



Technical Standards for Roadway, Trail, and Utility Facilities in the ARRC Right-of-Way

Alaska Railroad Corporation

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A handwritten signature in blue ink, appearing to read "Roy L. Jones", is written over a horizontal line.

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Alaska Railroad Chief Engineer

Technical Standards for Roadway, Trail, and Utility Facilities

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Technical Standards for Roadway, Trail, and Utility Facilities

PART 1 – PURPOSE AND BACKGROUND

1. Purpose and Application

This document sets forth technical engineering and design standards to be applied during consideration of proposed installations of roadways, trails and utility facilities within the right-of-way (ROW) of the Alaska Railroad Corporation (ARRC). The technical standards set forth herein relate to the accommodation, location and method of installation, modifications, removal, relocation and maintenance of roadways, trails, and utility facilities not owned by ARRC, but which are located within the ROW. These technical standards were developed in the interest of safety, protection, utilization, and future development of ARRC and the ROW with due consideration given to public and private service afforded by adequate and economical utility installations.

These technical standards were developed by and shall be applied by the Chief Engineer of ARRC and other ARRC Engineering staff, and shall serve as the Engineering Standard of Practice for ARRC with respect to roadways, trails and utility facilities constructed, maintained and operated in the ROW by non-ARRC parties. These technical standards shall be applied to all locations within ARRC lands or ROW located within two hundred (200) feet of ARRC Track. These technical standards specifically apply to the following types of facilities on ARRC lands:

- A. New roadway, trail and utility facilities;
- B. Additions, modifications, upgrades, or relocation of existing roadway, trail and utility facilities defined as any betterment to a facility resulting in a change to the facility foot print, or a change in the measurement of any clearance or separation from ARRC Track;
- C. Planned utility facilities not yet approved for construction by ARRC prior to the date of the adoption of this technical guidance;
- D. Any other type of facility not specifically described herein, but which is physically located within two hundred (200) feet of any railroad track maintained by ARRC.

Nothing contained in these technical standards creates for any party any interest in or title to the ARRC property upon which any facility subject to these standards is constructed, nor does the application of these standards affect in any way ARRC's rights in said property, including but not limited to the rights of ARRC, its successors, assigns, permittees and licensees to use said property for any purpose whatsoever.

2. Exceptions

Exceptions to any design, location or methods of installation provisions contained in these technical standards must be authorized by ARRC. 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 prescribed in keeping with the intent of these technical standards. All requests for exceptions shall be fully documented including design data, cost comparisons, and other pertinent information. Requests for exemption from these technical standards will be determined at the sole discretion of ARRC's Chief Engineer.

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These technical standards do not apply to existing facilities within ARRC ROW that were permitted under pre-existing agreements prior to the institution of these technical standards. Such existing facilities shall instead remain subject to the technical provisions set forth in the existing permits, including but not limited to any standard specifications, supplemental conditions and/or special conditions included in those permits. These technical standards shall apply, however, to any additions, modifications upgrades, or relocation of existing Facilities defined as any betterment to said facilities resulting in a change to the Facility Footprint, or a change in the measurement of any clearance or separation from ARRC Track.

These technical standards do not apply to tracks which are not maintained by ARRC. Such tracks shall be governed by ARRC technical standards specifically applicable to Industrial Track, as defined below.

3. Definitions

- ARRC Track – Any railroad track that is owned and operated by ARRC and that is used for the movement, storage, or switching of trains.
- At-Grade Crossing – Any roadway, trail, sidewalk, or path that crosses railroad track at the same elevation as the rails, through the incorporation of surface improvements.
- Chief Engineer – Engineer designated by, and in the general employ of, ARRC who has ultimate responsibility for the safety, design, and maintenance of railroad and facility infrastructure.
- Clearance – The minimum envelope generally required for the passage of railway equipment without special permit.
- Design Track Speed – The maximum speed trains could be reasonably authorized to operate on a section of track during the expected life-span of a facility. This *may or may not* be the presently posted speed on the track.
- Facility – Any physical improvement or delimited area wholly or partially within the bounds of the ARRC right-of-way or other ARRC land subject to these technical standards.
- Facility Owner – The party legally responsible for the construction, maintenance, and serviceability of a Facility located on the ARRC right-of-way or other ARRC land subject to these technical standards.
- Footprint – The area enclosed by the physical edge of a Facility.

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- Future Track – Any track that does not exist today, but which the design of a Facility must accommodate such that said Facility will not need to be modified when ARRC constructs said track.
- Industrial Track – Any track not owned by ARRC and any track, whether or not owned by ARRC, used for the regular loading, unloading, or storage of rail cars.
- Longitudinal Use – For utility Facilities, longitudinal use of the right-of-way is any encroachment where the total length of the line measured from the point of entry onto ARRC right-of-way to the point of departure, measured along the utility line, is greater than 125% of the width of the ARRC right-of-way measured at a right angle to the railroad track at the point of entry. For roadways and other non-utility Facilities, longitudinal use of the right-of-way is any encroachment that is longer in length measured along the railroad tracks than the right-of-way is wide when measured at a right angle to the railroad tracks at the point of entry.
- Railway Clear Zone – The Railway Clear Zone is a three-dimensional zone within the right-of-way required for the operation and maintenance of the mainline of the railroad. The horizontal component of the Railway Clear Zone is measured horizontally twenty-five (25) feet on either side of the center line of a tangent (straight) ARRC Track where the foreslope is less than three (3) feet horizontal to one (1) foot vertical (3:1). The width of this horizontal component is increased by five (5) feet per degree of curvature on the outside of a curve, with a maximum of ninety-five (95) feet. The vertical component of the Railway Clear Zone is twenty-three-and-a-half (23.5) feet measured from the top of rail to the nearest obstruction.
- The may be significantly larger in yards, industrial tracks, or other areas where the switching, loading, unloading, inspection, or maintenance of railway vehicles occurs. The Railway Clear Zone will be set by the Chief Engineer in these areas.
- Roadway Clear Zone – The Roadway Clear Zone is equivalent to the Clear Zone defined by AASHTO’s Roadway Design Guide, 4th edition (2011), Chapter 3.
- Road or Roadway – Any surface or path specifically designed for the movement of motorized vehicles.

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- Skew – The measure of an acute angle between ARRC Track and another linear feature, subtracted from ninety (90) degrees.
- Temporary – When referring to Facilities subject to these technical standards, a length of time one (1) year or less EXCEPT At-Grade Crossings where the length of time is (6) months or less.
- Trail – Any surface or path used for foot traffic or other forms of transportation that specifically prohibits the public use of motorized vehicles.
- Utility – All public and private utility Facilities, including electric power, telephone (including fiber optics), telegraph, cable television, water, gas, oil, petroleum products, steam, chemicals, sewage, drainage, irrigation, conveyors, and similar lines.

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PART 2 – DESIGN PRACTICES

The following practices are applicable to all subsequent Parts of this policy.

1. Environmental and Regulatory Compliance

All design and construction activity must be in compliance with any and all applicable local, state and national codes and regulations. Any permits required to construct a Facility shall be provided to ARRC by the Facility Owner within thirty (30) days of ARRC's written request.

2. Accommodation of Future Track(s)

All Facilities constructed by non-ARRC parties on ARRC property will accommodate the construction of at least one Future Track adjacent to the existing track(s). The spacing (normally 16-foot center-to-center), number (at least one), and location (left or right of the existing) for additional track(s) will be provided by ARRC's Chief Engineer, whose decision will be final.

3. Maintenance and Accommodation of Snow and Storm Water

No Facility will allow for the direct discharge of any storm water, snow, or other material within fifty (50) feet of the centerline of ARRC Track.

Any proposed changes in storm water drainage on or onto the ARRC ROW must maintain or reduce the existing volume, flow patterns, and nature of storm water prior to the construction of the proposed Facility. Any proposed Facility that would discharge any storm water onto ARRC ROW must provide ARRC with calculations demonstrating that ARRC would not encounter any increase to storm water demands upon its existing storm water system. At a minimum, ARRC will require the applicant to provide:

- A. Plans and calculations, sealed by a Professional Civil Engineer registered in the State of Alaska, demonstrating that the volume and intensity for the 1-, 5-, 10-, 50-, and 100-year 24-hour storm events does not exceed the existing condition.
- B. An Alaska General Permit (AGP) as submitted to the Alaska Department of Environmental Conservation under the Alaska Pollutant Discharge Elimination System. Where the project undertaken may not meet the requirements to file an AGP, then the applicant will provide a Storm Water Pollution Prevention Plan demonstrating that storm water received by ARRC is free from contaminants to the satisfaction of the Chief Engineer.

4. Maximum Transverse Encroachment

Any proposed longitudinal or crossing Facility shall not restrict the use of the ROW for other uses by more than 25%, measured transversely from the centerline of the ARRC Track. This encumbrance includes the construction of structures, walls, Utilities, or other Facilities that would require substantial modification or re-construction to accommodate for use by ARRC or other utilities and tenants.

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5. Reference Standards

All design and construction not otherwise specified by these technical standards shall be executed in accordance with the following applicable standards, regulations, specifications and recommended practice. Where one or more reference specifications provide conflicting guidance, the most restrictive provision shall apply. Specific guidance in these Technical Standards will supersede any reference specification.

Alaska Policy on Railroad/Highway Crossings, Revised September 1988.

Alaska Standard Specifications for Highway Construction, 2004 Edition

Federal Railroad Administration, 49 CFR

Manual for Railway Engineering, American Railway Engineering and Maintenance Association (AREMA), 2013 Edition.

A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 2004

Railroad-Highway Grade Crossing Handbook, US Department of Transportation, Federal Railroad Administration, Revised 2nd Edition, 2007

Roadside Design Guide, AASHTO, 4th Edition, 2011

Standard Plans, Alaska Railroad Corporation

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PART 3: ROADWAY, FACILITY, AND TRAIL ACCOMMODATION

1. Longitudinal Accommodation

The Longitudinal Use of ARRC right-of-way for Roadways, Trails, parking, or other transportation uses will be considered only where the use can be accommodated such that the safe and efficient operation of the railroad can be maintained, and that future use of the ROW is not overly encumbered.

2. Horizontal Separation

No non-railroad Facility shall be physically located as far away from ARRC Track as possible, but not within fifty (50) feet of the centerline of any operating ARRC Track or any Future Track. Exceptions to this requirement may be requested under Section 1.2 of these technical specifications for roadway projects only. Where an exception is granted, the absolute minimum horizontal separation will be determined by application of the most restrictive of the following:

- A. Where Design Track Speeds are twenty-five (25) mph or less, the absolute minimum Facility separation is twenty-five (25) feet from center line from the nearest track to the edge of the Facility (e.g. pavement, fence, wall, embankment, etc.).
- B. Where Design Track Speed is over twenty-five (25) mph, the minimum Facility separation from centerline of track to the edge of the Facility is the number of feet that is equal to the number of miles per hour in the Design Track Speed, with a maximum value of fifty (50) feet.
- C. At the discretion of the Chief Engineer, where Design Track Speed exceeds twenty-five (25) mph, a Roadway Clear Zone may partially overlap the Railway Clear Zone so long as there is no physical improvement to the right-of-way within Railway Clear Zone, and at no point will the Roadway Clear Zone be within twenty-five (25) feet of present or Future ARRC Track.
- D. All non-ARRC Facility structures (e.g. bridges) will have a minimum clear separation of twenty-five (25) feet to any ARRC structure. The minimum clearance between two separate ARRC structures is ten (10) feet.

3. Positive Separation

Where non-railroad vehicular Facilities are arranged such that roadway vehicles are oriented towards ARRC Track, measures shall be installed to prevent the errant movement of vehicles into the Railway Clear Zone.

- A. Any non-railroad vehicular Facility where the movement of vehicles is at a Skew angle of thirty (30) degrees or greater with respect to the ARRC Track (e.g. parking facilities, roadway curvature) shall include a barrier covering the width of the potential vehicle path and of suitable design to prevent any vehicle from getting closer to the centerline of track than that approved under Section 3.2 of these technical standards.
- B. Any pedestrian or non-motorized transportation Facility will have associated trespass prevention measures in place to include a fence at least six (6) feet in height, and/or a non-traversable vertical separation (e.g. a wall) of at least twelve (12) feet in height, along the entire length of the Facility. The trespass prevention measures will terminate in

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such a way as to prevent or severely dissuade circumvention of those measures by pedestrians or non-motorized vehicles.

4. Vertical Separation

No transverse slope within twelve (12) feet of the centerline of ARRC Track shall exceed five percent (5%). No transverse slope between twelve (12) feet and twenty-five (25) feet from the centerline of ARRC Track shall exceed two (2) feet horizontal to one (1) foot vertical (2:1).

Any type of retaining structure or reinforced earth shall be designed to withstand the live-load surcharge per AREMA Chapter 8, Part 5 for Coopers E-80 loading. No tie-backs or other forms of mechanical earth stabilization will be allowed within the live-load surcharge zone underneath the track (AREMA, Figure 1-5-11).

5. Drainage

All storm drainage from non-ARRC Facilities will drain away from ARRC Track or other ARRC facilities. Where this is not feasible, the Facility Owner will design the proposed Facility to collect storm-water run-off and either:

- A. divert it off and away from ARRC property; or
- B. provide ARRC with a full storm water analysis per Section 2.3 of this policy.

Any drainage-related permits or other down-stream improvements required to be made to drainage facilities, ARRC's or otherwise, shall be made the responsibility of the proposed Facility Owner under any ARRC permit issued for a Facility.

6. Snow Storage

No Facility shall be designed in such a fashion that snow being removed can be cascaded within the Railway Clear Zone. Where proposed Facilities are separated vertically with the railroad below, the proposed Facilities will incorporate a closed barrier to prevent snow, ice, and debris from errantly falling within the Railway Clear Zone.

7. Lights, Signs and Signals

All Facility signs, lights, or signal systems either oriented with a skew angle greater than seventy-five (75) degrees of ARRC Track, or any located within fifty (50) feet of ARRC Track, shall be of such design that they do not resemble any sign, lights, or signals used for the control of trains.

8. At-Grade Crossings

A. Location

1. The location, ownership, and responsibilities relating to At-Grade Crossings are generally governed by the ARRC Railroad/Highway Crossing Policy, ARRC Board Rule No. 13.
2. No grade crossing, separation, or other Roadway Facility shall inhibit the future separation of any other existing grade crossing.

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3. Crossings of ARRC Track will located on tangent (straight) track, and
4. not closer than one hundred (100) feet to the end of a horizontal curve, spiral, turnout, vertical curve, or signal control point.
5. not within three hundred (300) feet of the end of any railroad bridge.
6. not within one hundred (100) feet of any area where trains are regularly stopped.

B. Geometry

1. Roadways should cross tracks as close to right angles as possible, with the Skew angle between ARRC Track and the Roadway or Trail shall not to exceed fifteen (15) degrees.
2. Roadways should be tangent and of uniform width for at least one-hundred (100) feet on either side of the ARRC Track.
3. The vertical profile of the Roadway shall match the cross level of the ARRC Track for five (5) feet on either side of the centerline of the track, and shall not deviate more than three inches from this plane for thirty (30) feet on either side of the centerline of track.

C. Adjacent Intersections

Intersections of other roadways with Roadways crossing ARRC Track shall be located a sufficient distance away from the ARRC Track such that adequate vehicular storage exists between the ARRC Track and the intersection. The minimum distance allowable between the stop bar of the intersection and the centerline of an ARRC Track equals the maximum allowable vehicle length plus fifteen (15) feet. Where this distance is not available, the intersection must have preempted traffic signals at the intersection sufficient to clear the crossing queue prior to the arrival of a train, and the railroad crossing must have crossing gates.

D. Grade Crossing Design

1. Grade crossings for public Roadways shall incorporate concrete crossing panels, and shall be constructed per ARRC Standard Plans 2.78-06.
2. Timber grade crossings per ARRC Standard Plan 2.72-04 may be used on private crossings only at the discretion of the Chief Engineer.
3. Subgrade conditions may require more extensive foundation remediation measures than those shown in the ARRC Standard Plans.
4. Grade crossing surface width will extend a minimum of two (2) feet beyond the edge of pavement or improved shoulder, whichever results in the greater crossing width.

E. Grade Crossing Safety and Warning Devices

1. All Trail, bicycle, and pedestrian Facilities located within the same corridor as a Roadway shall have the same level of crossing warning devices and treatments as the Roadway.
2. Crossing gates, lights, signs, pavement striping, guardrails, crash cushions, bungalows, curb and median terminations, and all other crossing safety-related appurtenances shall be designed and installed per applicable ARRC Standard Plans,

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FRA, FHWA, AREMA, and AASHTO regulations and guidance. Where each reference standard differs in specific direction the more restrictive shall govern.

3. All At-Grade Crossings will incorporate site lighting.
4. All private grade crossings will have a gate on either side of the right-of-way, secured with a lock, to prevent unauthorized use. Countermeasures will be employed at the direction of ARRC to prevent the circumventing of the gates.

F. Quiet Zones

The design and implementation of Quiet Zone Crossings shall be done in accordance within application regulations, procedures and guidance of the Federal Railroad Administration (FRA).

9. Grade Separations

A. General

It is generally preferable to have a Roadway go over the railroad (Overpass) compared to the railroad going over a Roadway (Underpass) due to the weight of railroad vehicles and limiting railroad design geometry.

The maximum Skew recommended for grade separations is twenty-five (25) degrees.

B. Roadways Over Railroad (Overpass)

1. Location

Roadway overpasses will not be located within two hundred (200) feet of the end of a railroad bridge or grade crossing, or within one hundred (100) feet of a turnout.

2. Horizontal and Vertical Clearances

The main opening beneath a Roadway overpass for the accommodation of railroad track shall be of sufficient size to accommodate the Railway Clear Zone for each existing ARRC Track and Future Track, without separation. This opening may also have to accommodate other uses of ARRC ROW.

Where the horizontal clearance is reduced under Part 1.2 of these Technical Standards, the minimum horizontal clearance will be fifteen (15) feet for ARRC Track. All structural elements shall be protected per AREMA Chapter 8, Part 2.1.5.

All piers, walls and abutments shall be oriented parallel to ARRC Track.

3. Railroad Loading Considerations

Any portion of a facility located within twenty-five (25) feet of ARRC Track or Future Track must be designed in accordance with AREMA Chapter 8, Part 2-1-5, and must take into account appropriate railroad live load surcharge on buried structures (AREMA Figure 1-5-11).

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4. Drainage

All ARRC storm drainage systems will be accommodated through any overpass. Open ditches shall remain open unless the Facility Owner collects ARRC storm water and directs it off the ARRC ROW through the Facility Owner's own storm drainage system.

All drainage from a bridge deck shall be carried to the end of the bridge deck and taken off ARRC right-of-way.

5. Snow Removal

Overpass design shall incorporate "closed railing" design at least five (5) feet in height without openings that snow can penetrate and fall upon the tracks. Further, the Facility Owner shall ensure that maintenance practices forbid the cascading of snow over the edges of the bridge onto the ARRC ROW below.

6. Pedestrian Accommodations

Any overpass which does not expressly exclude pedestrian and non-motorized traffic will incorporate fencing, or a combination of fencing and railing extending at least eight (8) feet above the bridge deck for curved (inward) fence, or ten (10) feet for straight fencing. The length of the fencing will extend a minimum of twenty-five (25) feet beyond the edge of the existing and future Railway Clear Zone.

The ends of the overpass shall be designed to discourage trespass.

C. Roadways Under Railroad (Underpass)

1. Location

Railroad underpasses will only be located on tangent track, and not closer than three hundred (300) feet to existing railroad bridges, turnouts, or grade crossings. The minimum separation between the end of the underpass and the nearest spiral or horizontal curve is calculated as the distance traveled by a train in two seconds at the Design Track Speed, but not less than one hundred (100) feet.

Where the proposed structure bifurcates ARRC non-track longitudinal access, provisions must be made such that maintenance vehicle access is available on both sides of the bridge. Where access to one or both sides is not feasible, the proposed bridge will have to be either widened to provide vehicular access across the structure, or a separate bridge for vehicular access will also have to be constructed. Crossing panels on railroad bridges will not be allowed.

2. Accommodation of Future Track(s)

ARRC will only require the construction of a super-structure to handle additional tracks as outlined in Section 2.2 if said track construction is reasonably imminent. However, the Facility must be designed such that the construction or modification of the Facility to accommodate any Future Track(s) can be reasonably constructed. The

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Facility Owner must sign a binding agreement as part of the permit for the Facility that provides for the accommodation of any Future Track given reasonable notice by ARRC.

3. *Structural Design*

The design of any bridge or structure subject to loading other than from ARRC Track shall be designed in accordance with relative AASHTO design standards and criteria.

The design of any bridge or structure subject to loading from ARRC Track shall be done in accordance with AREMA chapters 8, 9, and 15, as appropriate, for Coopers E-80 live loading with Diesel Impact. ARRC has additional supplemental requirements for bridge design as follows:

- a. All structures will be constructed of steel, concrete, or a combination there of. Wooden structures will only be accepted for Temporary structures, designed according to AREMA Chapter 7 and other appropriate sections.
- b. ARRC will not allow any voided or box girders (steel or concrete) for railroad structures.
- c. The use of longitudinal stiffeners on steel beams or girders is not allowed.
- d. Only bridge designs incorporating a ballast deck will be considered. Where bridges carry more than one track, the bridge deck shall be continuous between the two tracks. Dead load calculations shall assume thirty (30) inches of ballast below the ties on the bridge (maintenance condition) even though the initial construction will be twelve (12) inches or less.
- e. Composite bridge span design will not be incorporated over any Roadway or Trail where motorized vehicles are not strictly prohibited.
- f. Structural skew of the railroad structure is generally not allowed unless no other options are feasible. In such cases, the maximum allowable skew is seventy-five (75) degrees for concrete structures, and sixty (60) degrees for steel structures. All skewed structures will have an approach slab a minimum twelve (12) feet wide (per track) and extend at least three (3) feet beyond the back edge of the abutment. The approach slab shall be doweled into the abutment, but square with the track at the non-abutment end.
- g. Bridge decks will be sloped to promote the free drainage of storm water.
- h. Bridge decks will have waterproofing applied complying with AREMA Chapter 8, Part 29.
- i. Where possible, bridge abutments will be of low profile design, incorporating approach spans or retaining walls to achieve the vertical separation of grades. Tall, pier-type abutments should be avoided.

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- j. All railroad bridge structures will incorporate deep foundations where feasible. Shallow foundations will only be considered where they can be socketed into competent bedrock.
- k. All new bridges will have trainman walkways constructed on both sides of the track(s) in accordance with AREMA guidance and appropriate FRA regulations.

ARRC may require additional supplemental conditions for bridge design above and beyond those set forth above.

4. Clearances

- a. Railroad bridge clearances will be per AREMA Chapter 28, Part 1-3. Through structures shall accommodate an additional thirty (30) inches of ballast for all vertical clearances.
- b. Roadway and Trail clearances will be at the direction of the Facility Owner. Where the vertical clearance for vehicular traffic is less than sixteen and a half (16.5) feet, a crash (fascia) beam will be installed on either side of the bridge. The crash beams will be designed as an independent structure (from the bridge) and will be of sufficient strength to deflect no more than six (6) inches from the impact of over-height vehicles. The bottom of the crash beam(s) shall be set a minimum of two (2) inches below the lowest clearance elevation of the bridge.

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PART 4 – DESIGN OF RAILROAD RELOCATIONS

The relocation of ARRC tracks should be considered only where the separation or other requirements of these Specifications cannot otherwise be achieved in a practicable manner. Such relocations will require the approval of, and close coordination with, several departments within ARRC. The Facility Owner should take the additional coordination into account when managing the project schedule, and ultimate approval should not be assumed. In no case shall the relocation result in an ARRC alignment more restrictive, or a ROW interest less than the pre-project condition.

1. Typical Section

- A. Typical section for new construction will be per ARRC Standard Plan 2.3-04 as follows:
 - 1. Trackage where all horizontal curves are under six (6) degrees, wood crossties will be used. Concrete ties will be used for all other construction.
 - 2. Where tracks are to be re-aligned, or the length of construction is greater than five-hundred (500) feet, the road section will be incorporated.
- B. ARRC's property interest must extend at least twenty (20) feet beyond the top or bottom of any fore or back slope to facilitate long term maintenance.
- C. Any longitudinal retaining walls shall not be within the Railway Clear Zone, and shall be designed for railroad live loading per AREMA Chapter 8, Part 5. No structural tie-backs shall be located within the live load surcharge zone of the embankment. Vertical walls greater than four (4) feet in height must have railings affixed per AREMA Chapter 15, Part 8-5.

2. Clearances

- A. There will be no non-railroad related fixed obstructions within the Railway Clear Zone for existing and Future ARRC Track(s).
- B. The minimum separation between operating tracks is sixteen (16) feet, center-to-center.
- C. The minimum separation between an operating track and a yard or storage track is twenty-five (25) feet, center-to-center.
- D. The minimum separation between an operating track and an Industrial Track will vary depending upon the nature of the operation, but will be a minimum of twenty-five (25) feet.

