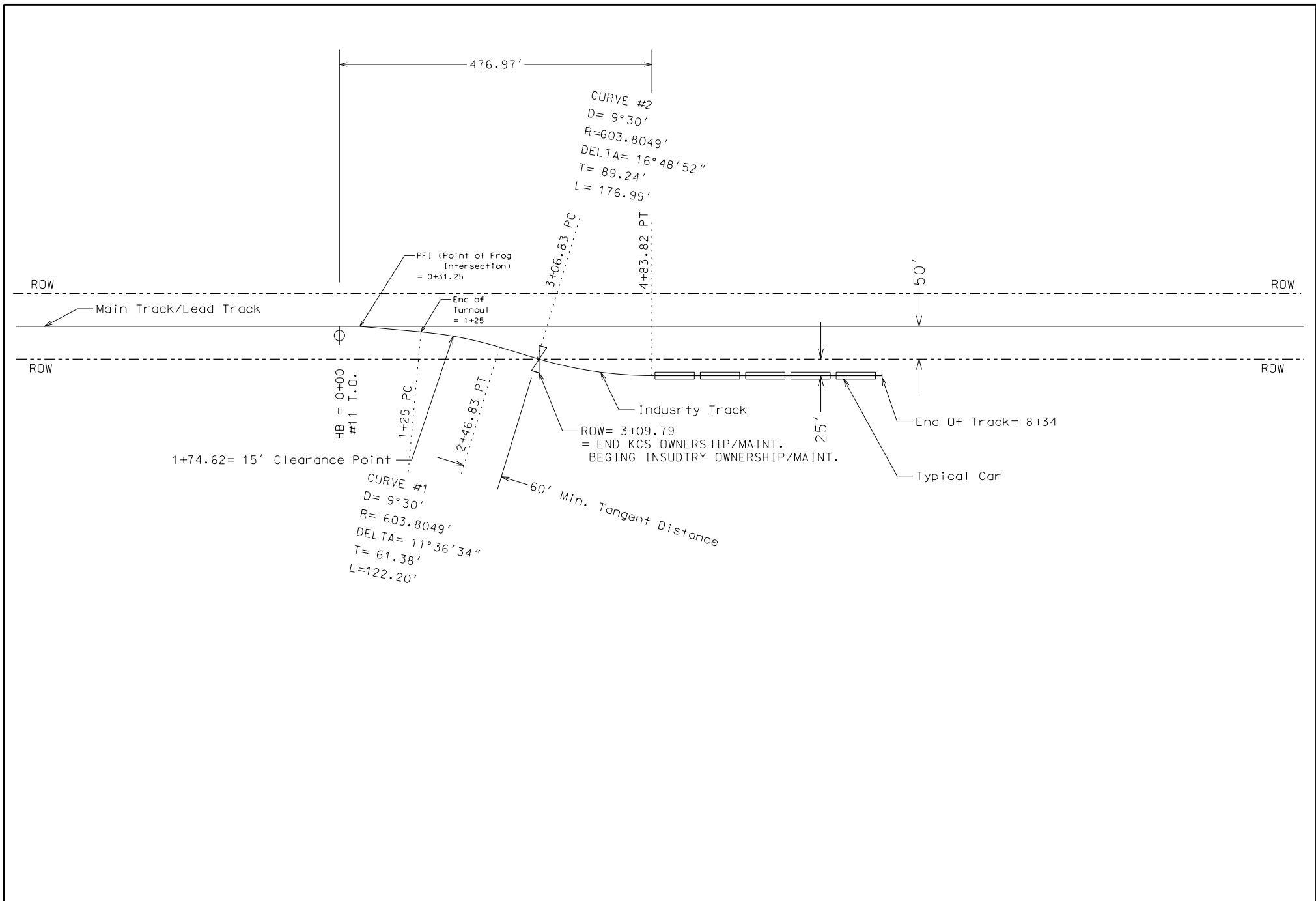
DATE: 1-6-98
REV: 4-27-07
SCALE: NONE
DRAWN BY: RGT

APPROVED BY:
J.W. Heaven
CHIEF ENGINEER

CLEARANCE REQUIREMENTS

DRAWING NO.

RB-703



K.C.S.
STANDARDS

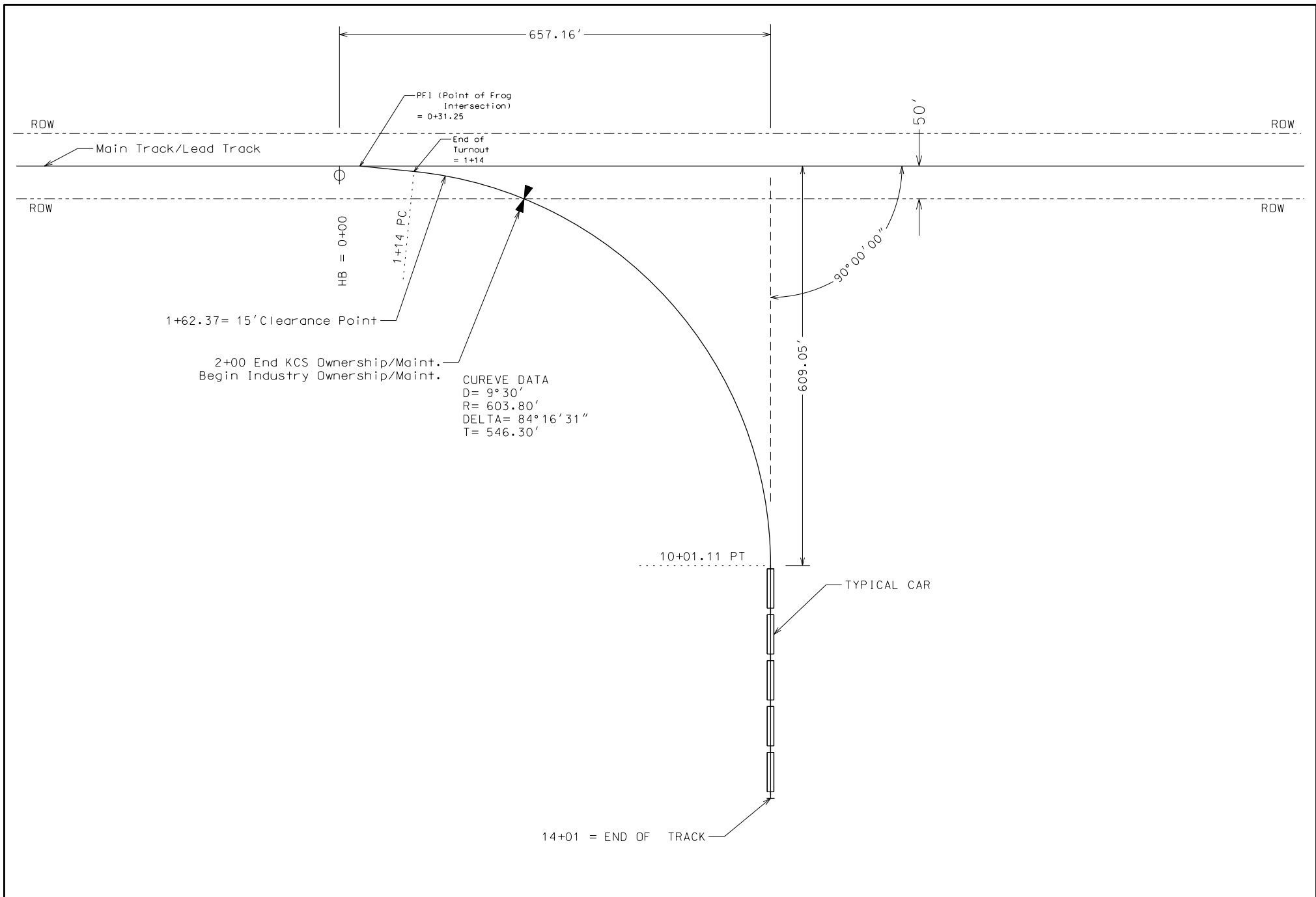
DATE: 7-10-97
 REV: 4-27-07
 SCALE: NONE
 DRAWN BY: WLC