3. Horizontal Alignment Design

A. General

ARRC Track which has been relocated will be done so that the new alignment is as straight as possible. Where the relocation of track occurs in a tangent section of track, the entire tangent between existing curves shall be shifted (from existing curve to the next existing curve) to accommodate the track relocation such that additional curves are not introduced. Curvature of the relocated trackage will not be more severe (i.e. sharper) than that elsewhere in the vicinity of the relocation.

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Curves shall be calculated, referenced, stationed and measured using the Chord-Defined Method (one (1) degree of curvature equals the angle subtended along a one-hundred (100) foot chord).

B. Superelevation

All curves will incorporate at least 1-inch of superelevation. The required superelevation for a curve shall be calculated per AREMA Chapter 5, Part 3.3 using two (2) inches of underbalance. The results of this calculation shall be rounded up to the nearest one-quarter (1/4) inch. No actual superelevation shall be used over three (3) inches without the consent of the Chief Engineer, and shall no case be greater than four-and-a-half (4 ½) inches.

C. Horizontal Curvature

1. Horizontal curves shall be as gentle as practicable.
2. The maximum curvature for relocation equates to that limited by the maximum superelevation for the Design Track Speed, but in no case shall be over ten (10) degrees.
3. All curves on ARRC Track, except yard and Industrial Tracks, shall incorporate spirals on either end per AREMA Chapter 5, Part 3.1. Curves starting off the divergent leads of turnouts do not require spirals.
4. Compound curves which incorporate different superelevations shall be connected by a spiral.
5. The minimum separation between the end of two spirals or horizontal curves is calculated as the distance traveled by a train in two seconds (three (3) seconds is preferred) at the Design Track Speed, but not less than 100 feet.

D. Turnouts

Turnouts shall be oriented such that the predominance of traffic moved through the straight leg.

1. All turnouts located in ARRC Track(s) shall be at least number 11's, or larger (Number 15), per ARRC Standard Plan 12.51-04. Where a significant percentage of traffic is expected to travel through the divergent leg, or the speed through the divergent leg of the turnout is greater than ten (10) mph, then the turnout shall be a number 15 per ARRC Standard Plan 12.8-04. Number 9 turnouts per ARRC Standard Plan 12.3-04 shall only be used on Industrial Tracks with permission of the Chief Engineer. No other turnout configurations will be uses on ARRC Tracks.
2. Turnouts will not be located within three-hundred (300) feet of bridges, or one-hundred (100) feet of grade crossings.
3. The minimum separation between the end of a turnout and another turnout, curve, or spiral is calculated as the distance traveled by a train in two seconds (three (3) seconds is preferred) at the Design Track Speed, but not less than one-hundred (100) feet. The only exception to this is where a turnout with the direction of the divergent

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leg is the same as the curve, spiral, or another turnout. Then the minimum distance maybe reduced to eight (8) feet if no other option is practicable and signal and operating rules allow for it.

4. Vertical Alignment Design

Parallel tracks within twenty (20) feet of each other shall not vary in vertical elevation more than one (1) foot.

A. Grades

1. Grades shall be designed such that the number of changes between positive and negative grades is kept to a minimum. In no case shall the vertical alignment be designed such that a longest train shall be located on more than one positive (up) and one negative (down) gradient. Train lengths to be accommodated range from eight thousand to twelve thousand (8,000-12,000) feet depending upon the location. The ARRC Chief Engineer will provide train length guidance if required.
2. Generally, the maximum gradient (up or down, and length) shall not be more than those generally found elsewhere in the vicinity of the location, but in no case shall they exceed:
 - a. 1.0% (one (1) foot vertical per one-hundred (100) feet horizontal) where horizontal curvature is generally less than three (3) degrees.
 - b. Where the horizontal curvature is three (3) degrees or greater, the gradient will be compensated per AREMA Chapter 5, Part 3.7.
 - c. Where trains are expected to be stopped or started (sidings), the maximum gradient is 0.5%.
 - d. On tracks where cars are expected to be left un-attended (industry tracks, yard tracks, etc.), the maximum gradient is 0.1%.
3. Grades through both routes of a turnout shall be equal.

B. Vertical Curves

1. Any location where the change in vertical provide changes more than 0.1%, the two vertical tangents shall be connected via a vertical curve as found in AREMA Chapter 5, Part 3.6 incorporating the Design Track Speed, but in no case shall the vertical curves be less than one-hundred (100) feet in length.
2. Vertical curves shall not be located within twenty-five (25) feet of a spiral, turnout, grade crossing, or bridge. Vertical curves may be located completely within the body of a horizontal curves or ballast deck bridges if no other option is practicable.

5. Drainage Design

Storm water drainage design shall be in accordance with AREMA Chapter 1 with the following additional guidance:

- A. All natural drainage patterns prior to railroad construction will be maintained after construction.
- B. Trackside drainage ditches will have a gradient sufficient for the positive flow of water to a point where it flows away from the right-of-way. Ditches shall be sized to

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- accommodate, and not erode during the 100-year 24-hour storm event with an energy grade line four (4) feet below the top of rail of ARRC Track.
- C. All railroad drainage and bridges over water bodies shall be designed for the 100-year flood event as calculated or published by FEMA guidelines.
 - D. Pipe culverts shall not have more than one (1) foot of water above the crown of the pipe at the entrance or exit during the 100-year 24-hour storm event.
 - E. Pipe culverts shall not be less than 36-inches in diameter, and will have energy dissipation end treatments at the down-stream end of the pipe. Multiple pipe crossings will only be considered when proper pipe cover is not practicable. Culverts shall not have racks or other end treatments that could trap woody debris.
 - F. Pipe culverts shall not be placed parallel to the track unless open ditches are not feasible.
 - G. The minimum freeboard for bridges over water bodies shall be not less than three (3) feet for the design storm or flood event. For certain rivers with significant woody debris or ice floes, this value may be more at the direction of the Chief Engineer.
 - H. Bridges over water bodies subject to meandering will have adequate stream/river training measures in place to ensure that the water course remains at the crossing location.

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PART 5 – UTILITY ACCOMMODATION

Utilities will be accommodated within the ARRC right-of-way in a manner so as not to interfere with existing ARRC Facilities and operations, as well as pre-existing permitted Facilities of non-ARRC parties. The Utility owner will make every attempt to locate the Utility as close to other Utility encumbrances and crossings as possible.

These Specifications provide guidance for common types of utility service and distribution lines. ARRC may require additional guidance or separation than what is contained within these specifications where larger or more complex utility uses are considered (e.g. transmission lines).

1. Parallel Utilities

Under normal circumstances, longitudinal Utility Facilities will be located within the outer ten (10) feet of the ROW. Where a portion of the ROW is encumbered in a manner that does not allow a longitudinal Utility Facility to be placed in the outer ten (10) feet of the ROW, such Utility Facility shall be located within ten (10) feet of the encumbered portion of the ROW, but not closer than either (i) twenty-five (25) feet to the centerline of the nearest ARRC Track or Future Track; or (ii) fifteen (15) feet beyond the fore slope or back slope of the railroad grading, whichever results in a greater distance of the Utility Facility from the ARRC Track and Future Track.

A. Overhead Utilities

1. Overhead Utility lines will not be placed within four (4) feet of an ARRC signal or communication line.
2. An un-guyed pole shall be located at least fifty (50) feet from any ARRC Track or the length of the pole above ground plus fifteen (15) feet from any ARRC Track, whichever is greater.
3. No guys shall be located between the ARRC Track(s) and the pole.
4. No guys for poles located off the ARRC ROW will be permitted on or above the ROW.
5. For proposed electrical lines paralleling tracks, ARRC may request that an inductive interference study be performed at the expense of the Utility owner. Inductive interference from certain lines has the potential to disrupt the signal system in the ARRC Track causing failures in the track signals and highway grade crossing warning devices. The ARRC Director of Signals will determine the need for a study on a case-by-case basis.

B. Underground Utilities

1. Pipelines

- a. If a pipeline is located fifty (50) feet or less from centerline of track, the pipeline shall be encased in a steel pipe subject to approval from ARRC. No pipe may be placed closer than twenty-five (25) feet from centerline of track. Pipe must be buried with a minimum cover of forty two (42) inches.

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- b. If less than the above-stated forty two (42) inch minimum depth is necessary for a proposed pipeline Utility because of existing Utilities, water table, ordinance or similar reasons, the line shall be rerouted.
- c. Locations for pipelines where it will be difficult to attain minimum depth due to wet or rocky terrain shall be avoided. Any change in the location of a pipeline from the approved plan must be approved by ARRC.
- d. The use of plastic carrier pipe for sewer, water, natural gas and other liquids is acceptable under specific circumstances. The use of plastic pipe is satisfactory if the pipe is designed to meet AREMA Chapter 1, Part 5 and all applicable federal and state codes, and if the carrier pipe is properly encased with a steel casing pipe for the entire length of the pipeline on the ARRC ROW.
- e. Manholes shall be limited to those necessary for installation and maintenance of underground lines. Manholes vary as to size and shape depending on the type of utility they serve. To conserve space, their dimensions should be minimally acceptable by good engineering and safety standards. In general, the only equipment to be installed in manholes located on ARRC property is that which is essential to the normal flow of the Utility, such as circuit re-closers, cable splices, relays, valves and regulators. Other equipment should be located outside the limits of ARRC property. Manholes shall not be located within twenty-five (25) feet of the centerline of ARRC Track.

2. Electric Power, Communication and Fiber Optic Lines

- a. Cables for electric power, communications lines and fiber optics lines will be placed at a minimum depth of four (4.0) feet below natural grade (BNG) on the ARRC ROW.
- b. Cables will be located within the outside five (5) feet of the ARRC ROW wherever reasonably possible.
- c. For longitudinal cable lines, markers shall be placed above the cable at intervals of no less than three hundred (300) feet. The markers should identify the owner, type of cable and emergency telephone number. A 6-inch wide warning tape will be installed at one (1.0) foot BNG directly above the underground line where located on the ARRC ROW outside the track ballast sections.
- d. Above-ground Utility appurtenances installed as a part of an underground Utility Facility shall be located at or near the ARRC property line and shall not be any closer than twenty-five (25) feet to the centerline of track.

3. Attachment to Bridges and Other Structures

The Utility owner will not be permitted to attach anything to ARRC bridges or to route Facilities through drainage structures. Utilities are not to be attached to other railroad structures without the written approval of ARRC Chief Engineer. As a general rule, overhead power, communication and cable television line crossings at ARRC bridges will not be approved by ARRC.

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2. Utilities Crossing ARRC Property

Utility Facilities crossing ARRC property in the vicinity of ARRC Track, to the extent feasible and practical, shall be perpendicular to the ARRC Track alignment. Where a perpendicular crossing is not reasonably feasible, a Utility Facility should cross the centerline of the ARRC Track at an angle of not less than twenty-five (25) degrees to the centerline of the track. Utilities shall not be placed within culverts or under railroad bridges, buildings or other important structures.

A. Overhead Utilities

1. Pipelines and conveyors will not be placed above or over ARRC Track.
2. Overhead Utility lines will not be placed within four (4) feet of an ARRC signal or communication line.
3. *If feasible*, no poles shall be placed within the limits of the ARRC ROW. Un-guyed poles shall be located at least fifty (50) feet from any ARRC Track, or the length of the pole above ground plus fifteen (15) feet from any ARRC Track, whichever is greater.
4. No guys shall be located between the ARRC Track(s) and the pole.
5. No guys for poles located off the ARRC ROW will be permitted on or above the ROW.
6. Power line crossings will not be located within five hundred (500) feet of any railroad signal, signal facility, antenna, or other communication facility. For proposed electrical lines crossing tracks, ARRC may request that an inductive interference study be performed at the expense of the Utility owner. Inductive interference from certain lines has the potential to disrupt the signal system in the ARRC Track causing failures in the track signals and highway grade crossing warning devices. The ARRC Director of Signals will determine the need for a study on a case-by-case basis.
7. Crossings will not be installed less than five hundred (500) feet from the end of any railroad bridge, or less than 300 feet from the centerline of any culvert or switch area. No overhead lines may be located across ARRC terminal or logistical areas where the loading or unloading of cars takes place, or cross between a railroad bridge and the nearest siding capable of loading or unloading a railway vehicle.
8. Electric lines must have a florescent ball marker on low wire over centerline of track(s).
9. The Utility owner will label the posts closest to the crossing with the owner's name and telephone number for emergency contact.

B. Underground Utilities

1. General

- a. All underground Utility crossings of ARRC Track shall be designed to carry Cooper's E-80 Railroad live loading with diesel impact (AREMA Cooper's loading Chapter 8, Part 2.2.3). This 80,000-lb. axle load may be distributed laterally a distance of three (3) feet plus a distance equal to the depth from

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structure grade line to base of rail, on each side of centerline of single tracks, or centerline of outer track where multiple tracks are to be crossed. In no case shall railroad loading design extend less than ten (10) feet laterally from centerline of track. Longitudinally, the load may be distributed between the five-foot axle spacing of the Cooper configuration. Railroad loading criteria will also apply to ARRC Future Track.

- b. For all boring and jacking installations under ARRC Track that are greater than twenty-six (26) inches in diameter and at a depth of between five-and-a-half (5.5) feet and ten (10.0) feet below top of tie, a geotechnical study will need to be performed at the sole expense of the Utility owner to determine the presence of granular material and/or high water table elevation. The geotechnical study must include recommendations and a plan for a procedure to prevent failure and a collapse of the bore. Generally, ARRC will require core samples to be taken near the ends of tie at the proposed location, with the samples extending at least as deep as the bottom of the proposed horizontal bore. Test results must be reviewed and approved by ARRC, or its agent, prior to boring activities commencing. ARRC reserves the right, based on test results, to require either (i) that the Utility owner select an alternate location for the bore; or (ii) that additional engineering specifications be implemented, at the sole expense of the Utility owner, in order to utilize the existing location.
- c. If the minimum depth of five-and-a-half (5.5) feet is not attainable because of existing Utilities, water table, ordinances, or similar reasons, the line shall be rerouted.
- d. Locations that are considered by ARRC to be unsuitable or undesirable are to be avoided. These include, but are not limited to, deep cuts and in wet or rocky terrain or where it will be difficult to obtain minimum depth.
- e. Utilities will not be attached to or routed through drainage structures.
- f. Utilities are not to be attached to other railroad structures.
- g. The Utility owner shall place a readily identifiable and suitable marker at each ARRC property line where it is crossed.

2. Pipelines

- a. Pipeline designs must specify the type and class of material, maximum working pressures and test and design pressure. Pipelines which are not constructed, operated and maintained under regulations established by the U.S. Department of Transportation Hazardous Materials Regulations Board shall, upon revisions in the class of material or an increase in the maximum operating pressure, obtain ARRC approval.
- b. Manholes shall be limited to those necessary for installation and maintenance of underground lines. Manholes shall vary as to size and shape depending on the type of Utility they serve. To conserve space, their dimensions should be minimally acceptable by good engineering and safety standards. In general, the only equipment to be installed in manholes located on ARRC property is that which is essential to the normal flow of the Utility, such as circuit re-closers,

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- cable splices, relays, valves and regulators. Other equipment should be located outside the limits of ARRC property. Manholes shall not be located within twenty-five (25) feet of the centerline of ARRC Track(s).
- c. Pipelines carrying oil, liquefied petroleum gas, natural or manufactured gas and other flammable products shall conform to the requirements of the current AREMA Chapter 1, Part 5, ANSI/ASME B 31.4 Code for pressure piping - Liquid Petroleum Transportation Piping Systems; ANSI B 31.8 Code for pressure piping - Gas Transmission and Distribution Piping Systems; other applicable ANSI codes and 49 C.F.R. Part 192 or Part 195 -Transportation of Hazardous Liquids by Pipeline, except that the maximum allowable stress of design of steel pipe shall not exceed the specified minimum yield strength (multiplied by longitudinal joint factor) of the pipe as defined in the ANSI codes.
 - d. The use of plastic carrier pipe for sewer, water, natural gas and other liquids is acceptable under specific circumstances. The use of plastic pipe is satisfactory if the pipe is designed to meet AREMA and all applicable federal and state codes, and if the carrier pipe is properly encased with a steel casing pipe for its entire length on the ARRC ROW.
 - e. Casings
 - 1) Pipelines under railroad tracks and across railroad property shall be encased in larger pipes or conduits called "casings." Generally, casings shall extend from ROW boundary to ROW boundary, unless otherwise approved by the Chief Engineer.
 - 2) Casings shall be designed according to AREMA Chapter 1, Part 5.
 - 3) Pipelines and casing pipes shall be suitably insulated from underground conduits carrying electric wires on ARRC property.
 - 4) In circumstances where it is not feasible to install encasement from ROW boundary to ROW boundary, casing pipe under railroad tracks and across railroad property shall extend to the greater of the following distances, measured at right angles to the centerline of the ARRC Track:
 - a) Two (2) feet beyond toe of slope.
 - b) Three (3) feet beyond ditch line.
 - c) Either
 - (i) twenty-five (25) feet from centerline of outside track when the casing is sealed at both ends; or
 - (ii) forty-five (45) feet from centerline of outside track when the casing is open at both ends.
 - d) If Future Track is planned, the casing must extend far enough to meet above distances given the additional track requirement.
 - 5) Casing pipe and joints shall be made of metal, and of leak-proof construction. Casings shall be capable of withstanding the railroad loadings and other loads imposed upon them.
 - 6) Casings may be omitted for *gaseous products only* under the following circumstances:
 - a) Carrier pipe must be steel and the wall thickness must conform to E-80 loading for casing pipe shown in the tables as included in the AREMA

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manual Chapter 1, Part 5 for Pipeline Crossings. The length of thicker-walled pipe shall extend from ROW boundary to ROW boundary. This will generally result in thicker-walled pipe on the ARRC ROW.

- b) All steel pipe shall be coated and cathodically protected.
- c) The depth from base of rail to top of pipe shall not be less than ten (10) feet below base of rail. The depth from ditches or other low points on the ARRC ROW shall not be less than six (6) feet from ground line to top of pipe.

7) Vents

- a) Vents shall be located at the high end of short casings and at both ends of casing longer than one hundred fifty (150) feet.
- b) Vent standpipes shall be located and constructed so as not to interfere with maintenance of the railroad or to be concealed by vegetation. Where possible, they shall be marked and located at the property line. The markers shall give the name and address of the Utility owner, and a phone number to contact in case of emergency.
- c) Casing pipe, when sealed, shall be properly vented. Vent pipes shall be of sufficient diameter, but in no case less than two (2) inches in diameter, and shall be attached near each end of casing, projecting through ground surface at property lines.
- d) 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.
- e) For pipelines carrying flammable materials, vent pipes on casings shall be at least sixteen (16) feet (vertically) from aerial electric wires. Casings shall be suitably insulated from underground conduits carrying electric wires on the ARRC ROW.
- f) Where casing pipe is used for water lines, venting is not required; however, sealing will be required if the ends of the casing are not above high water.
- g) Where casing pipe is used for sewer lines, venting and sealing of casing will be required.

3. Electric Power, Communication, and Fiber Optic Lines

- a. Minimum depth of cover
 - 1) A minimum depth of five-and-a-half (5.5) feet below the base of rail will be maintained for all cables.
 - 2) A minimum depth of cover for electrical cables will be at least four (4.0) feet BNG.
- b. The wireline must be encased completely across the ARRC ROW with a rigid metallic conduit.
- c. Underground power cable crossings will not be installed under or within fifty (50) feet of the end of any ARRC bridge or the centerline of any culvert or switch area.

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- d. Markers that identify the Utility owner shall be placed at both ROW boundaries for Utilities crossing the ARRC ROW. For longitudinal lines markers shall be placed above the cable at intervals no less than three hundred (300) feet apart. The markers should identify the owner, type of cable and emergency telephone number. A six (6)-inch wide warning tape will be installed, one (1.0) foot BNG directly over the underground power line where located on the ARRC ROW outside the track ballast sections.
- e. Above-ground Utility appurtenances installed as a part of an underground Utility Facility shall be located at or near the ARRC ROW boundary and shall not be any closer than twenty-five (25) feet to the centerline of the ARRC Track.

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PART 6 – CONSTRUCTION

1. Temporary Construction Permit and Facility Right-of-Way Instrument

Before commencement of construction of any proposed Facility within the ARRC ROW, whether Temporary or permanent, may begin, both a Temporary Construction Permit (TCP) and an appropriate permit or easement allowing maintenance and operation of the Facility in the ARRC ROW must be obtained by the Facility Owner. A TCP may be in the name of the Facility Owner's contractor, but the underlying permit to maintain and operate the Facility must be in the name of the Facility Owner.

2. Standard Specifications for Work on Railroad Property

All construction will be completed in compliance with the Standard Specifications for Work on Railroad Property (Standard Specifications). These specifications may be tailored to the proposed Facility. The standard language of the Standard Specifications is found in Appendix C to these technical standards.

3. Temporary Construction

- A. Temporary track relocations will be constructed in accordance with Section 3 of this policy, except that the requirement to provide for Future Track(s) is waived for Temporary track relocations.
- B. At the discretion of the Chief Engineer, the minimum railway Clearance envelope may be reduced for Temporary falsework for tangent ARRC Track is twelve (12) feet horizontally from the centerline of the nearest track to the false work, and twenty-one-and-a-half (21.5) feet measured vertically from the top of rail. For curved track, these temporary clearances will increase two (2) inches horizontally for each degree of horizontal curvature, and four (4) inches vertically for each inch of super-elevation.
- C. Temporary At-Grade Crossings will be allowed if:
 1. The Temporary crossings will be used for construction projects within definite periods of time, and
 2. No other access is practicable

Temporary grade crossings will be constructed as Private Grade Crossings under Section 3.8 of these technical standards. The gate to such a Temporary grade crossing will be locked when not in use, and will only be used when protected by an ARRC flagman.

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APPENDIX A: ALASKA POLICY ON RAILROAD/HIGHWAY CROSSINGS



ALASKA POLICY ON RAILROAD/HIGHWAY CROSSINGS
Revised September 1988

1.0 INTRODUCTION

The goal of any transportation agency is to provide for the safe, efficient, and economical movement of people, goods and services. It is a continuing challenge to seek the proper balance between safety, efficiency and economy to bring the greatest good to the most people within the constraints of available resources.

With the acquisition of the Alaska Railroad by the State, continued population growth, and decreasing financial resources, the need for a more uniform statewide program to provide safe railroad/highway grade crossings became apparent.

Responding to this need, the Commissioner of the Department of Transportation and Public Facilities (DOT&PF), and the President and Chief Executive Officer of the Alaska Railroad Corporation (ARRC), established a Task Force on Rail/Highway Crossings composed of representatives of their agencies and the Federal Highway Administration (FHWA).

At the Task Force's first meeting on October 29, 1985, the Commissioner outlined his concept of the three subtasks required to carry out his charge to the Task Force:

1. After referring to available technology and standards, determine the reasonable type of protection for each "class" of crossings.
2. Inventory all crossings in the State to determine the appropriate protection "classes".
3. Develop a reasonable structured priority system to implement improvements through a rational and systematic allocation of available resources.

Within these subtasks, the Task Force set out to accomplish this change and make the Alaska highway system and Alaska Railroad safer for the traveling public.

1.1 1988 Policy Revision

Early in 1988 it became apparent that this policy needed to be revised to include more information on sight triangles and how diagnostic teams function. A total of four work sessions were held (2 in Anchorage and 2 in Fairbanks). The procedures in new Section 5.1 were used in developing the revised policy.

2.0 DISCUSSION

Most crossings of the Alaska Railroad Corporation (ARRC) are under permit to the agency (State or local) which has the road authority. The terms of the permit make the road agency responsible for construction and maintenance costs associated with the permitted road crossing, and for claims resulting from the construction, maintenance and use of the road crossing.

The Task Force, with the assistance of the FHWA and the Federal Railroad Administration (FRA), reviewed the latest safety resource allocation techniques, including an accident prediction model developed through FHWA research. FHWA's research was aimed at establishing a national standard for planning crossing improvements.

The computed "DOT Accident Prediction Value" (APV) of a crossing is the product of a series of factors representing the various characteristics of the crossing, and is equivalent to the expected number of accidents per year at that crossing.

The State Inventory was completed and the APV's of all crossings were computed. A graph was made of the number of crossings exceeding the various values of APV, and this was compared to a similar graph developed by the FHWA/FRA for all crossings in the nation. On a percentage basis, the two graphs were very similar. The Task Force found that the crossings with the highest APV's are generally those that are already known to be in need of improvement, many of which are already programmed or in progress.

The FHWA resource allocation model develops threshold values of the APV to determine the optimum cost-effective safety improvement decisions at each crossing.

With the exception of grade separations, the biggest decision is whether or not to install active warning devices (train activated flashing lights or flashing lights and gates). The allocation model arrives at an APV of 0.1 as the cost-effective threshold value for considering going from passive devices only (signs, markings) to active protection. Rapidly decreasing safety benefits along with rapidly rising costs are associated with an APV less than a value near 0.1, both for the national inventory and the state distribution. When this criterion is applied to the State's crossings, the Task Force found that it resulted in a program that can be accomplished in a reasonable time within the available State and federal resources.

In addition, this technique meets the federal requirement of a rational prioritization scheme for using federal crossing safety improvement funds.