APPROVED BY:
JW Heaven
 CHIEF ENGINEER

**TYPICAL LAYOUT FOR INDUSTRY TRACK
 PARALLEL TO MAIN/LEAD TRACK**

DRAWING NO.

RB-302



K.C.S.
STANDARDS

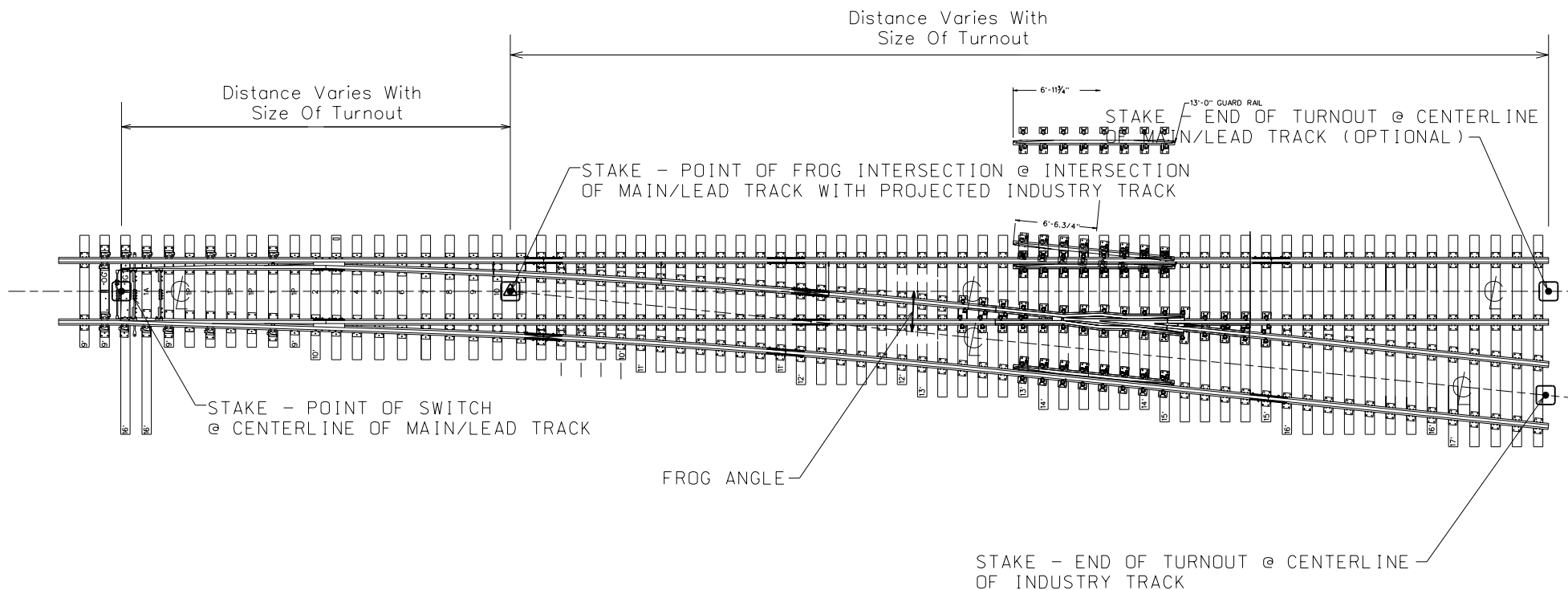
DATE: 7-10-97
REV: 4-27-07
SCALE: NONE
DRAWN BY: WLC

APPROVED BY:
JW Heaven
CHIEF ENGINEER

**TYPICAL LAYOUT FOR INDUSTER TRACK
PERPENDICUALR TO MAIN/LEAD TRACK**

DRAWING NO.

RB-303



K.C.S.
STANDARDS

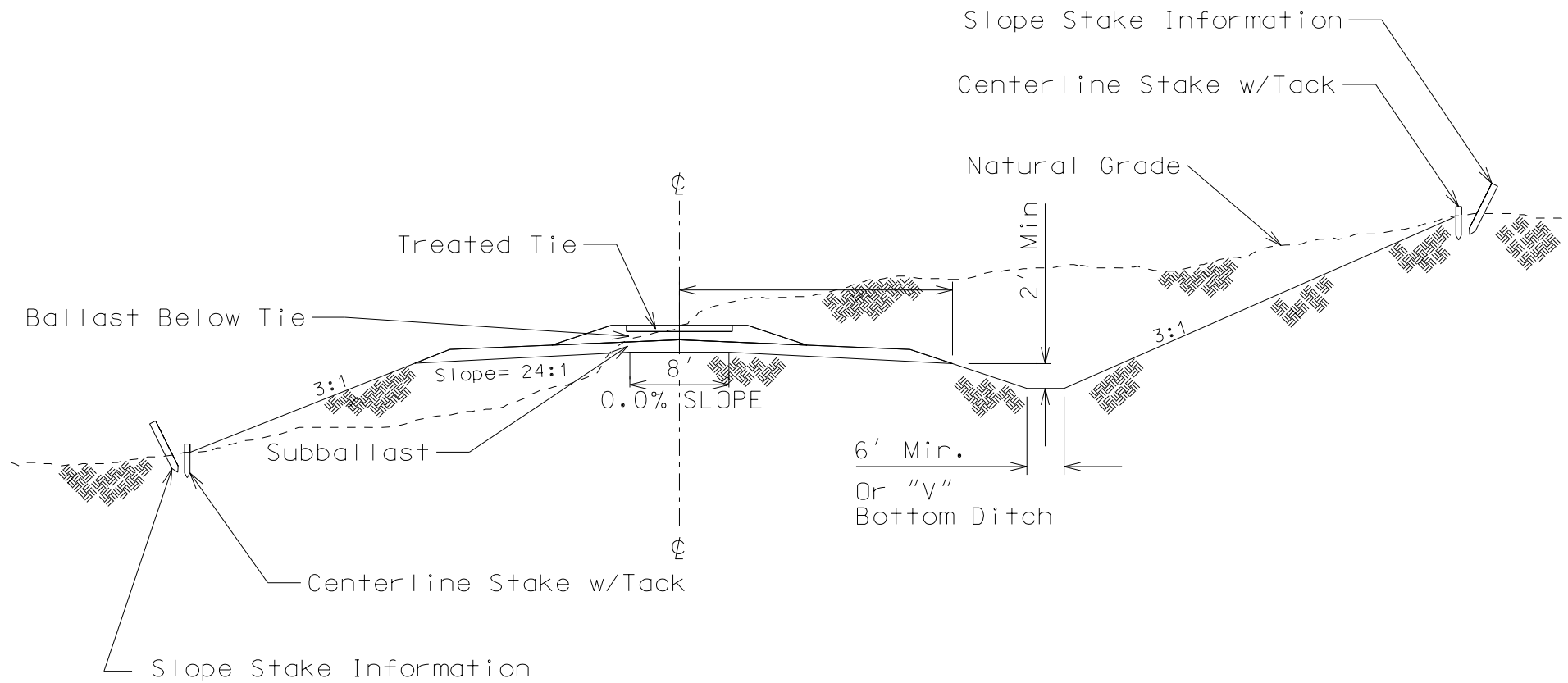
DATE: 7-11-97
REV: 4-27-07
SCALE: NONE
DRAWN BY: WLC