The Task Force noted that this prioritization system is only an indicator of the probable treatment required at a given crossing in order to concentrate efforts where they are most urgently needed. In other words, the final decision as to what major treatment is required at a crossing would be based on an on-site evaluation by a

professional diagnostic team, and the APV criterion would not normally be blindly followed, especially for borderline cases. There will be instances in which an evaluation reveals that relatively low-cost improvements such as increased sight-distance in conjunction with better signing might change the accident potential to a level that would not require active devices which are expensive to install and maintain, thereby freeing funds to be applied where they would do more good.

It is also imperative that local jurisdictions be brought into the diagnostic process when they are affected by the engineering decision. Likewise, local jurisdictions, developers, and other State agencies that have the potential to create a rail/highway safety conflict must take this into account in their planning functions, and should be responsible for their fair share of any costs created by their actions.

Provision should be made to maintain the program through regular updating of the inventory and priority list, and periodic evaluation of the effectiveness of the improvements made.

The following subsections summarize the results of the Task Force investigations and deliberations.

3.0 DEFINITIONS

3.1 The U.S. Department of Transportation (DOT)/Association of American Railroads (AAR) National Railroad-Highway Crossing Inventory Procedures Manual ("Procedures Manual") defines public and private crossings as follows:

"Public Crossing: A public crossing is a location where the tracks cross a road which is under the jurisdiction of and maintained by a public authority and which is open to public travel."

"Private Crossing: A private crossing is a location where a physical crossing is present but the road does not meet the conditions indicated above for a public crossing. Private crossings usually restrict public use by an agreement which the railroad has with the property owner, or by gates or similar barriers."

3.2 When the Task Force looked at the inventory of crossings on the Alaska Railroad, it became apparent that there are numerous crossings that are open to public travel but not "under the jurisdiction of and maintained by a public authority." The Procedures Manual also states "In some instances changes in land use have resulted in an expansion of crossing use to the extent that it has become a public crossing in fact, whether or not any public agency has accepted responsibility for maintenance or control of the use of the traveled

way over the crossing. The railroad company and highway agency should make every effort to mutually resolve and agree on the appropriate classification (either public or private) of questionable crossings."

- 3.3 The Task Force recognized the problem of crossings that are open to public travel but are not under the jurisdiction of and maintained by a public authority. To be able to move forward and identify the magnitude of the problem, the Task Force developed and assigned the designation of "PUB-4" to this type of crossing.
- 3.4 The Task Force's definition is: "PUB-4. A crossing that is open to the public but the road is not maintained by a public authority." Open to the public means that (1) there is no restriction placed upon the use of the crossing; (2) if there is a gate, the gate is not being closed to restrict the use of the crossing; (3) there is more than one user regularly using the crossing; or (4) the roadway serves more than one piece of property on the opposite side of the tracks. One or more of these conditions may exist today on a truly "private" crossing. With the exception of serving more than one piece of property, most existing private crossings could be made to fit this definition.
 - 3.4.1 While the problems are the most acute in the Fairbanks North Star Borough, other boroughs, cities and municipalities have PUB-4 crossings. These include the Matanuska-Susitna Borough, Kenai Peninsula Borough, Municipality of Anchorage, City of Houston, City of Nenana, City of North Pole, and City of Seward. To be eligible for federal funding, the road authority must be responsible for the maintenance and meet the standards for public crossings as defined by the DOT/AAR Railroad-Highway Crossing Inventory Procedures Manual.
- 3.5 The roadway crossing at a PUB-4 crossing may have a designated street name, may be recognized as a public roadway and may be platted as such on either side of the railroad right-of-way.
- 3.6 The only known PUB-4 crossings outside of the boundaries of local government are the crossings at Cantwell (ARRC MP 319.6), at Ferry (ARRC MP 371.1), and North Nenana (ARRC MP 415.5). The first two crossings are at the end of State-maintained roads.
- 3.7 For the area outside of the organized boroughs (Broad Pass to Dunbar), the Task Force recognized the problem of no planning agency. To be able to properly plan the development in this area, all state and federal agencies having land in this area must work together.

3.8 Sight Triangles

3.8.1 A sight triangle for at-grade crossings is an area free of obstructions, which allows a motor vehicle operator approaching an at-grade crossing to safely observe a train approaching the crossing. The size of the sight triangle is based upon maximum train speeds and the posted highway speed. A table of sight triangle distances is shown in Appendix "A". There are two scenarios with regard to sight triangles:

- a. Case I involves a moving vehicle approaching the crossing at the posted speed limit and the train traveling at the maximum speed approved for that location.
- b. Case II involves a stopped vehicle departing from the crossing and the train traveling at the maximum speed approved for that location.

3.8.2 The table in Appendix "A" is based on the latest sight triangle calculations available and has been agreed to by the ARRC and DOT&PF. It will not be changed without concurrence of both parties.

3.9 New Crossing

3.9.1 A new crossing is a crossing that is being proposed where there is currently no crossing in existence.

3.9.2 Construction of a crossing at a new location that is replacing an existing crossing in the same vicinity will be seen as a major improvement project and not considered a new crossing.

3.10 Highway

For the purposes of this policy, the words "highway", "road", and "roadway" are synonymous.

4.0 **RECOMMENDATIONS**

4.1 General Recommendations

4.1.1 All crossings should be brought up to the basic safety standards in the Alaska Traffic Manual.

4.1.2 New construction will adhere to the standards in the Alaska Traffic Manual, Association of American Railroads (AAR) Rail/Highway Grade Crossing Handbook, and other State standards for the installation of passive and active warning devices.

- 4.1.2.1 Sight distances, track profile, drainage and train operation will all be factors considered in the design and improvement of crossings. The Railroad-Highway Grade Crossing Handbook, Federal Highway Administration Publication TS-86-215 (or revision) and current State of Alaska design standards thereof will be consulted in the design of crossings.
- 4.1.3 12-inch rounders for flashing lights, and RR crossbucks with high intensity reflective sheeting on both sides should be adopted as a standard in the State of Alaska.
- 4.1.4 DOT&PF and the ARRC will update the FRA National Rail/Highway Crossing Inventory annually or more frequently if significant changes are discovered, and use this data base to compute the crossing Accident Prediction Values.
- 4.1.5 "Operation Lifesaver" should be actively supported and participated in by the ARRC, DOT&PF, local governments and law enforcement agencies.
- 4.1.6 The ARRC and DOT&PF should arrange meetings with all local governmental planning and road agencies in the railbelt. These meetings would be used to discuss the results of the Task Force and set up procedures for implementing these recommendations.

4.2 Planning Recommendations

- 4.2.1 Local jurisdictions, state and federal agencies, and private enterprise should incorporate planning processes (a) aimed at minimizing the need for at-grade crossings and traffic at existing at-grade crossings; and (b) which will evaluate the effect on a crossing by changes in zoning, approval of new subdivisions and other elements of the planning process. Estimated future Accident Prevention Values based on the proposed activity and future highway and railroad traffic densities will be used in the evaluation of the crossings. New at-grade crossings are discouraged and no new crossings will be permitted without concurrence of the appropriate diagnostic team.
- 4.2.2 Agencies, authorities, jurisdictions, and/or private enterprise whose actions have an impact on the crossings should be required to participate in the funding of the construction and maintenance costs precipitated by those actions. For construction, this could include the matching funds (10%) if federal funding is available.

4.2.3 The ARRC and DOT&PF should arrange a meeting with the Bureau of Land Management (BLM), Department of Natural Resources (DNR), National Park Service (NPS), Community and Regional Affairs Department, and Division of Parks and Outdoor Recreation to review the planning processes for the area in the unorganized boroughs.

4.3 Diagnostic Team Recommendations

4.3.1 A professional diagnostic team should perform an on-site evaluation before any major improvement is planned for an existing crossing or a new crossing is approved.

4.3.2 Diagnostic teams should include as a minimum:

- a. Alaska Railroad Corporation
- b. DOT&PF Region
- c. Borough (Kenai Peninsula, Municipality of Anchorage, Matanuska-Susitna, or Fairbanks North Star as appropriate)
- d. The city when within incorporated city limits
- e. Proposed permittee of the crossing if not one of the above entities

Where appropriate, representatives of the following should be informed and invited to assist the diagnostic team:

- a. The FHWA;
- b. DOT&PF Headquarters;
- c. School District;
- d. Municipality or other local agency; and
- e. Law enforcement agency(ies);

4.3.3 The recommendation of the diagnostic team will be forwarded to the appropriate parties involved for action. The action at the crossing shall be in accordance with the permit and construction agreement with the ARRC.

4.3.4 The diagnostic teams should always consider the feasibility of eliminating crossings if this can be accomplished with safety benefits which outweigh the increased operational costs and inconvenience to users, and if it would not shift the safety problem to another area, or increase the area-wide hazard potential.

4.3.5 Diagnostic teams may be initiated by request of any interested party. The request is to be forwarded to the ARRC Chief Engineer. The Chief Engineer will arrange for the notification of the team members and establish the location and time for the meeting.

4.3.6 Where there are majority and minority Policies from the Diagnostic Team, it will be referred to a resolution committee. The committee will consist of the ARRC President and CEO, the DOT&PF Commissioner, and the chief administrator of the local jurisdiction. For crossings outside of a local jurisdiction, the Commissioner of Community and Regional Affairs will be the third person.

4.4 Existing Crossing Recommendations

4.4.1 The DOT Accident Prevention Value (APV) should be used as one factor in classifying and prioritizing crossings for improvements.

4.4.2 Diagnostic teams should consider an APV of 0.1 (one accident every 10 years) as an indicator of probable need to go from passive to active warning devices.

4.4.3 Diagnostic teams should evaluate crossings which have an APV greater than 0.1 to determine the feasibility of providing grade separations (overpass/underpass) or increasing the level of protection of the warning devices. Table VIII-I Quantitative Procedures in the Alaska Traffic Manual will be used as part of the process for determining possible upgrades of the existing crossing. The current table is shown in Appendix "B." If the Alaska Traffic Manual is revised, Appendix B will automatically become the revised Table VIII-1.

4.4.4 Where possible, upgrades and improvements should be accomplished when there is another project affecting the roadway or railway in the area of the crossing.

4.4.5 Sight triangles for at-grade road crossings shall be maintained to the minimum required by Appendix A. As a minimum, all crossings shall have Case II sight triangles except for certain industrial tracks.

In industrial areas, where local roads cross industrial tracks, there are crossings where the Case II requirements cannot be met due to building construction next to the track and road. In these cases, the ARRC will issue instructions that the crossing must be flagged by ARRC personnel prior to entering the crossing.

Case I sight triangles are desirable at all crossings, however, they are difficult and often impractical to achieve, except possibly in flat, open terrain.

4.4.5.1 When Case I sight triangles cannot be provided at a public crossing, a diagnostic team shall review the crossing. The team could, in addition to closing the crossing, propose one of the following requirements:

- a. Active warning devices installed.
- b. A crossing with low highway volume and low highway speed may have an advisory speed posted that is consistent with the sight triangles that can be provided. In no case should the difference in the posted speed and the advisory speed be greater than 10 miles per hour.

Low highway speeds generally mean 40 mph or less. Low highway volume is generally in the range of less than 500 vehicles per day.

- c. Stop signs installed if the Alaska Traffic Manual requirements for stop signs can be met.

4.4.5.2 If the maximum authorized train speed or posted highway speed are increased, the sight triangle requirements will be recalculated. If the new sight triangles are impractical to achieve, the provisions of Section 4.4.5.1 will apply.

4.5 New Crossing Recommendations

4.5.1 New crossings must be part of a comprehensive community plan. For the area between Broad Pass and Dunbar (unorganized borough), DOT&PF or Community and Regional Affairs Department (or the appropriate State agency) will be required to develop the plan. The comprehensive community plan must address factors such as future growth in the area, existing local governmental agencies, land ownership, geographical restrictions, availability and/or restrictions of natural grade separation locations.

4.5.2 New at-grade crossings should not be allowed if there is another crossing within two miles of the proposed new location, nor if there is a reasonable alternative to a crossing such as a feeder road. Exception may possibly be made after the diagnostic team review. Factors to be considered would include terrain conditions which make alternative access impossible or economically unfeasible.

- 4.5.3 It will be the responsibility of the government authority having road jurisdiction in the area of the proposed crossing to hold the necessary public hearings to insure that the road will be located so as to efficiently connect into future road networks. It will also be that governmental authority's responsibility to handle all protests concerning crossing location.
- 4.5.4 A professional diagnostic team will perform an on-site evaluation before any new crossing is approved. Factors to be considered by the diagnostic team include:
- 4.5.4.1 Any new crossing will likely become a permanent crossing and possibly become a major roadway.
 - 4.5.4.2 The proximity of the proposed new crossing to existing crossing and/or other planned crossings.
 - 4.5.4.3 The effect the construction of the new crossing will have on the elimination of one or more existing crossings, making the transportation network safer and better able to serve the road needs of the area.
 - 4.5.4.4 The grade of approaches to all crossings should be level with top of rail (+/- 1") for at least 100' to prevent long low trailers from hitting the crossing.
 - 4.5.4.5 Roadway approaches to the crossing should be at or nearly 90°. Short radius curves or skew angle approaches below 75° will not be permitted.
 - 4.5.4.6 For public crossings, the road must have a dedicated right-of-way on both sides of the Alaska Railroad track right-of-way. The dedicated road right-of-way must include dedicated clear sight triangles for maximum design highway and train speeds.
 - 4.5.4.7 For private crossings, the owner must own or secure road right-of-way and sight triangles for maximum design speeds. The private owner will be restricted from developing within the sight triangles.
 - 4.5.4.8 The dedicated sight triangles referenced in 4.5.4.6 and 4.5.4.7 are for Case I and Case II scenarios. If the Case I sight distances cannot be achieved, automatic crossing signals will be required.

4.5.4.9 Sight triangles for at-grade road crossings shall be maintained to provide the sight distances required for both Case I and Case II scenarios.

4.5.5 The DOT Accident Prediction Values will be used as a factor in determining protection at new crossings. The new crossing will also be compared to existing crossings of similar geometric characteristics and rail and highway traffic densities. The comparison will also consider accident history and the effect of accidents on the DOT Accident Prediction Value.

4.5.6 The crossing permit issued by the ARRC for private crossings will be recorded as an encumbrance against the real property benefited by the crossing including the restriction on sight triangles, with the obligations of the permit to remain appurtenant to the real property.

4.5.7 For public crossings, the ARRC will only issue the permit to the DOT&PF or government authority having road construction and maintenance jurisdiction at the location of the crossing.

4.6 Private Crossings Recommendations

4.6.1 Existing truly "private" crossings and new private crossings will be deemed public when any of the following occur:

4.6.1.1 The crossing serves two or more parcels of property, unless all parcels are owned or leased by the same permittee;

4.6.1.2 The use of the crossing cannot be or is not controlled by the permittee of the crossing;

4.6.1.3 The roadway is designated by plat as a public roadway by the governmental authority responsible for planning and/or zoning; or

4.6.1.4 If school buses or mass transit vehicles use the crossing unless the school district notifies the ARRC in writing that it will operate across the private crossing and has permission of the permittee.

4.6.2 Some existing private crossings currently serve more than one parcel of property. The crossing may remain as a private crossing as long as there is not further subdivision of the property.

4.6.2.1 Private crossings may serve property owned or leased by more than one person or entity provided the following conditions are met:

- a. The roadway is not open to public travel, and
- b. The permit for the crossing has been executed by all owners/lessees of all property which can gain access from the crossing or a legally formed association of property owners.

4.6.3 If the permittee no longer complies with the conditions of the "Private Crossing Permit" and the crossing has not become a public crossing, the ARRC will notify the permittee of the deficiencies. If the permittee fails to correct the deficiencies, the crossing will be removed at the permittee's expense.

4.6.4 If the crossing's use has become public, the ARRC will work with the appropriate public authority to permit the crossing as a public crossing. A diagnostic team shall review the crossing prior to the issuance of the public crossing permit. The diagnostic team will recommend improvements to the crossing required to bring it into conformance with current design standards.

4.6.5 If the public authority refuses to accept the responsibility for the public crossing, the permittee of the crossing shall take appropriate action (if possible) to make the crossing "private". If the permittee fails to correct the deficiencies, the ARRC will remove the crossing at the permittee's expense.

4.6.6 Where Case I sight triangles are impractical to achieve at a private crossing, stop signs shall be posted at the crossing and Case II sight triangles will be maintained.

4.7 PUB-4 Crossings Recommendations

4.7.1 ARRC and DOT&PF should involve the local governments and use diagnostic teams to address the problems of these crossings. The local public authority with road powers must make decisions on the continuing need for the crossing balanced with the cost and liability of maintaining the crossings.

4.7.1.1 Diagnostic teams should be formed as soon as possible with each governmental agency which has PUB-4 crossings within its boundaries.

4.7.2 The use of ARRC right-of-way to eliminate a crossing will be reviewed on a case by case basis. When development has occurred and natural physical obstructions such as lakes and rivers prevent alternate access, the ARRC may permit to the public authority a road on ARRC right-of-way to facilitate the removal of one or more crossings. The use of ARRC right-of-way should only be permitted after a diagnostic team review and coordination with the local planning and zoning agency.

4.7.3 Roadway signing at the PUB-4 crossing should be in accordance with the Alaska Traffic Manual and include as a minimum:

4.7.3.1 Stop sign on both sides of the track unless a diagnostic team determines that stop signs are not required;

4.7.3.2 Crossbuck on both sides of the track;

4.7.3.3 Railroad advance warning signs (W10 Series) according to the Alaska Traffic Manual; and

4.7.3.4 An "ARRC Property-Proceed at Your Own Risk" sign at the right-of-way line on both sides of the track.

5.0 CHANGES AND ADOPTION OF POLICY

5.1 Changes to Policy

5.1.1 This policy was developed by a process that included input from the local governmental bodies. Changes to the policy will be developed in accordance with the following subsections.

5.1.2 The proposed changes will be coordinated by the ARRC Engineering Department and DOT&PF Headquarters Engineering and Operations Standards Section. DOT&PF will coordinate with the Federal Highway Administration.

5.1.3 Work sessions on the proposed changes will be held in Anchorage and Fairbanks. All government agencies concerned with crossings will be notified of the meeting and encouraged to attend.

5.1.4 After the work sessions, the changes will be reviewed by the ARRC and DOT&PF and all parties in attendance at the work sessions before being finalized.

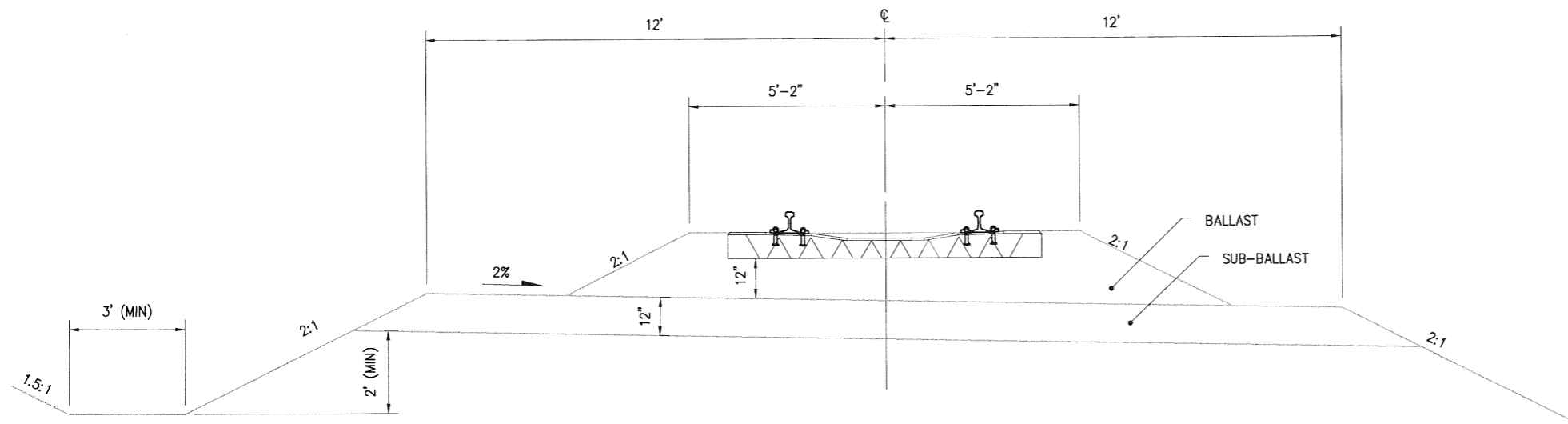
5.2 Adoption and Implementation of Policy

- 5.2.1 Section 42.40.180 of the Alaska Railroad Corporation Act mandates that policies which affect the general public require adoption by the ARRC Board as a board rule once public notification has been made and a public hearing has been held on the Rule. In accordance with this procedure the proposed changes (see 5.1.4) will be submitted to the ARRC Board of Directors for approval in accordance with Board rules.
- 5.2.2 After adoption of the changes by the ARRC Board of Directors and concurrence by DOT&PF, the ARRC Policies and Procedures Manual relating to the Railroad Crossing Policy will be updated to incorporate the changes.

Technical Standards for Roadway, Trail, and Utility Facilities

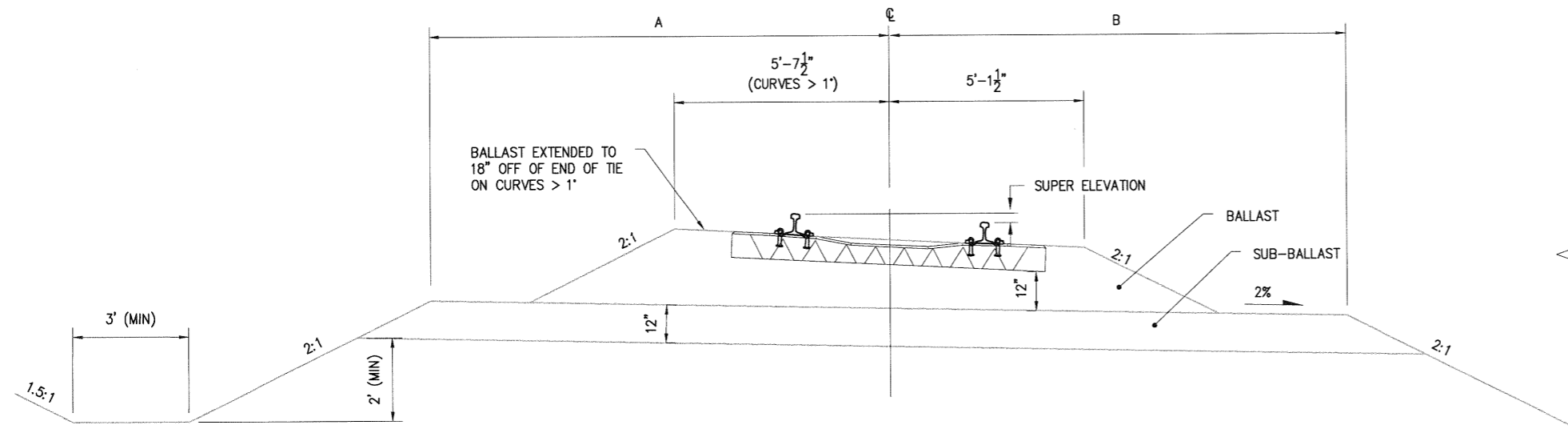
APPENDIX B: ALASKA RAILROAD STANDARD PLANS (excerpts)





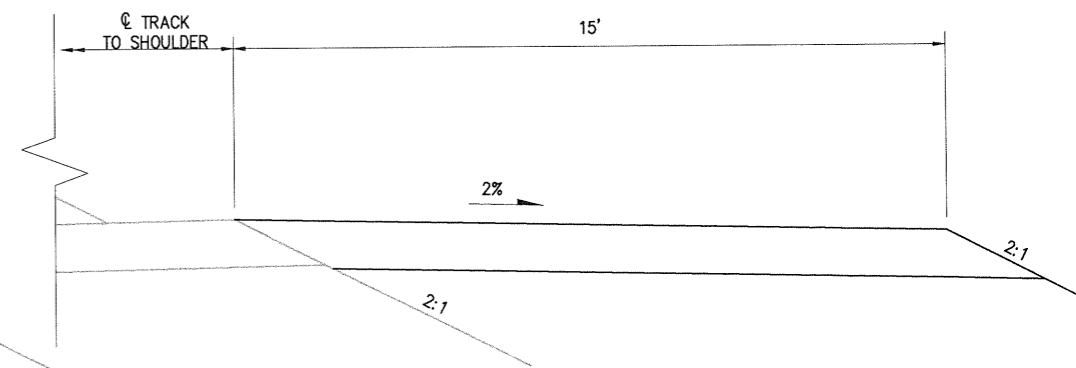
TANGENT SECTION

SCALE: 1" = 4'



CURVE SECTION

SCALE: 1" = 4'



ROAD SECTION

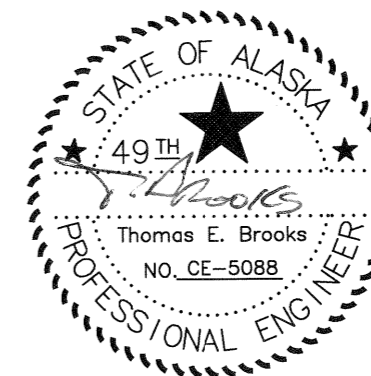
SCALE: 1" = 4'

BALLAST REQUIRED FOR 100' OF TRACK		
CURVED TRACK	SUPER ELEVATION	CUBIC YARDS
	1"	80.1
2"	84.8	
3"	89.6	
4"	94.9	
5"	100.0	
TANGENT TRACK		84.3

SUB-BALLAST REQUIRED FOR 100' OF TRACK		
CURVED TRACK	DEGREE OF CURVE	CUBIC YARDS
	0' - 1'	96.3
1' - 2'	98.2	
2' - 6'	100.0	
+6'	101.9	
TANGENT TRACK		96.3

SUB-BALLAST WIDTH FOR DEGREE CURVATURE	DIMENSIONS	
	A	B
0' - 1' 00" INCLUSIVE	12'-0"	12'-0"
1' 01' - 2' 00" INCLUSIVE	12'-6"	12'-0"
2' 01' - 6' 00" INCLUSIVE	13'-0"	12'-0"
OVER 6'	13'-6"	12'-0"

- NOTES**
1. BALLAST DEPTH SHALL BE MINIMUM 12" UNDER TIE, MEASURED AT LOW RAIL.
 2. ALL QUANTITIES ESTIMATED, REPRESENT IN-PLACE, COMPACTED MATERIAL, BASED ON 2,640 EACH, 8'-3" CONCRETE TIES PER MILE AND MINIMUM BALLAST AND SUB-BALLAST DIMENSIONS.
 3. SUB GRADE SHALL SLOPE TO PREVAILING DRAINAGE SIDE ON TANGENT, OR TO THE INSIDE OF THE CURVE.
 4. SUBGRADE SLOPE TRANSITION RATE TO BE 1" IN 10'.
 5. DEPTH OF DITCH VARIES TO PROVIDE POSITIVE DRAINAGE.