APPROVED BY:
JW Heaven
CHIEF ENGINEER

**TYPICAL STAKES SET DURING
CONSTRUCTION OF THE TURNOUT**

DRAWING NO.

RB-304



K.C.S.
STANDARDS

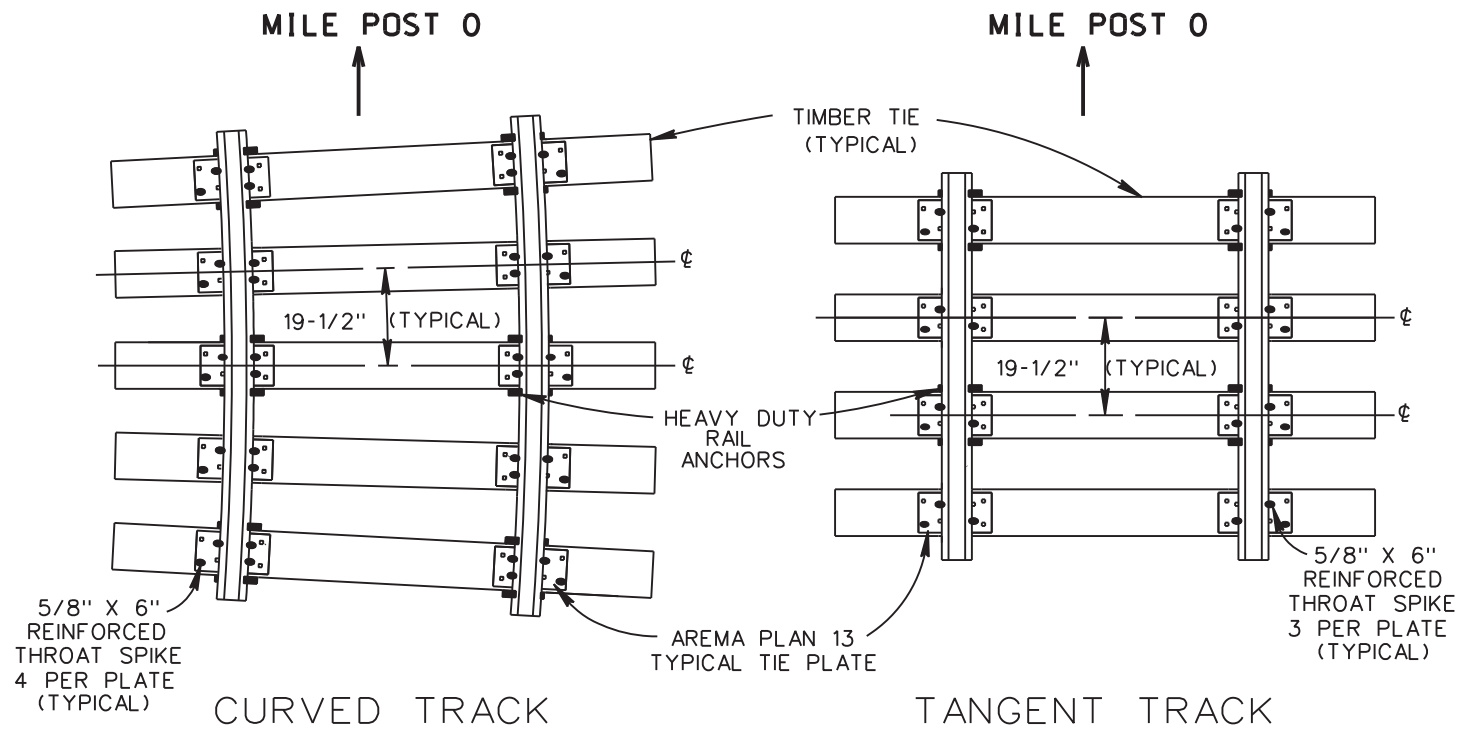
DATE: 7-14-97
REV: 4-27-07
SCALE: NONE
DRAWN BY: WLC