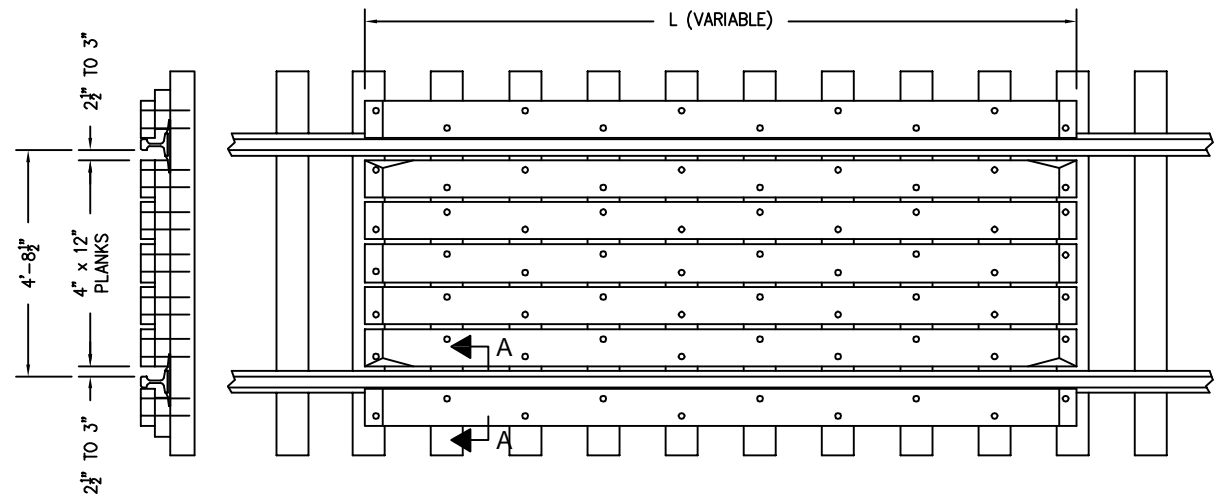
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 P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456

STANDARD
MAIN LINE
BALLAST SECTIONS
CONCRETE TIES

APPROVED: *TEB* DATE: 1/28/04
 DESIGNED BY: REH
 DRAWN BY: BBF
 CHECKED BY: REH
 APPROVED BY: TEB

SCALE: 1" = 4'
 DATE: 1/28/2004

FILE: a2.3-04.dwg
2.3-04

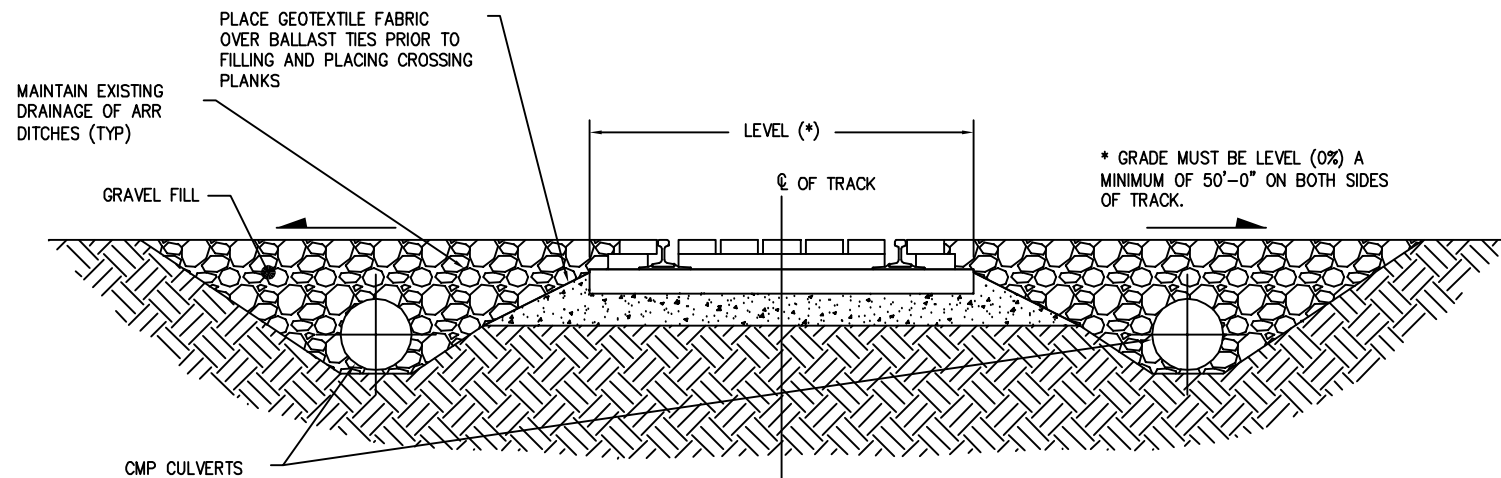


ROAD CROSSING

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

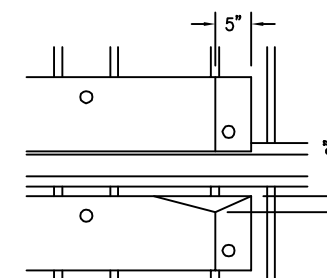
BILL OF MATERIAL FOR CROSSING	
7 PC.	4" x 10" x L LONG CROSSING PLANKS
*	4" x 10" CROSSING PLANKS FOR SHIMS
	1/2" x 12" BOAT SPIKES AS SHOWN

- NOTES**
- BEFORE PUTTING CROSSING IN PLACE, REPLACE SUCH TIES AS WILL REQUIRE EARLY ATTENTION.
 - PLACE GEOTEXTILE FABRIC ON TOP OF TIES AND BALLAST PRIOR TO FILLING APPROACHES AND LAYING PLANKS.
 - FASTEN PLANKS TO TIES WITH 1/2" X 12" BOAT SPIKES AS SHOWN ON PLAN. PROVIDE ADDITIONAL PLANKS TO BE USED AS SHIMS ON EACH TIE UNDER PLANKING IN ORDER TO BRING TOP OF PLANKING FLUSH WITH OR ABOVE TOP OF RAIL.
 - THIS PLAN IS TO BE USED FOR ALL NEW OR REBUILT PUBLIC CROSSINGS AND RENEWAL OF PLANKS NEXT TO FLANGEWAY OF EXISTING PUBLIC CROSSINGS.
 - FOR RIGHT ANGLE CROSSINGS THE WIDTH OF PLANKING SHALL BE NOT LESS THAN THE FULL WIDTH OF THE TRAVELED ROADWAY.
 - FOR SKEWED CROSSINGS, PLANKING SHALL BE EXTENDED 2' BEYOND EACH EDGE OF TRAVELED ROADWAY.
- * NUMBER OF AND LENGTH OF SHIMS SUFFICIENT TO BE USED AS SHOWN.

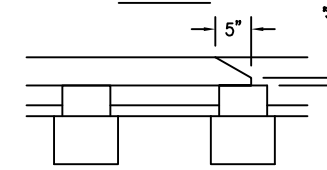


SECTION - ROADBED

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



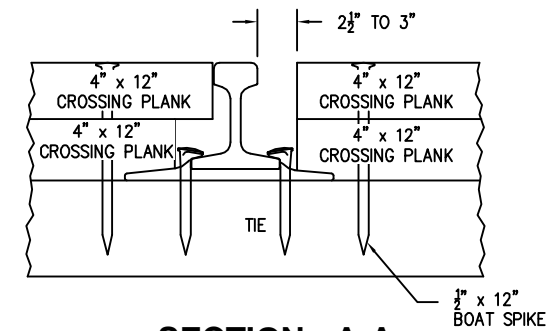
PLAN



ELEVATION

DETAIL - END BEVEL

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



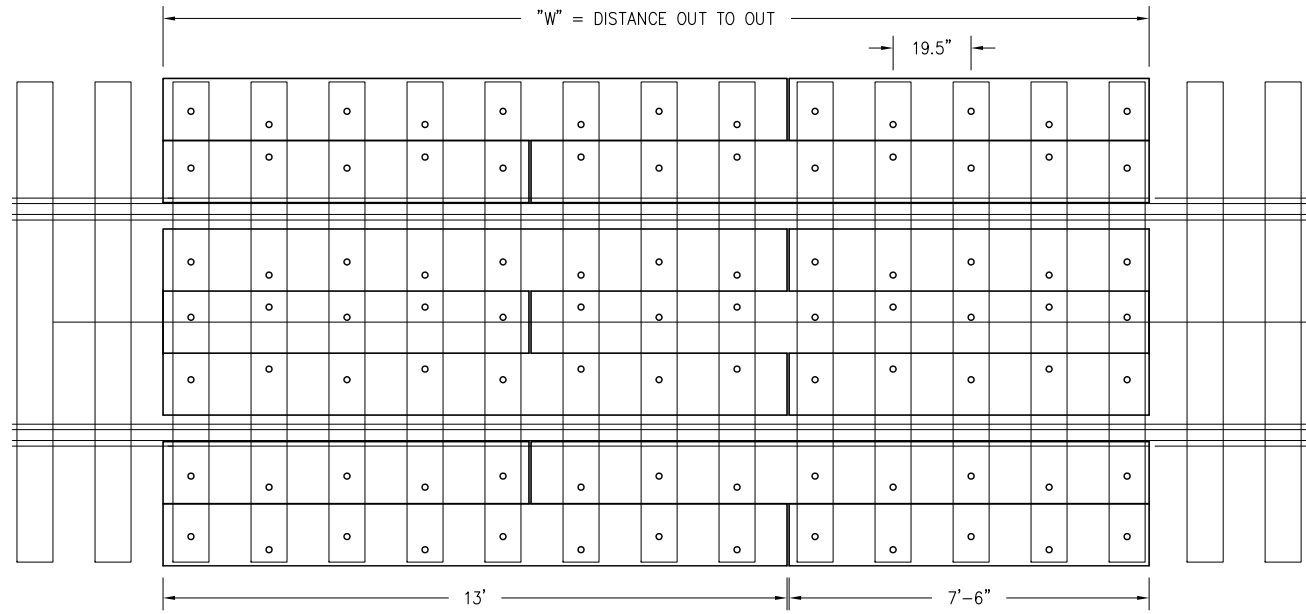
SECTION - A-A

SCALE: 1" = 1'-0"

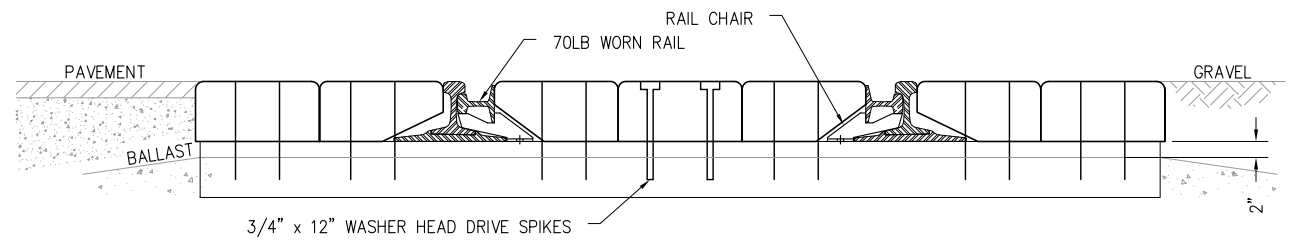
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STANDARD

TEMPORARY ROAD CROSSING

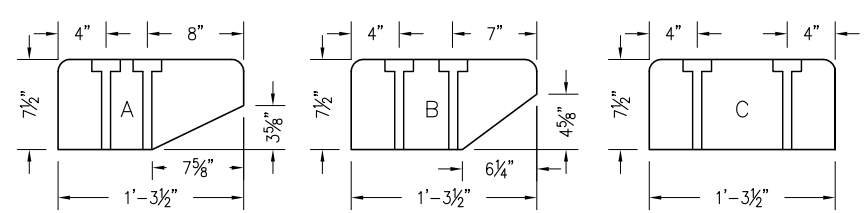
APPROVED:	DATE:
DESIGNED BY:	SCALE: AS NOTED
DRAWN BY:	FILE: s2.7-05.dwg
CHECKED BY: BBF	DATE: 7/7/2005
APPROVED BY: ENG DEPT	2.7-05



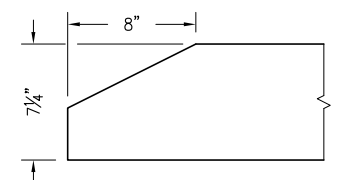
TYPICAL PLAN OF CROSSING PLANK (115# RAIL)
SCALE 1/4" = 1'-0"



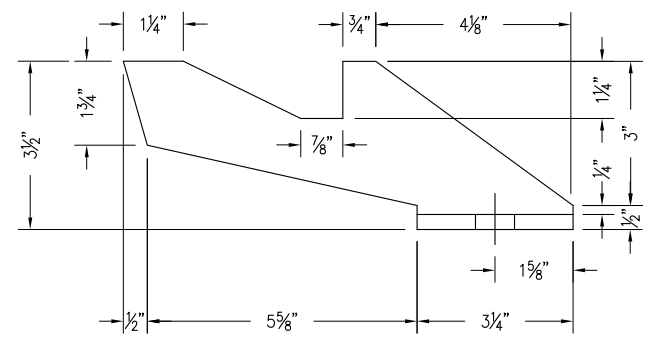
SECTION THROUGH TRACK
SCALE 1/2" = 1'-0"



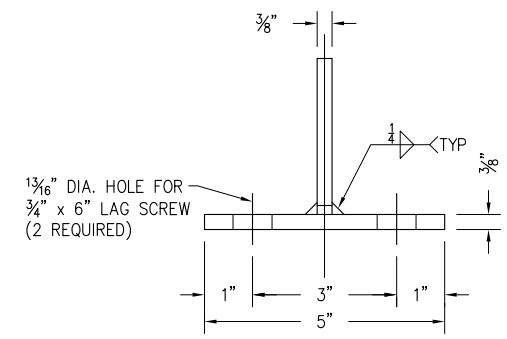
DETAIL - PLANKS A, B, & C
SCALE 3/4" = 1'-0"



DETAIL-END BEVEL
SCALE 1" = 1'-0"

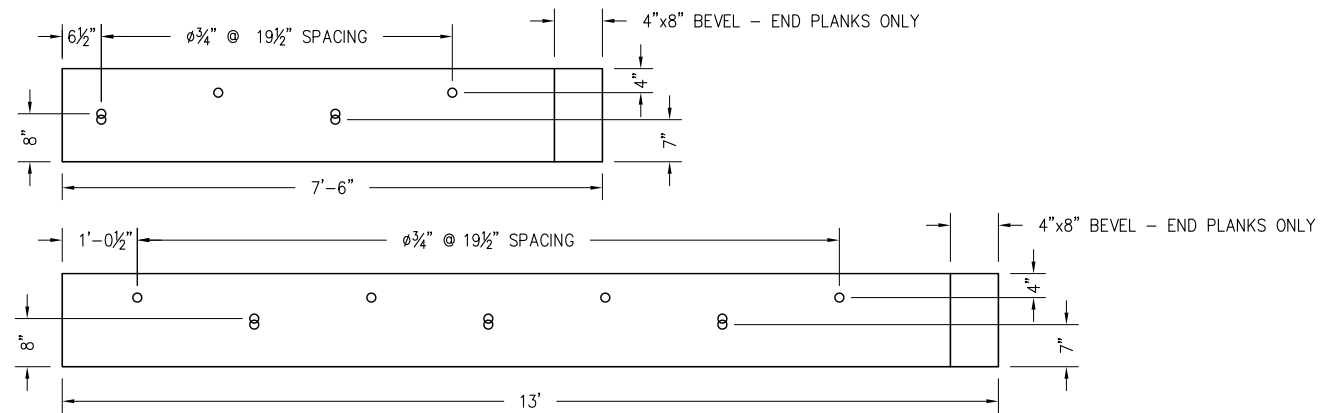


SIDE VIEW

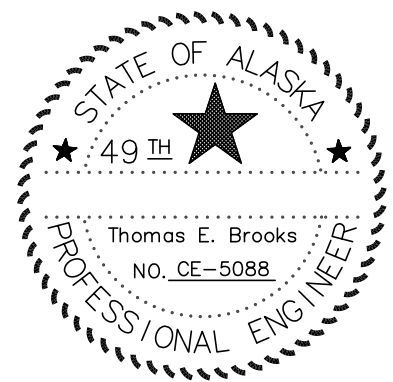


FRONT VIEW

RAIL CHAIR DETAIL
SCALE: 3" = 1'



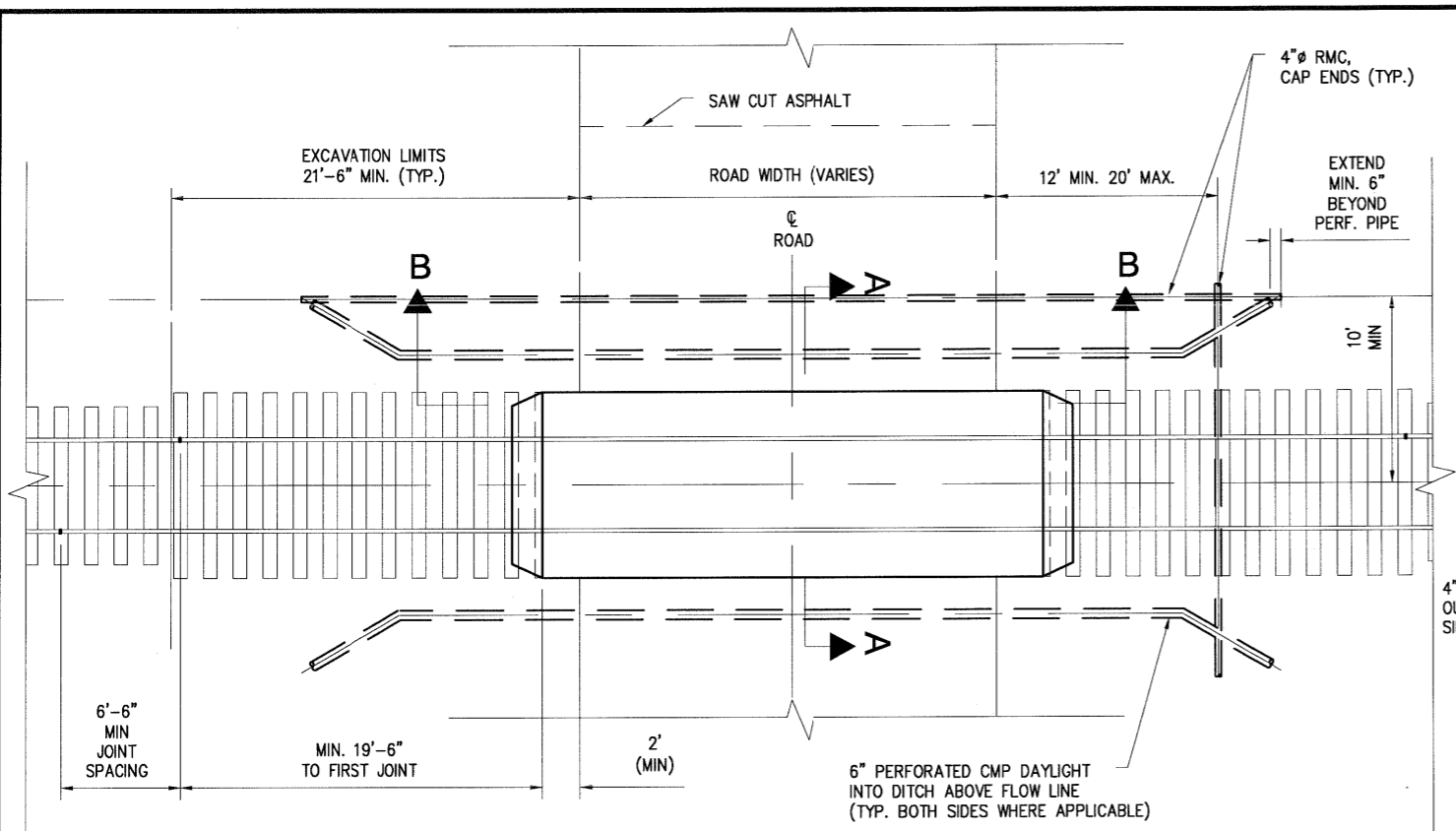
PLANKS A, B, & C - 115# CROSSING
SCALE 3/8" = 1'-0"



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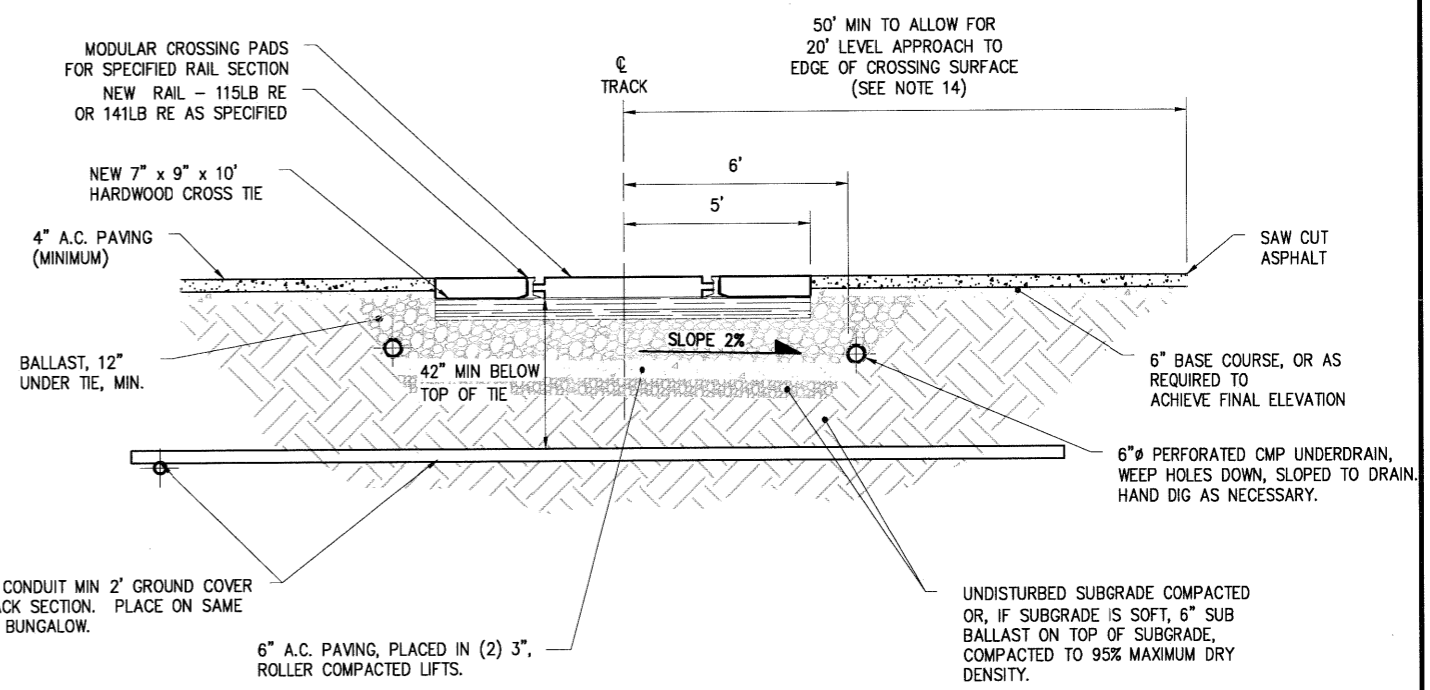
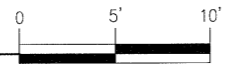
STANDARD
SOLID TIMBER
PRIMARY ROAD CROSSING

DESIGNED BY: ARRC	SCALE: AS NOTED	FILE: s2-72.04.dwg
DRAWN BY: BBF	DATE: 1/15/2004	2.72-04
CHECKED BY: REH		
APPROVED BY: TEB		



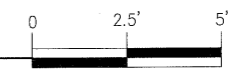
PLAN

SCALE: 1:10'



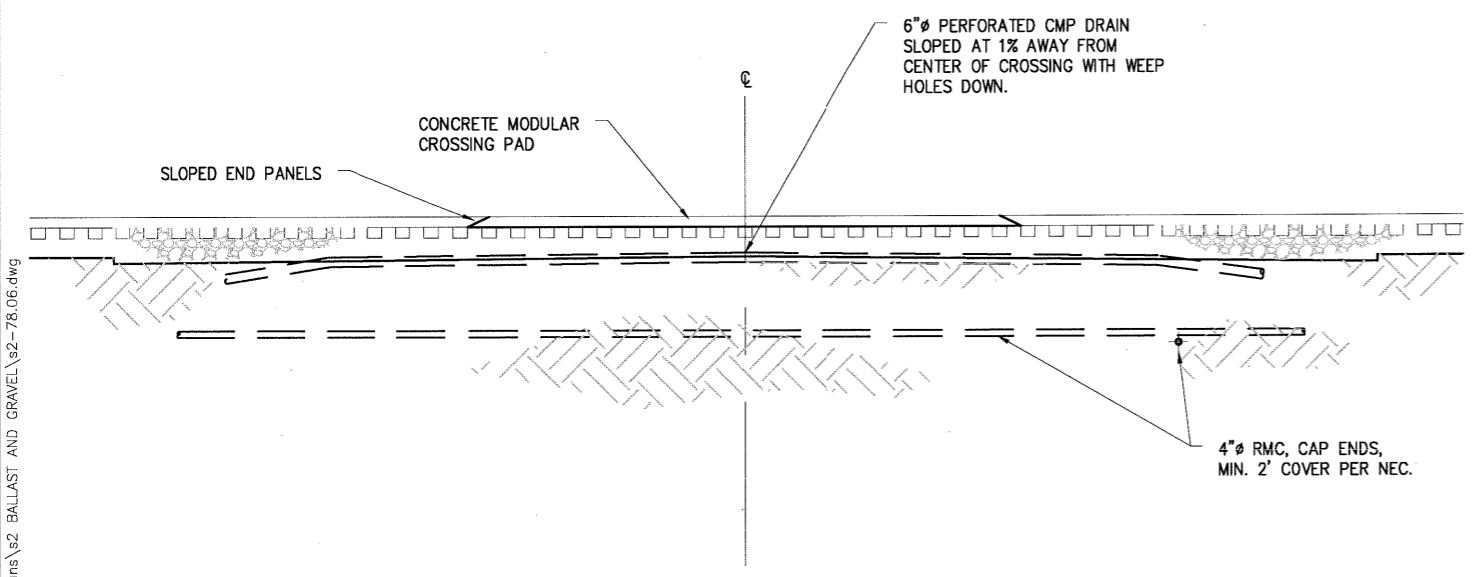
SECTION A-A

SCALE: 1:5'



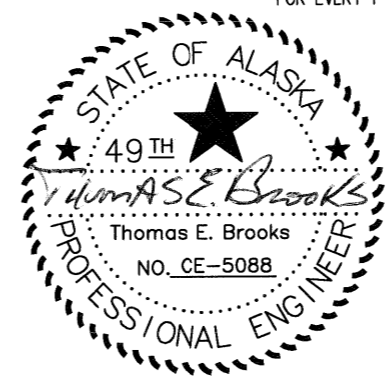
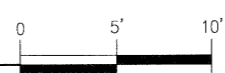
GENERAL NOTES

1. PROVIDE NEW 7"x9"x10" HARDWOOD CROSS TIES WITH PANDROL PLATES AND E-CLIPS ON 19-1/2" CENTER-TO-CENTER (OR PER MODULAR CROSSING MANUFACTURER'S RECOMMENDATION) THROUGH CROSSING AND 12 TIES BEYOND CROSSING IN BOTH DIRECTIONS.
2. MODULAR CROSSING PADS SHALL BE 8.125' LONG AND MANUFACTURED FROM CONCRETE SPECIFICALLY DESIGNED FOR RAILROAD CROSSING APPLICATIONS. THE PARTICULAR MANUFACTURER SHALL BE REGULARLY ENGAGED IN THE FABRICATION OF RAILROAD CROSSING MATERIALS AND APPROVED BY THE CHIEF ENGINEER.
3. CROSSING PADS LOCATED WITHIN 3' OR GREATER CURVES SHALL BE DESIGNED FOR THE SPECIFIC APPLICATION.
4. ALL MODULAR CROSSING PADS, HARDWARE, AND INSTALLATION PROCEDURES SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND FOR THE RAIL SIZE USED.
5. ALL RAIL JOINTS MUST BE WELDED THROUGHOUT THE CROSSING. NO JOINTS ALLOWED WITHIN 19.5' OF THE CROSSING PANEL, WITH JOINTS STAGGERED MIN. 6.5'. WELDING KITS AND WELDER PROVIDED BY THE CONTRACTOR MUST BE APPROVED BY THE CHIEF ENGINEER. ALL WELDS IN CROSSING SHALL BE GROUND FLUSH SO AS NOT TO INTERFERE WITH FLANGE FILLER.
6. THE INNER 2 HOLES SHALL BE DRILLED ON NEW RAIL, AND CONNECTED TO EXISTING RAIL WITH NEW 36" ANGLE BARS AND BOLTS.
7. TO MINIMIZE SETTLEMENT, KEEP EXCAVATION FOR UNDER DRAIN AND CONDUITS TO A MINIMUM. COMPACT BACKFILL IN LIFTS NOT EXCEEDING 6" TO 95% OF MAXIMUM DRY DENSITY.
8. IT WILL BE NECESSARY IN MOST CASES TO RAISE THE TRACK THROUGH THE CROSSING TO MATCH FINAL TRACK DESIGN GRADE. FINAL TRACK DESIGN GRADE SHALL BE APPROVED BY THE CHIEF ENGINEER. RUNOFF OF TRACK RAISE SHALL BE NO GREATER THAN 1/4" PER 62 FEET.
9. MINIMUM OF THREE DAYS OF RAIL TRAFFIC REQUIRED OVER NEWLY CONSTRUCTED TRACK PRIOR TO FINAL SURFACING OF THE TRACK.
10. FINAL INSTALLATION OF MODULAR CROSSING PADS CANNOT BEGIN UNTIL FINAL SURFACING OF THE TRACK IS COMPLETED.
11. DRAINAGE FROM ROAD SURFACE SHALL NOT DRAIN TOWARD CROSSING.
12. BOX ANCHOR EVERY TIE FOR 184 TIES BEYOND CROSSING PADS IN BOTH DIRECTIONS. PANDROL PLATES COUNT AS BOX ANCHORS.
13. EXTEND ROAD SURFACE LEVEL WITH CROSSING SURFACE A MINIMUM OF 20' BEYOND EDGE OF CROSSING.
14. FOR A TRACK ELEVATION CHANGE OF 3" OR LESS, SAW CUT AND REMOVE PAVEMENT A MINIMUM OF 50 FT FROM THE CENTERLINE. FOR EVERY 1" OF RAISE GREATER THAN 3", CUT THE ASPHALT BACK AN ADDITIONAL 10 FT.



SECTION B-B

SCALE: 1:10'



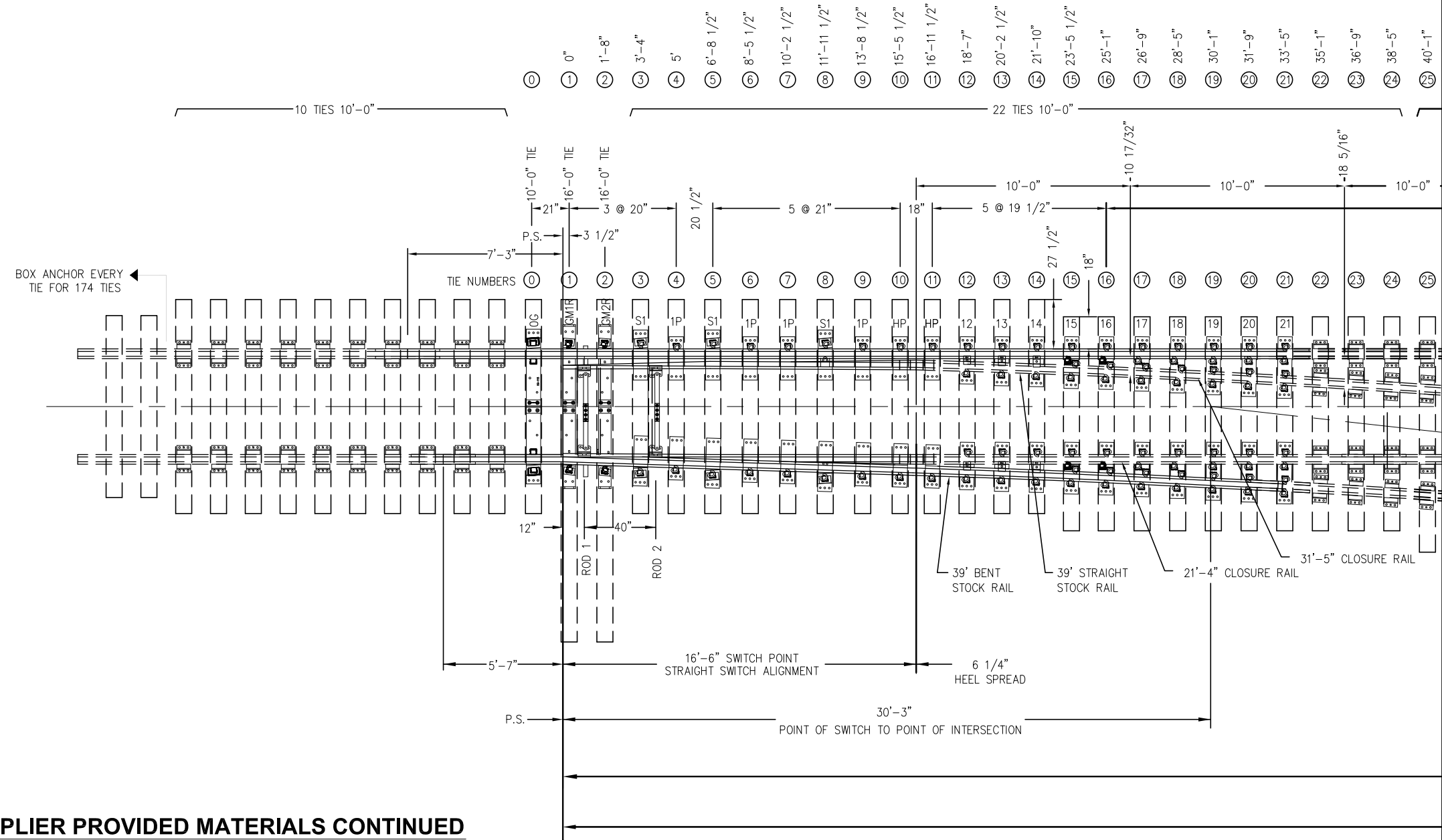
**BEFORE YOU DIG
CALL FOR FREE
UNDERGROUND
LOCATION**

Locate Call Center of Alaska
Anchorage Area.....278-3121
Statewide.....800-478-3121
who will notify subscribed utilities only.
Other utilities need to be contacted
individually.

ALASKA RAILROAD CORPORATION OFFICE OF THE CHIEF ENGINEER P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456 STANDARD		
MODULAR CROSSING		
APPROVED:	DATE:	
DESIGNED BY: JLS	SCALE: AS NOTED	FILE: s2-78.06.dwg
DRAWN BY: BBF		
CHECKED BY: JLS		
APPROVED BY: TEB	DATE: 9/18/2006	2.78-06

U:\ACAD\ARRStandards\Standard Plans\s2 BALLAST AND GRAVEL\s2-78.06.dwg

TURNOUT DATA	
FROG	NUMBER= 9
	ANGLE= 6'-21"-35"
	TOE LENGTH= 7'-0"
	HEEL LENGTH= 9'-6"
	TOTAL LENGTH= 16'-6"
SWITCH	ALIGNMENT= 16'-6"
	ANGLE AT POINT= 1'-48"-32"
	POINT THICKNESS= 0"
	VERTEX DISTANCE= 0"
	HEEL SPREAD= 6 1/4"
	THROW= 4 3/4" AT No. 1 ROD
	RISER= GRADUATED
GAUGE= 4'-8 1/2"	
ACTUAL LEAD= 73'-0"	
PS TO PI= 30'-3"	
CENTERLINE RADIUS= 596.924'	
DEGREE OF CURVE Dc= 9'-36'-35"	
CENTRAL ANGLE Δ = 4'-33'-03"	



SUPPLIER PROVIDED MATERIALS

MATERIAL LIST FOR PACKAGE TURNOUT

QTY.	ITEM No.	DESCRIPTION		
		RIGHT HAND No. 9 MANUAL THROW TURNOUT - SHOWN		
		LEFT HAND No. 9 MANUAL THROW TURNOUT - OPPOSITE		
EACH CONSISTING OF:				
QTY.	ITEM No.	DESCRIPTION		DRAWING
FOR RIGHT HAND TURNOUT ONLY				
1 EA		RH STR. SAMPSON SWITCH POINT 16'-6", UNIFORM RISER	PRS	P-202105
1 EA		LH STR. SAMPSON SWITCH POINT 16'-6", UNIFORM RISER	PRS	P-202105
1 EA		LH STR. SAMPSON STOCK RAIL 39'-0"	PRS	P-202130
1 EA		RH BENT SAMSON STOCK RAIL 39'-0"	PRS	P-202130
1 EA		No. GM1R INSL MACHINE GAUGE PLATE	CTM	902803
1 EA		No. GM2R INSL MACHINE GAUGE PLATE	CTM	902803
4 EA		No. HP HEEL PLATE	CTM	902803
FOR LEFT HAND TURNOUT ONLY				
1 EA		RH STR. SAMPSON SWITCH POINT 16'-6", UNIFORM RISER	PRS	P-202105
1 EA		LH STR. SAMPSON SWITCH POINT 16'-6", UNIFORM RISER	PRS	P-202105
1 EA		RH STR. SAMPSON STOCK RAIL 39'-0"	PRS	P-202130
1 EA		LH BENT SAMSON STOCK RAIL 39'-9"	PRS	P-202130
1 EA		No. GM1L INSL MACHINE GAUGE PLATE	CTM	902803
1 EA		No. GM2L INSL MACHINE GAUGE PLATE	CTM	902803
4 EA		No. HP HEEL PLATE	CTM	902803


SUPPLIER PROVIDED MATERIALS CONTINUED

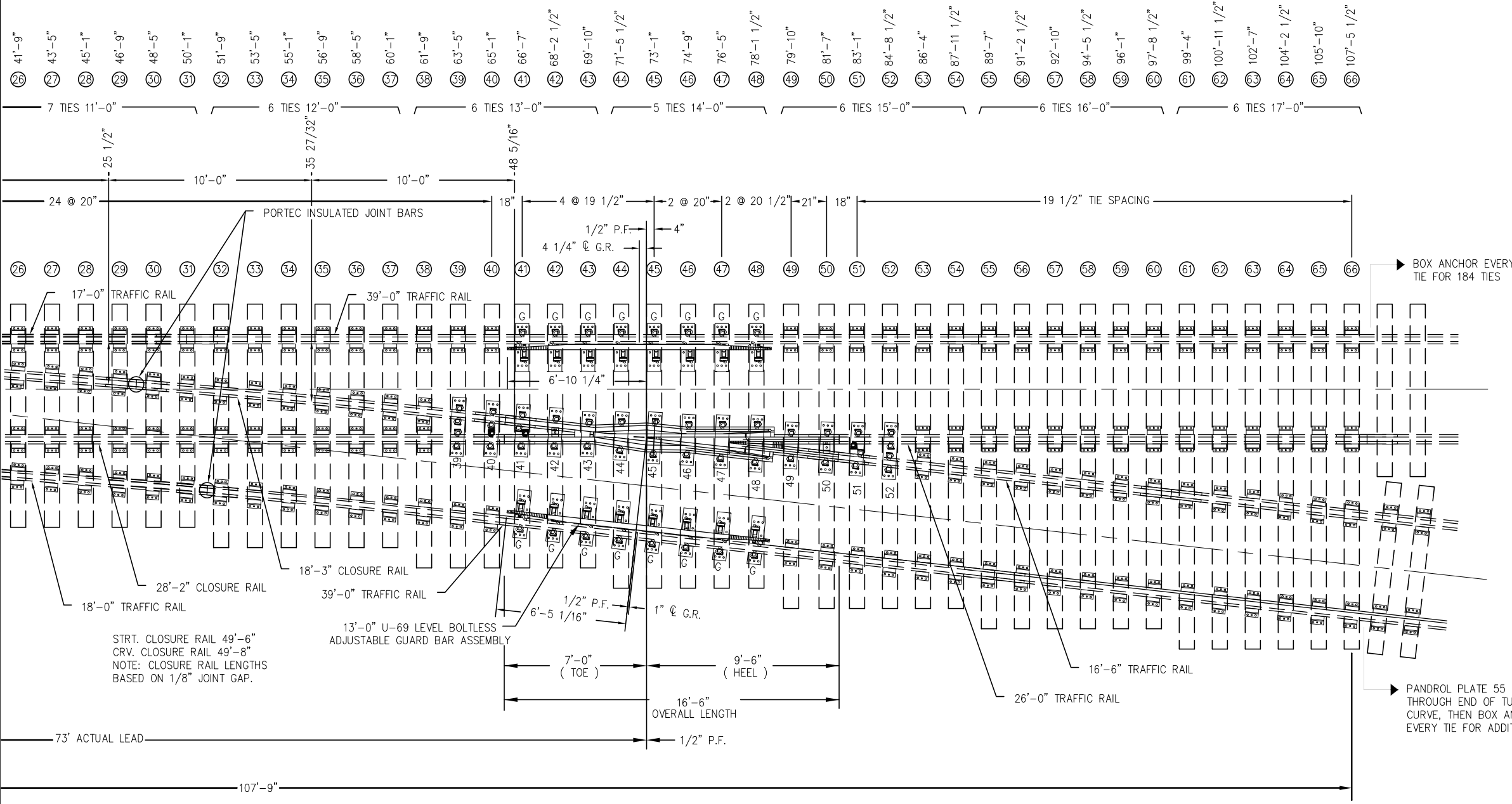
COMMON TO RH AND LH TURNOUTS

QTY.	ITEM No.	DESCRIPTION		DRAWING
1 EA		LH 4-HOLE FLOATING HEEL BLOCK ASSEMBLY	PRS	P-102602
1 EA		RH 4-HOLE FLOATING HEEL BLOCK ASSEMBLY	PRS	P-102602
1 EA		No.1 SMJ SWITCH ROD, HEAD ROD WITH BASKET	CTM	931004
1 EA		No.2 SMJ SWITCH ROD, SPREAD ROD	CTM	931004
1 EA		No. 0G INSL GAUGE PLT	CTM	902803
8 EA		No. 1P SW SLIDE PLT	CTM	902803
6 EA		No. S1 BRACE SLIDE PLATE (SERRATED ADJUSTABLE)	CTM	902803
1 SET		TURNOUT PLATES - No. 12 THRU 21	ARRC	902808
1 EA		#9 RBM FROG, 16'-6"	ARRC	P-201356
1 SET		FROG PLATES - NO. 39 THRU 52	ARRC	903229
148 EA		PANDROL CLIP ECL-2055		
8 EA		PANDROL CLIP ECL-2056		
292 EA		15/16" x 6" SQUARE HEAD SCREW SPIKE		
2 EA		MACHINE HOLD-DOWN CLIP (HC-1) WITH SCREW SPIKE	s12.9-04	P-200020
3 EA		MACHINE HOLD-DOWN CLIP (HC-2) WITH SCREW SPIKE	s12.9-04	P-200020
2 EA		MACHINE HOLD-DOWN CLIP (HC-3) WITH SCREW SPIKE	s12.9-04	P-200020
1 EA		MACHINE HOLD-DOWN CLIP (HC-4) WITH SCREW SPIKE	s12.9-04	P-200020
1 EA		RACOR 112E HIGH STAND W/6'-0" CONN. ROD	CTM	1013767
1 EA		SWITCH POINT LOCK, RACOR DESIGN NO. 3911	ARRC	P-200020

#9 R.H. TURNOUT, MANUAL THROW - 115 LB. RE
L.H TURNOUT OPPOSITE

PAGE 1 OF 2

 ALASKA RAILROAD CORPORATION OFFICE OF THE CHIEF ENGINEER P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456		
STANDARD NO 9 TURNOUT WITH 16'-6" STRAIGHT POINTS, UNIFORM RISERS AND 16'-6" RBM FROG		
APPROVED:	DATE:	
DESIGNED BY: REH	CHECKED BY: BBF	SCALE: 1" = 6'
CHECKED BY: REH	APPROVED BY: TEB	DATE: 1/23/2004
FILE:s12.3-04.dwg		12.3-04



GENERAL NOTES

- ALL MEASUREMENTS GIVEN AT 5/8" BELOW TOP OF RAIL.
- ALL SWITCH RODS TO BE HORIZONTAL INSULATED TRANSIT RODS.
- 4 3/4" THROW AT ROD #1
- ALL GAGE PLATES TO BE INSULATED.
- TURNOUT MANUFACTURER TO FURNISH ALL COMPONENTS SHOWN IN SOLID LINES AND AS LISTED IN THE "SUPPLIER PROVIDED MATERIALS" TABLES

SPECIFICATIONS

- ANGLE OF TURNOUT : LATERAL No. 9 6'-21'-35"
- RAIL SECTION : 115RE HEAD HARDENED
- FLANGEWAYS : 1 7/8" WIDE THRU-OUT
- GAGE : 4'-8 1/2" BOTH RUNS THRU-OUT +/- 1/16"
- JOINT DRILLING : 3 1/2" x 6" x 6" 1 1/4" DIA. 2 7/8" A.B.

FABRICATION NOTES

- ALL COMPONENTS TO BE MANUFACTURED TO MEET OR EXCEED AREMA STANDARDS.
- SPECIAL TRACKWORK MATERIALS SHALL BE BUNDLED AND MARKED FOR IDENTIFICATION.
- FROG BODY BOLTS SHALL BE 1 3/8" DIA. W/ NECESSARY BEVELED HEADLOCKS, TAIL WASHERS, A-325 HD. FLAT WASHERS AND HEAVY SQUARE NUTS.
- SWITCH RODS ARE INSULATED VERTICAL SMJ WITH GREASE ZERK FITTING.
- ALL CANTED PLATES (STANDARD TIE PLATES) TO BE INSTALLED WITH "HIGH SIDE" TOWARD FIELD.
- ALL PLATES TO BE UNIFORMLY AND CLEARLY STAMPED WITH TURNOUT NO. AND SPECIALTY PLATE OR TIE NUMBER FOR FIELD IDENTIFICATION.