APPROVED BY:
JW Heaven
CHIEF ENGINEER


**TYPICAL LOCATION OF SLOP STAKES
DURING CONSTRUCTION OF ROADBED**

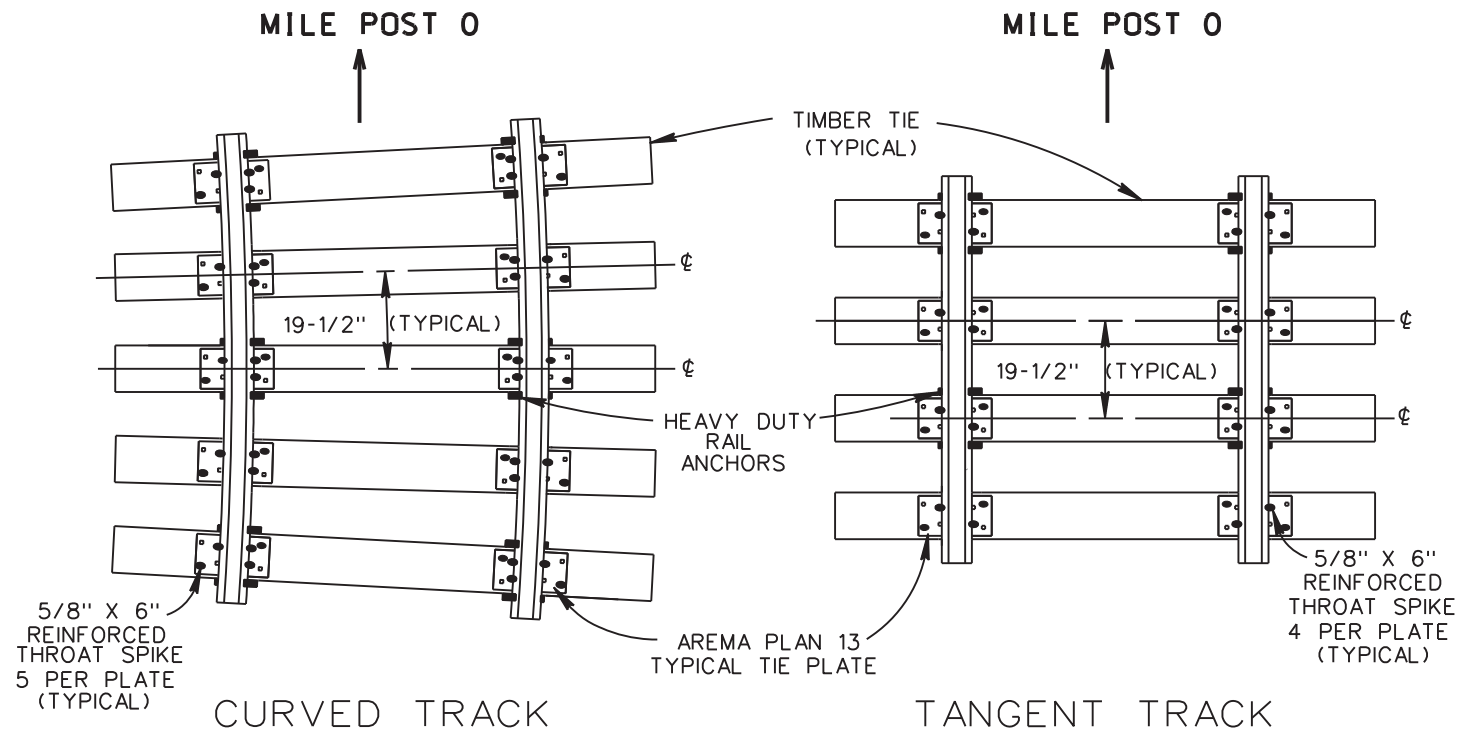
DRAWING NO.

RB-305



REFERENCE DRAWINGS= 990-76
999-108B

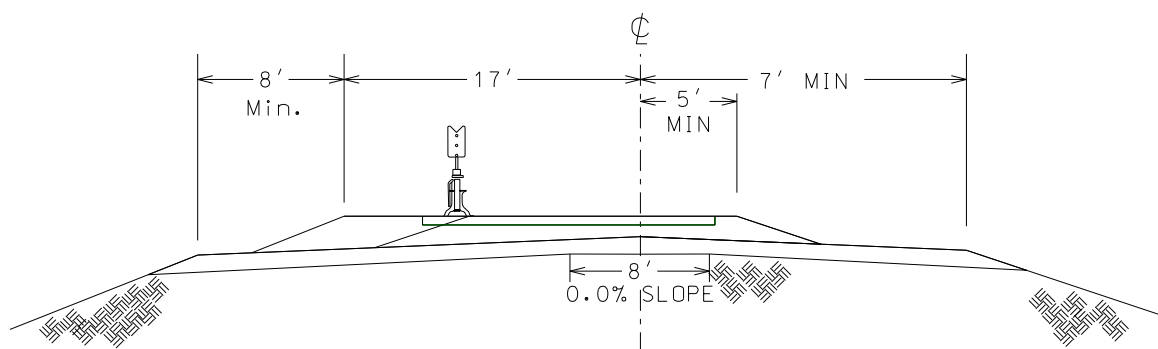
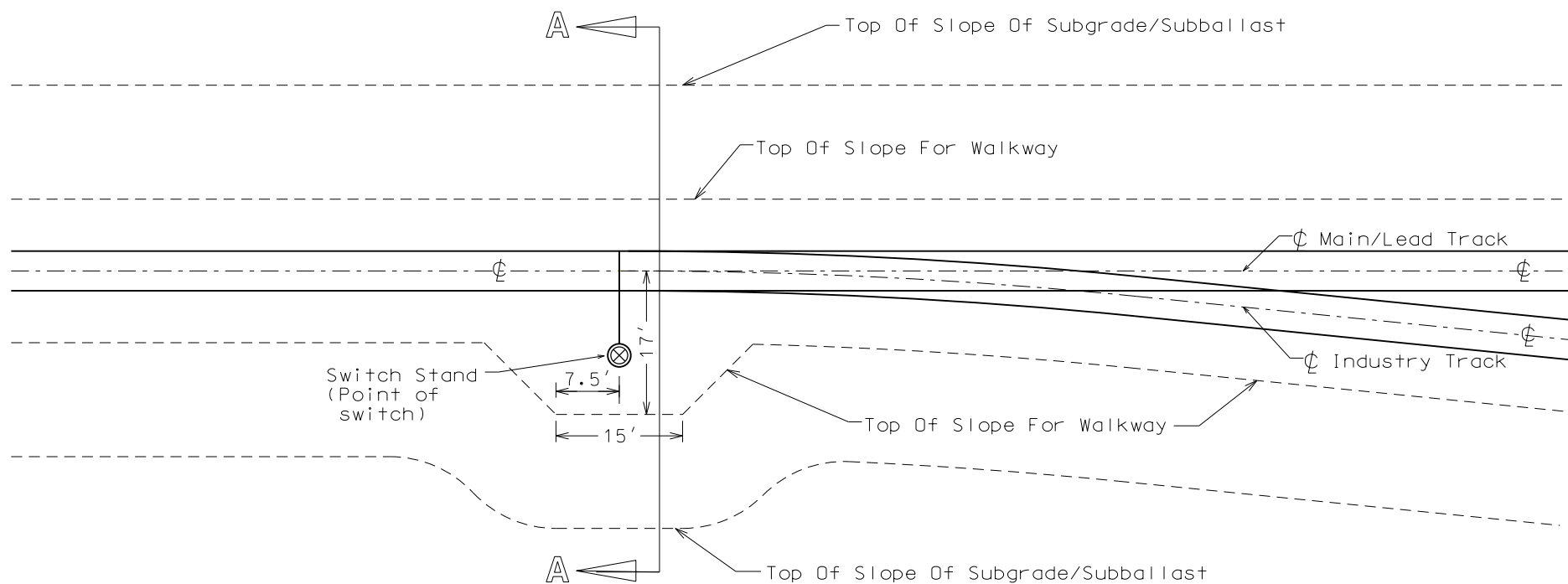
| REVISIONS | | EXHIBIT "A" | | | |
|---|--|--|-----------------|-------------------|--|
| 7/14/1997 WLC 1/17/2000 WLC 2/4/2000 WLC | | THE KANSAS CITY SOUTHERN RY. CO. | | | |
| | | TYPICAL SPIKE AND ANCHOR PATTERN FOR TANGENT AND CURVED TRACK WHEN USING NON PRE-PLATED TIES | | | |
| | |  | DRAWN BY MEV | DATE 3-24-93 | VAL. SEC. • |
| | | | CHECKED BY • | SCALE AS SHOWN | SHEET NO. 1 OF 1 DRAWING NO. 999-108A |