GAGE LINE OFFSETS	
DISTANCE FROM HEEL OF SWITCH	OFFSET
10'-0"	10 17/32"
20'-0"	18 5/16"
30'-0"	25 1/2"
40'-0"	35 27/32"
50'-0"	46 5/16"

#9 R.H. TURNOUT, MANUAL THROW - 115 LB. RE L.H TURNOUT OPPOSITE

ADDITIONAL MATERIALS REQUIRED

ADDITIONAL MATERIAL LIST FOR PACKAGE TURNOUT

QTY.	ITEM No.	DESCRIPTION	DRAWING
266 EA	023853	PANDROL PLATE, P26M, (4) Ø1", (2) 11/16" SQ	
1150 EA	313112	SCREW SPIKE, Ø15/16"x6" SQUARE HEAD	
532 EA		PANDROL CLIP ECL-2055	
1948 EA		RAIL ANCHORS UNIT 5	
1 PR		13'-0" BOLTLESS ADJUSTABLE LEVEL GUARD BAR W/ PLATES (U-69)	
2 PR		PORTEC 36" INSULATED JOINT BAR KIT W/ BNW	
14 PR	024156	36" STANDARD JOINT BAR	
8 EA		PANDROL CLIP E-2063 FOR INSULATED JOINT BAR	
56 EA	023706	PANDROL CLIP J267 FOR JOINT BAR	
56 EA		ANGLE BAR BOLTS AND NUTS (Ø1 1/16" x 6")	
56 EA		LOCK WASHERS (FOR ANGLE BAR BOLTS)	
1 SET		SET OF CONNECTING & TRAFFIC RAILS (SEE BILL OF RAIL TABLE)	

BILL OF RAIL (FROM 4 - 80' LENGTHS)

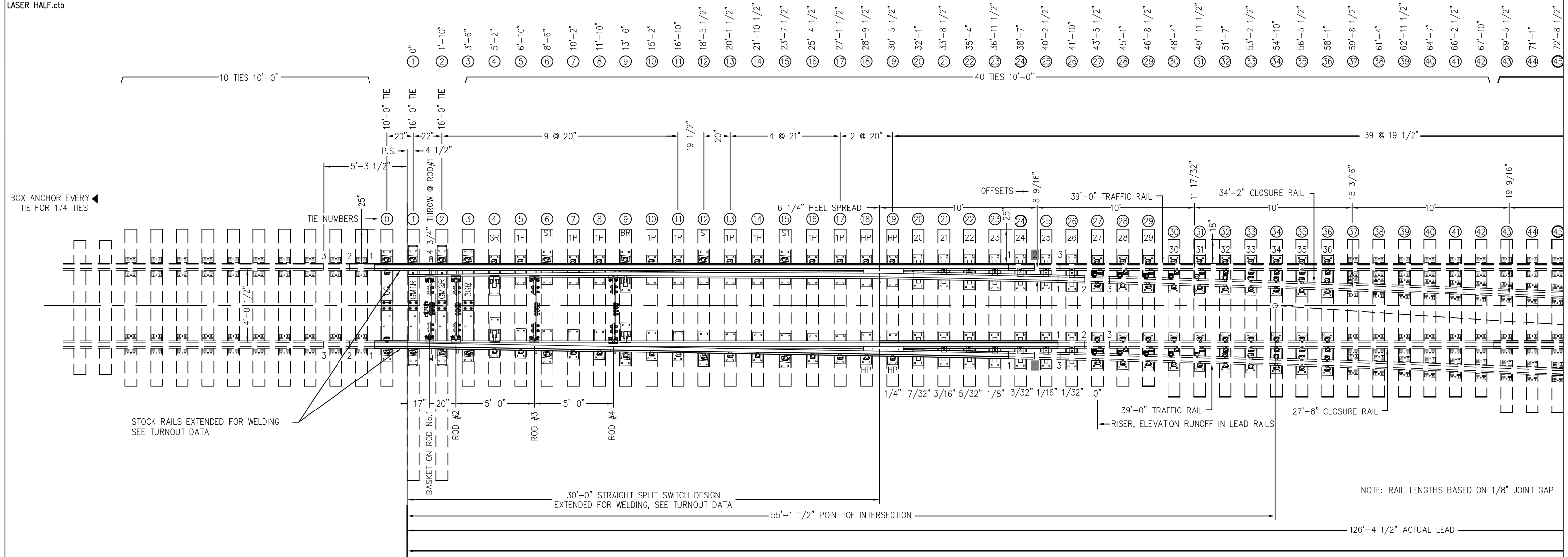
RAIL TYPE	LENGTH
CLOSURE RAIL	18'-3" (2)
CLOSURE RAIL	21'-4" (3)
CLOSURE RAIL	28'-2" (3)
CLOSURE RAIL	31'-5" (2)
TRAFFIC RAIL	16'-6" (4)
TRAFFIC RAIL	17'-0" (4)
TRAFFIC RAIL	18'-0" (2)
TRAFFIC RAIL	26'-0" (3)
TRAFFIC RAIL	39'-0" (1)
TRAFFIC RAIL	39'-0" (1)

(#) INDICATES SUGGESTED RAIL CUTTING BASED ON 1/8" JOINT GAPS

BILL OF TIES (NO. 9 TURNOUT PACKAGE)		
QUANTITY	TIE NUMBER	SIZE
10 EA.	AHEAD OF TIE #0	7" X 9" X 10'-0"
23 EA.	NO. 0, NO. 3 THRU NO. 24	7" X 9" X 10'-0"
7 EA.	NO. 25 THRU NO. 31	7" X 9" X 11'-0"
6 EA.	NO. 32 THRU NO. 37	7" X 9" X 12'-0"
6 EA.	NO. 38 THRU NO. 43	7" X 9" X 13'-0"
5 EA.	NO. 44 THRU NO. 48	7" X 9" X 14'-0"
6 EA.	NO. 49 THRU NO. 54	7" X 9" X 15'-0"
8 EA.	NO.1, NO. 2, NO. 55 THRU NO. 60	7" X 9" X 16'-0"
6 EA.	NO. 61 THRU NO. 66	7" X 9" X 17'-0"
77 TOTAL		

PAGE 2 OF 2

	ALASKA RAILROAD CORPORATION OFFICE OF THE CHIEF ENGINEER <small>P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456</small>	
	STANDARD NO 9 TURNOUT WITH 16'-6" STRAIGHT POINTS, UNIFORM RISERS AND 16'-6" RBM FROG	
APPROVED:	DATE:	
DESIGNED BY: REH	SCALE: 1" = 6'	FILE: s12.3-04.dwg
DRAWN BY: BBF		
CHECKED BY: REH	DATE: 1/23/2004	12.3-04
APPROVED BY: TEB		



**No. 15 RIGHT HAND TURNOUT, POWER OPERATED - 115RE
LEFT HAND TURNOUT OPPOSITE**

GENERAL NOTES


ALL MEASUREMENTS GIVEN AT 5/8" BELOW TOP OF RAIL.
4 3/4" THROW AT ROD #1
ALL GAGE PLATES TO BE INSULATED.
SWITCH POINTS ARE 30'-0" ALIGNMENT. SEE TURNOUT DATA
EXTENDED LENGTHS FOR WELDING
FROG WING (TOE) RAILS EXTENDED (8'-6") FOR WELDING
FROG HEEL RAILS EXTENDED (6'-6") FOR WELDING
TURNOUT MANUFACTURER TO FURNISH ALL COMPONENTS
SHOWN IN SOLID LINES AND AS LISTED IN THE "SUPPLIER
PROVIDED MATERIALS" TABLES

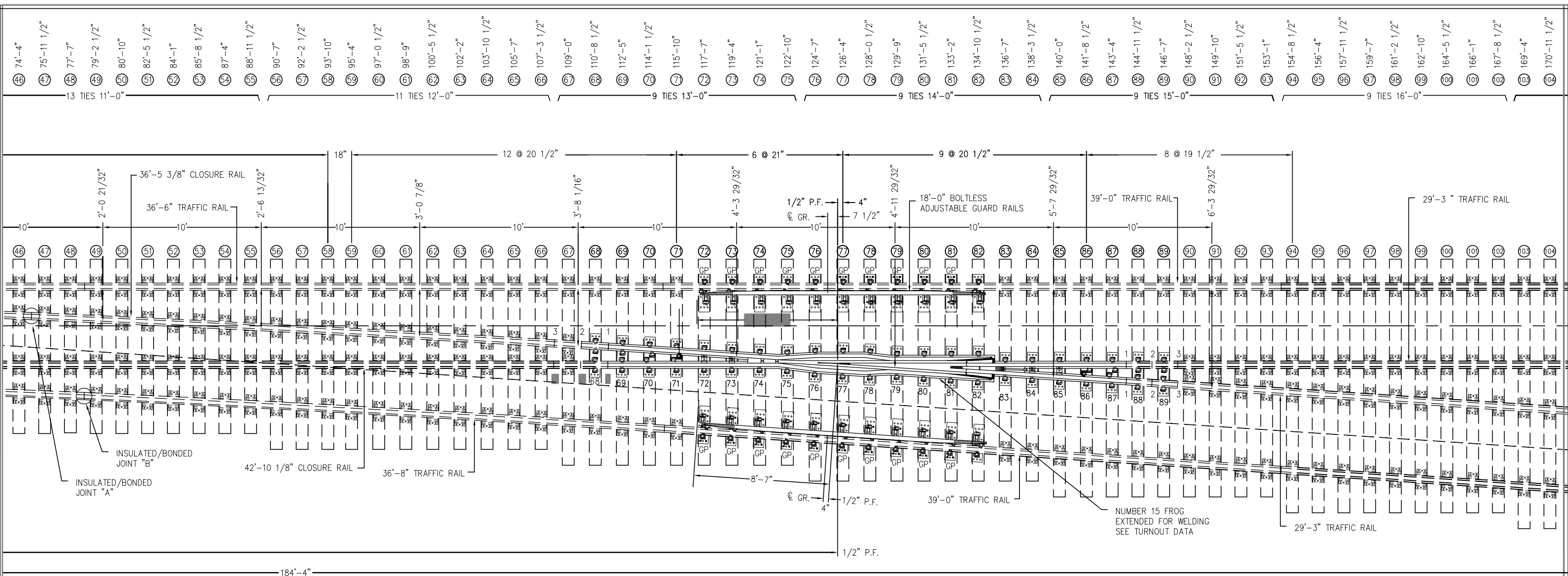
SPECIFICATIONS

ANGLE OF TURNOUT : LATERAL No. 15 3'-49'-06"
RAIL SECTION : 115RE HEAD HARDENED
FLANGEWAYS : 1 7/8" WIDE THRU-OUT
GAGE : 4'-8 1/2" BOTH RUNS THRU-OUT +/- 1/16"
JOINT DRILLING : NONE FOR CWR
FOR JOINTED RAIL, LEAVE END HOLE BLANK;
9 1/2" x 6" x Ø1 1/4" 2 7/8" A.B.

FABRICATION NOTES


- F1. ALL COMPONENTS TO BE MANUFACTURED TO MEET OR EXCEED AREMA STANDARDS.
- F2. SPECIAL TRACKWORK MATERIALS SHALL BE BUNDLED AND MARKED FOR IDENTIFICATION.
- F3. FROG BODY BOLTS SHALL BE 1 3/8" DIA. W/ NECESSARY BEVELED HEADLOCKS, TAIL WASHERS, A-325 HD. FLAT WASHERS AND HEAVY SQUARE NUTS.
- F4. SWITCH RODS ARE INSULATED VERTICAL SMJ WITH GREASE ZERK FITTING.
- F5. ALL CANTED PLATES (STANDARD TIE PLATES) TO BE INSTALLED WITH "HIGH SIDE" TOWARD FIELD.
- F6. ALL PLATES TO BE UNIFORMLY AND CLEARLY STAMPED WITH TURNOUT NO. AND SPECIALTY PLATE OR TIE NUMBER FOR FIELD IDENTIFICATION.

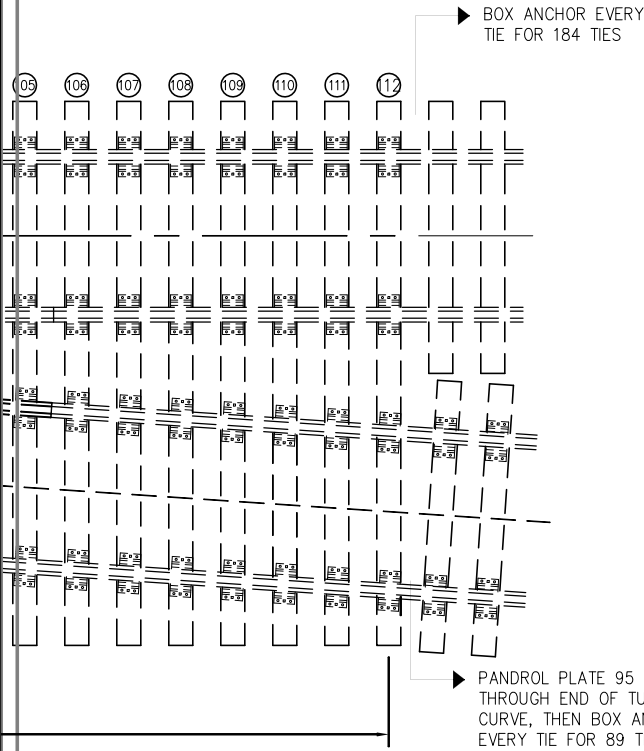
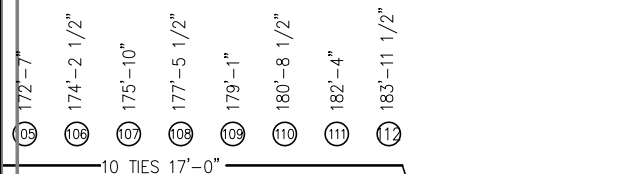
 ALASKA RAILROAD CORPORATION OFFICE OF THE CHIEF ENGINEER P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456		
STANDARD NO. 15 WELDABLE WOOD TIE TURNOUT, 115 LB. RE RAIL 30'-0" SWITCH POINTS		
APPROVED:	DATE:	
DESIGNED BY: REH	SCALE: 1" = 6'	FILE: s12.8-04.dwg
DRAWN BY: BBF		
CHECKED BY: REH	DATE: 1/23/2004	12.8-04
APPROVED BY: IEB		



**No. 15 RIGHT HAND TURNOUT, POWER OPERATED - 115RE
LEFT HAND TURNOUT OPPOSITE**

PAGE 2 OF 3

 ALASKA RAILROAD CORPORATION OFFICE OF THE CHIEF ENGINEER P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456	
STANDARD NO. 15 WELDABLE WOOD TIE TURNOUT, 115 LB. RE RAIL 30'-0" SWITCH POINTS	
APPROVED:	DATE:
DESIGNED BY: REH	SCALE: 1" = 6'
DRAWN BY: BBF	FILE: s12.8-04.dwg
CHECKED BY: REH	12.8-04
APPROVED BY: IEB	



SUPPLIER PROVIDED MATERIALS

MATERIAL LIST FOR PACKAGE TURNOUT

QTY.	ITEM No.	DESCRIPTION	DRAWING
		RIGHT HAND No. 15 POWER OPERATED TURNOUT - SHOWN	
		LEFT HAND No. 15 POWER OPERATED TURNOUT - OPPOSITE	
EACH CONSISTING OF:			
QTY.	ITEM No.	DESCRIPTION	DRAWING
FOR RIGHT HAND TURNOUT ONLY			
1 EA		LH 30'-0" (44'-7 1/2" PT.RL) CVD SAMSON SWITCH POINT	SEE TURNOUT DATA
1 EA		RH 30'-0" (44'-7 1/2" PT.RL) STR SAMSON SWITCH POINT	SEE TURNOUT DATA
1 EA		LH STRT SAMSON STOCK RAIL 43'-6" (WELDABLE)	SEE TURNOUT DATA
1 EA		RH BENT SAMSON STOCK RAIL 43'-6" (WELDABLE)	SEE TURNOUT DATA
1 EA		No. GM1R INSL MACHINE GAUGE PLATE	CTM 902824
1 EA		No. GM2R INSL MACHINE GAUGE PLATE	CTM 902824
1 EA		No. 3GR INSL GAUGE PLATE	CTM 902824
4 EA		No. HP HEEL PLATE	CTM 902824
FOR LEFT HAND TURNOUT ONLY			
1 EA		RH 30'-0" (44'-7 1/2" PT.RL) CVD SAMSON SWITCH POINT	SEE TURNOUT DATA
1 EA		LH 30'-0" (44'-7 1/2" PT.RL) STR SAMSON SWITCH POINT	SEE TURNOUT DATA
1 EA		RH STRT SAMSON STOCK RAIL 43'-9"	SEE TURNOUT DATA
1 EA		LH BENT SAMSON STOCK RAIL 43'-9"	SEE TURNOUT DATA
1 EA		No. GM1L INSL MACHINE GAUGE PLATE	CTM 902824
1 EA		No. GM2L INSL MACHINE GAUGE PLATE	CTM 902824
1 EA		No. 3GL INSL GAUGE PLATE	CTM 902824
4 EA		No. HP HEEL PLATE	CTM 902824
COMMON TO RH AND LH TURNOUTS			
QTY.	ITEM No.	DESCRIPTION	DRAWING
2 EA		WELDED SWITCH FLOATING HEEL BLOCK ASSEMBLY	CTM 98906
1 EA		No.1 SMJ SWITCH ROD, HEAD ROD WITH BASKET	CTM 931003
1 EA		No.2 SMJ SWITCH ROD, SPREAD ROD	CTM 931003
1 EA		No.3 SMJ SWITCH ROD, SPREAD ROD	CTM 931003
1 EA		No.4 SMJ SWITCH ROD, SPREAD ROD	CTM 931003
1 EA		No. OG INSL GAUGE PLT	CTM 902824
2 EA		No. SR ROLLER SLIDE PLATE	CTM 902824
2 EA		No. BR BRACE ROLLER SLIDE PLATE	CTM 902824
6 EA		No. S1 BRACE SLIDE PLATE	CTM 902824
18 EA		No. 1P SLIDE PLATE	CTM 902803
1 SET		TURNOUT PLATES - No. 20 THRU 36	CTM 902825
4 EA		SW ROLLER BEARING ASSY	
1 EA		No. 15 RBM FROG	CTM 131866
1 SET		No. 15 RBM FROG PLATE SET, PLATES 68 THRU 89	CTM 903229
258 EA		PANDROL CLIP ECL-2055	
10 EA		PANDROL CLIP ECL-2056	
384 EA		Ø15/16" x 6" SQUARE HEAD SCREW SPIKE	
6 EA		MACHINE HOLD-DOWN CLIP (HC-1) WITH SCREW SPIKE	s12.9-04
2 EA		MACHINE HOLD-DOWN CLIP (HC-2) WITH SCREW SPIKE	s12.9-04
6 EA		MACHINE HOLD-DOWN CLIP (HC-3) WITH SCREW SPIKE	s12.9-04
2 EA		MACHINE HOLD-DOWN CLIP (HC-4) WITH SCREW SPIKE	s12.9-04
1 EA		RACOR 112E HIGH STAND W/ 6'-0" CONN. ROD	ARRCP-200020
1 EA		SWITCH POINT LOCK, RACOR DESIGN NO. 3911	ARRCP-200020

ADDITIONAL MATERIALS REQUIRED

ADDITIONAL MATERIAL LIST FOR PACKAGE TURNOUT

QTY.	ITEM No.	DESCRIPTION	DRAWING
448 EA	023853	PANDROL PLATE, P26M, (4) Ø1", (2) 11/16" SQ	
1798 EA	313112	SCREW SPIKE, Ø15/16"x6" SQUARE HEAD	
896 EA		PANDROL CLIP ECL-2055	
1902 EA		RAIL ANCHORS UNIT 5	
1 PR		18'-0" BOLTLESS ADJUSTABLE LEVEL GUARD BAR W/ PLATES (U-69)	
2 EA		PORTEC 36" INSULATED JOINT BAR KIT SEE NOTE 8.	
18 EA	024156	36" STANDARD JOINT BAR SEE NOTE 7.	
8 EA		PANDROL CLIP E-2063 FOR INSULATED JOINT BAR SEE NOTE 8	
72 EA	023706	PANDROL CLIP J267 FOR JOINT BAR SEE NOTE 7.	
72 EA		ANGLE BAR BOLTS AND NUTS (Ø1 1/16" x 6") SEE NOTE 7.	
72 EA		LOCK WASHERS (FOR ANGLE BAR BOLTS) SEE NOTE 7.	
1 SET		SET OF CLOSURE & TRAFFIC RAILS (SEE BILL OF RAIL TABLE)	

BILL OF TIES (NO. 15 TURNOUT PACKAGE)		
~ MANUAL OPERATED ~		
QUANTITY	TIE NUMBER	SIZE
10 EA.	AHEAD OF TIE #0	7" X 9" X 10'-0"
41 EA.	NO. 0, NO 3 THRU NO 42	7" X 9" X 10'-0"
13 EA.	NO 43 THRU NO 55	7" X 9" X 11'-0"
11 EA.	NO. 56 THRU 66	7" X 9" X 12'-0"
9 EA.	NO. 67 THRU 75	7" X 9" X 13'-0"
9 EA.	NO. 76 THRU 84	7" X 9" X 14'-0"
9 EA.	NO. 85 THRU 93	7" X 9" X 15'-0"
11 EA.	NO 1, NO 2, NO. 94 THRU 102	7" X 9" X 16'-0"
10 EA.	NO. 103 THRU 112	7" X 9" X 17'-0"
123 TOTAL		

TURNOUT DATA					
		CWR INSTALLATION LENGTHS	1ST INSTALL	2ND INSTALL	3RD INSTALL
NUMBER 15 FROG	ANGLE=	3'-49'-06"			
	TOE LENGTH		14'-6"	16'-2 1/2"	17'-11"
	HEEL LENGTH		18'-2 1/2"	19'-10"	21'-5 1/2"
	TOTAL LENGTH		32'-8 1/2"	36'-0 1/2"	39'-4 1/2"
STOCK RAILS	AHEAD OF P.O.S.		2'-0 1/2"	3'-8"	5'-3 1/2"
	BEHIND P.O.S.		34'-11 1/2"	36'-7"	38'-2 1/2"
	TOTAL LENGTH		37'-0"	40'-3"	43'-6"
SWITCH	SWITCH POINTS		41'-4 1/2"	43'-0"	44'-7 1/2"
	ALIGNMENT=	30'-0"			
	ANGLE AT POINT=	0'-59'-41"			
	POINT THICKNESS=	0"			
	VERTEX DISTANCE=	0"			
	HEEL SPREAD=	6 1/4"			
	THROW=	4 3/4" AT No. 1 ROD			
		RISER= GRADUATED			
		GAUGE= 4'-8 1/2"			
		ACTUAL LEAD= 126'-4 1/2"			
		PS TO PI= 55'-1 1/2"			
		CLOSURE RAIL RADIUS= 1723.125'			
		CENTERLINE RADIUS= 1720.770'			
		DEGREE OF CURVE Dc= 3'-19'-48"			
		CENTRAL ANGLE Δ = 2'-49'-25"			
		TANGENT ADJACENT TO HEEL OF SWITCH= 18 23/32"			
		TANGENT ADJACENT TO TOE OF FROG= 0"			

BILL OF RAIL (FROM 6 - 80' LENGTHS)	
RAIL TYPE	LENGTH
CLOSURE RAIL	27'-8" (1)
CLOSURE RAIL	34'-2" (1)
CLOSURE RAIL	33'-0 3/8" (2)
CLOSURE RAIL	42'-10 1/8" (2)
TRAFFIC RAIL	29'-3" (3)
TRAFFIC RAIL	29'-3" (3)
TRAFFIC RAIL	36'-6" (4)
TRAFFIC RAIL	36'-8" (4)
TRAFFIC RAIL	39'-0" (5)
TRAFFIC RAIL	39'-0" (5)
TRAFFIC RAIL	39'-0" (6)
TRAFFIC RAIL	39'-0" (6)

(#) INDICATES SUGGESTED RAIL CUTTING IF JOINTED FIRST INSTALLATION

GAGE LINE OFFSETS	
DISTANCE FROM HEEL OF SWITCH	OFFSET
10'-0"	8 9/16"
20'-0"	11 17/32"
30'-0"	15 3/16"
40'-0"	19 9/16"
50'-0"	24 21/32"
60'-0"	30 13/32"
7'-0"	36 7/8"
80'-0"	44 1/16"

NOTES FOR INSTALLATION

- ALL RAIL LENGTH ARE SHOWN FOR (1ST) INSTALL JOINT LOCATIONS SEE INSTALLATION TABLE FOR CUT LENGTHS.
- PLACE CENTER LINE OF GUARD BAR ON NEAREST TIE OPPOSITE THE 1/2" POINT OF FROG.
- SEE FRA TRACK SAFETY STANDARDS FOR MAINTAINING TURNOUT COMPONENTS
- BOX ANCHOR TIES AS SHOWN AT ALL ENDS OF TURNOUT
- SWITCH STAND SHALL BE PLACED SO THAT CONNECTION ROD WILL BE IN TENSION WHEN THE SWITCH IS LINED FOR MAIN LINE.
- WHEN INSULATED JOINTS ARE REQUIRED, SPECIAL LENGTH BONDED PLUG RAILS ARE REQUIRED. THE LOCATION OF JOINTS :A: AND :B: SHOULD BE STAGGERED ALONG THE TURNOUT, AND NOT MORE THAN (4'-6") APART.
- WHEN TURNOUT IS WELDED, JOINT BARS AND ACCESSORIES WILL NOT BE USED.
- WHEN BONDED RAILS ARE USED, INSULATED JOINT BARS AND ACCESSORIES WILL NOT BE USED.
- SIGNAL DEPARTMENT TO PROVIDE ADDITIONAL INSULATED JOINTS FOR SIGNALS WHERE APPLICABLE.