REFERENCE DRAWING= 990-76
999-180A

| REVISIONS | | EXHIBIT "B" | | | |
|---|--|--|-------------------|----------------|-------------------------|
| 7/14/1997 WLC 1/17/2000 WLC 2/4/2000 WLC | | THE KANSAS CITY SOUTHERN RY. CO. | | | |
| | | TYPICAL SPIKE AND ANCHOR PATTERN FOR TANGENT AND CURVED TRACK WHEN USING PRE-PLATED TIES | | | |
| | | DRAWN BY MEV | DATE 3-24-93 | VAL. SEC. . | SHEET NO. 1 OF 1 |
| | | CHECKED BY . | SCALE AS SHOWN | FILE . | DRAWING NO. 999-1088 |





SECTION A-A



K.C.S.
STANDARDS

DATE: 7-15-97
REV: 4-27-07
SCALE: NONE
DRAWN BY: WLC

APPROVED BY:
J.W. Heaven
CHIEF ENGINEER

**TYPICAL WALKWAY/ROADBED
AT SWITCH STAND
(NEW CONSTRUCTION)**

DRAWING NO.

RB-204

TRACK PROTECTION SHORING:

ALL DIMENSIONS ARE MEASURED PERPENDICULAR TO C OF TRACK.

PRIOR TO COMMENCING ANY WORK, THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE RAILROAD ENGINEER, DETAILED PLANS INDICATING THE NATURE AND EXTENT OF THE TRACK PROTECTION SHORING PROPOSED. THE CONTRACTOR SHALL PROVIDE AND INSTALL TRACK PROTECTION SHORING BEFORE COMMENCING EXCAVATION.

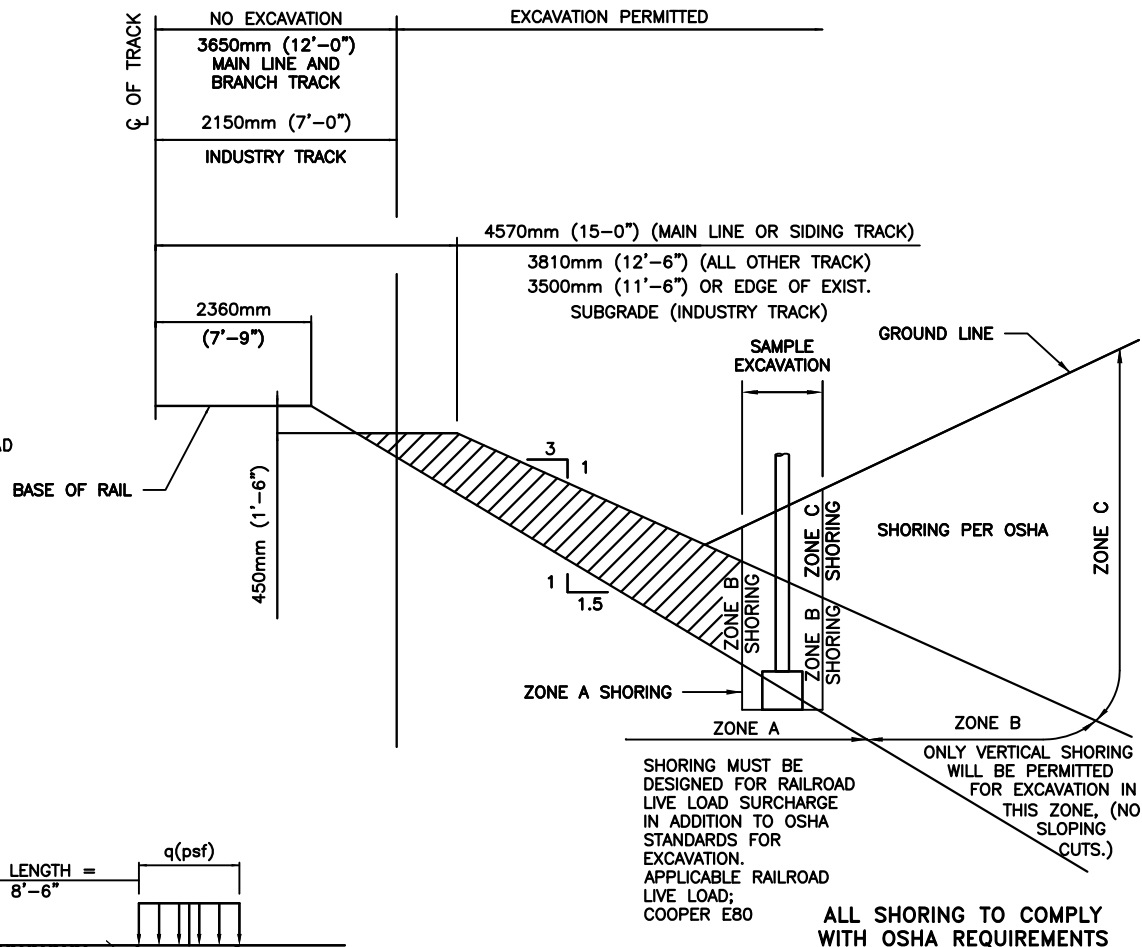
SHORING WITHIN ZONE A SHALL BE DESIGNED FOR COOPER E80 LIVE LOAD SURCHARGE, IN ADDITION TO ALL OTHER APPLICABLE LOADS. THE RAILROAD MAY IMPOSE MORE STRINGENT REQUIREMENTS AS CONDITIONS WARRANT.

FOR EXCAVATIONS WHICH ENCROACH INTO RAILROAD LIVE LOAD SURCHARGE ZONE A, SHORING PLANS WILL BE ACCOMPANIED BY A COPY OF DESIGN CALCULATIONS, AND BOTH MUST BE STAMPED BY A REGISTERED PROFESSIONAL ENGINEER IN THE APPLICABLE STATE.

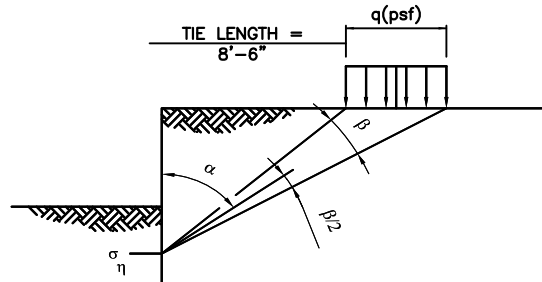
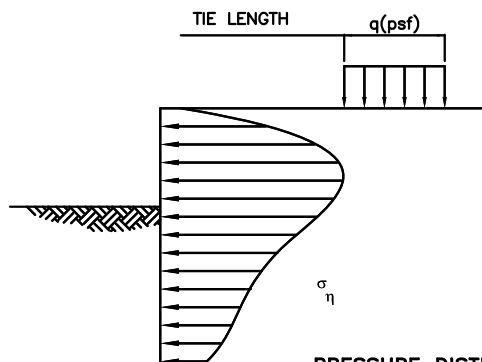
THE PRESSURE AT A GIVEN POINT OF A CONTINUOUS STRIP OF SURCHARGE LOAD q(psf) PARALLEL TO SHORING SHALL BE COMPUTED BY:

$$\sigma_{\eta} = \frac{2q}{\pi} [\beta - \sin \beta \cos 2\alpha]$$

WHERE ANGLES α AND β ARE EXPRESSED IN RADIAN.



$$q = \frac{80,000 \text{ lbs}}{(5 \text{ FEET})(8.5 \text{ FEET})}$$



**PRESSURE DISTRIBUTION FOR STRIP LOAD
(AREMA FIGURE 8.20-2)**



**K.C.S.
STANDARDS**

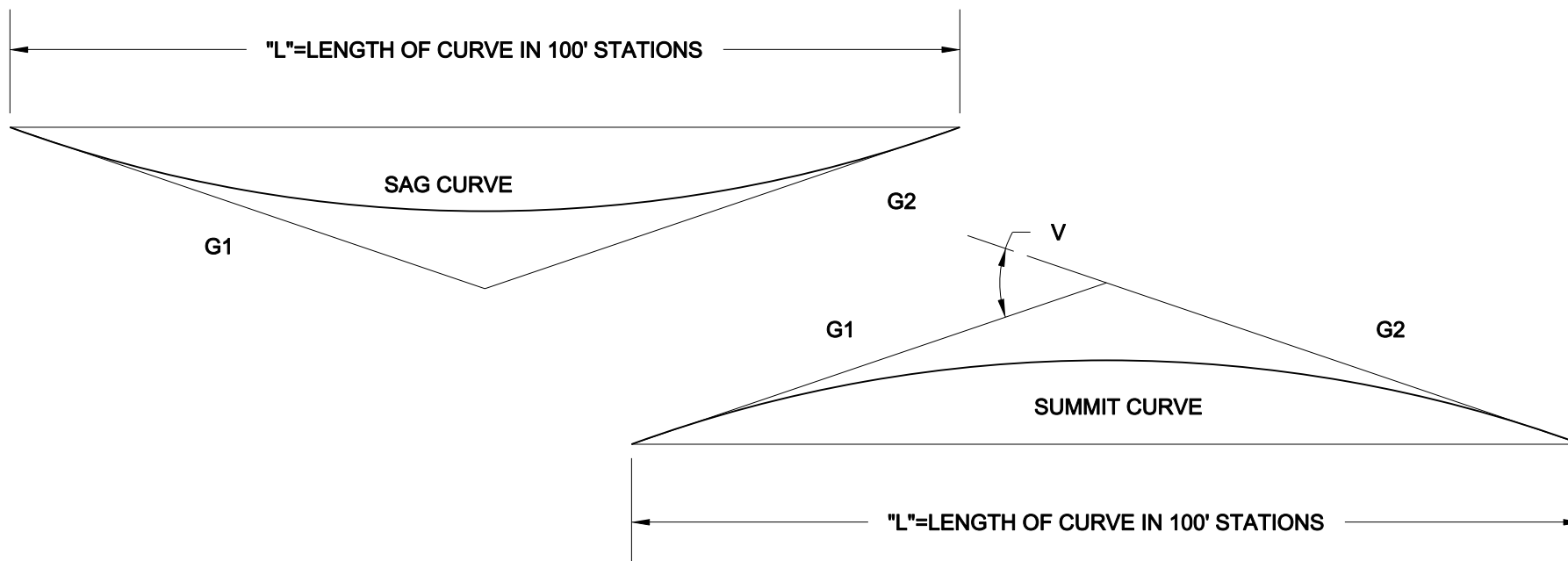
DATE: 4-21-06
REV: 4-27-07
SCALE: NONE
DRAWN BY: RED

APPROVED BY:
CHIEF ENGINEER

GENERAL SHORING REQUIREMENTS

DRAWING NO.

BR-122



G1 AND G2 DESIGNATE GRADES IN PERCENT
 L = LENGTH OF CURVE IN 100' STATIONS
 V = ALGEBRAIC DIFFERENCE IN GRADES IN PERCENT (G2-G1)
 V/L = AVERAGE CHANGE IN GRADE EVERY 100' STATION

| | | | | |
|---|--------------|-----------------|---|---------------------------|
| ALL MAIN TRACKS | SAG V/L .06 | SUMMIT V/L .10 | ≤ | $V/L = \frac{(G1-G2)}{L}$ |
| BRANCH TRACK SPEEDS 40 MPH AND GREATER | SAG V/L .06 | SUMMIT V/L .10 | ≤ | |
| BRANCH TRACK SPEEDS LESS THAN 40 MPH | SAG V/L .12 | SUMMIT V/L .20 | ≤ | |
| YARD TRACKS | SAG V/L .40 | SUMMIT V/L .80 | ≤ | |
| INDUSTRIAL LEADS | SAG V/L .60 | SUMMIT V/L 1.00 | ≤ | |
| INDUSTRY TRACKS | SAG V/L 1.20 | SUMMIT V/L 2.00 | ≤ | |



K.C.S.
STANDARDS

DATE: 4-21-06
 REV: 4-27-07
 SCALE: NONE
 DRAWN BY: RGT

APPROVED BY:

 CHIEF ENGINEER

VERTICAL CURVE DESIGN

DRAWING NO.

RB-806

**IN COMPLIANCE WITH NATIONAL ELECTRICAL SAFETY
CODE FOR GIVEN TEMPERATURE AND WIND LOAD
CONDITIONS**

| VOLTAGE (TO GROUND) | MINIMUM CLEARANCE REQUIRED ABOVE TOP RAIL | MINIMUM CLEARANCE REQUIRED ABOVE COMMUNICATION & SIGNAL LINE INCLUDING STATIC WIRES |
|---|--|--|
| INSULATED COMMUNICATION WIRELINES | 23.5 FT. (7.16M) | 4 FT. (1.22M) |
| NON-INSULATED COMMUNICATION WIRELINES | 24 FT. (7.32M) | 4 FT. (1.22M) |
| SHIELDED OR INSULATED POWER WIRELINES 0-750 VOLTS | 24 FT. (7.32M) | 4 FT. (1.22M) |
| SHIELDED OR INSULATED POWER WIRELINES (LASHED TO BARE GROUND MESSENGER) 750V - 2.9 K V | 24.5 FT. (7.47M) | 4 FT. (1.22M) |
| OPEN SUPPLY CONDUCTORS 0 - 750 VOLTS | 24.5 FT. (7.47M) | 4 FT. (1.22M) |
| OPEN SUPPLY CONDUCTORS 751 V - 22 K V | 26.5 FT. (8.1M) | 6 FT. (1.83M) |
| 50 K V | 27.5 FT. (8.38M) | 6 FT. (2.29M) |
| 100 K V | 29.2 FT. (8.9M) | 7.5 FT. (2.74M) |
| 150 K V | 30.8 FT. (9.39M) | 9 FT. (2.74M) |
| 200 K V | 32.5 FT. (9.91M) | 11 FT. (3.35M) |

ALWAYS REFER TO CURRENT NATIONAL ELECTRIC SAFETY CODE BEFORE INSTALLATION OR CONSTRUCTION OF POWER WIRELINES.