No. 15 RIGHT HAND TURNOUT, POWER OPERATED - 115RE LEFT HAND TURNOUT OPPOSITE

PAGE 3 OF 3

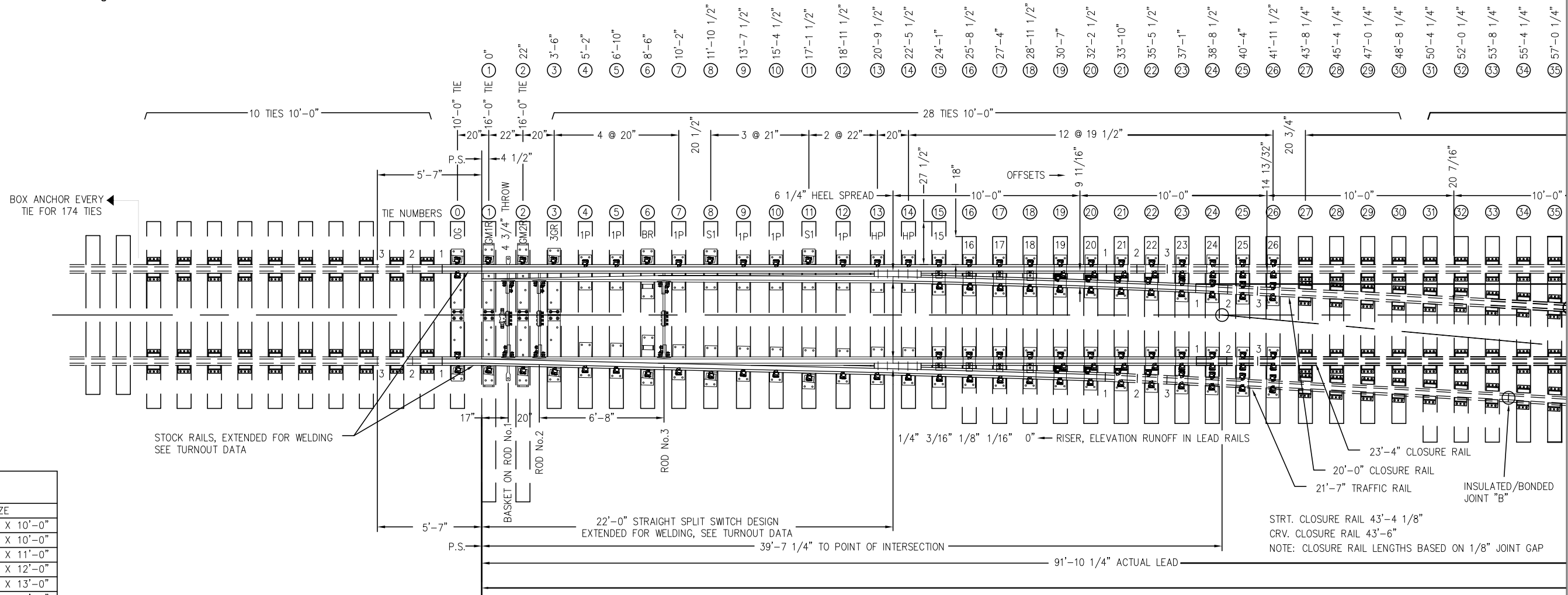
ALASKA RAILROAD CORPORATION OFFICE OF THE CHIEF ENGINEER P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456	
STANDARD NO. 15 WELDABLE WOOD TIE TURNOUT, 115 LB. RE RAIL 30'-0" SWITCH POINTS	
DESIGNED BY: REH	CHECKED BY: REH
DRAWN BY: BBF	SCALE: 1" = 6'
APPROVED BY: IEH	DATE: 1/23/2004
FILE: s12.8-04.dwg 12.8-04	

GAGE LINE OFFSETS	
DISTANCE FROM HEEL OF SWITCH	OFFSET
10'-0"	9 11/16"
20'-0"	14 13/32"
30'-0"	20 7/16"
40'-0"	27 3/4"
50'-0"	36 3/8"
60'-0"	46 9/32"

BILL OF RAIL (FROM 4 - 80' LENGTHS)	
RAIL TYPE	LENGTH
CLOSURE RAIL	20'-0" (1)
CLOSURE RAIL	20'-0" (1)
CLOSURE RAIL	23'-4" (3)
CLOSURE RAIL	23'-5 7/8" (3)
TRAFFIC RAIL	20'-0" (4)
TRAFFIC RAIL	21'-7" (4)
TRAFFIC RAIL	22'-7" (4)
TRAFFIC RAIL	28'-2 1/2" (3)
TRAFFIC RAIL	38'-0" (1)
TRAFFIC RAIL	38'-2" (2)
TRAFFIC RAIL	38'-8" (2)

(#) INDICATES SUGGESTED RAIL CUTTING IF JOINTED FIRST INSTALLATION

BILL OF TIES (NO. 11 TURNOUT PACKAGE) ~ MANUAL OPERATED ~		
QUANTITY	TIE NUMBER	SIZE
10 EA.	AHEAD OF TIE #0	7" X 9" X 10'-0"
29 EA.	NO. 0, NO 3 THRU NO 30	7" X 9" X 10'-0"
10 EA.	NO 31 THRU NO 40	7" X 9" X 11'-0"
7 EA.	NO. 41 THRU 47	7" X 9" X 12'-0"
7 EA.	NO. 48 THRU 54	7" X 9" X 13'-0"
6 EA.	NO. 55 THRU 60	7" X 9" X 14'-0"
7 EA.	NO. 61 THRU 67	7" X 9" X 15'-0"
9 EA.	NO 1, NO 2, NO. 68 THRU 74	7" X 9" X 16'-0"
7 EA.	NO. 75 THRU 81	7" X 9" X 17'-0"
92 TOTAL		



**No. 11 RIGHT HAND PACKAGE TURNOUT, POWER OPERATED - 115RE
 LEFT HAND TURNOUT OPPOSITE**

TURNOUT DATA				
CWR INSTALLATION LENGTHS		1ST INSTALL	2ND INSTALL	3RD INSTALL
NUMBER 11 FROG	ANGLE=	5'-12'-18"		
	TOE LENGTH	10'-3 1/2"	11'-11"	13'-6 1/2"
	HEEL LENGTH	14'-8 1/2"	16'-4"	17'-11 1/2"
	TOTAL LENGTH	25'-0"	28'-3"	31'-6"
STOCK RAILS	AHEAD OF P.O.S.	2'-4"	3'-11 1/2"	5'-7"
	BEHIND P.O.S.	32'-8"	34'-3 1/2"	35'-11"
	TOTAL LENGTH	35'-0"	38'-3"	41'-6"
SWITCH	SWITCH POINTS	39'-0"	40'-7 1/2"	42'-3"
	ALIGNMENT=	22'-0"		
	ANGLE AT POINT=	1'-21'-22"		
	POINT THICKNESS=	0"		
	VERTEX DISTANCE=	0"		
	HEEL SPREAD=	6 1/4"		
THROW=		4 3/4" AT No. 1 ROD		
RISER=		GRADUATED		
GAUGE=		4'-8 1/2"		
ACTUAL LEAD=		91'-10 1/4"		
PS TO PI=		39'-7 1/4"		
CLOSURE RAIL RADIUS=		929.62'		
CENTERLINE RADIUS=		927.27'		
DEGREE OF CURVE Dc=		6'-10'-56"		
CENTRAL ANGLE Δ =		3'-50'-56"		
TANGENT ADJACENT TO 1/2" PT FROG=		1 7/16"		

ADDITIONAL MATERIALS REQUIRED


ADDITIONAL MATERIAL LIST FOR PACKAGE TURNOUT

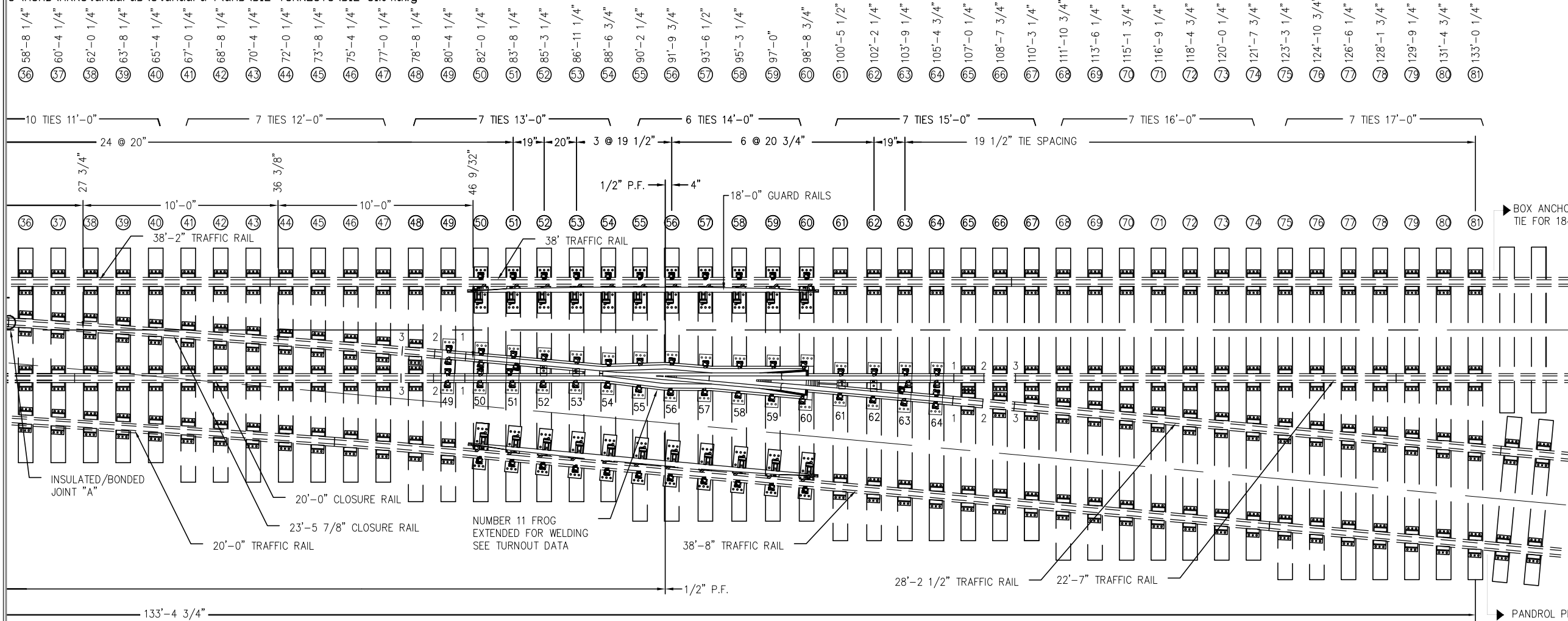
QTY.	ITEM No.	DESCRIPTION	DRAWING
336 EA.	023853	PANDROL PLATE, P26M, (4) #1", (2) 11/16" SQ	
1460 EA.	313112	SCREW SPIKE, #15/16"x6" SQUARE HEAD	
672 EA.		PANDROL CLIP ECL-2055	
1868 EA.		RAIL ANCHORS UNIT 5	
1 PR.		18'-0" BOLTLESS ADJUSTABLE LEVEL GUARD BAR W/ PLATES (U-69)	
2 PR.		PORTEC 36" INSULATED JOINT BAR KIT SEE NOTE 8.	
17 PR.	Q24156	36" STANDARD JOINT BAR SEE NOTE 7.	
8 EA.		PANDROL CLIP E-2063 FOR INSULATED JOINT BAR SEE NOTE 8	
68 EA.	Q23706	PANDROL CLIP J267 FOR JOINT BAR SEE NOTE 7.	
68 EA.		ANGLE BAR BOLTS AND NUTS (#1 1/16" x 6") SEE NOTE 7.	
68 EA.		LOCK WASHERS (FOR ANGLE BAR BOLTS) SEE NOTE 7.	
1 SET		SET OF CLOSURE & TRAFFIC RAILS (SEE BILL OF RAIL TABLE)	

NOTES FOR INSTALLATION

- ALL RAIL LENGTH ARE SHOWN FOR (1ST) INSTALL JOINT LOCATIONS SEE INSTALLATION TABLE FOR CUT LENGTHS.
- PLACE CENTER LINE OF GUARD BAR ON NEAREST TIE OPPOSITE THE 1/2" POINT OF FROG.
- SEE FRA TRACK SAFETY STANDARDS FOR MAINTAINING TURNOUT COMPONENTS
- BOX ANCHOR TIES AS SHOWN AT ALL ENDS OF TURNOUT
- SWITCH STAND SHALL BE PLACED SO THAT CONNECTION ROD WILL BE IN TENSION WHEN THE SWITCH IS LINED FOR MAIN LINE.
- WHEN INSULATED JOINTS ARE REQUIRED, SPECIAL LENGTH BONDED PLUG RAILS ARE REQUIRED. THE LOCATION OF JOINTS "A" AND "B" SHOULD BE STAGGERED ALONG THE TURNOUT, AND NOT MORE THAN (4'-6") APART.
- WHEN TURNOUT IS WELDED, JOINT BARS AND ACCESSORIES WILL NOT BE USED.
- WHEN BONDED RAILS ARE USED, INSULATED JOINT BARS AND ACCESSORIES WILL NOT BE USED.
- SIGNAL DEPARTMENT TO PROVIDE ADDITIONAL INSULATED JOINTS FOR SIGNALS WHERE APPLICABLE.

PAGE 1 OF 2

 ALASKA RAILROAD CORPORATION OFFICE OF THE CHIEF ENGINEER P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456		
STANDARD NO. 11 WELDABLE WOOD TIE TURNOUT, 115 LB RE RAIL 22'-0" SWITCH POINTS		
DESIGNED BY: REH	CHECKED BY: BBF	SCALE: 1" = 6'
DRAWN BY: REH	APPROVED BY: TEB	DATE: 1/23/2004
FILE: s12.51-04.dwg		12.51-04



FABRICATION NOTES

- F1. ALL COMPONENTS TO BE MANUFACTURED TO MEET OR EXCEED AREMA STANDARDS.
- F2. SPECIAL TRACKWORK MATERIALS SHALL BE BUNDLED AND MARKED FOR IDENTIFICATION.
- F3. FROG BODY BOLTS SHALL BE 1 3/8" DIA. W/ NECESSARY BEVELED HEADLOCKS, TAIL WASHERS, A-325 HD. FLAT WASHERS AND HEAVY SQUARE NUTS.
- F4. SWITCH RODS ARE INSULATED VERTICAL SMJ WITH GREASE ZERK FITTING.
- F5. ALL CANTED PLATES (STANDARD TIE PLATES) TO BE INSTALLED WITH "HIGH SIDE" TOWARD FIELD.
- F6. ALL PLATES TO BE UNIFORMLY AND CLEARLY STAMPED WITH TURNOUT NO. AND SPECIALTY PLATE OR TIE NUMBER FOR FIELD IDENTIFICATION.

**No. 11 RIGHT HAND PACKAGE TURNOUT, POWER OPERATED - 115RE
 LEFT HAND TURNOUT OPPOSITE**

SUPPLIER PROVIDED MATERIALS

MATERIAL LIST FOR PACKAGE TURNOUT

QTY.	ITEM No.	DESCRIPTION	DRAWING
		RIGHT HAND No. 11 POWER OPERATED TURNOUT - SHOWN	
		LEFT HAND No. 11 POWER OPERATED TURNOUT - OPPOSITE	
EACH CONSISTING OF:			
QTY.	ITEM No.	DESCRIPTION	DRAWING
FOR RIGHT HAND TURNOUT ONLY			
1 EA		LH 22'-0" (41'-6" PT.RL) STRAIGHT SAMSON SWITCH POINT	SEE TURNOUT DATA
1 EA		RH 22'-0" (41'-6" PT.RL) CURVED SAMSON SWITCH POINT	SEE TURNOUT DATA
1 EA		LH STRT SAMSON STOCK RAIL 42'-3" (WELDABLE)	SEE TURNOUT DATA
1 EA		RH BENT SAMSON STOCK RAIL 42'-3" (WELDABLE)	SEE TURNOUT DATA
1 EA		No. GM1R INSL MACHINE GAUGE PLATE	CTM 902803
1 EA		No. GM2R INSL MACHINE GAUGE PLATE	CTM 902803
1 EA		No. 3GR INSL GAUGE PLATE	CTM 902803
4 EA		No. HP HEEL PLATE	CTM 902803
FOR LEFT HAND TURNOUT ONLY			
1 EA		RH 22'-0" (41'-6" PT.RL) STRAIGHT SAMSON SWITCH POINT	SEE TURNOUT DATA
1 EA		LH 22'-0" (41'-6" PT.RL) CURVED SAMSON SWITCH POINT	SEE TURNOUT DATA
1 EA		RH STRT SAMSON STOCK RAIL 42'-3" (WELDABLE)	SEE TURNOUT DATA
1 EA		LH BENT SAMSON STOCK RAIL 42'-3" (WELDABLE)	SEE TURNOUT DATA
1 EA		No. GM1L INSL MACHINE GAUGE PLATE	CTM 902803
1 EA		No. GM2L INSL MACHINE GAUGE PLATE	CTM 902803
1 EA		No. 3GL INSL GAUGE PLATE	CTM 902803
4 EA		No. HP HEEL PLATE	CTM 902803

SUPPLIER PROVIDED MATERIALS CONTINUED

COMMON TO RH AND LH TURNOUTS

QTY.	ITEM No.	DESCRIPTION	DRAWING
2 EA		WELDED SWITCH FLOATING HEEL BLOCK ASSEMBLY	CTM 98903
1 EA		No.1 SMJ SWITCH ROD, HEAD ROD WITH BASKET	CTM 931004
1 EA		No.2 SMJ SWITCH ROD, SPREAD ROD	CTM 931004
1 EA		No.3 SMJ SWITCH ROD, SPREAD ROD	CTM 931004
1 EA		No. OG INSL GAUGE PLT	CTM 902803
12 EA		No. 1P SW SLIDE PLT	CTM 902803
2 EA		No. BR BRACE ROLLER RISER PLATE	CTM 902803
4 EA		No. S1 BRACE SLIDE PLATE	CTM 902803
1 SET		TURNOUT PLATES - No. 15 THRU 26	ARRC 902808
2 EA		SW ROLLER BEARING ASSY	
1 EA		AREMA No. 11 RBM FROG, EXTENDED FOR WELDING AS SHOWN	
1 SET		FROG PLATES - NO. 49 THRU 64	ARRC 903229
192 EA		PANDROL CLIP ECL-2055	
6 EA		PANDROL CLIP ECL-2056	
280 EA		15/16" x 6" SQUARE HEAD SCREW SPIKE	
4 EA		MACHINE HOLD-DOWN CLIP (HC-1) WITH SCREW SPIKE	s12.9-04
4 EA		MACHINE HOLD-DOWN CLIP (HC-2) WITH SCREW SPIKE	s12.9-04
3 EA		MACHINE HOLD-DOWN CLIP (HC-3) WITH SCREW SPIKE	s12.9-04
1 EA		MACHINE HOLD-DOWN CLIP (HC-4) WITH SCREW SPIKE	s12.9-04
1 EA		RACOR 112E HIGH STAND W/ 6'-0" CONN. ROD	ARRC P-200020
1 EA		SWITCH POINT LOCK, RACOR DESIGN NO. 3911	ARRC P-200020


GENERAL NOTES

- ALL MEASUREMENTS GIVEN AT 5/8" BELOW TOP OF RAIL.
 4 3/4" THROW AT ROD #1
 ALL GAGE PLATES TO BE INSULATED.
 SWITCH POINTS ARE 22'-0" ALIGNMENT. SEE TURNOUT DATA
 EXTENDED LENGTHS FOR WELDING
 FROG WING RAILS TO BE EXTENDED (4'-10 1/2") FOR WELDING
 FROG HEEL RAILS TO BE EXTENDED (4'-10") FOR WELDING
 TURNOUT MANUFACTURER TO FURNISH ALL COMPONENTS
 SHOWN IN SOLID LINES AND AS LISTED IN THE "SUPPLIER
 PROVIDED MATERIALS" TABLES

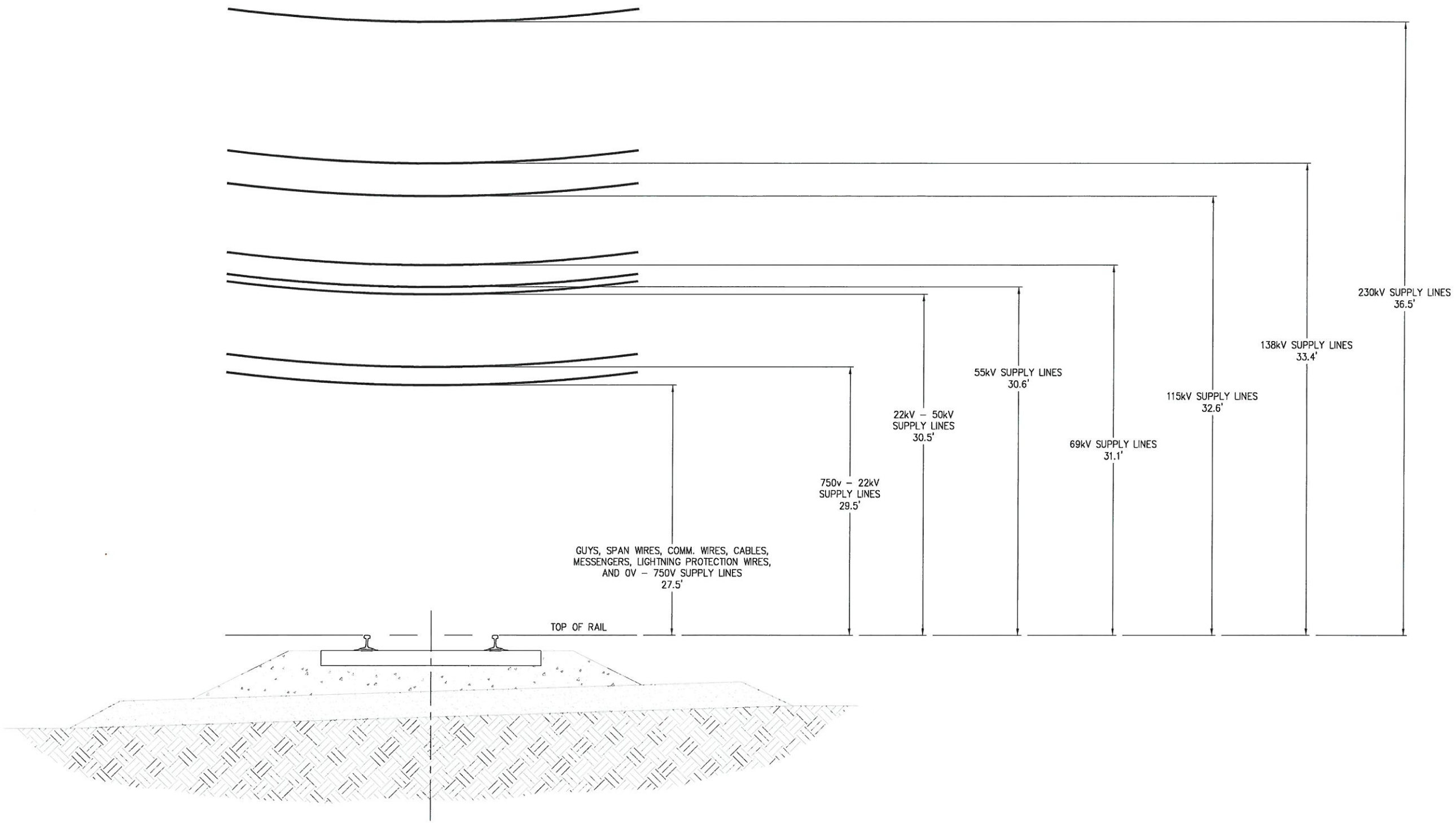
SPECIFICATIONS

- ANGLE OF TURNOUT : LATERAL No. 11 5'-12'-18"
 RAIL SECTION : 115RE HEAD HARDENED
 FLANGEWAYS : 1 7/8" WIDE THRU-OUT
 GAGE : 4'-8 1/2" BOTH RUNS THRU-OUT +/- 1/16"
 JOINT DRILLING : NONE FOR CWR
 FOR JOINTED RAIL, LEAVE END HOLE BLANK;
 9 1/2" x 6" x Ø1 1/4" 2 7/8" A.B.

PAGE 2 OF 2

 ALASKA RAILROAD CORPORATION OFFICE OF THE CHIEF ENGINEER P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456		
STANDARD NO. 11 WELDABLE WOOD TIE TURNOUT, 115 LB RE RAIL 22'-0" SWITCH POINTS		
APPROVED:	DATE:	
DESIGNED BY: REH	CHECKED BY: BBF	SCALE: 1' = 6'
CHECKED BY: REH	APPROVED BY: TEB	DATE: 1/23/2004
		12.51-04

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750C-Half.ctb



OVERHEAD WIRE CLEARANCE

O/H LINE CLEARANCES		
VOLTAGE	PRE 2006 STANDARD	CURRENT STANDARD
0-750V	27.5'	27.5'
750-15kV	28.0'	29.5'
15-50kV	30.0'	30.5'
55kV	30.2'	30.6'
69kV	30.8'	31.1'
115kV	32.7'	32.6'
138kV	33.6'	33.4'
230kV	37.5'	36.5'

NOTE:
 1. OVERHEAD WIRE CLEARANCES WERE UPDATED IN 2006 TO REFLECT NATIONAL ELECTRICAL SAFETY CODE (NEC), 2002 EDITION, SECTION 232.
 2. NEC ASSUMES A MAXIMUM 20' RAILCAR/LOAD HEIGHT. THE ALASKA RAILROAD MAXIMUM CAR/LOAD HEIGHT IS 23'. TO MITIGATE THE DIFFERENCE, 3' WAS ADDED TO ALL NEC CLEARANCE REQUIREMENTS.

ALASKA RAILROAD CORPORATION
 OFFICE OF THE CHIEF ENGINEER
 P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500 (907) 265-2456

STANDARD
OVERHEAD WIRE CLEARANCE DIAGRAM

APPROVED: *J. Brooks* DATE: 10/22/12
 DESIGNED BY: _____
 DRAWN BY: rsm SCALE: NOT TO SCALE
 CHECKED BY: RJT FILE: s90.21a-07
 APPROVED BY: JEB DATE: 10/22/12 **90.21a-07**

Technical Standards for Roadway, Trail, and Utility Facilities

APPENDIX C: STANDARD SPECIFICATIONS FOR WORK ON RAILROAD PROPERTY



Standard Specifications for Work on Railroad Property

- Section 1. Definition of Terms
- Section 2. General Requirements
- Section 3. Safety Requirements
- Section 4. Insurance Requirements
- Section 5. Notice
- Section 6. Flag Protection and Protection of ARRC Traffic
- Section 7. Train Delays
- Section 8. Protection of ARRC Communication Lines
- Section 9. Road Crossings
- Section 10. Power and Communication Lines
- Section 11. Underground Utilities
- Section 12. Open Trenching
- Section 13. Excavations
- Section 14. ARRC Inspectors
- Section 15. Use of Explosives
- Section 16. Snow Removal
- Section 17. Clean-up
- Section 18. Indemnity

SECTION 1. DEFINITION OF TERMS

<u>ARRC</u>	Alaska Railroad Corporation, P.O. Box 107500, Anchorage, AK 99510-7500.
<u>ARRC Property</u>	all lands owned or withdrawn for the use of the ARRC, including the ARRC's track right-of-way and communications pole line right-of-way.
<u>Chief Engineer</u>	the person employed by the ARRC as head of its Engineering Department or Branch, or his/her authorized representative.
<u>Contractor</u>	any agent of the Permittee, including Contractors or subcontractors employed to construct, reconstruct, operate and/or maintain the Facility. The term "Contractor" shall be synonymous with the term "Permittee" when the Permittee performs the construction, reconstruction, operation and/or maintenance of the Facility with its own personnel.
<u>Director, Real Estate</u>	the person authorized by the ARRC to execute contractual real estate agreements on behalf of the ARRC.
<u>Facility</u>	any improvements owned by the Permittee/Contractor which are to be placed on ARRC property in accordance with written permission executed by ARRC and Permittee.
<u>Telecommunications Supervisor</u>	the person employed by the ARRC as head of its Signals and Telecommunications Department or Branch, or his/her authorized representative.
<u>Permittee/Contractor</u>	the person, company or governmental agency to whom the right to enter upon ARRC Property was given in the form of written permit, easement or contract executed by the ARRC and Permittee/Contractor.
<u>Track Work</u>	all work on the line from the top of subgrade to the top of rail, including geotextile, when required.
<u>Track Materials</u>	all hardware, excluding signals and controllers, associated with the running of a railroad.

SECTION 2. GENERAL REQUIREMENTS

- 2.1 All construction, reconstruction, operation, and maintenance on ARRC Property shall be performed in compliance with these Standard Specifications for Work on Railroad Property, including all revisions thereto.
- 2.2 Failure to comply with these Standard Specifications for Work on Railroad Property shall result in the demand of ARRC to suspend all work on ARRC Property.
- 2.3 All work on or about ARRC Property shall be performed by experienced personnel in a safe and workmanlike manner in keeping with approved ARRC practices, and as specified herein. ARRC traffic and property shall be protected at all times.
- 2.4 The safety and continuity of the operation of the traffic of ARRC shall be of first importance and shall be at all times protected and safeguarded. The Permittee/Contractor and its subcontractors shall be required to perform and arrange their work accordingly. Whenever, in the opinion of the Chief Engineer or his or her representatives, the work or its performance may affect or involve the safety of ARRC's facilities and/or operation of its railroad, the method of doing such work shall first be submitted by the Permittee/Contractor to the Chief Engineer for his/her approval, without which it shall not be commenced or prosecuted. The approval of the Chief Engineer, when given, shall not be considered as a release from responsibility or liability for any damage which ARRC may suffer, or for which it may be liable, as a result of the acts or omissions of the Permittee/Contractor, its subcontractors or employees.
- 2.5 Whenever, in the opinion of the Chief Engineer, the construction may cause a hazard to the safe operation of ARRC, ARRC may, in its discretion, place at the site of the work the required number of qualified employees to protect its operations. The providing of such employees and such other precautions as may be taken shall not relieve the Permittee/Contractor and its subcontractors from liability for the payment of damages caused by their operations. ARRC shall be the sole judge of the necessity for, and as to the number and classification of employees required. The Permittee/Contractor shall reimburse ARRC for the cost and expense incurred in providing such employees.

SECTION 3. SAFETY REQUIREMENTS

- 3.1 The safety of personnel, property, rail operations, and the public is of paramount importance in the prosecution of any work on ARRC Property. The Permittee/Contractor shall comply with all Federal, State and local governmental regulations (e.g. OSHA, NESC, etc.) applicable to the construction, installation, or maintenance of any Facility. As reinforcement and in furtherance of overall safety measures to be observed by Permittee/Contractor (and not by way of limitation), the following special safety rules shall be followed while working on ARRC Property. Further railroad safety information may be obtained from the ARRC Safety Office at 907-265-2440. Safety information is also available on the ARRC website at www.akrr.com.

- 3.2 ARRC flag protection is required before any activity can occur on or near a railroad operating facility such as a track, yard, bridge or shop building. For incidental work, such as surveying or inspection, an ARRC furnished flagman will provide a safety briefing prior to the commencement of the work. For any activity involving a disturbance or potential disturbance to the track, track embankment, or any railroad facility, ARRC may require the Permittee/Contractor to submit a specific Railroad Safety Plan prior to startup. Projects which involve activities which cross the tracks or are longitudinal to the tracks will require a specific Railroad Safety Plan and a one hour ARRC provided training course for Permittee/Contractor's project supervisors prior to the initiation of work on ARRC Property. Specific information on Railroad Safety Plans may be obtained from the ARRC Safety Office at 907-265-2440.
- 3.3 The Permittee/Contractor shall arrange for ARRC flag protection when performing any work within 20 feet of any track. All work within 20 feet of the track shall cease when a train passes and all Permittee/Contractor employees shall maintain a distance of at least 20 feet from the track until the train has safely passed. In addition, any work that could come within 20 feet of the track will cease when a train passes. For example, crane or pile driving activities shall stop when trains pass when the maximum boom and suspended load radius can come within 20 feet of the tracks. Pile driving shall not be done when trains are passing the work site. Vehicles and other construction equipment shall not be operated or parked closer than 20 feet from any track without ARRC flag protection.
- 3.4 In the event Permittee/Contractor will be performing construction or other activities on or in close proximity to a railroad track, the Permittee/Contractor shall be responsible for compliance with applicable Federal Railroad Administration's Roadway Worker Protection ("RWP") regulations (49 CFR 214, Subpart C) if its employees qualify as "Roadway Workers"¹. Under 49 CFR 214, Subpart C, railroad contractors are responsible for the training of their employees on these regulations. All RWP related Work shall be conducted in strict compliance with the RWP safety standards set forth in 49 CFR 214, Subpart C and the Permittee/Contractor will be required to submit a Railroad Safety Plan to ARRC to demonstrate compliance with said safety standards prior to beginning any RWP related Work.
- 3.5 In the event Permittee/Contractor will be performing construction or other activities on a railroad bridge, the provisions of 49 CFR 214 regarding bridge worker safety shall apply. All bridge related work shall be conducted in strict compliance with the bridge worker safety standards set forth in 49 CFR 214 and the Permittee/Contractor will be required to submit a Railroad Safety Plan to ARRC to demonstrate compliance with said safety standards prior to beginning any bridge related work.

¹ A Roadway Worker is any employee of a railroad, or of a contractor to a railroad, whose duties include inspection, construction, maintenance, or repair of railroad track, bridges, roadway, signal and communication systems, electric traction systems, roadway facilities, or roadway machinery on or near track or with the potential of fouling a track.

SECTION 4. INSURANCE REQUIREMENTS

- 4.1 The Permittee/Contractor shall procure and maintain at all times while performing work on ARRC Property, and be covered by the types of insurance with the minimum limits as specified in Section 4.4.
- 4.2 Each policy specified in Section 4.4 shall be: (1) endorsed to include ARRC as an additional insured with respect to the performance of the work; (2) endorsed whereby the insurance company will notify ARRC of any material change, cancellation, non-renewal or expiration of the insurance policy in writing not less than thirty (30) days prior to the effective date; (3) endorsed with a waiver of subrogation rights in favor of ARRC; and (4) endorsed with the Alaska Suit Endorsement.
- 4.3 Prior to commencement of any work on ARRC Property, the Permittee/Contractor, shall deliver to ARRC certificate(s) of insurance showing evidence of the insurance required in Section 4.4.
- 4.4 Alaska Railroad Corporation Minimum Insurance Requirements.
 - a. Commercial General Liability insurance with limits not less than \$5,000,000 per occurrence and \$10,000,000 aggregate for Bodily Injury and Property Damage, including coverage for Premises and Operations Liability, Products and Completed Operations Liability, Contractual Liability, and Broad Form Property Damage Liability. Coverage shall not contain any exclusions for Explosion, Collapse, Underground, Rail Operations, or Work on Railroad Property.
 - b. Automobile Liability insurance on all owned, non-owned, hired and rented vehicles with limits of liability of not less than \$1,000,000 Combined Single Limit for Bodily Injury and Property Damage per each accident or loss.
 - c. Worker's Compensation insurance in accordance with the statutory coverages required by the State of Alaska and, where applicable, insurance in compliance with any other statutory obligations, whether State or Federal, pertaining to the compensation of injured employees assigned to the Work, including but not limited to Voluntary Compensation, Federal Longshoremen and Harbor Workers Act, and the Federal Employers Liability Act.
 - d. If any part of the work to be performed on ARRC Property is located within one hundred feet (100') of a railroad track, then the Permittee/Contractor shall also obtain Railroad Protective Liability insurance (Alaska Railroad Corporation as named insured) with limits of liability of not less than \$5,000,000 Combined Single Limit for Bodily Injury and Property Damage per each accident or loss.

SECTION 5. NOTICE

- 5.1 A pre-construction meeting shall be held with ARRC's Chief Engineer and representatives of the Permittee/Contractor and subcontractors prior to the

commencement of any work on ARRC Property by the Permittee/Contractor or its subcontractors.

- 5.2 The Permittee/Contractor shall give written notice to the Chief Engineer not less than ten (10) days in advance of the commencement of any construction, reconstruction or major maintenance activity on ARRC Property, in order that the necessary arrangements may be made for the protection of ARRC's operations. This notice shall include a description of the proposed work on ARRC Property, schedule of work, and the names of any Permittee/Contractor's subcontractor who may also be working on ARRC Property.

SECTION 6. FLAG PROTECTION AND PROTECTION OF ARRC TRAFFIC

- 6.1 Whenever ARRC flag protection is required, it will be provided by ARRC at Permittee/Contractor's expense. ARRC flag protection is to insure the safe movement of trains and other rail traffic and shall be done in strict accordance with the ARRC rules on flagging. All flag protection must be scheduled prior to any work commencing within the ARRC right-of-way.
- 6.2 ARRC will, during the progress of the work, utilize as many qualified flag people as in the opinion of the ARRC may be required for the adequate protection of ARRC traffic. All expense for providing such flagpersons shall be paid by the Permittee/Contractor to ARRC.
- 6.3 The Permittee/Contractor shall arrange with ARRC to keep itself informed on the time of arrival of all trains and shall stop any of Permittee/Contractor's operations which might be or cause a hazard to the safe passage of the train past the site of the work from ten (10) minutes before the expected arrival of the train until it has safely passed.
- 6.4 Track outages will only be approved in exceptional cases for limited durations. Prior to a proposed track outage, the Permittee/Contractor shall submit a closure plan to ARRC. The plan will describe the work to be accomplished, the equipment, manpower and other resources required, and the work schedule. Once approved by ARRC, the Permittee/Contractor shall follow the plan. ARRC reserves the right to assume control of the work to reestablish rail service if the schedule is not met. Permittee/Contractor shall bear all costs and damages which may result from failure to meet the closure schedule, in addition to the train delay charges provided for herein.

SECTION 7. TRAIN DELAYS

- 7.1 All work on ARRC Property shall be conducted in such a manner as to prevent delays to trains or other rail traffic operated by ARRC.
- 7.2 Should any of the Permittee/Contractor's or its subcontractor's actions or activities cause delays to trains or other rail or water traffic, the agreed amount of liquidated damages shall be at the following rates and shall be collected from the Permittee/Contractor by ARRC.

Passenger trains each: \$50 per minute of delay, 60-minute minimum charge.

All other rail traffic:	50 per minute for each delay over five minutes, 30-minute minimum charge.
Rail barges, or other	No charge for delays of one hour or less; \$1,000 per hour
Connecting Carrier Vessels:	for each hour or any part of an hour thereafter with a minimum charge of \$6,000.

- 7.3 Delay time will be taken from the train sheet in ARRC's Dispatcher's Office, Anchorage (907-265-2504) for all delays and such train sheet shall be the official document by which the length of time a train is delayed will be determined. If another crew is needed to relieve the original crew, the charge shall also apply to the second crew. If such delay causes a water carrier to miss a sailing, the liquidated damage computation of time covering the period of time to the next possible sailing time shall be in addition to the length of time determined by said train sheet.

SECTION 8. PROTECTION OF COMMUNICATION LINES & FIBER OPTIC CABLE

- 8.1 All work on ARRC Property shall be conducted in such a manner as to protect ARRC's communication facilities at all times from outages resulting directly or indirectly from the Permittee/Contractor's or its subcontractor's operations.
- 8.2 Should any of the Permittee/Contractor or its subcontractor's operations cause outages to said communications facilities, the agreed amount of liquidated damages shall be at the following rates and shall be collected from the Permittee/Contractor:
- | | |
|-----------------------------------|-------------------------------|
| Open wire communication circuits: | \$1.00 per minute per circuit |
| Communication cable: | \$1.00 per minute per cable |
- 8.3 A minimum charge of \$250.00 will be made for each outage plus the total repair costs. The outage time shall be that as established by ARRC's Test Board, Anchorage.
- 8.4 There shall be no equipment operated or excavation made within fifteen (15) feet of any ARRC communication pole guy, anchor, or other communications apparatus unless authorized in advance by the Telecommunications Supervisor.
- 8.5 Fiber optic cable systems are buried on ARRC's ROW Property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. Contractor shall telephone the telecommunications company(ies) involved, arrange for a cable locator, and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on ARRC's Property.

SECTION 9. ROAD CROSSINGS

- 9.1 Whenever automatic railroad crossing signals are in the work area, these signals must remain in operating condition at all times. If, as a result of the Permittee/Contractor's or subcontractor's activities the signals become

inoperable, the crossing shall be continuously flag protected until the signals are again operable. See Section 6 for flagging specifications.

- 9.2 When regular railroad crossings are used as haul routes inside or outside the work area, flagpersons shall be provided by the Permittee/Contractor for said crossings in all situations at the discretion of the ARRC.
- 9.3 Temporary road crossings may be installed provided the Permittee/Contractor has acquired from ARRC a temporary road crossing permit for said crossing. If the crossing is not shown on the project plans as approved by ARRC, then it will be at ARRC's sole discretion whether to allow a later-requested crossing.
- 9.4 The temporary road crossing shall be constructed to the length and the standards specified in the temporary road crossing permit. All protective signs required by ARRC shall be provided and properly maintained by the Permittee/Contractor. The temporary road crossing shall be installed under ARRC flag protection in accordance with Section 6 of these specifications.
- 9.5 The flange ways of all road crossings used by the Permittee/Contractor or its subcontractor as haul routes or temporary road crossings shall be kept clean and free of gravel at all times and shall otherwise be maintained to the satisfaction of the Chief Engineer.
- 9.6 When a temporary road crossing is in use, ARRC flag protection shall be provided at all times. See Section 6 for specifications.
- 9.7 When a temporary or private road crossing is not in use, the Permittee/Contractor shall provide suitable barricades (gates with padlocks, posts driven into the ground, etc.) to prevent vehicular access to the crossing.
- 9.8 When not in use during the winter season, the temporary road crossing shall be removed. Upon completion of the work or termination of the crossing permit, the temporary crossing shall be removed and the area restored to its original condition.
- 9.9 The Permittee/Contractor agrees that all others using the private road crossing, except ARRC and its employees, shall be considered agents of the Permittee/Contractor.
- 9.10 Sight Triangles at road crossings shall be maintained by Permittee/Contractor free of vegetation and other obstructions to vision in accordance with the table entitled "Sight Triangle Distance" attached and as otherwise established and revised from time to time by ARRC.
- 9.11 Temporary public road crossings must be included in a traffic control plan submitted by the Permittee/Contractor to Alaska Department of Transportation (ADOT) for review and approval prior to constructing the crossing.

SECTION 10. POWER AND COMMUNICATION LINES

- 10.1 All power and communication lines shall be designed and constructed in accordance with the current edition of the National Electric Safety Code (NESC).

- 10.2 Underground power and communication lines shall be installed in accordance with Section 11 of these specifications. Whenever an underground power or communication line crosses underneath a track, a casing pipe shall be installed for carrying such lines.
- 10.3 The minimum clearance above the top of rail of ARRC track shall be in accordance with the handbook referenced in Section 11.1, plus six (6) inches to allow for future grade raises.
- 10.4 The minimum clearance above ARRC communication lines shall be in accordance with the handbook referenced in Section 11.1.
- 10.5 Additional lines may not be added, or the characteristics of the line(s) changed without the prior written approval of ARRC's Director, Real Estate or Chief Engineer.
- 10.6 Wires shall be strung across ARRC tracks only when ARRC flag protection is provided in accordance with Section 6 of these specifications.
- 10.7 No wires shall be strung across ARRC's communications lines without first receiving prior written approval from ARRC's Telecommunication Supervisor, and such work must be accomplished only at a time and in a manner prescribed by said Telecommunication Supervisor.

SECTION 11. UNDERGROUND UTILITIES

- 11.1 All underground utilities, including culverts, pipelines, and underground power and communication lines, on ARRC Property shall conform to the current American Railway Engineering and Maintenance-of-way Association (AREMA) Manual for Railway Engineering.
- 11.2 Unless another method is authorized in advance and in writing by the Chief Engineer, all underground utilities shall be installed under tracks and roads by boring, jacking or tunneling.
- 11.3 Boring, jacking or tunneling shall be done under ARRC tracks only when ARRC flag protection is provided in accordance with Section 6 of these specifications.
- 11.4 The proposed plan for boring, jacking or tunneling shall be approved by the Chief Engineer prior to commencing the operation.
- 11.5 All boring, jacking or tunneling headings shall be continuously protected against any loss of ground material by shoring and/or cribbing as necessary.

SECTION 12. OPEN TRENCHING

- 12.1 Only when authorized in advance and in writing by ARRC shall any portion of the track be removed to allow trenching for installation of the Facility.
- 12.2 If allowed to open trench, the track may be removed from service only at the time authorized by the Chief Engineer and shall be restored to service within the time period specified by the Chief Engineer. Should the track not be restored to service within the time period specified, the agreed amount of liquidated damages shall be at the rate specified in the written authorization allowing the

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open trenching or the liquidated damages in accordance with Section 7 of these specifications, whichever is greater, and shall be collected from the Permittee/Contractor.

- 12.3 All track work shall be accomplished by qualified track persons.
- 12.4 Only that portion of the track structure necessary to excavate, stockpile and install the Facility shall be removed. All track material removed shall be handled, stockpiled and relayed in a manner to avoid damage. Any material which may be damaged shall be replaced by the Permittee/Contractor at its own expense.
- 12.5 The backfill of the trench under the track and in the road bed prism shall be of the same type of material as taken out, except the top 2 feet shall be clean pit run gravel. Backfilling and compaction shall be in one-foot lifts with a compaction of 95% of maximum density in the area affecting the roadbed prism.
- 12.6 The ballast used in replacing the track shall be equal in depth and quality as that which was removed. The track shall be relayed and brought to original grade in accordance with standard ARRC practices. The track shall be resurfaced as often as necessary for a period of 12 months after completion of construction to remove any settlement that may have occurred.

SECTION 13. EXCAVATIONS

- 13.1 Unless authorized in advance and in writing by ARRC, the top of any excavation shall not be within 20 feet of the centerline of any track; nor shall any excavation exceed ten (10) feet in depth regardless of its proximity to track.
- 13.2 No water shall be allowed to stand in open excavations in the track area.
- 13.3 Bridging and shoring shall be adequate to safely carry ARRC traffic and the decision of the Chief Engineer pertaining to same shall be final.
- 13.4 All open excavations shall be continuously protected by flags, flares, barricades or watchpersons, as directed by ARRC.
- 13.5 No excavation shall be left open more than three days, unless authorized by the Chief Engineer.
- 13.6 ARRC embankments and cut slopes shall not be disturbed any more than necessary to accommodate the construction and shall be left in a stabilized condition.
- 13.7 ARRC ditches, culverts and roadways shall be kept clean and free of rock, gravel, construction debris and equipment at all times.

SECTION 14. ARRC INSPECTIONS

- 14.1 ARRC may furnish an inspector during the periods of construction on ARRC Property. The ARRC inspector will inspect the removal and replacement of tracks, excavation, backfill, necessary bridging for tracks, shoring, flagging, lighting, clearances, etc., when necessary. The ARRC inspector will work directly with the representative of the Permittee /Contractor and the decision of the ARRC inspector in matters pertaining to ARRC operations and safety shall be

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final. In the event more than one shift is worked, an ARRC inspector will be required for each shift. Presence or absence of an ARRC inspector shall not relieve the Permittee /Contractor of liability for damage done to property of ARRC, or the property of ARRC lessees or permittees having installations on ARRC Property. All ARRC cost and expense for furnishing said inspector(s) shall be collected from the Permittee /Contractor.

SECTION 15. USE OF EXPLOSIVES

- 15.1 The use of explosives shall be done in compliance with all applicable Federal, State and local laws and ordinances regarding same.
- 15.2 No blasting of any kind will be permitted unless the Permittee/Contractor thoroughly safeguards the movement of trains and other rail traffic and personnel in the area where such blasting is being conducted. Before blasting, ARRC flag protection in accordance with Section 6 of these specifications shall be provided on each side of the blast area by the Permittee/Contractor. This flag protection shall not be removed until the track is inspected for damage from the blast.

SECTION 16. SNOW REMOVAL

- 16.1 Snow removal operations shall be conducted in such a manner as to not place snow (1) upon the tracks of ARRC; (2) where it interferes with the normal operation of the automatic crossing signals; or (3) where it impairs the visibility of either highway or rail traffic at the crossing.
- 16.2 Snow removal operations shall be conducted in accordance with Section 3 of these specifications.

SECTION 17. CLEAN-UP

- 17.1 At all times, all work and activities on ARRC Property shall be accomplished in such a manner as to keep the ARRC Property in a neat, orderly and safe condition satisfactory to ARRC.
- 17.2 Upon completion of Permittee/Contractor's work, all equipment and unused materials shall be removed and the ARRC Property shall be left in a neat and clean condition satisfactory to ARRC.
- 17.3 Should the Permittee/Contractor or its subcontractor fail to comply with Section 17.1 and 17.2 above, ARRC may perform the required clean-up. All ARRC costs and expenses for performing this work shall be collected from the Permittee /Contractor.

SECTION 18. INDEMNITY

- 18.1 To the extent not prohibited by applicable statute, Contractor shall indemnify, defend and hold harmless ARRC, its affiliates, and its and their officers, agents and employees (individually an "Indemnified Party" or collectively "Indemnified Parties") from and against any and all loss, damage, injury, death, liability, claim, demand, cost or expense (including, without limitation, attorney's, consultant's and expert's fees, and court costs), fine or penalty (collectively, "Loss") incurred by any person (including, without limitation, any Indemnified Party, Contractor, or

any employee of Contractor or of any Indemnified Party) arising out of or in any manner connected with (i) any work performed by Contractor, or (ii) any act or omission of Contractor, its officers, agents or employees, or (iii) any breach of this Agreement by Contractor.

- 18.2 The right to indemnity under this Section 18 shall accrue upon occurrence of the event giving rise to the Loss, and shall apply regardless of any negligence or strict liability of any Indemnified Party, except where the Loss is caused by the sole active negligence of an Indemnified Party as established by the final judgment of a court of competent jurisdiction. The sole active negligence of any Indemnified Party shall not bar the recovery of any other Indemnified Party.
- 18.3 Contractor expressly and specifically assumes potential liability under this Section 18 for claims or actions brought by Contractor's own employees. Contractor waives any immunity it may have under worker's compensation or industrial insurance acts to indemnify the Indemnified Parties under this Section 18.
- 18.4 No court or jury findings in any employee's suit pursuant to any worker's compensation act or the Federal Employers' Liability Act against Contractor may be relied upon or used by Contractor in any attempt to assert liability against any Indemnified Party.
- 18.5 The provisions of this Section 18 shall survive the completion of any work performed by Contractor. In no event shall this Section 18 or any other provision herein be deemed to limit any liability Contractor may have to any Indemnified Party by statute or under common law.