K.C.S.
STANDARDS

DATE: 4-21-06
REV: 4-27-07
SCALE: NONE
DRAWN BY: DLL

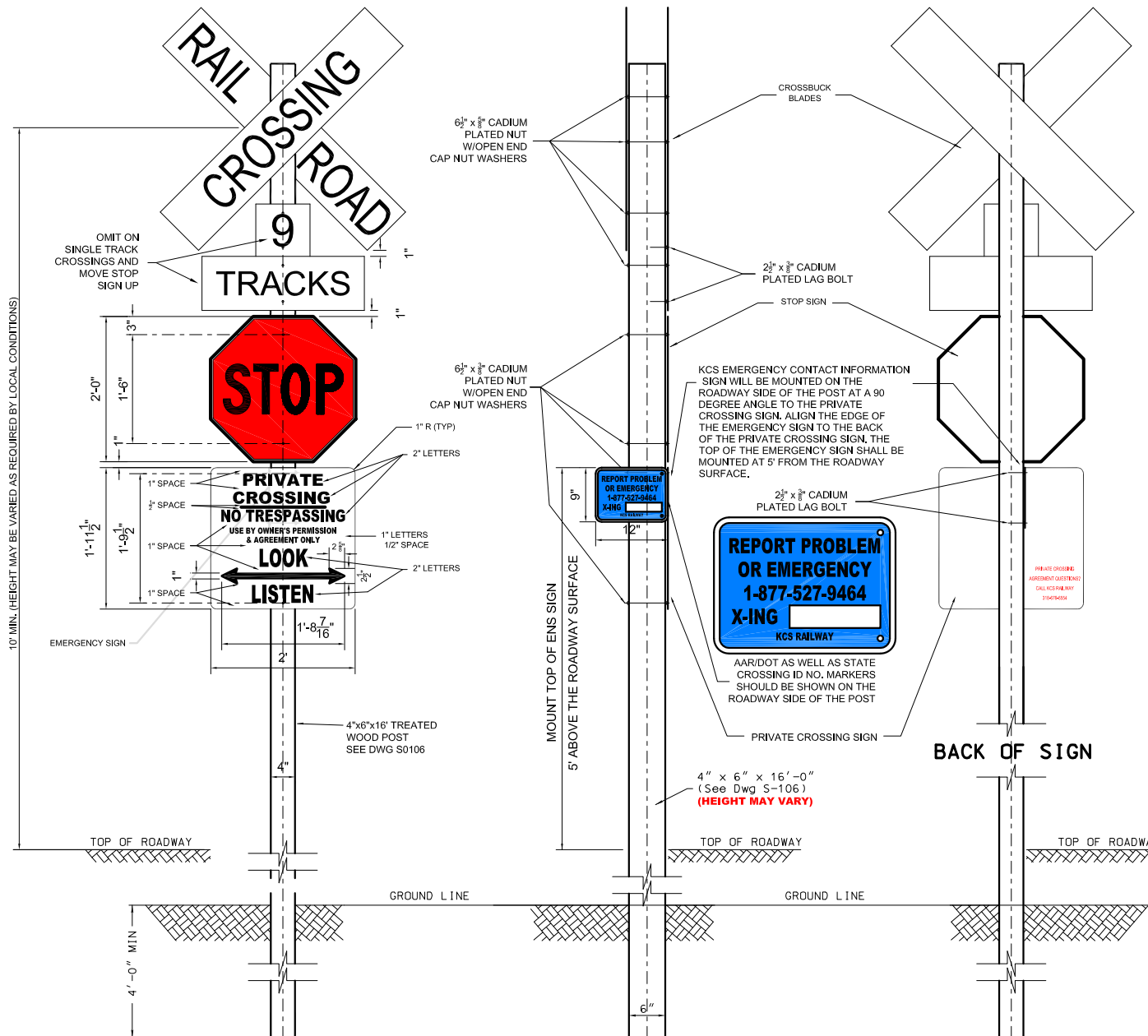
APPROVED BY:

CHIEF ENGINEER

WIRE LINE CLEARANCE CHART

DRAWING NO.

RB-704



NOTES:

- 1) PRIVATE CROSSING SIGN TO BE 3290 SILVER 3M HIGH INTENSITY GRADE BACKGROUND ON 0.80" SHEET ALUMINUM.
- 2) SIGN LOCATION SHOULD BE 15' FROM THE NEAREST RAIL WITH THE CENTER OF POST NO LESS THAN 6' FROM THE DEFINED EDGE OF THE TRAVELED ROADWAY. POSITION THE SIGN TO PROVIDE THE BEST VIEW FROM THE ROADWAY APPROACH. SEE DWG NO. S-127
- EXCEPTION: ON PRIVATE FRMS FIELD TO FIELD SEE DWG NO. S-127 FOR ASSEMBLY POST LOCATION**
- 3) FOR CROSSBUCK BLADE INFORMATION SEE DWG NO. S-111
- 4) FOR TRACK SIGN INFORMATION SEE DWG NO. S-111
- 5) FOR ENS SIGN INFORMATION SEE DWG. NO. S-121
- 6) FOR CROSSBUCK POST INFORMATION SEE DWG. NO. S-106

| QUANTITY | ITEM DESCRIPTION | ITEM NO. |
|----------|---|----------|
| 1 EA | 24" x 24" STOP SIGN | ----- |
| 1 EA | PRIVATE CROSSING SIGN | ----- |
| 1 EA | EMERGENCY NOTIFICATION SIGN | ----- |
| 1 EA | "RAILROAD" SIGN BLADE | ----- |
| 1 EA | "CROSSING" SIGN BLADE | ----- |
| 1 EA | "TRACKS" SIGN (IF NEEDED) | ----- |
| 1 EA | "NUMBER" SIGN (IF NEEDED) | ----- |
| 1 EA | 4" x 6" x 16'-0" CCA TREATED POST (DUE TO LOCAL CONDITIONS HEIGHT MAY VARY) | ----- |
| 4 EA | 6 1/2" x 3/8" CADMIUM PLATED NUT W/OPEN END CAP NUT WASHERS | ----- |
| 4 EA | 6 1/2" x 3/8" CADMIUM PLATED NUT W/OPEN END CAP NUT WASHERS | ----- |
| 4 EA | 2 1/2" x 3/8" CADMIUM PLATED LAG BOLT | ----- |

**PRIVATE
CROSSING
NO TRESPASSING**
USE BY OWNER'S PERMISSION
& AGREEMENT ONLY

**LOOK
LISTEN**

PRIVATE CROSSING
AGREEMENT QUESTIONS?
CALL KCS RAILWAY
318-676-6554



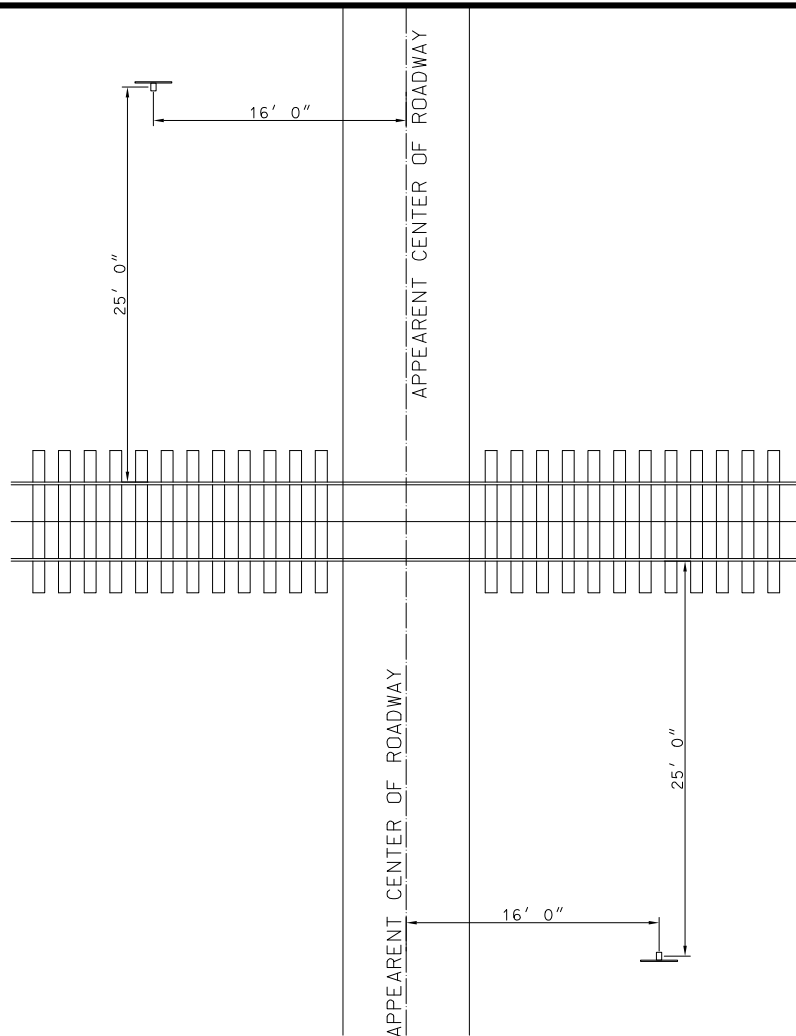
**K.C.S.
STANDARDS**

DATE: 7-7-06
REV: 8-28-10
SCALE: NONE
DRAWN BY: DLL

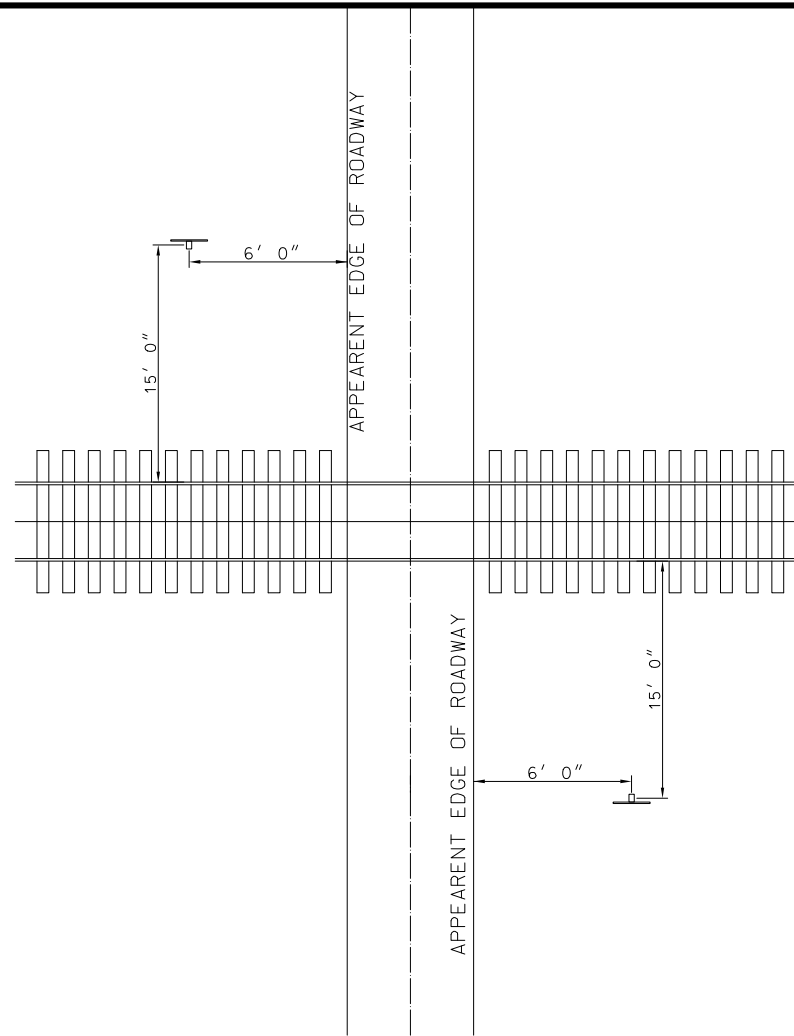
APPROVED BY:
[Signature]
CHIEF ENGINEER

**PRIVATE ROADWAY
GRADE CROSSING SIGN
(NEW INSTALLATION)**

DRAWING NO.
S-120



PRIVATE FARMS
FIELD TO FIELD
CROSSINGS ONLY
ASSEMBLY POST LOCATION



PRIVATE CROSSING
ASSEMBLY POST LOCATION



K.C.S.
STANDARDS

DATE: 7-14-10
REV: X-X-X
SCALE: NONE
DRAWN BY: DLL

APPROVED BY:

[Signature]
CHIEF ENGINEER

PRIVATE ROADWAY
POST PLACEMENT
(NEW INSTALLATION)

DRAWING NO.

S-127